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The Role of the Railroad Car Ferry in Freight Transportation

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LANGAN

THE RAILROAD CAR FERRY

THE ROLE OF THE RAILROAD CAR FERRY IN FREIGHT TRANSPORTATION

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"As our case is new, so we must think
anew and act anew...."

Abraham Lincoln

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Chapter I

THE PROBLEM

Transportation costs are one of the largest elements in distribution cost.[1] One of the devices that has been used to reduce transportation costs for freight shipments over rail-water routes is the railroad car ferry. The purpose of this thesis is to examine the role of the railroad car ferry in freight transportation.

General Discussion

Essentially there are three major classes of railroad car ferry service: (1) Lake and ocean transfer by large seagoing vessels; (2) river transfer by steamers, motor vessels and barges; and (3) harbor transfer mainly by barges or car floats handled by tugboats. For services of the first class, vessels with high freeboard and enclosed car deck are required in order to be seaworthy. For the other two classes, low freeboard and open deck may suffice. The routes generally range from one to fifty miles in the crosswise hauls. There are also long distance

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1. Stewart and Dewhurst, Does Distribution Cost Too Much, The Twentieth Century Fund, 1939, pp. 118, 211. However transportation costs may be in part substituted for other costs of production. See: Locklin, D. P., Economics of Transportation, 1938, p. 17.

routes and the services plying these routes will be the major concern of this paper.

The specific design of a railroad car ferry is influenced in part by the conditions under which it is to work. An early account by W. Friderica, Engineer to the Danish State Railways, states:

> Sometimes they are flat-bottomed, wide boats fitted with a number of parallel rails and constructed like tugboats. At other times they are boats like ocean going ships with one or more tracks and often arranged to act as ice breakers. Sometimes paddles have been used and at others screws, either single or twin. In most cases the rails intended to take railway vehicles have been laid on the main deck of the boats. Under exceptional circumstances, where there are high tides, and where the rails on the quays are much above the water level, recourse has been had to using a movable deck which can be moved by hand or by steam.[2]

Description of a Railroad Car Ferry

Perhaps a better understanding of just what constitutes a modern railway car ferry may be gained by a brief examination of the general characteristics of the S. S. New Grand Haven. The vessel was delivered to her owners, the West India Fruit and Steamship Company, by her builders, Canadian Vickers Limited, on April 27, 1951, at Montreal, Canada. From there she was taken to the Port of Palm Beach, Florida, and is currently ferrying railroad cars between the port of Palm Beach and Havana, Cuba.

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2. Friderica, W., "General Remarks Upon the Construction and Working of Railway Steam Ferries in Denmark and Elsewhere," Bulletin of the International Railway Congress, Vol. 12, p. 500, May, 1898.

The vessel's overall length is 466 feet and her beam is seventy feet. The average service speed is sixteen and one-half knots and her gross tonnage is 5,074.21. Rail car capacity of a railroad car ferry varies with the length of the cars. The rail car capacity of the S. S. New Grand Haven with cars forty-five feet in length is thirty-nine cars. Her rail car capacity with cars forty-five feet, six inches long is forty-one cars.

> The design of the vessel has been dictated to an unusual extent by the route and service of the vessel. The designed speed was chosen to give a two-day round trip with necessary port time for loading and unloading operations. The length was dictated by the speed requirements and desired car capacity. The beam of 70 feet allows five tracks athwartship with minimum clearance for structure and jacking and clamping of cars. [3]

Railroad cars awaiting transport are switched onto and off the hold of the vessel over an adjustable apron or cradle -- an extended portion of track that can be raised or lowered (usually by counterweights) with the tide. Within the hull the railroad cars are pushed by the yard switch engine to their assigned location. On location, the car's wheels are locked by four rail clamps to prevent rolling. Then automatic jacks are placed under the car to take the entire weight of the car off its springs. Chains and turnbuckles are applied to hold the car body securely down on the jacks, and the air brakes are turned on. When the loading is completed, the cradle is raised, the lines are cast off and the railroad car ferry embarks on another voyage.

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3. "Car Ferry New Grand Haven, "Marine Engineering and Shipping Review, Vol. 56, p. 53, June, 1951.

The next step in the approach is to examine the foreign railroad car ferry experience. This is done in Chapter II with the aid of the Appendix materials.

In Chapter III the railroad car ferry experience in the United States is discussed in some detail.

Chapter IV contains an appraisal of the contributions and shortcomings of the railroad car method in freight transportation.

In Chapter V the writer attempts an appraisal of the railroad car ferry as an intermediate step in freight-container transportation development.

Chapter II

FOREIGN RAILROAD CAR FERRY EXPERIENCE

Early History

Scotland, apparently, has the honor of having instituted the first railroad car ferry service. In 1851 the Leviathan, owned by the North Britain Railways, operated on the Firth of Forth from Granton to Burntisland. The Leviathan's "maximum capacity was thirty-four loaded wagons." [4] The service was displaced by the building of railway bridges. A short time later a railroad car ferry service was organized on the Humber river for the Gainsborough and Hull railway. [5]

The first railroad car ferry service in continental Europe began in 1852 on the Rhine river and operated between Ruhrort and Hamburg. Further continental developments in car ferries as noted by W. Fridericia are: "...In Switzerland, ferries were instituted on the Lakes of Thun in 1875, of Zurich in 1885, of the Quatre Cantons in 1890, and lastly on Lake Constance." [6]

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4. "The Train Ferries," The Engineer, Vol. 137, February 24, 1924, p. 221.

5. Fridericia, op. cit., p. 496.

6. Ibid.

In 1872, the Danish government placed the railroad car ferry Lillebelt in service across their Little Belt. And in 1899 the Italians founded their service across the Straits of Messina.

At the turn of the century, a number of passengers and railroad car ferries were in operation between the principal islands in Denmark, between Germany and Denmark, Denmark and Sweden, and Germany and Sweden. The ferries were of particular importance to the German and Swedish export trade. [7]

England

In 1914 British interest in the railroad car ferry was heightened by a proposal to establish an "All-Red Route" in which the railroad car ferry was to play an important part.

> ... the question of the safety and the economy of time and expense in this mode of transportation assumes an international scope at present from the fact that it is being agitated in Great Britain and Ireland in connection with the working out of the "all-Red Route," a rail and steamship system planned to operate between London, England, and Sydney, Australia, via the Atlantic, Halifax and Boston, a Canadian transcontinental road, and the Pacific. [8]

The project was slated to appear for parliamentary action at the Imperial and Colonial Conference in London that year (1914) but the international crisis caused it to be pushed aside.

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7. Tripp, G. W., "Motor Vessel Norfolk Ferry," The Engineer, Vol. 192, August 3, 1951, p. 155.

8. "The Car Ferry in Freight and Passenger Service," Scientific American Supplement, Vol. 77, February 7, 1912, p. 89.

During World War I railroad car ferries were in operation from Southampton, England, to Dieppe, France, and from a secret terminal at Richborough, England, to the French ports of Calais and Dunquerque. The Richborough terminal facilities, located near the coastal town of Sandwich, were kept secret to prevent bombing by airplanes or Zeppelins.

> The site selected included about 2,200 acres, and, in addition to a large railway storage and classification yard, with the usual tracks and storage buildings, there was constructed an extensive plant for the construction of barges. The magnitude of the Richborough terminal works may be judged from the fact that at the close of the war its personnel included 20,000 officers and men. [9]

The Richborough terminal facilities necessarily included ferry slips equipped with counter weighted, flanged cradles to compensate for the rise and fall of the tides.

The general characteristics of the three railroad car ferries operating in the World War I Channel service were: "... 363 feet 6 inches long and 61 feet 6 inches broad and their draft when loaded, is 9 feet forward and 10 feet aft. They have a speed of 12 knots and displace 3,654 tons. The average load carried is about 900 tons...." [10]

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9. "Railroad Ferry Service Between England and France," Scientific American, Vol. 120, January 11, 1919, p. 21.

10. "The English Channel Train Ferry," Railway Age, Vol. 66, February 28, 1919, p. 509.

The World War I Channel service began February 1, 1917, and operated at full capacity until the signing of the Armistice. It ferried 1,285,000 tons of cargo, 785,000 tons of which were guns, ammunition and other war materiel. [11]

Immediately after World War I the railroad car ferries in the Channel service were managed by the South-Eastern Railways and were used in salvage trade, returning war materiel from France. One of the vessels was then sent to Ireland to aid in the withdrawal of British military stores from the newly formed Free State. An interesting point, here, is that in the absence of the necessary docking cradle, the freight cars had to be lifted to the vessel's decks by cranes. [12]

In 1923 the three vessels were sold by the British government to the Great Eastern Train Ferry Company, Ltd. In 1924, the company started a railroad car ferry service between Harwich, England, and Zeebrugge, Belgium, popularly known as the "Harwich-Zeebrugge Route." The entire operation was taken over by the British Railways ten years later.

Export Marketing Considerations in the Harwich-Zeebrugge Railroad Car Ferry Service

At first it was thought that the "Anglo-Belgian" railroad car ferries would be used only for perishables. Later develop-

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11. For further discussion of the plans, dimensions and operations of the railroad car ferries in the Channel during the war, see: "Les ferryboats miliares franco-anglais" Génie Civil, Vol. 74, February 22, 1919, pp. 141-146.

12. "The Train Ferries," loc. cit.

ments revised this attitude considerably. Italian automobile manufacturers had noted the advantages of the railroad car ferry system and ordered English gauge flat cars manufactured to carry automobiles from Italy to England without transhipment.

Heavy equipment manufacturers in England found several difficulties in shipping to the European continent by break-bulk steamer. The ordinary wharf crane or cargo booms could not do the required lifting and the stowage frequently resulted in damage. In many cases a vessel had to be warped to a point on the docks where a heavy crane was available or a floating crane had to be brought in. Considerable service charges resulted. These difficulties occurred not only when loading but also when unloading the equipment at its destination. Theodore Rich, in discussing the situation, states: "So troublesome is this class of business (heavy machinery) that in some cases it is cheaper to send heavy gear by rail for a long journey rather than by what would appear to be a cheaper sea route; the risk of damage is also reduced." [13]

Today the commodity types carried on the Harwich-Zeebrugge railroad car service range from turbo-generators and locomotives to carloads of glace candy. [14]

The British freight car manufacturers have met the ganging problem by increasing the width of the car wheel rolling surface and by increasing the bevel. The only parts of Europe requiring a transshipment from British freight cars are Russia, Spain and Portugal.

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13. "Train Ferries and Exports," The Electrician, Vol. 106, February 27, 1931, p. 313.

14. Wilson, B. W., Public Relations Officer, British Railways, Eastern Region, Marylebone Station, London, N. W. 1.

The Harwich-Zeebrugge Service
in the Post World War II Period

Two of the three British Railways' vessels were sunk during World War II and the motor vessel Norfolk Ferry was built in 1947 to serve as a replacement. The general characteristics of the "Norfolk Ferry" according to G. W. Tripp are as follows: "Length, 397 feet 6 inches (overall)...; breadth, 61 feet 6 inches (over fenders); ... tonnage, 3,157 gross." [15]

The British Railways now operate a railroad car ferry daily between the ports of Harwich, England, and Zeebrugge, Belgium. The number of freight cars carried per vessel varies per length of car, but "... on the average between 32 and 38 are taken on each sailing." [16]

France

After the Armistice there was a general feeling that a Channel tunnel might become a reality and the railroad car ferry operation between lower Channel ports and France were discontinued. The vessels were transferred to the Harwich-Zeebrugge route.

The idea of a railroad car ferry service to France once again gained the attention of shipping officials. In 1936 the Southern Railway of England placed three vessels, "The Twickenham Ferry, Hampton Ferry and Sheperton Ferry," into service between

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15. Tripp, op. cit., p. 156.

16. Ibid.

Dover and Dunquerque.[17] These ships were designed to carry both passenger and freight types of railroad cars. Lounge and dining accommodations were provided on the upper decks. The general characteristics of these vessels were: "...length, 346.8 feet; breadth, 60.7 feet; depth, 18.2 feet; tonnage, 2830 gross."[18]

The French National Railways insisted on a share in the traffic so Southern Railways was required to transfer the Twickenham Ferry to the French flag.

The post World War II period saw a steady increase in Channel traffic so the French National Railways ordered an additional railroad car ferry. The contract was let to a Danish shipbuilder at Elsinore, Denmark, and the completed vessel went into service in 1951. Named the Saint Germain, her general characteristics are as follows: "Length, overall, 379 feet 8 inches;... breadth overall, 62 feet 2 inches; ... deadweight, 1300 tons; ... maximum speed, 18 knots."[19]

In the early post World War II period, according to M. Dubaux, considerable delay in the resumption of Channel ferry traffic occurred because of harbor reconstruction. After the reconstruction of the lock "Watier" which controls the entrance of large vessels into Dunquerque harbor, the two remaining railroad

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17. "The Dover Train Ferry," The Engineer, October 9, 1936, Vol. 162, p. 377.

18. Ibid.

19. "French Railways Train Ferry M. V. Saint Germain," The Engineer, Vol. 192, September 14, 1951, p. 331.

car ferries went into service (December 1, 1947).[20]

To point out the significance of the traffic, Dubaux cites the 1936 to 1939 periods as having reaffirmed the success of the Dunquerque-Dover railroad car ferry, year after year. He states:

> From 11,804 for the last three months of 1936, the figures for passengers, carried both ways, were raised to 72,889 in 1937, 75,552 in 1938, and attained 53,491 for the 8 months of 1939.[21]

In further expansion on the importance of the traffic, Dubaux finds that in 1938 the railroad car ferry import freight traffic reached 16,000 tons, 11,000 of which was wool. French export, in turn, was 58,000 tons _via_ railroad car ferry.

Comments on the nature of the traffic reveal three major types of shipments:

1. Food shipments from the South of France and the Rhone Valley. Manufactured article shipments from the Alsace, Paris and Lille.
2. Shipments of fresh fruits from Switzerland and Italy.
3. Shipments of foods, especially dead poultry from Central Europe (Hungary).[22]

In relating the shippers' position to cargo carriers', Dubaux very cogently observes that the railroad car ferry eliminates double handling and (French experience) reduces cargo time in transit. Further advantages accrue from the very important

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20. Dubaux, M., "Rétablissement du service par ferryboat de Dunkerque à Douvres," _Notre trafic_, No. 36, January, 1948, p. 10. (See Appendix)

21. _Ibid_, p. 12.

22. _Ibid_.

reductions in damage risks and possible reductions in the cost of packing.[23]

The railroad car ferries in the Channel service make complete round trips every 24 hours. Day voyages are primarily for commercial traffic and night voyages combine passenger and commercial traffic.[24]

Ireland

In keeping with the comprehensive nature of this paper, mention should be made of the rather colorful "Irish Channel railroad car ferry scheme." In November, 1918, a syndicate was formed called the Irish Packing Company, Ltd., for the purpose of developing an Irish dead meat export trade with England. The promoters decided to make use of railroad car ferries, "... in order to save the double transshipment of the meat and to facilitate its passage to the English market."[25] The Irish Free State agitation and the Black and Tan rebellion, however, frightened off the necessary British risk capital.

Present day Irish export meat practice, based on the writer's observations, is to ship live horses to England to be slaughtered locally. To encourage home employment, British duties are lower on live meat imports than on dead or dressed meat. The short

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23. Ibid., p. 10.

24. Ibid., pp. 11-12.

25. "Train Ferries for the Irish Channel," The Engineer, Vol. 127, January 17, 1919, p. 60.

haul from Ireland to England tends to offset the low carrying efficiency of live animals.

Sweden

The use of railroad car ferries began in Sweden in 1909. The principal significance registered in continuity of service rendered, especially between Traelleborg and Sassnitz in the Island of Rugen. In a very short period the ferries had proved themselves indispensable in Swedish trade with Germany and Denmark. For example, "... between 1909 and 1913 the number of trips between Traelleborg and Sassnitz increased from 903 to 2,976 annually,... the freight traffic increased from 35,120 to 126,023 tons." [26] Four vessels with an individual gross tonnage of 3,074 tons were in use during 1916. Further general characteristics were: "...length measured on the railroad train deck, 371 feet; speed, 17.5 knots; total number of passengers, 1800." [27] Mention is made of a train deck double track 302 feet long. From this we may deduce that their vessel's freight car capacity, using the older type thirty-six feet long freight car, was approximately sixteen freight cars.

In 1929 the Board of Administration of the Swedish State Railways submitted a detailed report of a projected railroad car ferry service between Gothenburg, Sweden and Immingham, England.

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26. "Train Ferries," Scientific American Supplement, Vol. 83, January 20, 1917, p. 39.

27. Ibid.

It proposed the use of two or three ships with a speed of sixteen and one-half knots and a displacement of 9,100 tons. These ships would be 445 feet long overall and would have a sixty-four foot beam; their depth to train deck would be thirty feet and they would be driven by 7,200 h. p. turbines. Accommodations for 300 passengers would be provided. The railroad car capacity per vessel would be sixty-four cars of fourteen ton capacity, giving a maximum effective freight capacity of from 850 to 900 tons.[28]

The scheme detailed in the report overlooked some basic marketing considerations. As has been pointed out above, a principal advantage of the railroad car ferry is that it enables freight to be carried without transshipment. However, this advantage decreases as the length of the voyage increases, and on a voyage such as that between Sweden and England it might disappear. Another point worthy of consideration is that in carrying a paying cargo of 850 to 900 tons a deadweight of some 450 tons in freight car must also be carried, and the individual freight car may itself be deadheading empty. A complete analysis of the factors involved, advantages and limitations of the railroad car ferry method, will be found in Chapter IV. Suffice it to say here that the scheme fell through; just what all the considerations were is apparently not a matter of record.

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28. "Transport by Train Ferries," Engineering, Vol. 128, October 4, 1929, p. 442.

On October 1, 1945, the Swedish State Railways put into service the new railroad car ferry Malmölus, a vessel ninety-four and fifteen hundreds meters long, sixteen meters broad, and displacing 3,000 tons. The bow and stern are designed for ice-breaking. The addition of the Malmölus brings the number of railroad car ferries in the Malmö, Sweden-Copenhagen, Denmark service to five. The annual traffic over this route averages 250,000 passengers and 100,000 tons of freight. [29]

Denmark

The railway system of Denmark is interrupted by a deeply indented coast line, having wide inlets which extend far inland. The system has to serve a number of islands. Because of these conditions, railroad car ferries have been used extensively for nearly seventy years by the Danish State Railways.

The names of the railroad car ferry lines and their distances as of 1939 are as follows: [30]

	Miles
Korsor-Nyborg	16.12
Elsinore-Helsingborg (Sweden)	6.20
Glyngore-Nykobing	4.65
Oddesund N-Oddesund S	3.10
Gjedser-Warnemunde (Germany)	28.00
Copenhagen-Malmö (Sweden)	18.60

The Danish railroad car ferries are of major importance as passenger vessels. The passenger capacity of the Fyn, for instance, is 2,000 persons. The Fyn frequently carries up to three

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29. "The Swedish Train Ferry Malmölus," The Engineer, Vol. 180, October 5, 1945, p. 271.

30. "Denmark," Railway Gazette, Vol. 70, May 12, 1939, p. 774.

Diesel-engined trains each composed of three or four railway cars.[31] "Instead of the Diesel-engined trains, 13 four-axle or 30 two-axle railway cars can be conveyed." [32]

Italy

To connect the railroad systems of the mainland and the island of Sicily, the Italian State Railways have maintained since 1899 a railroad car ferry service across the Strait of Messina, between Messina (Sicily) and Villa San Giovanni, a distance of about four and one-half miles.

In 1931 two new railroad car ferries, the Scilla and the Cariddi were placed in the Straits service. At that time the vessels were characterized as "the largest and speediest ships for the carriage of passengers, trains and automobiles at the same time, which has ever been built in Europe." [33] The purpose in the speed (17.1 m.p.h.) is to handle the daily traffic of 350 to 630 railroad cars during the Scilian fruit export season.

The general characteristics of the vessels are as follows: "...364 feet long overall, 51 foot beam and three tracks equivalent to nearly 800 feet of rails. The ferries can each carry trains totaling 650 tons..." [34]

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31. Berge and Loftus, Diesel Motor Trains, Northwestern University School of Commerce, 1949, p. 29.

32. "Danish Motor Train Ferry Fyn," Marine Engineering, Vol. 52, September, 1947, p. 73.

33. "Transport in Italy," The Electrician, Vol. 109, August 5, 1932, p. 171.

34. "Train Ferries," Marine Engineering, Vol. 35, November 1930, p. 616.

Thus we have a fairly broad picture of the European application of the railroad car ferry method.[35] Ranging from the early history in Scotland, through the Channel and North Sea services, to the Mediterranean and the Italian experience. With this in mind, we now turn to a further examination of the railroad car ferry method. The application in the United States.

no evidence

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35. For further discussion of foreign railroad car ferry experience see: Appendix to Chapter II.

Chapter III

THE RAILROAD CAR FERRY IN THE UNITED STATES

The purpose of this chapter is to give the reader a general picture of the application of the railroad car ferry method in the United States. The first section is a summary of the early general history available. The second section deals with the Great Lakes operations. The third and fourth sections are concerned with the application of the railroad car ferry method in the Florida-Havana service. The fifth and last section in this chapter is devoted to the Seatrain Lines, Inc.

Early Development

The earliest railroad car ferry in the United States was one that operated on the Detroit river in 1876. On the West coast, the Solano, a wooden paddle steamer, began operating in 1882 connecting Port Costa and Benicia, Port of the San Francisco Bay area.[36]

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36. Fridericia, W., "General Remarks Upon the Construction and Working of Railway Steam Ferries in Denmark and Elsewhere," Bulletin of the International Railway Congress, Vol. 12, p. 497.

Railroad car ferries first were used on Lake Michigan in 1888 when the Green Bay and Western Railroad established a line from Green Bay to Kewaunee, and the Ann Arbor Railroad constructed two wooden railroad car ferries capable of carrying eighteen cars each. [37]

In "Sur Les Bacs Porte-Trains," M. O. Ravier takes special note of the early importance of the car ferry operations on Lake Michigan. Ravier seems to have been especially interested in a service which traversed the length of the lake for some 240 miles. No evidence supporting the existence of this service was uncovered by this writer's investigation. However, Ravier was particularly concerned with the Anglo-Belgian railroad car ferry operations; therefore, his study of the Lake Michigan operations was probably restricted by time and money limitations and he may have been unable to verify his statement. [38]

Of some historical interest is the early recognition of the large scale handling cost savings in freight car ferrying, as pointed out by S. W. Allender in 1922. In studying the federally operated Barge Line servicing the Mississippi, he noted that the shipping method of unloading from a freight car into a barge and out again at the end of the voyage involved double rehandling costs, wharfage for the barges and increased loss and damage claims. He proposed a plan that was "...simply an enlargement of the car

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37. Ravier, M. L., "Sur Les Bacs Porte-Trains," Mémoire et Compte Rendu des Travaux de la Société des Ingénieurs Civils, Bulletin 78, 1925, p. 526.

38. Ibid., p. 527.

ferry idea -- instead of a self-propelled ferryboat loaded only with freight cars, crossing from shore to shore, we would have a powerful towboat towing a flock of eight or ten barges loaded with many thousands of tons of freight below deck, and with several trains of loaded freight cars on the decks of the barges, making trips of over 1,000 miles each." [39]

Turning from the early general history of the application of the railroad car ferry method in the United States, we discuss a specific area -- that of the Great Lakes Services.

The Great Lakes Services

It is estimated that the Great Lakes railroad car ferries transport annually some 20,000,000 short tons of revenue freight, exclusive of the deadweight of cars, across Lake Michigan. The Great Lakes traffic is currently handled by 20 railroad car ferries, nine of which are operated by the Chesapeake and Ohio (which absorbed the Pere Marquette), five by the Ann Arbor Railroad, three by the Grand Trunk Western, and three by the Wabash. The 1951 traffic consisted of 900,000 loaded and over 150,000 empty freight cars. The floating equipment of the four companies had a replacement value of over $100,000,000 and the docks, tracks and auxiliary land equipment a value of approximately $45,000,000.

The quantitative data in the preceding paragraph are based on the unofficial estimates of the District Engineer at Milwaukee,

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39. Allender, S. W., "A New Era in Transportation," Scientific American, Vol. 127, August 1922, p. 24.

Wisconsin. The last comprehensive survey of Great Lakes carrier operations was made in 1935 by the U. S. Army Engineers and published in 1936 under Transportation Series #5.

The Interstate Commerce Commission receives 244 annual reports from inland waterway carriers and 34 from maritime carriers. Selected financial and operating statistics from these carriers are published in Statement 521 of the Commission. [40] The one railroad car ferry operator selected for the statement however, is listed as not reporting on the more pertinent operating statistics.

According to the Board of Engineers for Rivers and Harbors: [41] The Ann Arbor Railroad Company operates five railroad car ferries between Frankfort, Michigan, and Manitowoc, Wisconsin, Kewaunee, Wisconsin, Menominee and Manistique, Michigan. The Chesapeake and Ohio Railway Company operates three railroad car ferries between Detroit, Michigan, and Windsor, Ontario, Canada. The C & O operates six railroad car ferries between Ludington, Michigan, Milwaukee, Manitowoc and Kewaunee, Wisconsin. The Grand Trunk Western Railroad Company operates three railroad car ferries between Milwaukee, Wisconsin and Muskegon, Michigan. The Wabash Railroad Company operates three railroad car ferries between Detroit, Michigan, and Windsor, Ontario on the Detroit river.

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40. "Selected Financial and Operating Statistics From Annual Reports of Carriers by Inland and Coastal Waterways and Maritime Carriers, for the Year Ended December 31, 1950," Statement No. 521, Bureau of Transport Economics and Statistics, Interstate Commerce Commission, Washington, D. C., January, 1952.

41. "Transportation Lines on the Great Lakes, 1952," Series #3 Corps of Engineers, Department of the Army, pp. 55, 58, 64, 78.

At Milwaukee the railroad car ferries connect with the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul and the Minneapolis, St. Paul and Sault Ste. Marie. At Manitowoc they connect with the Chicago and North Western and the Minneapolis, St. Paul and Sault Ste. Marie. At Kewaunee they connect with the Kewaunee, Green Bay and Western. At Menominee they connect with the Chicago and North Western, the Chicago, Milwaukee and St. Paul, and the Wisconsin and Michigan. At Manistique they connect with the Manistique and Lake Superior and the Minneapolis, St. Paul and Saulte Ste. Marie. At Windsor, Ontario, they connect with the Canadian National and Canadian Pacific railroads respectively.

The Ann Arbor Railroad Car Ferry

The Ann Arbor railroad is a wholly owned subsidiary of the Wabash railroad, operating a continuous railroad car ferry service to Frankfort, Michigan (the headquarters) and Kewaunee, Wisconsin, Monominee and Manistique, Michigan.

The Ann Arbor operates its railroad car ferry service over 320 of its 620 route miles. The service involves the use of five railroad car ferry vessels with an approximate carrying capacity of thirty freight cars per vessel.

The company is primarily a bridge carrier and as such "... is an essential link in the short all-rail route between Eastern Trunk Line, New England and Central Freight territories on the

one hand and Wisconsin, Minnesota and the Northwestern Pacific Coast territories on the other...." [42]

Major operational significance is reflected in the statement that "... the car ferry routes make the short line distances between large portions of the Northwest and Eastern Territories and thus are an important factor in freight rate making... and in the economic life of the territory served." [43]

Recent Developments

The Chesapeake and Ohio launched the first of two 410 foot railroad car ferries on January 4, 1952. The cost of the two vessels is estimated at $10,000,000. A popular marine journal states:

> Carrying freight cars, passengers and automobiles, the ships, on runs between Ludington, Michigan, and the Wisconsin ports of Milwaukee, Manitowoc, and Kewaunee, will cover more than 100,000 miles annually. [44]

That, in summary, is the Great Lakes picture. The next area for our attention is that of the railroad car ferry in ocean freight transportation.

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42. "Rails across Lake Michigan," Railway Age, Vol. 132, March 3, 1952, p. 55.

43. Ibid.

44. C & O Launches First of Two Carferries for Lakes Service," Marine Engineering, Vol. 57, February 1952, p. 80.

Development of the Florida-Havana Railroad Car Ferry Service

According to H. C. Plummer, development of an all-rail route to Cuba was a major objective of Henry M. Flagler, the founder of the Florida East Coast Railway Company. [45]

The first step was completed when the Florida East Coast Railway route to Key West, Florida, was opened on January 20, 1912. The trains traveled from the Florida mainland to Key West over a $15,000.000 (construction cost) viaduct system. The second and final step in this project was completed on January 7, 1915, by the inauguration of a daily railroad car ferry service between Key West and Havana, Cuba. [46]

The Henry M. Flagler, the first of three railroad car ferries to service the route, is 360 feet long and fifty-seven feet wide on the car deck. A post-World War II remodeling enlarged the vessel's freight car capacity to thirty-two freight cars.

From 1912 to 1935, the Florida East Coast Railway operated trains to and from Key West, over a succession of bridges and viaducts spanning the Florida Keys. In 1935, a hurricane practically destroyed forty miles of this line. The railway company discontinued service south of Florida City, thirty miles

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45. "To Cuba by Rail," Scientific American Supplement, Vol. 74, January 16, 1915, p. 40.

46. "New Car Ferry of the Florida East Coast Railway," Railway Age Gazette, Vol. 58, No. 5, January 29, 1915, p. 188.

below Miami. The operating base of the Florida-Havana railroad car ferry service was transferred to Port Everglades, Florida.[47]

In 1941, the Florida East Coast Railway sold their three railroad car ferries to the United States government for use as minelayers. Two of the vessels, the Parrott and the Flagler, survived the World War II period; a third vessel, the Scott, was lost at sea.

The West India Fruit and Steamship Company's Florida-Havana Railroad Car Ferry

The West India Fruit and Steamship Company was organized in 1934 with headquarters in Norfolk, Virginia. The operating equipment consisted of a fleet of fifteen small ships that carried bananas from the West Indies and Central America to Gulf and South Atlantic ports. Submarine activity during World War II curtailed the banana traffic and the small vessels carried general cargos and exports on a limited basis. Headquarters were moved to the Port of Palm Beach, Florida, in 1942.

In 1945, the company bought the Grand Haven, a Great Lakes railroad car ferry, from the Grand Trunk Western railroad, and started the "Florida-Havana Railroad Car Ferry" as the line is known today.

In 1946, the company bought the two Florida East Coast vessels, which had been used as minelayers during the war, from

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47. "R. R. Ferry Set-up Largest in World," Railway Age, Vol. 103, September 4, 1937, p. 321.

the Maritime Commission. These were reconverted into the railroad car ferries, Henry M. Flagler and Joseph R. Parrott. A fourth ship, the S. S. New Grand Haven is now in operation.

The Florida-Havana railroad car ferry service provides the fastest and most regular freight deliveries between the United States and Cuba today. As such, it represents a key element in the export-import marketing process. In checking ladings, the writer found that Chicago to Havana freight can be delivered in five to seven days. In some instances, a freight car from St. Louis is delivered at Havana in four and a half days. Shipments from Canada and the United States are routed to Jacksonville, Florida, over the Atlantic Coast, Southern or Seaboard, Lines. From Jacksonville the shipment reaches the Port of Palm Beach over the double-track facilities of the Florida East Coast Railway.

At the Port of Palm Beach the West Palm Beach Terminal Company, agents for the West India F. & S. S. Company, maintain switching and yard facilities with a capacity of 300 cars. Cars are sorted and classified almost immediately upon arrival in the yards and then await the ferry. Loading and unloading the railroad car ferry requires fifty-three minutes. The ocean run requires eighteen to twenty hours.

At Havana, the freight cars are shunted off the ferry into the bonded yards of the United Railways. Merchandise is cleared through customs and the delivery to consignee process begins. Cargo for the interior of Cuba may be shipped over the United Railways of Havana or the Consolidated Railroads of Cuba. LCL freight is trucked immediately to its destination. The large number of tank cars handled annually are usually delivered

by the Cuban roads to the sidings of the individual or group consignees.

As part of its several services, the West Palm Beach Terminal Company maintains an 800 foot long warehouse for assembling packaged freight. The significance of the LCL business can be verified somewhat by the fact that both Railway Express and Acme Fast Freight maintain consolidation offices in the West India F. and S. S. Company's headquarters building. The United States Customs also maintain an office there, since imports, exports and personnel are checked on arrival and departure.

The Traffic Significance of the Florida-Havana Railroad Car Ferry Service

Freight carried in 1950 (with only three vessels operating) totaled approximately 410,000 tons at a gross revenue of over six million dollars. Of this tonnage, 250,000 were southbound, conveyed in approximately 9,500 loaded cars. About 160,000 tons of freight were imported last year from Cuba in over 3,500 loaded cars. A large number of freight cars are deadheaded back from Havana empty, due to seasonal import-export variations.

Shipping is especially slack during the winter season. In December of each year, 150 to 200 box cars of California grapes are shipped to Cuba via railroad car ferry. This extra business is occasioned by the Cuban ritual of eating a grape at each of the midnight peals of the bell that rings in the New Year. The twelve grapes consumed commemorate each month of the year just completed.

The traffic solicitation agents of the West India F. and S. S. Company maintain offices in Chicago, Detroit and New York City. Their function is to solicit potential shippers to Cuba and advise them on the rates, routing and handling via the all-rail route to Cuba. Naturally, a great deal of cooperation is obtained from the traffic solicitors of the various inland railroads over which the shipment will travel. This is especially true of the Florida East Coast Railway.

In order to compete with New Orleans-Havana break-bulk ocean carrier services, the West India F. and S. S. Company maintains the policy of equalizing inland rail rates between midwest points of origin and New Orleans as compared to Port of Palm Beach. The company subtracts the difference in the inland transportation rates from their ocean charges in order to give shippers the same through rate. This is not, however, a blanket policy. [48]

The Seatrain Lines, Inc.

Early in the 1920's Graham Brush and Joseph Hodgson, executives of the Ward Line, worked out a new approach to coastwise shipping. At first it involved the design and construction of a modified railroad car ferry for the coastwise trade. In 1926, the first Seatrain ferry reached the blueprint stages.

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48. (See: An Investigation, etc., Appendix to Chapter III)

By 1929, the Seatrain ferry had established itself in competition against break-bulk carriers and began to make serious inroads on the all-rail coastwise traffic. [49]

The Seatrain ferries are approximately 480 feet long with a sixty-three foot beam and have a speed of sixteen and one-half knots or better. They are ocean-going vessels built to the specifications of Lloyds-Register. Although the original vessel has tank space for 2,200 tons of liquid cargo, and the newer vessels have space for 4,000 tons of such cargo, the vessels are designed primarily to ferry freight cars. Each vessel has four decks and each deck has four sets of standard gauge railroad track, the aggregate length of which is one mile. The original seatrain vessel had a capacity of 95 cars, while the newer vessels have a capacity of 100 cars. These vessels can handle cargo in railroad cars only between ports at which special loading facilities have been provided. Such facilities have been provided at four ports; Hoboken, New Jersey; New Orleans, Louisiana; Havana, Cuba; and Texas City, Texas. [50]

Loading and Unloading Procedure

The loading facilities are specially designed elevators located at each terminal point. The following is a relatively

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49. See: The Seatrain Controversies, Appendix to Chapter II.

50. Based on the writer's observations and the following documentation:
"A Multiple Deck Vessel for Car Ferry Service," Railway Age, Vol. 73, September 15, 1928, p. 492. (Continued)

precise description of the process:

> A switch engine spots a car on the track of a big movable steel cradle. Then, a 125-ton crane, which bridges both the ship and a railroad siding, hoists the cradle bearing the car, above the ship, and moves it over the hatch, and lowers away. The load descends into one of the four sets of guides forming hatchways which hold the cradle in position exactly in the manner of a platform in an elevator shaft. When the desired deck is reached, the cradle is stopped so that its rails register with the rails on the ship's deck and the car is then drawn off the cradle and onto the deck rails by a car puller. In unloading the vessel, the operations are reversed. Cars are handled at the rate of 20 an hour making it possible to load and unload a complete cargo in a period of about 10 hours.[51]

The Organization and Operations

In the late 20's Brush and Hodgson, and their associates organized four corporations: (1) Railway Transports, Inc.; (2) Over-Seas Steamship Company, Ltd. of Canada; (3) Over-Seas Railways, Inc.; and (4) Seatrain Lines, Inc.

Railway Transports, Inc., a New York corporation, owned the Seatrain patents, and is controlled by Messrs. Brush and Hodgson, who in turn control the Seatrain Lines, Inc.

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50. (Continued) Freight Cars Carried at Low Cost Between New Orleans and Havana," Marine Review, Vol. 59, February, 1929, p. 22.

"A Ship That Carries Trains," Scientific American, Vol. 141, July, 1929, p. 21.

"Seatrain New York," Marine Engineering, Vol. 37, October, 1932, p. 416.

"Seatrain Texas, Car Carrier," Marine Engineering, Vol. 45, November, 1940, p. 110.

51. "Seatrains New Link New York, Havana and New Orleans," Manufacturers Record, Vol. 101, November, 1932, p. 32.

Over-Seas Steamship Company, Ltd. of Canada, was organized abroad for the purpose of building the first Seatrain vessel and to take advantage of lower foreign construction costs. The company was dissolved upom completion of the vessel and transfer of the company's stock to Seatrain Lines, Inc.

Over-Seas Railways, on October 14, 1933, was merged into Seatrain Lines, Inc. Prior to this, Over-Seas had been the initiating and the most active of the four companies.

Seatrain Lines, Inc., a Delaware corporation, own the Seatrain vessels, and control two other corporations, the Hoboken Terminal Properties, Inc., and the Hoboken Manufacturers Railroad Company.

The Seatrain vessels now operate between Hoboken, New Jersey, New Orleans (Belle Chasse) Louisiana, and Texas City, Texas. (The Cuban service was discontinued because of labor problems.) [52] The loading facilities at Hoboken are owned by the Hoboken Manufacturers Railway Company and, together with piers and tracks, are leased by Seatrain Lines, Inc. The railroad is a switching line about one and a half miles long and connects with the Erie railroad.

The loading facilities at New Orleans, Louisiana, are owned by Seatrain Lines, Inc., and are on property of the Lower Coast Railroad, a subsidiary of the Missouri Pacific. Belle Chasse,

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52. See: The Cuban Problem, Appendix to Chapter V.

the Seatrain New Orleans terminal, is within switching limits of the city.

Seatrain Lines, Inc. contracts with the Hoboken Manufacturers Railway Company for the interchange and use of freight cars and for payment by Seatrain of rentals, insurance and loss and damage claims. The agreement also provides for the return of empty cars. [53]

Seatrain Lines, Inc., also contracts with American Refrigerator Transit Company for the lease of refrigerator cars and with the New Orleans and Lower Coast Railroad to service their terminals.

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53. See: The Seatrain Controversies, Appendix to Chapter III.

Chapter IV

CONTRIBUTIONS AND SHORTCOMINGS OF THE RAILROAD CAR FERRY METHOD IN FREIGHT TRANSPORTATION

From the preceding discussion and the Appendix materials we have a fairly broad picture of the application of the railroad car ferry method to freight transportation. We can now turn to an examination of the contributions and shortcomings of the railroad car ferry method using the operations covered in the preceding chapter as a partial discussion base.

The first section of this chapter is concerned with the application of the railroad car ferry method on the Great Lakes. The second section deals with the railroad car ferry method in ocean freight transportation. The examples are drawn primarily from the modified, or Seatrain, type of railroad car ferry rather than from the conventional type. This has been done because of the increasing dominance of this modified type carrier on the American scene.

The Great Lakes Operations

A comparison of distances from points in the Northwest to the East *via* the Great Lakes railroad car ferry routes and *via*

all-rail routes through Chicago reveals the following differentials in tabular form:

	Distance in Miles		
	Via Chicago	Via R.R. Car Ferry	Mileage Saved
Milwaukee to Detroit	357	275	82
Milwaukee to Buffalo	606	484	122
Milwaukee to Toledo	319	304	15
Green Bay to Toledo	431	373	58
Minneapolis-St. Paul to Detroit	679	609	70
Minneapolis-St. Paul to Buffalo	928	818	110
Duluth to Detroit	737	630	107
Duluth to Buffalo	986	855	131

Source: Data derived from:
The Official Guide of the Railways, National Railways Publication Co., March, 1952, pp. 256, 257, 258, 266, 267, 494, 1,141.

Rand McNally Commercial Atlas and Marketing Guide, Rand McNally & Company, 1952, pp. 7, 16, 22.

A further contribution of the Great Lakes car ferry operations occurs in the reduction of terminal time. According to Mr. McInerney of the Grand Trunk Railways, the average terminal layover time for railroad car ferry traffic is two hours. [54]

54. McInerney, J. A., Operating Superintendent, Grand Trunk Car Ferry Terminal, Milwaukee, Wisconsin.

The terminal time required for freight cars taking the all-rail route through the Chicago terminals may vary from 12 to 96 hours.[55] The railroad car ferry on the Great Lakes enables freight shipments to avoid this delay by using the ferry ports.

The chief contributions, then, of the railroad car ferry method on the Great Lakes have been in terms of:

1. The saving in terminal time, and
2. the reduction of time in transit varying with the destination point by twenty-four to seventy-two hours.

The major limitation of the railroad car ferry method, its low carrying efficiency, is not too evident here because of the relatively short haul. Nor does the gauging limitation apply here because of the general use of standard gauge track in domestic traffic. The limitations of the railroad car ferry method are discussed at some length in the following section.

The Railroad Car Ferry Method in Ocean Freight Transportation

The Strengths

Freight car capacity can range from eighteen tons to as high as ninety tons and railroad statistics indicate an average paying load of forty tons. This average includes the large amounts of coal tonnage hauled in national traffic and, as a result, does not necessarily typify railroad car ferry traffic. An average paying load of about twenty tons is probably more typical of railroad car ferry traffic.

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55. "Car ferries aid transportation across Lake Michigan," Railway Age, Vol. 79, September 5, 1925, p. 430.

Labor cost savings under the railroad car ferry method begin upon the arrival of the loaded freight car at the terminal. If we assume an average minimum cost of one dollar [56] per ton for unloading a freight car at a steamship terminal, then with an average paying load of twenty tons the savings are twenty dollars per car. Labor cost savings are increased still further by reducing the amount of necessary stevedoring to a minimum. For example, sixteen men serving a Seatrain ferry crane handle 400 tons of freight an hour or twenty-five tons per man hour. A break-bulk carrier [57] handles thirty-three and one-third stevedore tons (2240 pounds) per hour when working a single gang (eighteen men) hatch. [58] The break-bulk rate then is one and eight-tenths tons per man hour against twenty-five tons per man hour under the railroad car ferry method. (In the conventional type ferry loading, a crew of five is required for less than an hour). Thus using the stevedore wage rate of two dollars [59] per hour, the per ton costs of stevedoring are reduced from one dollar and eight cents to four cents. This represents an average saving of twenty dollars and eighty cents ($1.04 x 20) at each end of the voyage. A fraction of the savings are offset by a car rental rate of one dollar per day per car. In the case of the Seatrain ferry special loading cranes are required, but this

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56. Statement by A. J. Gruin, Stevedore Contractor, Jacksonville Loaders, Inc., Jacksonville, Florida: "There is no average, you are lucky to get it done for ten dollars a ton."

57. Conventional cargo vessel with main deck loading hatches.

58. "Cargo Handling," Marine News, December, 1932, p. 41.

59. "Last of the Business Rackets," Fortune, Vol. 43, June, 1951, p. 91.

cost factor is more than offset by the elimination of the need for standard cargo hoists, life equipment (mobile), sheds and other standard warehousing facilities.

The high terminal efficiency of the railroad car ferry method is its major contribution to the problem of cost reduction in freight transportation. A quick turnaround is made possible by the speed with which freight is transferred at terminals under the railroad car ferry method. This quick turnaround increases the vessels ratio of carrying or earning time to idle port time. According to Fortune: ..."A quick turnaround is essential, since in port all operating expenses, except fuel, keep ticking away". [60] It might be expected that per ton costs of vessel operation would be reduced since the overhead for a given period can be spread over more trips. It must be recognized, however, that the freight car method of stowing cargo in the vessel leaves a large portion of lost space. Suffice it to say here, that the degree to which the waste of lost space offsets the economies of rapid turnarounds, depends in large measure on the length of the water haul involved. The rapidity of turnaround is of major importance to short haul traffic of less than 1,000 miles but becomes of less significance as the length of the haul increases.

Some savings, under the railroad car ferry method, may accrue from the fact that the railroad car itself forms the

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60. Ibid.

package and the contents do not need to be disturbed between origin and final destination. However, these savings may be offset by the loss of potential traffic where the carload may have to be broken to LCL for reconsignment enroute.

In shipping by railroad car ferry the cargo is secured in a springed, sealed, container known as the box car. Apparently the probability of pilferage, handling damage, contamination, and exposure to the elements is reduced. Just what degree of reduction occurs is not a matter of record. [61] Damage claims however do occur. In the payment of any claim in connection with through rail service, the car ferry carrier is only a link in the chain and is governed by the rules and regulations which are enforced by the various railroad carriers also participating in the claim. [62]

A further contribution of the railroad car ferry method is that the use of the freight car as a container eliminates the need for the heavy packing and crating normally required in transshipment or exporting. This factor will reduce the freight rate where the charges are "assessed per cubic foot or per 100

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61. Per: W. H. S. Stevens, Secretary of the Interstate Commerce Commission and E. O. Cullen, Research Librarian, Bureau of Railway Economics, Association of American Railroads, January 6, 1953.

62. Further claims discussion will be found under "An Investigation"...etc. in the Appendix to Chapter III.

pounds gross weight, carrier's option, whichever yields the greater revenue". [63] It will not tend to reduce U. S. Customs duties, however, because of the practice of determining the actual or schedule tare. [64] In shipments to foreign countries where they do not distinguish between net and gross weight in their tariff, or where they define a legal weight, the freight car container factor will act to reduce the charge. [65]

As might be expected, the types of freight the railroad car ferries handle most efficiently are those which are difficult and expensive to handle at terminals. For example, grain, salt, coke, and other bulk items.

Some indication of the strength of the railroad car ferry in competition for traffic with other Atlantic and Gulf Coast carriers is given by comparative ranking. Of ten carriers reporting total revenues, the Seatrain ferry ranked second with a total revenue of $8,742,779 for the year ended December 31, 1950. [66] This is not an accurate reflection of the competitive strength of the railroad car ferry method, however, as managerial skill and other elements are reflected in a total revenue figure.

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63. See: "Application of Rates", Freight Tariff No. G-8, Gulf and South Atlantic Havana Steamship Conference. And per Mr. Ed Mahoney, Tariff Section, Atomic Energy Commission.

64. F. G. Henius, Dictionary of Foreign Trade, Appleton, 1947, p. 552.

65. "Treatment of Weights", Exporters Encyclopedia, 1951, p. 1826.

66. "Selected Operating Statistics of Carriers by Inland and Coastal Waterways and Maritime Carriers," I.C.C., Statement #521, January, 1952, p. 41.

Twenty years ago when the railroad car ferry first entered the New York-New Orleans traffic, it cost the shipper less to ship coastwise by water carrier than by rail carrier. The rail lines competed most successfully for the small portion of the traffic in which speed rather than cost was the major consideration. The airlines soon picked up this segment of the traffic. Today, with the many hundred per cent rise in stevedore cost, the situation is reversed.[67] The rails, inland and coastwise, tend to carry the cream of the high revenue package and bulk freight, leaving the break-bulk ocean carriers the less desirable traffic.

Before terminating this discussion of contributions, we might turn to a slightly more subjective approach -- that of a freight shipper.

Assuming the freight shipper has not had the benefit of the following discussion in this chapter, the shortcoming most apparent to him would be that the railroad car ferry method can be used only for a limited number of destinations. A centrally located shipper must rely primarily on all-rail service.

The contributions of the method, apparent to the freight shipper, are quite numerous. They may be listed as follows:

1. A reduction in the cost of crating and packing his shipment.

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67. According to Fortune: "The paradoxical fact is that shore labor costs once a minor factor in the operation of a steamship service, today exceed in many instances the combined cost of vessel depreciation, insurance, crew wages, maintenance and fuel oil." June, 1951, p. 91.

2. Elimination of the necessity for the disassembly and reassembly of large machinery units.
3. Reduction of time, labor and warehousing costs required in the loading and unloading of vessels.
4. Reduction of time in transit and tie up of inventory values by quicker deliveries to the consignee.
5. Elimination of double handlings, thus minimizing the risk of pilferage, damage from salt spray, damage from ice and snow (especially at the New York piers). [68]

The Limitations

It is sometimes suggested that the major limiting factor in extending the railroad car ferry system to other countries is that other countries have a different track gauge than that of the United States. [69] The writer asserts, however, that the major limiting factor is vessel long haul carrying efficiency. If the long hauls were feasible, the interchangeability problem could eventually be resolved by the design of detatchable car housings permitting transfer to carriages of a different gauge. Or by some other measure.

The major weakness in using a freight car as a cargo container aboard a vessel is the large amount of space that is wasted. A Seatrain ferry, for example, carries 100 railroad cars (the conventional type of ferry carries fifty railroad cars). If the average paying load runs twenty tons per car then the vessel's capacity is some 2,000 tons plus the 8,000 bbls.

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68. For an early discussion of transshipment savings see: "Les Moyens de communicaton a travers le-Pas-de Calais et la question des ferryboats," Memoirs de la Société des Ingénieurs Civils de France, June, 1908.

69. Professor Horn is somewhat misled by this argument, See: Horn, P. International Trade Principles and Practices, 1949, p. 248.

stowage capacity between the skins. A standard type of break-bulk ocean carrier with the same overall dimensions as a Sea-train ferry can carry four to five times as much paying cargo. Thus the railroad car ferry demonstrates a low carrying efficiency.

Under the railroad car ferry method the overall transit time is shortened by expediting transfers at terminals. On short hauls the higher terminal efficiency outweighs the low carrying efficiency. But, as the length of the haul increases, the terminal costs form a decreasing proportion of the total cost of shipping and the carrying costs increase in importance.

A break-bulk carrier in port generally requires seven hours per turnaround for its movements between dock and pilot station.[70] Another four hours are expended for rigging and stowing at the dock. Cargo is handled through single and double gang hatches at the rate of thirty-three and one-third, and fifty-three and one-third stevedore tons per hour (weight ton of 2240 pounds or volume ton of forty cubic feet). To pull some 8,000 tons of cargo will require approximately forty-six hours. The rate varies considerably according to type of cargo and number of hatches worked. To hold down the stevedore overtime charges, the limiting hatch is usually worked only sixteen hours per day and other hatches work sufficient overtime to clear all holds simultaneously. Some grasp of the costly time elements in break-bulk ocean carriage may be obtained from the preceding statements.

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70. Rohn, A. C., "Cargo Handling", Marine Engineering, December, 1945, p. 151.

The expense and the time consumed in transferring freight at steamship terminals is a transportation problem upon which the railroad car ferry has made a very creditable attack, but in doing so vessel carrying efficiency has suffered considerably. On short hauls the higher terminal efficiency more than outweighs the weakness of lowered carrying efficiency. As the length of the haul increases, terminal expenses form a smaller proportion of the total transportation cost, and carrying cost assumes greater importance. Because of the variable elements involved, the point at which the low carrying efficiency of the railroad car ferry offsets its terminal efficiency is difficult to determine. However, on 600-mile-hauls a Seatrain ferry can make four trips to one trip by a break-bulk carrier. Under present day charges, the cost of a vessel lying at dock paying wharfage is greater than when the vessel is underway at sea. So on 600-mile-hauls or less the saving in port time offsets the twenty-five per cent carrying efficiency resulting from the inefficiency of a freight car as a container. (For further discussion of this point see Chapter V.)

The large savings made in terminal expense under the railroad car ferry method considerably increases the length of haul which a ferry can make advantageously. The railroad car ferry, modified type, probably has a competitive cost advantage over regular cargo vessels on hauls up to 2,500 miles. On longer hauls it is at an increasing disadvantage.

Chapter V

THE RAILROAD CAR FERRY AS AN INTERMEDIATE STEP IN FREIGHT-CONTAINER TRANSPORTATION DEVELOPMENT

Terminal Efficiency vs. Carrying Efficiency

To recapitulate briefly, the speed with which freight is transferred at terminals under the railroad car ferry method results in a quick turnaround. This feature increases the vessel's ratio of carrying time to port time. Per ton costs of vessel operation are reduced insofar as the overhead for a given period is spread over a greater number of trips. However, the importance of the terminal efficiency diminishes as the length of the haul increases. This is because of a poor carrying or space stowage efficiency.

In the hold of the railroad car ferry some space potential is lost between the car carriages and the under axle areas. The greatest loss, however, results from the container unit itself. While a box car requires 6,095 cubic feet, it contains only 3,098 cubic feet of space for freight. The carrying efficiency on a space stowage basis, then, is fifty-one per cent. A standard box car weighs 45,000 pounds and has a load limit of 90,000 pounds. On a weight basis, then it has a carry-

ing efficiency of fifty per cent. Thus the overall carrying efficiency of a railroad car ferry on a space stowage-weight basis is twenty-five per cent or less.

It thus becomes apparent that a more efficient container unit than the box car must be developed. The writer submits that the Dravo Transportainer is the most promising step in that direction.

The Transportainer

The Transportainer, essentially, is a 277 cubic-foot welded steel, interlocking, weathertight shipping container, designed to carry loads up to 12,000 pounds. [71] At present it is transported on open flat cars and in the holds of cargo vessels.

These containers should reduce physical distribution costs because of the following reasons:

1. Less time is required to perform the loading and unloading movements onto and off the vessel.
2. Containers of the same size are handled and stowed.
3. Checking, sorting and distribution is simplified.
4. These containers can be handled by mechanized equipment. Lifting lugs are installed in each top corner of the units for crane hooks. They have skids on the bottom for towing or movement by fork or platform trucks on the piers.

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71. "Waterman Steamship Company Inaugurates 'Transportainer', Service", Marine Engineer, Vol. 54, May 1949, p. 63.

5. The delay caused by the dunnage requirements of loose cargo is not incurred.

These five factors contribute to a reduction in the turnaround time of the vessel.

A very significant advantage of this container method to the shipper is that the shipper can supervise the loading and unloading of the merchandise on his own premises and give the freight carrier a locked package which is handled as a single unit instead of a group of units. Insurance underwriters, recognizing the pilferage and damage prevention element here, reduce their base rates as much as fifty per cent for goods shipped in steel containers. [72]

Further Research

The same problems in lack of container uniformity face the ocean carrier as face the inland carrier. In most ports, ships are required to load, stow, or discharge cargoes composed of every conceivable size, shape and weight of unit. Lack of uniformity of packaging is one of the factors that has increased the turnaround time of the vessel.

Canada Steamship Lines, Ltd. has been doing research on the container problem since 1935 and they have, as a result, gradually introduced the unit load system. According to Mechanical Handling, "It has resulted in a reduction in the num-

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72. Ibid., p. 63.

73. "Unit-handling of Steamship Freight", Mechanical Handling, Vol. 34, August 1947, p. 429.

5. The delay caused by the shortage requirements of large cargo is not important.

These five factors contribute to a reduction in the turnaround time of the vessel.

A very significant advantage of this containerization method to the shipper is that the shipper can supervise the loading and unloading of the merchandise on his own premises and give the freight carrier a locked package which is handled as a single unit instead of a group of units. Insurance underwriters, recognizing the pilferage and damage prevention element here, reduce their base rates as much as 75% per cent for goods shipped in sealed containers.[72]

Further Research

The same problem in lack of standard uniformity face the ocean carrier as face the inland carrier. Too most (ports) which are required to load, store, or discharge cargo in quantity of every conceivable size, shape and weight of unit. Lack of uniformity of packaging is one of the factors that has lengthened the turnaround time of the vessel.

Canada Steamship Lines, Ltd. has been doing research on the container problem since 1955 and they have, as a result, gradually introduced the unit load system. According to Mechanical Handling, "It has resulted in a reduction in the number

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72. Ibid., p. 94.

73. "Unit-handling at Seaway's Freight", Transport Topics, Vol. 56, August 1967, p. 42.

ber of operations, undergone by a typical load of 70 cartons from the original 17 1/2 hauls and 210 handlings to the present two hauls and three handlings". [73]

By way of projection, the writer asserts that further research on containers may establish the feasibility of consolidating the lots of identical destination packages at their source, providing for customs inspection at their source, and then stowing and sealing the lots in containers. Routines could be established for passing the sealed containers through customs areas without the usual break-bulk inspection. The potential savings through the elimination of waterfront customs inspection are quite heady to contemplate. However, the costs of field customs inspections may reduce the savings considerably.

The Present Role of the Railroad Car Ferry in Freight Transportation

The railroad car ferry method was the first attempt to transport freight over rail-water-rail routes in a standard size, cargo container, unit from the point of origination to the consignee. It was the beginning effort to adapt the carrier more efficiently to the cargo unit in this channel. It has been, however, only an intermediate step in the development of freight-container transportation.

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73. "Unit-handling of Steamship Freight", Mechanical Handling, Vol 34, August 1947, p. 429.

From the preceding sections, we see that the railroad car ferry represented an increase of terminal efficiency and consequent reduction in the turnaround time of the vessel at the sacrifice of long-haul carrying efficiency.

The development of the modified railroad car ferry called Seatrain resulted in a retention of the terminal efficiency benefits of the conventional vessel with an increase in vessel carrying efficiency by a doubling of the maximum of units carried. This, the writer asserts, increased the vessel's probable competitive long-haul range to some 2,500 miles. The doubling of capacity, however, does not solve the problem of loss incurred from the basic carrying inefficiency of the container unit itself -- the railroad freight car.

As pointed out, the most recent occurrence in the development of freight container transportation has been the testing and increasing use of the "Transportainer", a freight container. As the use of container units increases several distinct changes probably will occur: Container units should be carried most efficiently on open "flat" type rail cars. Rail shipments to ocean shipping areas should utilize this device increasingly and the box car should be gradually displaced. As break-bulk ocean carriers find larger amounts of their traffic consist of freight containers, gradual changes in ship design should occur. Ultimately, a container ship using the freight container as a cargo unit will evolve. This will be in keeping with the pattern of adapting the carrier to the cargo unit, as established by the railroad car ferry.

In keeping with the somewhat realistic nature of this paper, it might be well to point out some corollary effects of this container ship evolution.

The evolution of the container ship should have the effect of reducing costs through the elimination of the present system of cargo booms and winches. It should bring about the installation of more powerful pier equipment to handle the heavier sling loads, with consequent lower unit costs. A reduction in deck heights because of the low heights of containers would permit the construction of more decks for a given area and the carrying of a greater volume of cargo.

It might be well to bear in mind, however, that the rate at which a container ship will evolve depends, in part at least, on domestic and international acceptance of a uniform size and type requirement to facilitate container interchange.

The Future Role of the Railroad Car Ferry in Freight Transportation

It is to be expected that the railroad car ferry method will remain in use for twenty years or longer as the impact of the freight container should be felt on a gradual basis. Problems of change-over costs, standardization, etc., must first be resolved. The future role of the railroad car ferry method, however, is a diminishing one. Break-bulk carriers will increase their terminal efficiency with the increased use of containers, thus gradually reducing the coastwise business of the Seatrain ferry. Against the direct competition of a container ship the coastwise railroad car ferry activity eventually will disappear.

Short haul international use of the railroad car ferry, as in the case of the Florida-Havana line, may be prolonged until direct competition from container ships occurs. This is because of the innate short-haul efficiency of the railroad car ferry. The rise of motor carrier activity in Cuba, while reducing intra-island rail activity will not affect the inter-island trans - shipment savings inherent in the railroad car ferry method.

In the long run, however, the role of the railroad car ferry in freight transportation has been that of an intermediate step in freight-container transportation development.

Appendix to Chapter II

Asia
Africa
South America
Canada

Appendix to
Chapter II

ASIA

Russia

When the Trans-Siberian Railway was built, tracks could not be laid across a formidable section around the south end of Lake Baikál and, at this point, passengers and freight trains had to be carried across on barges, a distance of 42 miles. During the severe winter months, tracks were laid on the ice. In order to insure an uninterrupted flow of traffic, a railroad car ferry service to operate through the entire year was proposed. The Russian government sent engineers to the United States to study the Lake Michigan railroad car ferry operation under severe ice conditions. Similar vessels were built for the Russians in England in 1889. The first was the ice-breaker railroad car ferry Baikál, which was shipped "knocked-down" to St. Petersburg and reassembled on Lake Baikál. The ships were 290 feet long, with a beam fifty-seven feet long and had a bow screw for the ice-breaker bow.

The following report from the Russian Ministry of Ways and Communications may help to illustrate the situation.

> The exploration of the mountainous country contiguous to the southern part of the Baikál basin, in connection with the difficult technical conditions attached to the construction of an uninterrupted Great Siberian mainline,

evoked the scheme for building a special steam ferry for the transport of trains over the Baikál, which was to be supplied with icebreaking appliances and should establish continuous steam communication between the terminus of the Midsiberian railway line on the Baikál and the starting point of the Transbaikál line.

The application in the old world of these means of transportation for trains, as in the United States, effected with the help of icebreakers, is entirely due to the initiative of Prince Khilkson, Minister of Ways and Communication, who first saw the advantage of applying icebreakers to the Russian marine and river navigation.

The icebreaker Baikál was constructed at the works of Armstrong in England for the transport of trains over the Baikál. It was forwarded in separate pieces, which were put together on the shore of the lake. The fittings and the engines, boilers, waterpumping machinery and so on, were made here. For the launching of the ship, stockes were built under and above the water; their construction offered great difficulties on account of the rocky shores and the frequent storms on the Baikál. [1]

Turkey

In 1939, the Turkish Government Railways established a railroad car ferry service on the Bosphorus. The ferry operates between Birkedji, near Istanbul, as a terminal of the railroad systems of Europe and the western terminal of the Asiatic lines, Haidar-Pasha. [2]

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1. Guide to the Great Siberian Railway, Ministry of Ways and Communications, St. Petersburg, 1900, pp. 337, 338.

2. "Train-ferry Across Bosphorus," Railway Gazette, Vol. 71, July 14, 1939, p. 74.

China

The first railroad car ferry service in China began on October 22, 1933. The Chinese Ministry of Railways placed the Changkiang in service between Nanking and Pukow on the Yangtze thus establishing a through connection between Shanghai and Tientsin on the Tientsin-Pukow and the Nanking-Shanghai Railways. [3]

An interesting feature of the Changkiang was that it carried its own locomotive. According to Engineering:

> The trains will be shipped from the forward end of the steamer and shunting will be carried out by means of a locomotive carried on the ferry, at the after end of the upper deck, and capable of being moved horizontally across the three tracks by means of steam-driven traversing gear. [4]

Railroad car capacity of the vessel was twenty-one cars plus the locomotive.

India (Assam)

In a recent article on the Indian railways, brief mention is made of the Amingaon-Pandu railroad car ferry service on the Brahmaputra in the State of Assam. "The ferry service between Pandu and Amingaon is operated by two towing tugs, one passenger flat, two passenger landing stages, five wagon ferry barges, and other subsidiary vessels". [5]

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3. "Recent Railway Development in China," Railway Gazette, Special Overseas Railways Edition, November 28, 1934, p. 57.

4. "The Nanking-Pukow Train Ferry," Engineering, Vol 134, October 28, 1932, p. 518.

5. Arora, M., "Assam Railway," Railway Age, Vol. 119, July 7, 1945, pp. 34, 35.

An interesting feature of this Brahmaputra Wagon Ferry is that the cars are loaded transversely on a ferry barge which is towed by a steamer having passenger accommodations. Elephants often do switch engine work, pushing several loaded cars at a time.[6]

Japan

Because Japan, like Denmark, comprises a number of islands, the Japanese Government Railways operates three railroad car ferry lines to provide through train service between the railways on the four most important islands. These railways, incidentally, are all of the three foot six inch gauge.[7]

In July, 1911, a railroad car ferry service was established between Shimouoseki and Homorie (two and three-tenths miles) to connect the islands of Honshu and Kyushu. In October, 1921, another was opened between Uno and Takamatsu (twelve and six-tenths miles) to connect Honshu and Skikoku. By July, 1925, car couplers were standardized and service between Honshu and Hokkaido began.

According to M. Nawa, Engineer of the Japanese Government Railways, the four vessels which operated in the Honshu and Hokkaido service have the following general characteristics: "Length overall, 360 feet; beam, 22 feet; ... displacement, 4,250 tons; speed, 17 knots."[8]

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6. "Army Railroading on Bengal and Assam," Railway Age, Vol. 119, July 7, 1945, pp. 34, 35.

7. See Car Builders Cyclopedia, Section 17, for foreign gauging.

8. Nawa, M., "New Railway Train-Ferry in Japan," Engineering News-Record, Vol. 98, January 27, 1927, p. 148.

In describing the vessel Matsumao-Maru, Nawa mentions a total passenger capacity of 937. This would seem somewhat crowded by western standards. On car capacity he states: "...capacity for twenty-five 15 ton cars, or twenty 15-ton cars and two brake vans or cabooses of the bogie or double-truck type." [9] An interesting point is made on the ballasting. "To provide against the heeling of the boat if more heavily loaded on one side, wing water tanks are installed, each with a capacity of 140 tons of water. These tanks are served by pumps which enable the entire quantity of water to be removed from one side to the other in four minutes." [10]

AFRICA

The Nile River

Though mention is made of Stephenson using railroad car ferries in the 1852 crossing of the Nile, the earliest documented accounts begin about 1858.

The Egyptian State Railways notes: "Pending the construction of an iron bridge at Kafr-el-Zayat, a steam ferry was used there. A disastrous accident occurred on May 16, 1858, when a train fell into the Nile." [11]

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9. Ibid., p. 149.

10. Ibid.

11. "Egyptian State Railways," Railway Gazette, Special African Railway Number, November 28, 1911, p. 31.

The Orange River

Greathead gives a rather detailed description of the construction and operation of a temporary railroad car ferry on the Orange River, at Upington, South Africa. The ferry was used to facilitate the advance construction work on a railroad and was eventually displaced upon the completion of a bridge. [12]

The Nigerian Railway

As early as 1911, a railroad car ferry with tracks for a 3 foot 6 inch gauge railway was used while a South Channel bridge was under construction over the Niger River. [13]

Prior to 1916, there were no bridge connections between the north and south railroad lines at Jebba on the Niger River. "The traffic was conveyed across the stream by a ferry capable of carrying six large wagons or four passenger coaches at a speed of 7 knots per hour." [14]

Where severe bridging problems are encountered on inland waterways, the railroad car ferry may temporarily solve the problem. An illustration of this was the installation of a railroad car ferry service by the Nigerian Eastern Railways across the Bennue River, Nigeria, in 1924. [15]

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12. Greathead, James Merriam, "The Construction and operation of a temporary train-ferry on the Orange River at Upington, South Africa," Publication of the Institution of Civil Engineers (London, 1917) No. 4179, p. 18.

13. "Lagos Railway," Railway Gazette, Special African Railway Number, November 28, 1911, p. 29.

14. "The Nigerian Railway," Railway Gazette, Special African Railway Number, December 5, 1927, p. 86.

15. "Car-Ferry for an African Railway," Engineering News-Record, Vol. 93, October 30, 1924, p. 721.

It was replaced by a bridge in 1927 because the formation of sand banks in the river interfered with the railroad car ferry traffic.[16]

Cape-to-Cairo

In 1919 a scheme was evolved to establish a large system of railroad car ferries on Lake Tanganyika as part of the Cape-to-Cairo rail system. Many very telling arguments were advanced against the scheme, chiefly centering about the cost of interior construction (disassembled parts would have to be shipped in), and the justification in terms of traffic. [17] The scheme vaporized and the last reports cite only break-bulk carrier services operating on Lakes Victoria, Uganza and Tanganyika. [18]

Probably the most significant obstacle to the Cape-to-Cairo scheme (which incidentally was a pet project of Cecil Rhodes) was the unwillingness of the Sudanese to change from their three foot six inch gauge track to the standard four foot eight and one-half inch gauge. This writer suspects that the reluctance of the Sudanese was due to their fear of the territorially aggressive Egyptians who had the standard gauge tracks.

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16. "The Nigerian Railway," loc. cit., p. 88.

17. Baltzer, G., "Die Vermendung von Eisengahn Fährbooten auf den grossen afrikanischen Seen dür den Betrieb der Kap-Kairo Eisenbahn," Archiv für Eisenbahnwesen, October, 1920, pp. 794, 801.

18. "The Tanganyika Railways," Railway Gazette, Special African Railway Number, November 21, 1927, p. 99.

It was replaced by a bridge in 1927 because the formation of sand banks in the river interfered with the railroad car ferry service.[16]

Cape-to-Cairo

In 1928 a scheme was revived to establish a large system of railroad car ferries on Lake Tanganyika as part of the Cape-to-Cairo rail system. Many very telling arguments were advanced against the scheme, mainly concerning about the cost of tubular concrete (also mentioned earlier would have to be obtained [17]), and the practicability in terms of traffic. [18] The scheme report said that the lake ferries are only drop-hulk carrier barges operating on Lake Victoria, Uganda and Kenya.

Probably the most significant thing in the Cape-to-Cairo scheme (which incidentally was a product of Cecil Rhodes) was the unwillingness of the Germans to change from their three foot six inch gauge track to the adopted four foot eight and one-half inch gauge. This only reinforces what the reluctance of the Germans was due to their fear of the formidably aggressive Imperialists who had the wherewithal gauge to race.

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16. "The Congolese Railway," loc. cit., p. 5.

17. Belasse, G., "Die Transmanche von Eisenbahn und Kraftwagen auf den Strecken Ostende-Dover und Boulogne sur Mer-Calais der Fährgesellschaft Sealink Ltd. Eisenbahnwesen, October, 1970, pp. 294, 295.

18. "The Tanganyika Railway," Engineering (London), Feb. 1, Trans Railway Number, November 23, 1928, p. 6.

SOUTH AMERICA

Argentina [19]

The Entre Rios Railway operates a railroad car ferry service between Buenos Aires and Ibicuy, a distance of 126 miles. Another service runs from Ibicuy to Torate, fifty miles. The southern terminus of the railroad is at Ibicuy, on the Parana river, and the railroad car ferry service down the Parana and La Plata rivers is operated to give direct connection with the city and port of Buenos Aires. The route from Ibicuy to Tarate, downstream and on the opposite side of the Parana, connects with a line of the Central Argentine Railway from Tarate to Buenos Aires. The 126-mile journey requires ten hours and the fifty-six mile journey requires three and three-fourths hours.

Five railroad car ferries are in service. The Carmen de Avellaneda built in 1931, is 355 feet 6 inches long, with a beam of fifty-nine feet and a loaded draft of ten feet. Railroad car capacity is listed as twenty passenger cars or thirty-five long freight cars.

On the Argentine Northeastern Railway, which is operated jointly with the Entre Rios, there is a railroad car ferry service across the Parana river from Posadas, Argentina, to Pacucua in the Republic of Paraguay. The crossing is two miles long and

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19. The data was derived from: Hammond, R., "An Engineer Looks at Argentina," The Engineer, Vol. 182, August 18, 1946, pp. 138 139, and earlier writings.

is serviced by two sidewheel steamers, 203 feet long, with thirty-seven foot beam, and four foot six inch loaded draft. Railroad car capacity per vessel is ten freight cars.

CANADA

To Canada goes the distinction of having produced the world's largest ice-breaking railroad car ferry, the 7600 ton Abegweit, launched September 21, 1946, at Sorel, Quebec.[20]

The Abegweit was built in keeping with a Canadian government agreement to maintain a ferry service across the Northumberland strait as part of the conditions by which Prince Edward Island was admitted into the confederation (British Order in Council, June 26, 1873). The Abegweit replaced the Charlottetown which was sunk in 1941.

The general characteristics of the Abegweit are as follows: "Length, overall 372 feet 4 inches; beam, extreme 61 feet;... tonnage, gross 6,694 tons..." The Abegweit's capacity is "... railway cars, 19; automobiles and trucks, 60; passengers, 950..."[21]

The ice-breaking features of the vessel are the key to year-round operations, and as such, are worthy of some attention. The features are best described in a British journal as follows:

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20. "World's Largest Train Ferry Launched," Marine Engineering, Vol. 51, November, 1946, p. 85.

21. "Canadian Car Ferry Abegweit," Marine Engineering, Vol. 52, August, 1947, p. 86.

> ....In theory the Abegweit has been designed to meet and defeat the ice in three ways: first, with her bulk, which can be driven at a speed approaching 16 knots. Secondly, her cutaway bow has been designed to part ice packs. Thirdly, her trimming and heeling tanks will enable her to be rocked fore and aft and from side to side in the event of becoming wedged in the ice. The bow-propellors will suck the water from beneath the ice or, alternatively, push water under the ice directly in front of the ship's bows. The weight and shape of the bows can then deliver their blows against ice which has been temporarily robbed of its undersupport, or has been lifted, instead of against ice that is firmly held by the water beneath it. [22]

A special point of interest to the marketing student is that the increase in the Abegweit's capacity over the Charlotteville was decided upon only after extensive investigations of the potential railway and motor car traffic between Prince Edward Island and other provinces of the Dominion. The service is operated for the Canadian Government by the Canadian National Railways. [23]

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22. "Ice-Breaking Car Ferry Abegweit," The Engineer, Vol. 184, November 21, 1947, p. 489.

23. "Ice-Breaking Rail Ferry for Canada," Engineering, Vol. 158, August 25, 1941, p. 156.

Appendix to Chapter III

Abandonment of R. R. Car Ferry Operations in the U. S.

Seatrain Lines, Inc.
- Billing and Classification
- The Seatrain Controversies

An Investigation of the Standard Operating Procedure of the West India Fruit and Steamship Co.

Abandonment of Railroad Car Ferry Operations in the United States

Following are digests of Interstate Commerce Commission decisions on abandonment of railroad car ferry operations:

The South Pacific Coast Railway Company

On September 14, 1936, the South Pacific Coast Railway Company and its lessee received permission from the I. C. C. to abandon their railroad car ferry operations across San Francisco Bay between San Francisco and Alameda.

The service consisted of transporting interurban passengers between San Francisco and Alameda in connection with electric interurban trains operating in Alameda.

A bridge equipped for electric railway operation was built across San Francisco Bay connecting San Francisco and Oakland and replacing the ferry service. (217 I. C. C. 277)

The Texas and Pacific Railway Company

On July 8, 1941, the Texas and Pacific Railway Company and others received permission from the I. C. C. to abandon their railroad car ferry operations across the Mississippi river between Gouldsborough and the city of New Orleans including approach tracks in Orleans and Jefferson Parishes, Louisiana. (247 I. C. C. 285)

Central Railroad Company of New Jersey

On October 2, 1941, the trustees of the Central Railroad Company of New Jersey received permission from the I. C. C. to abandon their railroad car ferry operations between Jersey City, Hudson County, New Jersey and West Twenty-Third Street, New York, New York.

Abandonment of Electric Car Service
Operations in the Bay Area

Following are, digests of Interstate Commerce Commission decisions on abandonment of railroad and electric car service in the Bay Area:

The South Pacific Coast Railway Company

On September 14, 1939, the South Pacific Coast Railway Company and the lessee, received permission from the I. C. C. to abandon their electric car line operations across San Francisco Bay between San Francisco and Alameda.

The service consisted of passenger trains only, operated between San Francisco and Alameda, a connection with electric interurban trains operating on the mainline.

A bridge maintained for electric railway operations was built across San Francisco Bay connecting the Peninsula and Oakland and providing the lessee service. (247 I. C. C. 3)

The Tower and Pacific Railway Company

On July 8, 1941, the Tower and Pacific Railway Company and others received permission from the I. C. C. to abandon their railroad car ferry operations across the Hudson River between Weehawken and the city of New York. The ferry boats provided transfer facilities for interchange between the lessee.
(247 I. C. C. 3. 695)

Central Railroad Company of New Jersey

On October 8, 1941, the Central Railroad Company of New Jersey received permission from the I. C. C. to abandon their railroad car ferry operations across the Hudson River. The lessee had been the Central Railroad of New York.

The traffic record showed that the volume of traffic handled declined principally as a result of the rerouting of the Baltimore and Ohio traffic to the Liberty Street ferry. (249 I. C. C. 269)

The Gulf and Inter-State Railway Company of Texas

On December 12, 1941, the Gulf and Inter-State Railway Company of Texas received permission from the I. C. C. to abandon its railroad car ferry operations between the Port Bolivar and Galveston, Texas, as part of the total abandonment of their line from Beaumont to Galveston, Texas.

The service between Galveston and Port Bolivar was performed by a transfer barge of 15-car capacity and a tugboat. (249 I. C. C. 659)

The Erie Railroad Company

On June 19, 1942, the Erie Railroad Company received permission from the I. C. C. to abandon its railroad car ferry operations between Jersey City, New Jersey and West Twenty-Third Street, New York, New York.

The reason established for the abandonment was substantial operating losses because of insufficient patronage. (252 I. C. C. 659)

The Hoboken Ferry Company

On October 10, 1946, the Hoboken Ferry Company and others received permission from the I. C. C. to abandon their railroad car ferry operations between Hoboken, New Jersey and West Twenty-Third Street, New York, New York.

The reasons given are the same as cited on Page 30 (252 I. C. C. 659) and follow a regular pattern in the abandonment of the Twenty-Third Street Ferry terminal. (267 I. C. C. 51)

The Staten Island Rapid Transit Railroad Company

On September 15, 1948, the Staten Island Rapid Transit Railway Company received permission from the I. C. C. to abandon its railroad car ferry operations between Tottenville, Staten Island, New York, and Perth Amboy, New Jersey.

Permission was granted on the condition that the company made available to a succeeding operator, on reasonable terms, all or any necessary part of the property used in ferry operations, (271, I. C. C. 217)

CONCLUSIONS

The abandonment cases of the railroad car ferry operators cited reveal some striking similarities:

1. A relatively short-haul, ranging from 0.56 to 2.3 miles.
2. Decreasing traffic counts due to rerouting or bridge supplantment.
3. Heavy equipment depreciation and increasing operations costs.

The Seatrain Lines, Inc.

Billing and Classification

Rail bills of lading are for delivery at Hoboken, New Jersey, to a specified consignee. At Hoboken, Seatrain issues a bill of lading covering the rest of the movement. Cars routed Seatrain, on the Hoboken's tracks, are separated and classified by destination, car weight, type of car and commodity contained. After

classification, the cars are switched from the classification yard to the cradle of the car elevator alongside the vessel.

The Seatrain Controversies

One of the main controversies involving Seatrain was whether the Seatrain was a railroad car ferry. According to the Interstate Commerce Commission, they are not. The issue is an important one because "...unless Seatrain vessels are ferries used by or in connection with a railroad, and therefore to be included in the term 'railroad' they do not constitute an extension of a railroad". [24] In support of its argument, the Commission asserted that "...the vessel used by Seatrains is far larger and of a different type than the vessel envisaged when the word 'ferry' or 'carferry' is mentioned. Its method of operation is not the method used in operating any other ferry here or elsewhere in the world..." [25]

In the opinion of the writer, the Seatrain is a modified ocean-going railroad car ferry. As such, the Seatrain is entitled to treatment in this paper. The essential point of difference in the writer's opinion, is that Seatrain freight cars are carried throughout the holds between the decks and superstructures instead of one deck. The conventional railroad car ferries use the single strength-deck principle.

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24. Docket 25565

25. Ibid.

Temporary dislocations are generally created by the entrance into any industry of improved methods and facilities. This is particularly true in the case of ocean shipping which is characterized by over-capacity: i.e. where the existing facilities both represent a large capital expenditure and are overdeveloped in relation to traffic volume. The following statement by Commissioner Farrell indicates that this situation led to bitter competition among the ocean ferry companies.

> When the Over-Seas Railways, Inc. began operation it was invited to become a member of the Gulf and South Atlantic-Havana Steamship Conference, but instead of doing so, it started a rate war in which it published no tariffs but repeatedly reduced rates on traffic regarded as attractive, made special allowances to shippers and, as a consequence of this policy, the conference ceased to function as an organization for the discussion of rates and the publication of tariffs. [26]

Of the many pieces of litigation Seatrain Lines, Inc. has been involved in, perhaps the one most revealing of operational problems is the car interchange controversy.

The right of the Seatrain vessels to use railroad car equipment had been questioned since the service began. The Seatrain Lines, Inc. paid a standard car rental. The rental is on a cost basis with the expectation of mutual interchange of equipment and reciprocity between railroad lines. The usual rental is one dollar per day and is established under the Car Service, Per Diem and Master Car Builders' rules of the Association of American Railroads. Since Seatrain Lines, Inc. owns no freight cars tech-

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26. Docket 24119.

Temporary dislocations are particularly crucial in the entrance into any industry of improved or cheaper new facilities. This is particularly true in the case of ocean shipping which is characterized by over-capacity; i.e. where the existing facilities both represent a large capital expenditure and are overbuilt in relation to traffic volume. The following statement by Commissioner Farrell indicates that this situation has led to bitter competition among the ocean ferry companies.

> When the Port-Ocean Railway, Inc. began operation it was invited to become a member of the Port and South Atlantic-Ferry Steamship Conference, but instead of doing so, it unfortunately was in a position to publicized to merely but nevertheless reduced rates on traffic to Ocean, as a consequence made crucial allowances to make ends meet, as a consequence of this policy, the conference caused to function as an organization for the diversion of rates and the multiplication of tariffs.[26]

Of the many places of litigation Pacific Lines, Inc. has been involved in, perhaps the most novel proceeding of jurisdictional problems is the car interchange controversy.

The right of the American vessels to use railroad car equipment has been questioned since the service began. The Pacific Lines, Inc. said a standard car vessel. The result is a case basis with the accumulation of unpaid interchange of equipment and reciprocity between railroad lines. The usual charge is one dollar per day and is assessed under the car service, per diem and mileage. The railroad rule of the interchange of freight cars between railroads. Since Pacific Lines, Inc. cars do travel over

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26. Docket 24135.

nically, the mutual interchange contemplated in the costing does not occur. Railroads connecting with Seatrain contended that the company either should acquire railroad car equipment or pay a sufficient rental to allow the owner railroad to realize a profit on the use of its cars. One argument that might be posed here is that since Seatrain use subjects the railroad car to much less wear and tear than in ordinary use, the cost of the car's use is less and some profit accrues to the owner receiving the standard rental.

The issue of car interchange with Seatrain was finally resolved by a Supreme Court decision in the case of the United States vs. Pennsylvania Railroad Company. Mr. Chief Justice Black delivered the court's opinion which stated in part,"... the particular type of service introduced by Seatrain and found by the Commission to be qualitatively superior, cannot be rendered without the privilege of carrying the very railroad cars which carry freight to its ports. The inherent advantages of this service would be lost to the public without railroad car interchange." [27] The court also sustained the Commissioner's finding in 248 I. C. C. 199, that "...the current rate of one dollar per day payable by Seatrain for such periods as the cars are in its actual possession, would be reasonable for application to the interchange of cars between defendants and complainants for use by Seatrain." [28]

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27. United States vs. Pennsylvania Railroad Company, 323 U. S. 617.

28. Ibid., pp. 623, 624.

An Investigation of the Standard Operating Procedure of the West India Fruit and Steamship Company's Florida-Havana Car Ferry Service

Consistent with the comprehensive nature of this effort, the writer investigated the standard operating procedure of an organization operating a railroad car ferry service based in the United States and performing an export-import marketing carrier function in distribution.

The statement of the standard operating procedure herein contained is a twelve sectional refinement of the general operating policy of the West India F. and S. S. Company. The policy is that applied to the Florida-Havana Railroad Car ferry service. The sources of the materials range from operating executives to company agents. The material has, in many instances, been abstracted from the written or oral statements of the following:

D. E. TAYLOR.....President, West India F. and S. S. Company

W. L. HEATH.....Traffic Manager, West India F. and S. S. Company

E. A. KEUCKER.....President, Keucker Steamship Services, Chicago Representative of the West India F. and S. S. Company.

STANDARD OPERATING PROCEDURE
WEST INDIA FRUIT AND STEAMSHIP COMPANY

-Sections-

1. Conference Requirements
2. Claims
3. Cargo to Interior Cuba
4. Cuban Surcharge
5. Demurrage

6. Documentation
7. Equalization
8. Icing
9. Insurance
10. Maximum Height and Width
11. Minimum Weights
12. Miscellaneous

1. Conference Requirements

The West India F. and S. S. Company is a member of the Gulf and South Atlantic-Havana Steamship Conference. The function of the Conference is the discussion of rates and the publication of tariffs. Joint meetings of the conference occur semi-annually; contract and non-contract or tariff rates are established. (See Freight Tariff G-8, Item 70, Appendix.) Non-contract shippers wishing to sign agreements must clear through the conference chairman, A. J. Cooper, in New Orleans, Louisiana.

According to Mr. Cooper, in a letter to Mr. Heath, Traffic Manager of West India:

> All lines understand or should understand that in the event they secure a shipment in the name of a forwarder, they should demand from that forwarder the name of the actual shipper, and that the shipper must have a freighting agreement with the conference, otherwise, the non-contract rate is applied. (9-19-50)

Some grasp of the significance of the conference may be obtained from the following listing of the regular member lines of the conference and the ports from which the various lines maintain service. The information was supplied to the writer by Mr. Fred

D. Hill, Vice Chairman, Gulf and South Atlantic-Havana Steamship Conference at 321 St. Charles Street, New Orleans, Louisiana.

SOUTH ATLANTIC PORTS

Charleston, South Carolina
Linea de Vapores Garcia, S. A.

Jacksonville, Florida
Linea de Vapores Garcia, S. A.

Savannah, Georgia
Linea de Vapores Garcia, S. A.

Port of Palm Beach, Florida
West India Fruit & SS Co., Inc.

GULF PORTS

Pensacola, Florida
Empresa Naviersa de Cuba, S. A.

New Orleans, Louisiana
Empresa Naviera de Cuba, S. A.
Standard Fruit & Steamship Co.
United Fruit Company

Orange, Texas
Lykes Bros. Steamship Co., Inc.

Port Neches, Texas
Lykes Bros. Steamship Co., Inc.

Beaumont, Texas
Lykes Bros. Steamship Co., Inc.

Galveston, Texas
Linea de Vapores Garcia, S. A.
Lykes Bros. Steamship Co., Inc.

Corpus Christi, Texas
Lykes Bros. Steamship Co., Inc.

Brownsville, Texas
Lykes Bros. Steamship Co., Inc.

Lake Charles, Louisiana
Linea de Vapores Garcia, S. A.
Lykes Bros. Steamship Co., Inc.

Port Arthur, Texas
Lykes Bros. Steamship Co., Inc.

Houston, Texas
Empresa Naviera de Cuba, S. A.
Linea de Vapores Garcia, S. A.
Lykes Bros. Steamship Co., Inc.

(7-15-52)

2. Claims

The West India Fruit and Steamship Company is a member of the General Claim Agents Division of the American Railroad Association and their claim agent is Mr. D. Leer of the Florida East Coast Railway Company of St. Augustine, Florida. He investigates and handles all claims filed.

In the payment of any claim in connection with through rail service, including the car ferry haul from Port of Palm Beach, Florida; West India Fruit and Steamship Company is only a link in the chain and is governed by the rules and regulations which are enforced by the various railroad carriers also participating in the claim. The Claim Agent cannot pay a claim unless it is a justifiable claim supported with documentary evidence showing carrier negligence.

Policy on Claims

The following paragraphs are excerpts from a letter by D. E. Taylor, President, West India Fruit and Steamship Company, to E. A. Keucker, Chicago representative, on May 22, 1951, under the subject heading of "Claims for Armour and Company, Chicago."

a. Shipper Handling

I "I particularly refer to the notation written on the letter you sent to Mr. Colberg. In

the first place, no railroad, as far as we know, pays claims on shipper's load and count on carload shipments."

II "In this particular case there were 32 cases of milk short. Armour loaded the cars themselves. There could have been a mistake in the loading of it or it could have been stolen out of the car by the customs or someone else but certainly no railroad handling the car, if the seals were intact when delivered Havana, would be responsible for it being stolen or short."

III "We and the railroads are only responsible for our own mistakes or negligence or conditions that could be prevented by us."

IV "The car could have been loaded short by Armour and Company. I assume no one in Armour's place will swear that it was loaded in the car inasmuch as they will swear that the correct amount is loaded in the car when they are over which their records will also show. If they can load cars that check over, there is a possibility that they load cars short also."

b. Cuban Handling

I "All cargo we handle to Cuba is delivered into the custody of the Cuban Custom house and we have nothing whatever to do with the cargo as it

the first place, no matter, as far as we know, pays claims on behalf's loss are actual or carried adjusters.

II "In this particular case there were only 7% chance of milk short. Assume it was the one those-saives. There could have been a mistake in the loading of 2% or 1% & will have been stolen out of the car by the natives or someone else not certainly no fault" handling the car, if the seals were intact when delivered Farmer, would be responsible for " being stolen or short."

III "We and the railroads are only responsible for our own mistakes or negligence or conditions that could be prevented by us."

IV "The car could have been loaded short by mistake due dempsey. I answer no one in Armour's place will swear that it was loaded in the car 'half-mark as they will swear that the operator actually loaded in the car when the car was over which their records will show. If they can look back over, there is a possibility that the load was short also."

5. Duke Langley

I "All wrong we decide to give the railroad into the company of the Duke Chicago House and we have nothing always to do with the carrying as it

is checked out of the cars or delivered to the consignees by the Cuban Customs."

II "If the cargo is pilfered or stolen in the Arsenal Bonded Yard no steamship company nor ourselves are responsible for it. Armour and Company might have a car of eggs handled by us and delivered into the custody of the Cuban Customs and it might develop that the whole car has been stolen or taken or lost. We would not be responsible for it under the Cuban laws."

III I am enclosing a copy of our bill of lading and you will please refer to item 34. [29] This applies to all steamship companies handling cargo into Cuba. [30]

c. West India's Position

I "We are a party to the rules and regulations of the American Association of Railroads. Mr. D. Leer is our Claim Agent. Mr. D. Leer has been handling claims for the last 40 years and every railroad Claim Agent in the United States knows Mr. Leer's record and I am certain that Armour

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29. Bill of Lading, Item 34, Deliveries at Cuban ports. As by Cuban law all imported goods are required to be delivered by the carrier to the customs authorities with whom bills of lading must be filed. The carrier is not responsible or liable to the shipper or consignee for any non-delivery, misdelivery or other loss or damage to the goods whatever after delivery of the goods by it, to or in the custody of Cuban customs authorities.

30. See Appendix II for complete copies of the West India F. and S. S. Ocean Bill of Lading.

and Company's Claim Department knows Mr. Lear's record."

II "We are only responsible, the same as any other railroad, for the handling of cargo and all claims must be based on the rules and regulations of the claims division of the A. A. R."

3. Cargo to Interior Cuba

Cars going beyond Havana to any point where there is a Custom House can be billed on a separate manifest through to destination, and go right through Havana. This applies to all commodities whether they be packaged or bulk.

Outlined below is a statement by D. E. Taylor on what he understands to be proper method and procedure for the handling of cargo under the Cuban decrees and Customs laws:

a. "All cargo we handle is booked and handled to Havana only. All ocean freight charges are assessed and based on delivery at Havana only. The point of delivery and terminal of our operation is the Arsenal Bonded Yard of the United Railways of Havana. All merchandise of every nature handled by our service is delivered to the custody of the Cuban Customs in this terminal and yard which is a bonded yard."

b. "The consignees through their Customs brokers can reforward all merchandise destined for the following interior Customs hours points in Cuba in the same American railroad cars without the merchandise being

unloaded in Havana: Natanzas, Cardenas, Calibarien, Sagua la Grande, Nuevitas, Santiago, Cienfuegas. There may be one or two more Customs house points that cargo may be reforwarded without being unloaded, but those listed here are the principal points."

c. "If any shipper has a carload of merchandise of any description - whether in bulk, case goods, bags, or machinery - going to any of the places mentioned above which are Customs districts or Customs houses, we would accept the shipment by our service to Havana. The bills of lading and manifest could be marked final destinations for those places mentioned above where there is Customs house and the consignees' brokers in Havana can arrange with the Customs to reforward the merchandise in the same car over the United Railways from Havana by paying the railroad freight and other Customs brokerage charges. On all merchandise destined for such Customs house, districts or ports in the interior of Cuba, the shippers or consignees, when taking out marine insurance should cover it to the final destination. Otherwise there would be no insurance on the shipment after it left Havana or after it left our terminal and while in the custody of the United Railways or any other railroad in Cuba."

d. "The above arrangements only apply on shipments that are going to be forwarded to interior points in Cuba where there is a Custom house. When the goods arrive

customs in Havana: Gothaus, Tarrasa, Guiteras, Santa La Grande, Nuevitas, Santiago, Cienfuegos. There may be one or two more customs houses yet to which cargo may be referred without being unladen. But those listed here are the principal seaports.

c. "If any shipper has a complaint of overcharges or any description - whether in bulk, bale goods, logs, or machinery - going to any of the places mentioned above which are Customs districts or Customs houses, we will accept the advisement by our agents in Havana. The skills of loading and unlading could be marked final destinations for those places mentioned above where there is Customs house and the consignees brokers in Havana can arrange with the Customs to referment the merchandise in the same car over the United Railways from Havana by paying the railroad freight and other Customs brokerage charges. On all merchandise destined for such Customs houses, whatever or parts in the interior of Cuba, the shippers or consignees, when making out marine insurance should cover it to the final destination. Otherwise there would be no insurance on the shipment after it left Havana or after it left our terminal and while in the custody of the United Railways or any other railroad in Cuba."

d. "The above arrangements only apply on shipments that are going to be forwarded to interior points in those where there is a Customs house. When the goods arrive

at that Custom house the Cuban Customs will handle it, we assume, the same as the Custom house would if it were actually delivered to the Havana Custom house."

e. "The procedure for handling merchandise (delivery which is to be taken by the consignees at Havana either by having the cars switched to a private or public siding in the Havana switching area), where delivery is taken direct from cars in the Arsenal Bonded Yard by trucks or delivery is made direct from the miscellaneous warehouse on a certain type of merchandise, is as follows:

I The destination of all merchandise handled by us will be Havana and will be shown on the bills of lading." (This is the same as outlined in paragraph a. above)

II "We can handle all bulk materials, all heavy machinery (that cannot be handled by hand) all tank car materials. Bulk materials include loose brick, loose fertilizer, lumber, perishable cargo when under refrigeration and so shown on the bills of lading and documents. Commodities of this type can be entered and cleared by the consignees and switched to private or public sidings if the consignees wish them switched there. For most of these commodities we pay the switching charges when the private or public sidings are located in the Havana Conference switching area."

III "On all other classes of commodities such as canned goods, case goods, bag goods, light manufactured products like refrigerators and radios or any other commodities that can be handled from the car to trucks the requirements are that it must be unloaded either direct from cars into a warehouse and as our warehouse space is limited we mention in the booking permits that the cargo is to be handled and unloaded as per the clause that you always put on the bills of lading. Our warehouse is only used for the unloading and handling of miscellaneous cargo such as cotton piece goods, cigarettes and small shipments that go in miscellaneous cars which we make up here at the Port either for the Railway Express or Acme, or general merchandise that we receive in L. C. L. shipments either by the railroads or by trucks and consolidate them and make up miscellaneous pool cars."

f. "We, of course, can accept any kind of business to Cuba on the car ferry on any commodities that go there, but when it gets to Havana and is unloaded from the ferry in the railroad cars into or placed in the Arsenal Bonded Yard, then there are certain restrictions by the Cuban Customs and also by labor decrees which determine whether it can go to a private or public

ferry in the railroad cars into or placed in the Arsenal Bonded Yard, then there are certain restrictions by the Cuban Customs and also by labor decrees which determine whether it can go to a private or public switch or whether it has to be unloaded from the cars to trucks, etc." [31]

(6-29-52)

4. Cuban Surcharge

The Conference lines handling cargo out of Cuba, with the exception of sugar cargoes, agreed to increase a Cuban surcharge of five cents per 100 pounds on northbound shipments from Havana and other Cuban ports to fifteen cents per 100 pounds, effective July 16, 1951. (See Freight Tariff G-8, Item 280, Appendix.)

A large number of the commodities that West India handles are figured on the net ton or per 100 pound basis, which included the increased Cuban surcharge. The Conference suggested that they raise the rates on these commodities by one dollar per ton. The company then raised the ocean rates applying on scrap iron, bones and hoofs, tankage and any other commodities where the Cuban surcharge is included in the ocean freight rate, by one dollar per ton. On scrap iron that meant that the rate rose to $5.825 per ton, etc.

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31. See: The Cuban Problem

The effect on commodities where the rate was based on 100 pounds plus the then current ten cents per 100 pounds Cuban surcharge was that the base rate remained as it was and the total Cuban surcharge of fifteen cents was assessed instead of the then current ten cent Cuban surcharge. The condition applies on all the commodities that have a rate plus the surcharge, including tobacco, canned goods, rayon products, sisal products, glycerine, etc.

No increase was effected on fruits and vegetables which have a base rate that includes the surcharge. These commodities include pineapples - crates or bulk - avocados, tomatoes and other fresh vegetables that are shipped from Cuba during the harvest period.

The marketing significance of the surcharge increase is reflected somewhat in the fact that West India agents were instructed to discuss the increase with scrap iron, bone, tankage and canned goods shippers so that they could adjust their selling prices accordingly. Ultimately, the increase is passed onto the consumer.

5. Demurrage

According to Mr. J. J. Buttari, Operations Manager, Florida-Havana Railroad Car Ferry Service, the demurrage charges to consignees are as follows:

$2.80 per day per can for the first two days

$4.20 per day per car for the next three days

$7.00 per day per car for each additional day.

The effect on commodities which the rate was based on 100 pounds plus the then current ten cents per 100 pounds, was that the same rate resulted as if it was per ton. Total Cuban exports of fifteen cents was approved instead of the then current ten cent Cuban surcharge. The equalization applies on all the commodities that have a rate plus ten surcharge, namely: tobacco, canned goods, wrapping paper, oil products, glycerine, etc.

No increase was effected on fruits and vegetables which have a base rate that includes the surcharge. These commodities include pineapples - green or bulk - avocados, tomatoes and other fresh vegetables that are shipped from Cuba during the harvest period.

The marketing significance of the surcharge increase is reflected somewhat in the fact that East India exports were instructed to discuss the [illegible] with sorg [illegible], tobacco and canned goods shippers so that their social welfare activities prize accordingly. Ultimately, the increase is passed to the consumer.

5. Demurrage

According to Mr. W. J. Bustard, Operations Manager, Florida-Texas Railroad Car Ferry Service, the demurrage charges to consignees are as follows:

$20.00 per day per car for the first two days

$4.00 per day per car for the next three days

$7.00 per day per car for each additional day.

The charges serve the function of removing the temptation to consignees of using the car for storage.

6. Documentation

Procedure in Documentation and Collection

The field offices make the booking after contacting the shipper. The shippers make up the following documents:

Shipper's Export Declaration

One notarized copy of the Commercial Invoice

Commercial Invoice in quintuplicate:

one signed original

two signed copies

two unsigned copies

Consular Invoice in sextuplicate

Bank Draft with instructions

From the information in these documents the field office makes up the ocean bill of lading and presents it to the shipper for signing. (See Appendix II) The signed documents are then forwarded to the West Palm Beach Terminal Company.

When the signed bill of lading is delivered to the West Palm Beach Terminal Company, West Palm Beach, Florida, by the West India F. and S. S. Company, the West Palm Beach Terminal Company presents the necessary documents to the Cuban Consul for visa, after which they attach the following documents to the draft:

Original visaed Commercial Invoice and

two unsigned copies

Original visaed Bill of Lading and Second

and Third Originals of the Bill of Lading

Original visaed Consular Invoice

The draft is then forwarded on the same vessel on which the merchandise is being shipped and upon arrival is presented to the First National Bank of Boston at Havana for collection.

Visa of Shipment

Documents must be visaed by the Cuban Consul in Palm Beach before West India's ships sail, or the ship will arrive in Havana prior to the documents being visaed and the consignee is fined. The fine is double the amount of the Consular fees.

A tight operating problem of West India's is getting shipments visaed on the weekends. Generally, in order to clear for the weekend, the cars and documents must be in the Port of Palm Beach by late Thursday. If a car of meat or perishables that need icing arrives on Friday, there is a good possibility of it having to be iced until Monday. Normally these cars are iced when they arrive and go directly out. The icing charge at the port is $7.50 per ton. A number of perishable shipments require two or three icing charges.

Prepaid Freight

Care must be taken by West India's agents in correspondence with shippers that they do not get the impression that West India F. and S. S. Company collects freight charges in Cuba. If a car arrives at the Port of Palm Beach, and the shipper wishes the consignee to pay the ocean freight, West India calls or cables Cuba to contact the consignee and collect a draft on an

American bank. This draft is forwarded to the Port of Palm Beach and only when it is in West India's possession does the shipment go forward. This is in accordance with the stipulations of the Maritime Commission; which are renewed with the annual filing of their tariff by the West India F. and S. S. Company.

7. Equalization

West India F. and S. S. Company, as a member of the Gulf and South Atlantic-Havana Steamship Conference, is subject to the following provision on equalization: "On shipments in continuous transit from interior points in the United States, Mexico and Canada, carriers reserve the right to modify rates published herein, so as to make the rail and water rates from the interior point to Havana, Cuba, via port of shipment equal the rail and water rates from the same interior point to Havana, Cuba, via any other port, subject to specific confirmation by the Carriers." (See: Freight Tariff G-8, Item 30, Section L, Appendix, II)

On a heavily loaded carload West India will equalize the difference in the inland rail rates between midwest points of origin and New Orleans as compared to Palm Beach. They subtract the difference in the inland transportation rate from the ocean charges in order to give shippers the same through rate. Actually, equalization occurs only in cases where they have to meet strong competition. At the present time (Summer, 1952) there is no competitive situation on tank cars or bulk materials, either out of New Orleans or New York City, and if the condition

continues West India may be forced to discontinue equalizing on those items.

Shippers are specifically requested to load their cars to the greatest possible capacity. The point in this is that a 40,000 pound carload takes as much space on a railroad car ferry as does an 80,000 pound carload, and the revenue to West India is doubled by an 80,000 pound carload. Further, "The West India Fruit and Steamship Company reserves the right to specify the minimum weight per car (but not less than tariff minimum) it will accept on any carload shipments moving in connection with its car carrying vessel." (See: Freight Tariff G-8, Item 30, Section 3, Appendix II)

In commenting on equalization, D. E. Taylor says: "In our equalization agreement, we do not have to equalize on any shipment, and on all special movements that require special cars do not offer any shipper or consignee equalization on their shipments. The full ocean freight charges as outlined in the tariff must be assessed." (Letter to all company representatives, February 22, 1951)

8. Icing

The Florida East Coast Railway generally picks up Havana bound cars at Jacksonville, Florida, and delivers these cars to the interchange at Port of Palm Beach as quickly as possible. The minute the cars are dropped off at the interchange for Port of Palm Beach, they become West India's responsibility. The cars are billed and consigned to the West Palm Beach Terminal Company

which is the agent and freight forwarding unit of the parent company, West India Fruit and Steamship Company, Inc.

If a car of perishables is delivered to the Terminal Company on Friday, it usually cannot be delivered in Havana until Monday morning, some 72 hours later. It is essential, therefore, that the car be iced and it is up to the Terminal Company to reice it. For this service they charge $7.50 per ton for ice and $2.25 per hundred pounds for salt.

A car needing icing must be switched into a special track to be iced and then switched out again. Switching charges are $8.28 per switch; the two switches for icing cost $16.56. [32] The Terminal Company must absorb this charge.

In regular station icing practice, where the service is performed by the railroad, the railroad publishes a tariff and regardless of the costs they must absorb any excess in order to comply with the tariff. But in addition to their published charges, they also assess switching charges for switching the cars out of line that need to be serviced. So if the direct icing charges seem more expensive at Port of Palm Beach, considering that the Terminal Company absorbs the switching costs, the charges are not so far out of line with those of the major railroads.

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32. Interstate Commerce Commission Report and Order of April 14, 1952, Ex Parte 175, "Increased Freight Rates," authorizes a general increase of 15 per cent on switching charges. Effective May 2, 1952, West India increased the switching charge to $9.88 per car.

9. Insurance

The West Palm Beach Terminal Company, agents for the West India Fruit and Steamship Company, Inc., issue the insurance certificates for shipments. The Terminal Company makes the insurance certificates payable to the party designated in the shipper's letter of instruction. The cargo is covered from the Port of Palm Beach to Havana while on the ships of West India F. and S. S. Company.

The policies are full coverage policies and it makes no difference whether the shipments are carload ones, less than carload, or stowage location. The all risk coverage is at the rate of twenty cents per $100 valuation and includes marine and war risk, pilferage, breakage, etc. All the certificates that the West Palm Beach Terminal Company issues are exactly alike and the same policy is issued on the same type of cargo moving on West India vessels. The certificates are numbered and forwarded in sets to the West Palm Beach Terminal Company from the March and McLennon Company, 70 Pine Street, New York City.

10. Maximum Height and Width

Based on the yard superintendent's measurements, the following are the maximums: from the top of the rail to the extreme height of the car or package, fifteen feet eight inches; width, ten feet ten inches.

<u>Maximum Clearances on Cuban Railways between Havana and Santa Clara</u>

The United Railways of Havana, Engineering Department,

9. Insurance

The West Palm Beach Terminal Company, agents for the West India Fruit and Steamship Company, Inc., issue the insurance certificates for shipments. The Terminal Company issues the insurance certificates payable to the party designated in the shipper's letter of instruction. The cargo is covered from the Port of Palm Beach to Havana while on the wharf or the West India, S. and S. Company.

The policies are full coverage policies and it makes no difference whether the shipments are certified cars, less than carload, or storage loads. The all risk coverage is at the rate of twenty cents per $100 valuation for including marine war risk, pilferage, breakage, etc. All the certificates issued by the West Palm Beach Terminal Company covers the cargo while and the same policy is issued on the same type of cargo moving on West India vessels. The certificates are numbered and forwarded in sets to the West Palm Beach Terminal Company from the Marsh and Adamson Company, 70 Pine Street, New York City.

10. Maximum Height and Width

Based on the yard superintendent's measurements, the following are the maximum: from the top of the rail to the extreme height of the car or cargo, fifteen feet six inches; width, ten feet ten inches.

What are Discounts or Other Inducements between Harbor and Inland Points

The United Railway of Havana, regulating tariffs,

states that the standard clearance between Havana and Santa Clara from the top of the rail is sixteen feet three inches, with a maximum width at this height of five feet four inches. The maximum width from car floor up to a height of twelve feet nine inches is eleven feet two inches, and from this height up to sixteen feet three inches which is the maximum height from the top of rail, and must be five feet four inches.

11. Minimum Weights and Loading Requirements

In order to handle as much tonnage as possible for each shipper and to cooperate and use the least number of railroad cars, the following minimum weights are required for a booking permit: (See Page 86 for table.)

MINIMUM WEIGHTS REQUIRED FOR A BOOKING PERMIT

Commodity	Minimum Weights Refrigerator Cars 36 feet	Minimum Weights 40 feet
Sweet pickle meats or hams, loose	40,000 pounds	45,000 pounds
Dry salt meat, loose	45,000 "	50,000 pounds
Day salt meat, boxed, cased	50,000 "	ANY SIZE CAR
Canned meats either loaded with dry salt meat in boxes or other commodities in cans or boxes	50,000 "	ANY SIZE CAR
Hams or all kinds of meat in boxes	50,000 "	ANY SIZE CAR
Lard in tierces, cans, cases	60,000 "	ANY SIZE CAR
Canned milk, evaporated or condenced	80,000 "	ANY SIZE CAR
Feed, poultry or animal	80,000 "	ANY SIZE CAR
Eggs	Minimum, 600 cases per car	
Potatoes	45,000 pounds	ANY SIZE CAR
Onions	40,000 "	" " "
Brick	80,000 "	" " "
Beans	80,000 "	" " "
Starch	80,000 "	" " "
Grits	80,000 "	" " "
Malt	80,000 "	" " "
Tinplate	100,000 "	" " "

ALL HEAVY COMMODITIES IN BULK SHOULD BE BOOKED ON THE BASIS OF 100,000 POUNDS PER CAR

Source: Executive Order, D. E. Taylor, March 19, 1951, West Palm Beach, Florida

Generally on the unlisted commodities, the minimum weight requirement is for the shipper to load the maximum weight of the car.

The Association of American Railroads requested West India Company to cooperate to the fullest extent in using the least number of cars possible in their service to Cuba. If they permitted shippers to load any quantity they wished, the railroads would probably stop West India from taking cars to Cuba.

A further element of compulsion enters the picture in the issue of Service Order No. 878 outlining requirements for loading canned goods and foodstuffs, as prescribed at a session of the Interstate Commerce Commission:

> Upon representations of the Defense Transport Administration, outlining the urgent need in the interest of national defense for more efficient utilization of freight cars in the transportation of canned goods and foodstuffs, the following requirements shall become effective July 1, 1951; No carrier shall accept for transportation at point of origin, forward from point of origin, or transport within any terminal area, any carload shipments of canned goods and foodstuffs, canned, preserved or prepared, (not cold-pack nor frozen) in packages unless such car when forwarded from point of origin, is loaded in accordance with one of the following requirements: (1) The quantity loaded shall be at least equal in weight to the marked capacity in pounds stenciled on the car, or as shown under the caption, Capacity, (Not load limit) in the Official Railroad Equipment Register; (2) When the car is loaded to full visible capacity or to a weight of at least 65,000 pounds.[33]

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33. Division 3, Washington, D. C., June 11, 1951.

12. Miscellaneous

Storage Rate

The rate is seventy-six cents per net ton of 2,000 pounds, plus six per cent for thirty days or fraction thereof.

Increased Freight Rates, 1952

The Interstate Commerce Commission's Report and Order of April 14th in Ex Parte 175 authorize a general increase of fifteen per cent. Effective May 2, 1952, the switching charge is increased to $9.88 per car. On shipments in continuous transit between Port of Palm Beach and points in the United States, the increased switching charge was collected on shipments originating on and after May 2, 1952.

Tank Car Bookings

A clause is generally added in the booking that if tank cars are returned to the States within thirth days they will be returned free and if held in Cuba over thirty days, the northbound rate if $400 per tank car. The purpose is to prevent the West India backlog of cars from increasing and anticipates the consignee's habit of not unloading unless some penalty is assessed.

Duties

Some problem is encountered in duty assessments on fresh fruit. The writer found that the majority of duties are based on the value of the commodity itself. Thus -- water in a pineapple is not dutiable.

12. Miscellaneous

Storage Rate

The rate is seventy-six cents per cwt or 8,000 pounds, plus six per cent for thirty days or fraction thereof.

Increased Freight Rates, 1952

The Interstate Commerce Commission's Report and Order of April 14th in Ex Parte 174 authorizes a general increase of fifteen per cent. Effective May 8, 1952, the switching charge is increased to $9.00 per car. On shipments in continuous transit between Port of Palm Beach and points in the United States, the increased switching charge was collected on shipments originating on and after May 8, 1952.

Tank Car Booking

A clause is generally added in the booking that if tank cars are returned to the terminal within thirty days they will be returned free and if held in port over thirty days, the round-bound rate if $400 per tank car. The purpose is to prevent the West India booking of cars from increasing and indicates the consignee's habit of not unloading unless some penalty is assessed.

Duties

Some problem is encountered in duty assessment on fresh fruit. The writer found that the majority of duties are based on the value of the commodity itself. Duty -- water in a citrus is not dutiable.

The Cuban Problem

An interesting feature of the export marketing stress in this paper is the Cuban railway problem. Looking at the Cuban railroad picture in totum, "only some 2,600 of the 10,000 miles of railway in Cuba are worked as public-service lines; the remainder are private concerns owned and worked by the sugar industry." [34] The two groups owning the public-service lines are the United Railways of Havana, a British Company, and the Consolidated Railroads of Cuba, an American company. The main concern in this paper is with the United Railways of Havana, as they operate in the western part of the island and make direct contact with the Florida-Havana Railroad Car Ferry service in the Arsenal Yard at Havana. As such they are the next, and generally last, carrier link in the marketing channel to the consignee.

The United Railways of the Havana and Regla Warehouses Limited was formed in 1898 to take over and construct various railways and other enterprises in Cuba. Up until 1929 the company thrived on the huge sugar and tobacco business that developed. During the '30's the company suffered rather heavily from unregulated road competition as the road system in the western part of the island developed.

The World War II period saw a shortage of gasoline in Cuba, and the necessity of convoys for shipping, concentrated the ex-

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34. "The Future of the Cuban Railways," The Railway Gazette, March 16, 1951, Vol. 94, No. 11, p. 289.

Appendix to Chapter V

The Cuban Problem

Possible Main Approaches Needed to Lower the Cost and Raise the Efficiency of Cargo Handling in Physical Distribution

port traffic at the ports of Havana and Santiago. Though revenues doubled, no apparent improvement in the company's financial condition resulted. The hidden factor here was that by the end of the war, the Cuban government owed $4,250,000 to the company for services rendered, and an additional sum of $8,500,000 for government expropriated land.

After the war, road competition returned but the United Railways main concern now was labor. The employees union put pressure on the government to refuse to agree to a reduction of the railway staff from its wartime peak to the number actually required for the post-war traffic.

June 1949 found the United Railways unable to meet its wages and supplies payments and the Cuban government appointed an Interventor or Receiver.

Despite the rather valiant efforts of the Receiver, losses mounted. The annual losses of the United Railways which, in 1949, were $600,00 a year, now exceed $3,000,000 a year.

The Cuban government requested an International Bank study of the Cuban economy, and a Bank mission arrived in late July, 1950. The general purpose of the mission was "to make a comprehensive survey of the economy in order to determine its full potentialities and to make specific proposals for future developments. [35]

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35. Sixth Annual Report to the Board of Governors, 1950-1951, International Bank for reconstruction and Development, p. 35.

The railway problem, however, received immediate attention and the mission brought out a special interim report on the matter in early 1951.[36] After a general survey of the problem, specific arguments against abolition of the railways in favor of road development, despite the shortness of many hauls, are advanced. A cause-effect analysis of the present situation is made.

The report recommends the formation of a holding company for the operation of both the United and the Consolidated Railways. The board of the holding company would grant representation to the major users of the railways, the government and the sugar interests. This would pend on the development of government legislation guaranteeing payment of government debts to both railways, reduction of railway staff and regulation of road competition. The report further recommends against nationalization.

Shortly after the release of the mission's report, the Railway Trade Union started agitating for nationalization of the United Railways, with the provision that its employees should have the status of private enterprise employees and not that of Civil Servants. A similar, somewhat childish, inconsistency was reflected in the refusal of Cuban officials to tender copies of Decree No. 5 to writer. Even though the Decree is enforced as national law against certain distribution procedures

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36. Comment and Recommendations of the Cuban Mission with Respect to the Public Service Railways of Cuba, International Bank for Reconstruction and Development, January 10, 1951.

The railway problem, however, received immediate attention and the mission brought out a special train with reports on the mission in early June.[36] After a general review of the problem, specific grievances against abolition of the railways in favor of road development, despite the economics of long haul, are advanced. A cause-effect analysis of the present situation is made.

The report recommends the formation of a public company for the operation of both the United and the Demobilized Railways. The board of the holding company would grant repre-sentation to the major users of the railways, the provinces and the sugar interests. This would serve on the new-formed government legislation guaranteeing the rights of government ownership in both railways, reduction of railway tariff and regulation of road competition. The report further recommends against inter-alization.

Shortly after the release of the mission's report, the Railway Trade Union advanced notice for nationalization of the United Railways, with the provision that its employees should have the status of private enterprise employees and not that of civil servants. A strike, somewhat unlikely, threat-ened was relinquished in the refusal of Cuban officials to recognize of Decree No. 3 by writer. Even though the decree is an issued as national law against certain disorganizing procedures

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36. Comment and Recommendations of the Cuban Mission, which was given to the Public Service Commission of Cuba, International Bank for Reconstruction and Development, January 3, 1950.

(see below), the officials were apparently reluctant that the existance of the Decree should become common knowledge.

One of the first acts of General Batista after his bloodless coup d'etat of March 11, 1952, was to convene with the sugar interests to discuss the United Railways. [37] It had been suggested for some time that the sugar interests should buy and operate the railways. The sugar companies enjoying transportation at United Railways expense are naturally reluctant to change to a position of ownership.

In January, 1948, a Cuban presidential decree was issued that had the effect of perpetuating the employment of Cuban nationals by foreign firms, except for discharge for "just cause." The United States Department of State filed a protest. [38]

The decree places a sales agent of a foreigh firm in Cuba in a position analogous to that of an employee, which is a somewhat erroneous appraisal of a true employee-employer relationship. Agents of foreign firms generally act for more than one firm and, as a general rule, the firm has no control over the agency organization as such.

In showing "just cause" for making a change in its Cuban representation, a foreign firm must prove in proceedings before the Ministry of Labor, one of the following conditions: An infringement or violation of the provisions of the agreement under the terms of which the agency or representation has been conferred;

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37. "General Batista takes over Government by seizing Camp Columbia and Pres. Palace," New York Times, March 11, 1952, p. 1. Also see: "Batista proves thefts of public funds and equipment during Prio Administration," New York Times, March 25, 1952, p. 5.

38. "U. S. Protests New Cuban Labor Decree Shackling American Firms," Oil, Paint and Drug Reporter, Vol. 153, January 12, 1949, p.5.

fraud or abuse of confidence in the matters entrusted to the agent or distributor; lack of fitness or negligence on the part of the agent or distributor; continued decrease in the sales or distribution of the articles, for reasons that may be imputed to the agent or distributor; divulgence of the secrets of the trade or industry in question; any act imputable to the agent or distributor which is detrimental to the effective introduction or distribution of the products handled by the agency or trust.

The proceedings are handled in accord with the rules established in Article 70 of Decree No. 798, April 13, 1938, which established rules governing the termination of employment as between employers and employees in Cuba. In establishing a "just cause" all evidence produced within Cuba or abroad is admitted.

Foreign concerns which violate the decree are not permitted to operate in Cuba or establish agencies.

Before closing, some mention of Decree No. 5, a presidential decree ratified by the assembly should be made. Decree No. 5 is more commonly known as the "White Cargo" Decree: It states in effect that all packaged goods (white cargo) entering Cuba must first be unloaded into warehouses before being sent onto the consignees. The purpose in this is to "make work" for Cuban stevedores, and help alleviate the labor surplus problem. The immediate impact of this act was to force Seatrain Lines, Inc. to discontinue service to Cuba. The West India Company has been able to operate under the rule because of the large amount of bulk traffic carried by the Florida-Havana Car Ferry service - bulk cargo which, obviously, is exempted by the Decree.

Possible Main Approaches Needed to Lower the Cost and Raise the Efficiency of Cargo Handling in Physical Distribution

As part of the overall concern with distribution cost reduction factors in this paper, while developing the major investigation, above, the writer simultaneously worked out a group of possible approaches that future researchers may care to use for problem orientation purposes.

To aid the reader in grasping the urgency of the need for more research in this sector of our distribution universe, the writer submits the following observation:

> The paradoxical fact is that shore labor costs, once a minor factor in the operation of a steamship service, today exceed in many instances the combined cost of vessel depreciation, insurance, crew wages, maintenance and fuel oil.... A quick turnaround is essential, since in port all operating expenses, except fuel, keep ticking away. [39]

Further insight on the problem is revealed as follows:

> Most steamship companies are unwilling to disclose loss data, in part out of fear of alarming shippers and informing rivals, and in part out of the apathy that characterizes so much of port operation. [40]

1. Port Facilities and Organization Analysis

There are three major methods of transferring goods into and out of a given port area:

a. The belt line railway

b. Lighterage

c. Cartage by motor carrier.

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39. "Last of the Business Rackets," Fortune, Vol. 43, June, 1951, p. 91. For further orientation see: "The Shipping Men," Fortune, Vol. 39, March, 1949, p. 103; and "The Maritime Unions," Fortune, Vol. 16, September 1937.

40. Ibid.

All three of these methods employed, especially cartage by motor carrier, are long overdue for reexamination and research.

An inland originating shipment of general cargo may be destined for any number of consignees. One of the functions of a pier shed or wharf apron is to provide place utility while the goods are broken into destination lots, sorted, inspected by customs, and delivered to dockside or stowed as the lot shipment demands. Further research on containers may establish the feasibility of consolidating the lots of identical destination packages at their source, providing for customs inspection at their source, and then stowing and sealing the lots in containers. Routines could be established for passing the sealed containers through customs areas without the usual break-bulk inspection.

2. Ship Hatches, Primarily Design Research

Under the present system, one of the most important single factors in cargo working rates is the number, size, arrangement and covering methods of hatches. Cargo space increases as the cube of linear dimensions, while current types of hatch openings increase only as their square. This fact then has a direct effect on the considerations necessary in pier length and equipment improvement.

Working efficiencies on a comparative basis can be determined by comparing cargo tons worked over every linear foot of equipped pier. For instance, the port of Marseilles is supposed

All three of these methods employed, especially carrying for motor carrier, are long overdue for reorganization and management.

An Indiana ordinance requiring shipment of perishable cargo may be destined for any number of consignees. One of the functions of a plan based or shaped upon it is to provide ways whereby the goods are broken into manageable lots, marked, inspected by customs, and delivered to consignees or stored as the lot arrangement demands. Further research on consignees may establish the feasibility of consolidating the lots of individual consignation packages at their source, providing for express transportation at their source, and then sorting and sending the lots to consignees. Routines could be established for unpacking the sealed containers through customs areas without the usual case-by-case inspection.

2. Ship Hatches, Primarily Designed Less-Cost.

Under the present system, one of the most important direct factors in cargo working rates is the number, size, arrangement and covering methods of hatches. Cargo space increases as the cube of linear dimensions, while different types of hatch openings increase only as their square. This fact then has a direct effect on the consideration necessary in ship design and equipment improvement.

Working efficiencies on a comparative basis can be determined by comparing cargo tons worked over every linear foot of equipped pier. For instance, the port of Marseilles in numerous

to pull a yearly average of better than 1,500 tons per linear foot, while the pull at the much maligned New York piers is but 150 tons. Further investigation and verification of the elements is obviously needed before any useful contributory significance to the overall problem can be determined.

3. Pier Design

Research on the overall design of the pier obviously involves technical knowledge of a highly specialized nature. However, the outside areas of the shed, platform areas and the congestion problem (especially the New York Piers) is less a test of design skills than it is a test of the analytical ability of the distribution researcher.

The inside of the shed areas are quite obviously in need of investigation. The possible use of overhead traveling cranes, traveling the entire length of the shed, is open to investigation.

4. Cargo Handling Equipment on Vessels and Piers

Three basic approaches to research along these lines lie in the following apparent needs:

a. Loads should be pulled from the dock and spotted in the hold far more readily than under present methods.

b. Heavier sling loads at much higher speeds.

c. Cargo falls do not reach all corners of holds by any means. Extension of fall

range would permit drafts to be worked directly without the present skidding and snaking.

These last considerations are especially important because the speed at which the holds are worked directly determines the rate at which loads are pulled off the docks. And with the labor cost rising, break-bulk carriers are at an increasing disadvantage.

Estimates by Frazier Bailey, a maritime spokesman, place the total cost of cargo handling to break-bulk carriers as from fifty per cent to sixty per cent of the freight rate charged for the complete transport service. When an item of operating cost absorbs half or more of the total receipts the need for research becomes somewhat self-evident.

Martin Thomas Langan

BIBLIOGRAPHY

PERIODICALS AND DOCUMENTS

ARCHIV FÜR EISENBAHNWESEN

--- Baltzer, G., "Die Vermendung von Eisenbahn Fährbooten auf den grossen afrikanischen Seen dür den Betreib der Kap-Kairo Eisen bahn," October, 1920, pp. 794, 801.

BULLETIN OF THE INTERNATIONAL RAILWAY CONGRESS

--- Fridericia, W., "General Remarks Upon the Construction and Working of Railway Steam Ferries in Denmark and Elsewhere," Vol. 12, p. 500, May, 1898, pp. 496, 497.

CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

--- "Transportation Lines on the Great Lakes," 1952, Series #3, pp. 55, 58, 64, 78.

THE ELECTRICIAN

--- "Train Ferries and Exports," Vol. 106, February 27, 1931, p. 313.
--- "Transport in Italy," Vol. 109, August 5, 1932, p. 171.

THE ENGINEER

--- "Train Ferries for the Irish Channel," Vol. 127, January 17, 1919, p. 60.
--- "The Train Ferries," Vol. 137, February 24, 1924, p. 221
--- "The Dover Train Ferry," Vol. 162, October 9, 1936, p. 377.
--- "The Swedish Train Ferry Malmölus," Vol. 180, October 5, 1945, p. 271.
--- Hammond, R., "An Engineer Looks at Argentina", Vol. 182, August 18, 1948, pp. 138, 139.
--- "Ice-Breaking Car Ferry Abegweit," Vol. 184, November 21, 1947, p. 489.
--- Tripp, G. W., "Motor Vessel Norfolk Ferry," Vol. 192, August 3, 1951, p. 155.
--- "French Railways Train Ferry M. V. Saint Germain," Vol. 192, September 14, 1951, p. 331.

ENGINEERING

--- "Transport by Train Ferries," Vol. 128, October 4, 1929, p. 442.
--- "The Nanking-Pukow Train Ferry", Vol. 134, October 29, 1932, p. 518.
--- "Ice-Breaking Rail Ferry for Canada," Vol. 158, August 25, 1941, p. 156.

ENGINEERING NEWS-RECORD

--- "Car Ferry for an African Railway," Vol. 93, October 30, 1924, p. 721.
--- Nawa, M., "New Railway Train-Ferry in Japan," Vol. 98, January 27, 1927, p. 148.

FORTUNE

--- "The Maritime Unions," Vol. 16, September 1937.
--- "The Shipping Men," Vol. 39, March, 1949, p. 103.
--- "Last of the Business Rackets," Vol. 43, June, 1951, p. 91

GÉNIE CIVIL

--- "Les ferry boats miliares franco-anglais," Vol. 74, February 22, 1919, pp. 141-146.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

--- "Sixth Annual Report to the Board of Governors," 1950-1951, p. 35.
--- "Comment and Recommendations of the Cuban Mission with Respect to the Public Service Railways of Cuba," January 10, 1951.

INTERSTATE COMMERCE COMMISSION

--- Docket 25565
--- Docket 24119
--- Service Order No. 878, Division 3, Washington, D. C., June 11, 1951.
--- "Selected Operating Statistics of Carriers by Inland and Coastal Waterways and Maritime Carriers," January, 1952, p. 41.
--- "Increased Freight Rates," Report and Order of April 14, 1952, Ex Parte 175.

MANUFACTURERS RECORD

--- "Seatrains New Link New York, Havana and New Orleans," Vol. 101, November, 1932, p. 32.

MARINE ENGINEERING AND SHIPPING REVIEW

--- "Train Ferries," Vol. 35, November, 1930, p. 616.
--- "Seatrain New York," Vol. 37, October, 1932.
--- "Seatrain Texas, Car Carrier," Vol. 45, November 1940, p. 110.
--- "Worlds Largest Train Ferry Launched," Vol. 51, November, 1946, p. 85.
--- "Canadian Car Ferry Abegweit," Vol. 52, August, 1947, p. 86.
--- "Danish Motor Train Ferry Fyn," Vol. 52, September 1947, p. 73.
--- "Waterman Steamship Company Inaugurates Transportainer Service," Vol. 54, May 1949, p. 63.
--- "Car Ferry New Grand Haven," Vol. 56, June 1951, p. 53.
--- "C & O Launches First of Two Car Ferries for Lakes Service," Vol. 57, February, 1952, p. 80.
--- "Cargo Handling", A. C. Rohn, December, 1945, p. 150.

MARINE REVIEW

--- "Freight Cars Carried at Low Cost Between New Orleans and Havana," Vol. 59, February 1929, p. 22.

MECHANICAL HANDLING

--- "Unit-handling of Steamship Freight," Vol. 34, August, 1947, p. 429.

MÉMOIRE ET COMPTE RENDU DES TRAVAUX DE LA SOCIÉTÉ DES INGÉNIEURS CIVILS

--- Ravier, M. L., "Sur Les Bacs Porte-Trains," Bulletin 78, 1925, p. 526.

MEMOIRS DE LA SOCIÉTÉ DES INGÉNIEURS CIVILS DE FRANCE

--- "Les Moyens de Communication a travers le-Pas-de Calais et la question des ferryboats," June, 1908.

MINISTRY OF WAYS AND COMMUNICATIONS

--- "Guide to the Great Siberian Railway," St. Petersburg, 1900, pp. 337, 338.

NATIONAL PETROLEUM NEWS

--- "Seatrain Deal Enables Jobber to Buy No. 2. Fuel at the Gulf," Vol. 41, December 14, 1949, p. 7.

NEW YORK TIMES

--- "General Batista takes over Government by seizing Camp Columbia and Pres. Palace," March 11, 1952, p. 1.
--- "Batista proves thefts of public funds and equipment during Prio Administration," March 25, 1952, p. 5.

NOTRE TRAFIC

--- Dubaux, M., "Rétablissement du service par ferryboat de Dunkerque à Douvres," No. 36, January, 1948, p. 10.

OIL, PAINT, AND DRUG REPORTER

--- "U. S. Protests New Cuban Labor Decree Shackling American Firms," Vol. 153, January 12, 1949, p. 5.

PUBLICATION OF THE INSTITUTION OF CIVIL ENGINEERS

--- Greathead, James Merriam, "The Construction and operation of a temporary train-ferry on the Orange River at Upington, South Africa," No. 4179, London, 1917, p. 18.

RAILWAY AGE

--- "The English Channel Train Ferry," Vol. 66, February 28, 1919, p. 509.
--- "A Multiple Deck Vessel for Car Ferry Service," Vol. 73, September 15, 1928, p. 492.
---"R. R. Ferry Set-up Largest in World," Vol. 103, September 4, 1937, p. 321.
--- Arora, M., "Assam Railway," Vol. 119, July 7, 1945, pp. 34, 35.
--- "Army Railroading in Bengal and Assam," Vol. 119, July 7, 1945, pp. 34, 35.
--- Dietrich, C. H., "Loss and Damage Toll," Vol. 120, January 19, 1946, pp. 189, 193.
--- "Rails across Lake Michigan," Vol. 132, March 3, 1952, p. 55.
--- "Car ferries aid transport across Lake Michigan," Vol. 79, September 5, 1925, p. 430.

RAILWAY AGE GAZETTE

--- "New Car Ferry of the Florida East Coast Railway," Vol. 58, No. 5, January 29, 1915, p. 188.

RAILWAY GAZETTE

--- "Denmark," Vol. 70, May 12, 1939, p. 774.
--- "Train-ferry Across Bosphorus," Vol. 71, July 14, 1939, p. 74.
--- "The Future of the Cuban Railways," Vol. 94, March 16, 1951, p. 289.

RAILWAY GAZETTE (Special Editions)

--- "Egyptian State Railways," Special African Railway Number, November 28, 1911, p. 31.
--- "Lagos Railway," Special African Railway Number, November 28, 1911, p. 29.
--- "The Tanganyika Railways," Special African Railway Number, November 21, 1927, p. 99.
--- "The Nigerian Railway," Special African Railway Number, December 5, 1927, p. 86.
--- "Recent Railway Development in China," Special Overseas Railways Edition, November 28, 1934, p. 57.

SCIENTIFIC AMERICAN

--- "Railroad Ferry Service Between England and France," Vol. 120, January 11, 1919, p. 21.
--- Allender, S. W., "A New Era in Transportation," Vol. 127, August, 1922, p. 24.
--- "A Ship That Carries Trains," Vol. 141, July, 1929, p. 21.

SCIENTIFIC AMERICAN SUPPLEMENT

--- "The Car Ferry in Freight and Passenger Service," Vol. 77, February 7, 1912, p. 89.
--- "To Cuba by Rail," Vol. 74, January 16, 1915, p. 40.
--- "Train Ferries," Vol. 83, January 20, 1917, p. 39.

BOOKS CITED

Car Builders Cyclopedia, Section 17.

Horn, P., International Trade Principles and Practices, 1949, p. 248.

Henius, Frank G., Dictionary of Foreign Trade, 1947, p. 552.

"Treatment of Weights", Exporters Encyclopedia, 1951, p. 1826.

National Railway Publication Co., The Official Guide to the Railways, March, 1952.

Rand McNally Co., Rand McNally Commercial Atlas, 83rd Ed.
Locklin, D. P., Economics of Transportation, 1938, p. 17.

RESEARCH STUDIES CITED

NORTHWESTERN UNIVERSITY SCHOOL OF COMMERCE

--- Berge and Loftus, Diesel Motor Trains, 1949, p. 29.

THE TWENTIETH CENTURY FUND

--- Stewart and Dewhurst, Does Distribution Cost Too Much, 1939, pp. 118, 211.