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JAN 1924

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The CHICAGO, MILWAUKEE
& ST. PAUL RAILWAY

We take pleasure in acknowledging the kindness of the General Electric Company in allowing us to reproduce the drawing on the cover of this book; also for the use of the illustrations showing the "Olympian" in the Cascades, and the profile of the electrified divisions of the Chicago, Milwaukee & St. Paul Railway.

The CHICAGO, MILWAUKEE
& ST. PAUL RAILWAY

A BRIEF ACCOUNT OF THE HISTORY OF
THIS PIONEER AMERICAN TRANSPORTA-
TION SYSTEM AND ITS "EMPIRE BUILDING"
PROGRESS—LEADING UP TO ITS PRESENT
POSITION AS AN ESSENTIAL MEMBER OF
OUR TRANS-CONTINENTAL RAILROAD LINES



THE NATIONAL CITY COMPANY

HEAD OFFICE, NATIONAL CITY BANK BUILDING, NEW YORK

Offices in more than fifty leading cities of the United States and Canada



THE "OLYMPIAN" IN THE CASCADES

" No grinding, no jerking, no puffing, no pulling, no straining, no disturbed slumbers—just a keen sense of moving swiftly, of being propelled by power vastly in excess of requirements. You ride with ease—you are at ease—it is the very last word in transportation."—EDISON

The CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

THE history of the Chicago, Milwaukee & St. Paul since its beginning is, in a general way, a counterpart of most of the great railway systems of the country, being fraught with romance. Like other large systems, it began with a consolidation of numerous small railroads and the expansion into the present system was the result of foresight on the part of the road's pioneer management.

The chronological story of the St. Paul goes far and beyond railroading and the consolidation of roads. It reaches into the very depths of empire building—the change of bleak and barren waste lands into prosperous cities and towns, the centers of productive agricultural, lumber and mining enterprises now of world importance. This is evident today by the location of the Company's various lines and branches, which have formed the very arteries of progress over the territory they serve.

A study of the industrial map of the United States, in connection with a map of the Chicago, Milwaukee & St. Paul System, discloses a remarkable fact in railroad history—namely, that along its lines is produced every kind of mineral taken from the soil of the United States; every variety of lumber milled in the country may be found along the Company's lines; and this is also true of every manufactured article produced in any quantity in the United States.

SERVING THE GREAT WEST AND MIDDLE WEST

Another important feature of the Chicago, Milwaukee & St. Paul Railway is that in normal times it has a well sustained two way freight traffic on the greater portion of its lines. The lumber, ore and metals gathered from sources in Washington, Oregon, Montana, Idaho, Minnesota and Wisconsin, as well as the products of animals, grain and other products of agriculture in those states and in the Dakotas, Iowa and Illinois, are moved to the centers of their big markets in St. Paul, Minneapolis and Chicago, as well as to the large local markets of the Middlewest. The westbound traffic is composed largely of the movement of big quantities of coal, products of manufacture, and merchandise, including farm implements, fertilizers and machinery. In addition, the St. Paul moves a large amount of export and import products. So extensive has this grown in the last decade that one of the largest steamship lines on the Pacific has entered into a close interchange with the St. Paul and uses that Company's trademark or designation on its steamships in connection with its own.

The St. Paul, with its 10,808 miles extending from Indiana to Washington, serves twelve states with termini at the following important centers: Chicago, Ill., Milwaukee, Wis., Omaha, Neb., Kansas City, Mo., St. Paul and Minneapolis, Minn., Seattle and Tacoma, Wash. The system is so well located geographically that it is never confronted with the serious problem of loss of business to competitors, and, as Mr. H. E. Byram, President of the Road recently expressed it, when there is any traffic to move, the St. Paul gets its share.

THREE IMPORTANT PERIODS OF DEVELOPMENT

The development of the St. Paul may be divided into three periods: The first period from the incorporation of the parent company, the Milwaukee & St. Paul, in May 1863, with a mileage of less than 200 miles, to a system of 5,648 miles in 1890; the second period from 1890 to 1912, in which there was a substantial growth in the mileage of the system from 5,648 miles to 7,265 miles; the third period from 1912 to 1922, when there was a further growth of the system, the total operated mileage at the end of 1922 being 10,808 miles. The only comment relevant to the first period is that the consolidations and extensions which took place were both constructive and profitable. The second period was one of great railroad expansion, especially in the west. During that period a number of rival interests had practically secured control of the important railroad mileage located in the central and northwestern portion of the United States, the Vanderbilt interests dominating the Chicago & North Western, the Harriman interests the Union Pacific, Oregon Railway & Navigation Company and Oregon Short Line, and the Morgan-Hill interests dominating the Northern Pacific, Great Northern, and Chicago, Burlington & Quincy.

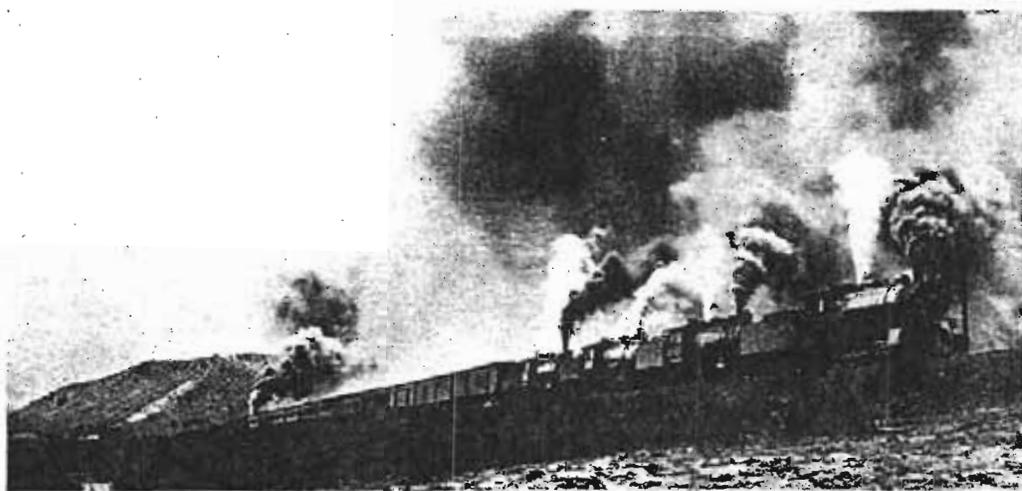
The control of those important systems left the St. Paul practically isolated as far as profitable traffic interchange with any of the western lines was concerned, and by reason of having no Pacific Coast outlet it stood to lose considerable traffic from the eastern trunk lines. While it is admitted that the management had no desire to build the Puget Sound Extension to the Pacific Coast, it was really forced to take that action as a matter of self-preservation. This venture was taken with the full realization that a trunk line through the mountain passes would involve an excessive expenditure. Since that extension was opened for operation there has been some difference of opinion in regard to the wisdom of that move. The final conclusion, however, seems to be that it was justified.

EARNING POWER OF THE PUGET SOUND EXTENSION

The best information given on this subject is furnished by Mr. H. E. Byram, President of the Chicago, Milwaukee & St. Paul Railway Company, when testifying before the Committee on Interstate Commerce in the United States Senate in 1921. The question was raised by Senator Kellogg as to whether he (Mr. Byram) thought the building of the western extension was an advantage or disadvantage. Mr. Byram replied that in his opinion it had been an advantage, or at least it had not been any disadvantage—that one of the first things he did when he went to the property in 1917 was to take up that very question, with a view to answering it, because it had been spoken of so many times and it seemed to him that the general impression was not the right one, and that as he had had nothing to do with the building of the extension he could approach it without bias. He had the figures of operating expenses and operating revenues separated, as they were when it was operated as a separate company west of the Missouri River, and allowing the same basis of division in earnings and expenses properly allocated, they indicated that during the year 1917, for which the figures were made, the western extension was producing 25% of the gross earnings and 40% of net earnings. Mr. Byram's statement is further borne out by the traffic density map of the St. Paul System, which is appended to the back of this book.

GRADES OF THE ST. PAUL COMPARED WITH OTHER TRUNK LINES

Comment on the Puget Sound Extension has raised the question whether this part of the St. Paul System passes through excessive grades to reach the Pacific Coast via the mountainous regions of the Rocky, Bitter Root and Cascade ranges.



Courtesy of Westinghouse Air Brake Co.



Courtesy of General Electric Company

For the purpose of comparison, the summit elevations and maximum grades of certain trunk lines west of the Mississippi River, including the three principal Canadian Systems, are given below in table form. The data showing the maximum grade and summit elevations of these lines were obtained from sources which we believe to be reliable.

Name of Road	Maximum Grade	Summit Elevation
Canadian Northern.....	.7%	3,706 feet
Canadian Pacific.....	2.2	5,321
Grand Trunk Pacific.....	1.0	3,719
Great Northern.....	2.2	5,215
Northern Pacific.....	2.2	5,565
Union Pacific.....	1.8	8,200
Chicago, Milwaukee & St. Paul.....	2.2	6,347
Atchison, Topeka & Santa Fe.....	2.6	7,421

It will be noted from the figures given above that the summit elevation of the St. Paul is lower than the Atchison, Topeka & Santa Fe or the Union Pacific and compares favorably with the Great Northern, Northern Pacific, and Canadian Pacific. In the matter of maximum grade, the St. Paul is lower than the Atchison, Topeka & Santa Fe, and exactly the same as the Northern Pacific, Great Northern, and Canadian Pacific. It is worthy of note in this connection that the grades on the Northern Pacific and Great Northern are the same, both east and west bound, while on the Chicago, Milwaukee & St. Paul the east bound grade is only 1.74, which is important because of the fact that the prevailing direction of tonnage on all of the St. Paul lines is east bound. The electrification of the 640 miles of line of the Chicago, Milwaukee & St. Paul, traversing the mountain passes, has overcome the problem of grades. One of the gigantic gearless electric locomotives used today performs the service for heavy train movement which formerly required three steam locomotives under ordinary conditions and four in severe winter weather. From the standpoint of operating efficiency, this change in motive power has reduced these mountain grades to practically a water level route.

A REVIEW OF OPERATIONS DURING THE LAST DECADE

During the third period 1912-1922 there were many changes in the fortunes of the company. From 1912 to 1916, inclusive, there was a satisfactory development in total operating revenues, as well as in net operating revenue, and the company operated at a ratio averaging about 66.70 annually. Fixed charges were earned and dividends paid on both classes of stock during that period with a balance remaining for surplus. In 1917 the company's operations were seriously affected by reason of snow blockades, washouts, industrial strikes, etc., the results of which were reflected in the company's net operating returns. During the years 1918 and 1919 and up to March 1, 1920, the property was under government control and under federal guaranty until September 1 of that year. From that date until September 1, 1922, the St. Paul's earning power was affected by the readjustment of national affairs which took place during that time.

COMPARISONS—1922 WITH 1916

The question that has confronted holders of St. Paul issues in the past five years has been whether there was anything fundamentally weak in the position of this railway which might prevent a restoration of its earning power. In order that some idea may be had of the revenues collected, the amount consumed in operating costs, and the tons of freight moved, a table is given herewith for the years 1916-1922, inclusive, in order that comparisons may be made with the last normal year which the St. Paul may be said to have had, namely, 1916.

Year	Total Operating Revenues	Net Operating Revenues	Tons of Freight Moved
1916.....	\$110,609,689	\$36,844,633	39,986,136
1917.....	113,739,202	28,543,238	38,444,353
1918.....	134,772,945	11,103,546	40,307,047
1919.....	150,370,394	11,808,689	40,295,220
1920.....	168,158,734	3,461,613	45,041,277
1921.....	146,763,766	18,808,764	34,067,136
1922.....	156,950,623	27,353,932	42,034,285

It should be remembered that all of the net operating revenues shown above are not available for interest on funded debt. Out of these amounts taxes, joint facility rents, and hire of equipment must be deducted. Although the actual operation of the railway produced little profit during 1918, 1919, and 1920, the period of Federal control and guaranty, the corporate revenues were more than sufficient to cover all fixed charges. In 1921, the first full year of private operation since the war, traffic declined precipitously, the freight movement being about 25% less than the year previous, and yet, although total operating revenues showed a shrinkage of over \$21,000,000, net revenues increased by \$15,000,000, a proof that effectual steps were being taken to bring about more normal operating conditions.

HOW DEFLATION AFFECTED THE NORTHWEST

The year 1921 will be remembered as one of marked business depression throughout the United States. Commodity prices, especially products of agriculture, dairy products, live stock, declined to a point where producers refused to sell, preferring to carry their commodities until such times as more favorable market conditions obtained. This was especially true of wheat and other grains. Mining and lumber industries in the northwestern portion of the United States were practically at a standstill during that year. This prostration of business was reflected in the decrease in net ton miles of revenue freight in that year compared with the previous year, and what is defined by the Interstate Commerce Commission as the northwestern region, suffered more heavily in that respect than any of the western rate group territories, as will be seen by the following table showing this decrease in the year 1921 compared with the previous year in terms of percentage:

Northwestern.....	27.6%
Central Western.....	21.2%
Southwestern.....	16.7%
Total Western.....	22.5%

For all the roads of the country the volume of business in 1921 equalled approximately that of 1915; for the northwestern roads, however, one must go back to 1912 to find a year in which their business was so poor. Under these conditions the wretched financial showing of all the roads in the northwest is readily explained.

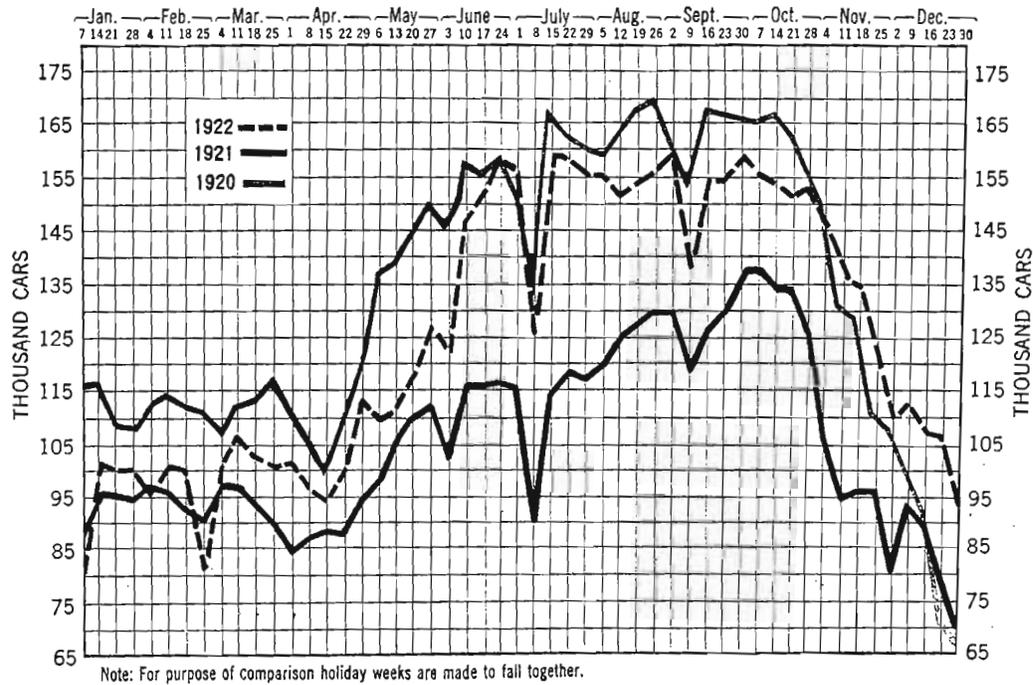
From tables appended hereto it appears that the St. Paul came through in 1921 a little better, from the standpoint of freight business, than the other three roads with which comparison has been made, viz:

DECREASE IN TONS OF REVENUE FREIGHT MOVED

Chicago, Milwaukee & St. Paul.....	24%
Northern Pacific.....	24.6%
Chicago & Northwestern.....	35%
Great Northern.....	40%

The low volume of traffic which obtained in 1921 is shown in the graph on the opposite page, which gives the total carloads of revenue freight in the northwestern district by weeks for the years 1920-1921-1922. It will be noted that from January 1 to the last week in October, 1920, the car loadings for that district were in excess of those of 1921 or 1922, while the loadings for 1921, with the exception of about three weeks, were less than those of 1920 or 1922. Just how the northwestern territory was affected in 1921 may be gathered from the fact that total car loadings decreased by 1,500,000 cars, as compared with 1920. The change in traffic conditions which occurred in the last quarter of 1922 is reflected in the graph showing that from the last week in October to the end of the year car loadings in that district were ahead of those for the same period of 1920 or 1921.

Total Revenue Freight Loaded—Northwestern District



GETTING BACK TO NORMAL

In general, a well established road serving a growing territory may look forward to a normal increase in traffic at the rate of about 7% per year. This amount, however, is not given as a fixed rate but varies according to geographical location and industrial conditions. The unsettled conditions resulting from the entrance of the United States into the European conflict and the subsequent taking over of the railroads by the government not only changed the flow of traffic, but served to retard it except for such commodities as were necessary to sustain our National life and to aid in winning the war. As a result, there was not the tonnage development by years which ordinarily would have resulted under peace-time conditions.

The last normal year which the St. Paul may be said to have had is that of 1916 and certain figures for 1922 have been compared with those of 1916. In 1916—39,986,136 tons of revenue freight were transported. In 1922 the amount was 42,034,285, an increase for the six-year period of only 5%. Owing to the rise in the cost of labor, materials, supplies, and fuel, which took place during the war period, numerous increases in freight and passenger rates were necessary. Freight revenue for the period in question increased over 45%, while total operating revenue increased about 42%. Notwithstanding these increases in rates and revenue, operating costs rose in greater proportion for the period under consideration. The increase in operating expenses was over 75%. The operating ratio rose from 66.69% in 1916 to 97.94% in 1920.

Since that time the management has made remarkable progress in getting the operating expenses under control, the result being that for the year 1922, notwithstanding the expense occasioned by the strikes, the operating ratio was only 82.5%. This reduction in the operating ratio from the peak of 1920 was a very substantial one, but it should be remembered that operating costs today are still excessively high when compared with those of 1916. Wages are about 80% higher, taxes 90% higher, and the cost of fuel about 100% higher. This reduction in operating costs was accomplished not by deferred maintenance, or any other form of sacrifice to the property, but is the result of greater operating efficiency.

The year 1922 was not a profitable one for the St. Paul, although in the preliminary estimate made during the early part of the year, it was estimated that the company would earn its fixed charges with a balance remaining. It is highly probable that this would have been the case, had it not been for the loss of traffic which the company would have otherwise moved, as a result of the strike of the coal miners and the loss occasioned by non-use of equipment which was tied up during the strike of the railroad shopcrafts. The company has given no figures as to what these factors cost it in actual dollars, but it has been variously estimated that the total loss is in the neigh-

borhood of \$8,000,000. If this estimate is correct, assuming that normal conditions had obtained throughout 1922 there would have remained a fair balance after fixed charges.

TRAFFIC CONDITIONS IN 1922

According to the latest available statistics of the Interstate Commerce Commission, the railroads in the United States carried an increase of 177,219,000 tons of revenue freight during the year 1922, compared with 1921. This is an increase of 10.77%. About one-quarter of this increase in tonnage occurred in the northwestern region alone. The statistics for the three western districts follow:

REVENUE TONS CARRIED (THOUSANDS)					
(Year ended December 31)					
Region	1922	1921	Change	Per Cent	
Northwestern.....	215,493	174,192	41,301	23.71	
Central Western.....	199,840	182,151	17,689	9.71	
Southwestern.....	123,668	123,729	*61	*0.05	
* Decrease.					

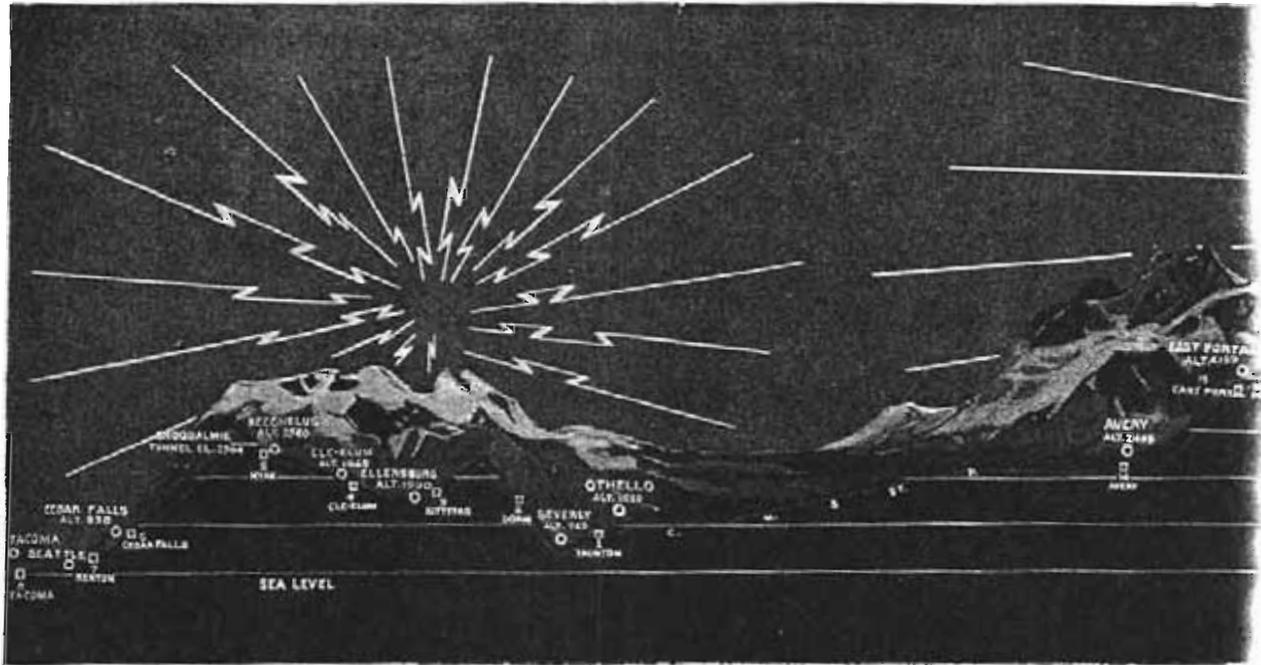
Compared with the Central Western and Southwestern territories, the Northwestern had the largest increase in revenue tons transported in 1922 compared with 1921.

CAR LOADINGS BY MONTHS

Despite the adverse conditions with which the St. Paul had to contend in 1922, its loadings were 259,192 cars ahead of 1921 and only 102,504 cars less than in the peak year, 1920. In terms of percentage, the increase in 1922 was 18% over 1921 as will be seen by the following table:

	NUMBER OF LOADED CARS		
	1922	1921	1920
January.....	120,733	110,177	155,914
February.....	113,175	100,274	145,299
March.....	135,191	115,538	167,185
April.....	120,348	110,612	128,088
May.....	143,308	115,119	147,094
June.....	148,359	124,631	151,192
July.....	143,509	116,520	153,144
August.....	161,927	141,033	162,084
September.....	156,940	134,915	158,882
October.....	164,989	145,099	167,323
November.....	150,150	112,954	145,034
December.....	136,586	109,151	116,480
	1,695,215	1,436,023	1,797,719

Car loadings for the first three months of 1923 made a much better showing than for the same period of 1922, the increase being more than 28%.

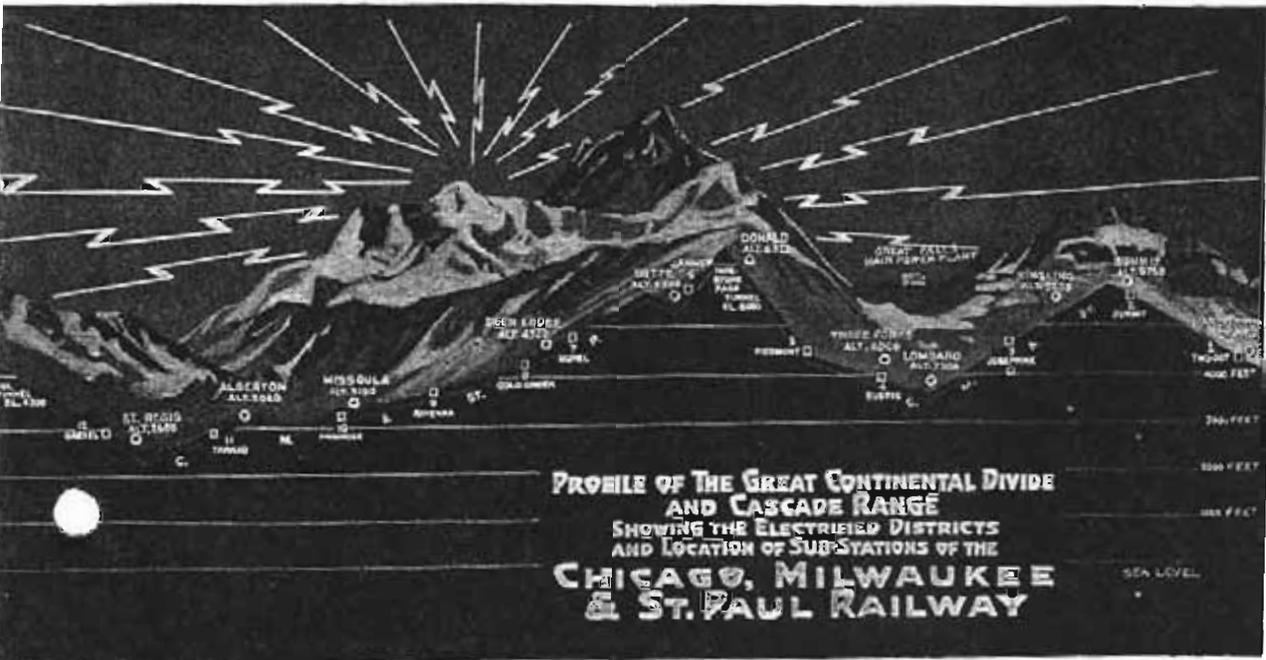


INCOME ACCOUNT BY MONTHS FOR 1922

The table of operating income for the twelve months, 1922, which is given below, is worthy of more than a passing glance. This table not only shows an improvement in total operating revenue, but a substantial growth in net operating income. The column headed "Hire of Equipment, Joint Facility Rents" is interesting, especially in the last two months of the year. In those months the company had just begun to receive the benefit from new equipment which was delivered in October. The operating ratio by months is also worth noting, as these figures show clearly that the management is making substantial progress in getting its expenses nearer the pre-war ratio.

	Total Op. Revenue	Oper. Ratio	Net Op. Revenue	Hire of Eq. Jt. Fac. Rents	Net Oper. Income
January.....	\$10,872,247	94.2%	\$637,160	\$300,499	*\$466,787
February.....	10,402,775	97.1	293,108	366,135	*877,018
March.....	13,364,836	82.5	2,341,354	481,972	1,055,902
April.....	10,733,572	87.4	1,356,815	338,340	216,635
May.....	12,249,791	86.5	1,645,578	367,694	473,318
June.....	13,513,554	82.7	2,337,886	318,621	1,215,105
July.....	12,694,329	72.1	3,531,981	358,567	2,334,534
August.....	14,272,931	74.0	3,714,421	403,144	2,465,275
September.....	14,421,141	80.4	2,828,186	413,731	1,564,107
October.....	15,888,955	78.1	3,468,677	521,032	2,224,314
November.....	14,549,839	79.3	3,012,695	308,420	1,918,607
December.....	13,966,658	84.4	2,186,071	230,201	1,160,253

Figures in italics denote debit balances: * deficit.



CURRENT OPERATING RESULTS SHOW MARKED IMPROVEMENT

It will be noted from the foregoing figures that there was a marked improvement in gross and net earnings in the last six months of the year over the first six months. Total operating revenues and net operating income were ahead not only of the six months of the year previous but also of the ten-year average of those months. Earnings for January 1923 were especially encouraging, net operating income being \$1,824,419, compared with a deficit for the same month of 1922 of \$466,787. The latest figures available are those for the month of February 1923 which show that net operating income was the largest for any February since 1916, the amount being \$599,747. This compares with a deficit of \$877,018 for the same month in 1922. Total operating revenues for the six months ended February 28 increased 16.2% over the same period of the year previous and 1.6% over the same period two years previous. Results of net operating revenue, however, were even more encouraging. The six-month period ended February 28, 1923, showed an increase of 159.1% over the same period of the year previous and 811% over the corresponding period ended February 1921.

OPERATING EFFICIENCY COMPARES FAVORABLY WITH WESTERN RAILROAD SYSTEMS

As previously pointed out, the railroads of the United States in the year 1922 were subject to considerable loss by reason of existing labor conditions in the coal mines and railroad shops. Very few of them were able to make the showing in operating efficiency that might have otherwise obtained. For the purpose of showing the progress the St. Paul was able to make in that direction, notwithstanding the light traffic in the northwestern section, ten of the largest trunk lines operating in that district have been selected and the results for the year are given below, measured in net tons per train, net ton miles per train hour, car miles per car day, and pounds of coal consumed per 1000 gross ton miles.

TWELVE MONTHS ENDING DECEMBER 31, 1922

Net Tons per Train			Net Ton Miles per Train Hour			Car Miles per Car Day			Lbs. of Coal per 1000 Gr. Ton Miles (inc. Loc. and Tender)			
Position	Road	Amt.	Position	Road	Amt.	Position	Road	Amt.	Position	Road	Amt.	
1st	Gt. North....	781	1st	No. Pac.....	8,863	1st	C. B. & Q....	30.7	1st	Soo.....	130	
2nd	C. B. & Q....	727	2nd	C. B. & Q....	8,644	2nd	Rock Isl....	29.2	2nd	No. Pac.....	137	
3rd	No. Pac.....	711	3rd	Gr. No.....	8,029	3rd	C. G. W.....	27.7	3rd	St. Paul.....	150	
4th	C. G. W.....	648	4th	C. G. W.....	7,889	4th	St. Paul.....	26.8	4th	Gr. No.....	160	
5th	St. Paul.....	626	5th	St. Paul.....	7,076	5th	No. Pac.....	25.9	5th	C. G. W.....	168	
6th	Soo.....	537	6th	Soo.....	6,960	6th	Gt. North...	22.9	6th	C. B. & Q....	169	
7th	C. & N. W....	512	7th	C. & N. W....	6,025	7th	Soo.....	22.5	7th	Omaha.....	172	
8th	Rock Isl....	503	8th	Rock Isl....	5,987	8th	C. & N. W....	21.8	8th	Rock Isl....	177	
9th	M. & St. L....	473	9th	M. & St. L....	5,420	9th	Omaha.....	21.0	9th	C. & N. W....	177	
10th	Omaha.....	428	10th	Omaha.....	4,982	10th	M. & St. L....	19.8	10th	M. & St. L....	211	
Average Northwest Region ...		618				7,164			23.3			158

It will be noted that under the item "Net tons per train" the St. Paul had fifth position. It also held that position in "Net ton miles per train hour"; under "Car miles per car day" it had fourth position and under "Pounds of coal consumed per 1,000 gr. ton miles" third position. With the new motive power and rolling stock which the St. Paul will receive during the year 1923, it is safe to predict that further improvement will be made in its relative position in the northwestern group in 1923.

FURTHER EVIDENCE OF IMPROVEMENT

As further evidence of the improvement in operating efficiency, a table is given below showing the net ton miles, total freight car miles, freight locomotive miles, and net tons per train of the St. Paul for the years 1916-1922, inclusive.

	Net Ton Miles	Total Freight Car Miles	Freight Loco. Miles	Net Tons Per Train
1916.....	12,237,311,524	817,507,941	39,934,006	503.2
1917.....	12,025,133,895	708,281,280	36,925,951	533.1
1918.....	12,876,125,854	713,227,134	35,642,457	599.7
1919.....	12,848,439,000	739,524,000	34,007,122	619.3
1920.....	12,940,376,000	735,272,000	35,102,408	618.8
1921.....	9,644,170,969	615,239,640	28,311,529	574.6
1922.....	12,244,107,823	720,119,366	32,123,831	626.8
Increase or Decrease 1922 over 1916.....	6,796,299 Inc.	97,388,575 Dec.	7,810,165 Dec.	123.6 Inc.
Percent of Change.....	0.05 Inc.	11.9 Dec.	19.5 Dec.	24.5 Inc.

It will be noted from the above table that while the net ton miles were practically the same in 1922 as they were in 1916, this tonnage was transported in freight cars that moved 97,388,575 miles less in 1922 than in 1916. This was accomplished by a more intensive use of equipment, which meant a large saving of money to the company, both directly and indirectly. The fewer car miles meant less expense in wages for engine and train crews, less coal consumed, and the wear and tear on equipment, roadbed and structures was also diminished.

While it is difficult to estimate in the form of dollars the amount of money saved by increasing the operating efficiency during the period in question, based on the reduction in freight locomotive miles and assuming that this mileage had been the same in 1922 as in 1916, it is estimated that the additional cost of operation in 1922 would have been \$15,000,000 to \$20,000,000. The last column of the table shows net tons per train, the increase for the period being 123.6 tons, or 24.5%. Considering the conditions which obtained during the period under consideration, the decrease in total freight car miles and freight locomotive miles and the increase in net tons per train is, indeed, remarkable.

OPERATING RATIO IN 1922 SHOWS TO ADVANTAGE

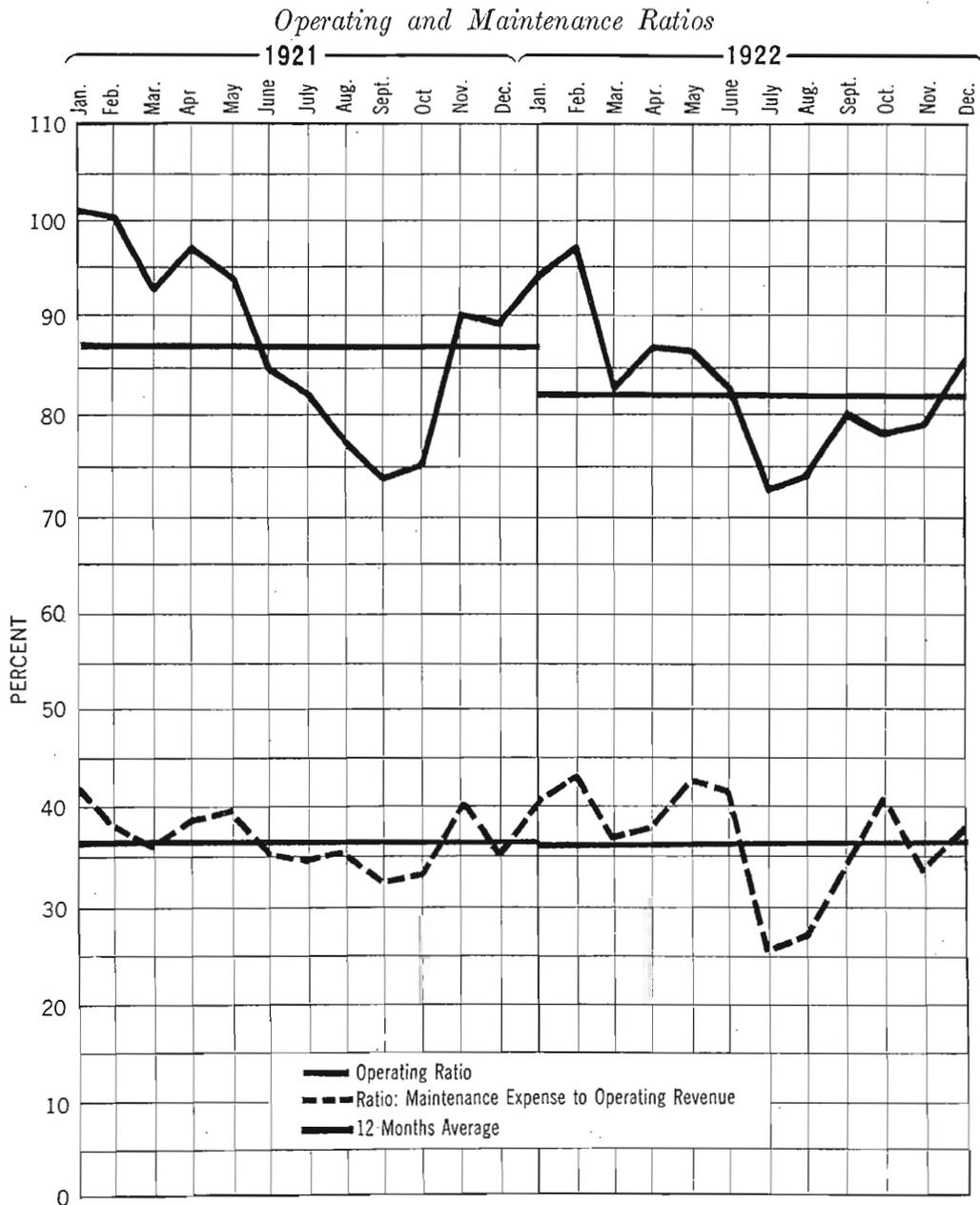
In the table that follows total operating revenues, net operating revenue, and the operating ratio for the years 1921 and 1922 are given, those being the first two full years since the property was released from federal control:

Year	Total Operating Revenues	Net Operating Revenue	Operating Ratio
1921.....	\$146,765,766	\$18,808,764	87.2%
1922.....	156,950,628	27,353,932	82.5%

It will be noted that there was a substantial increase in total operating revenues and net operating revenue in the year 1922 over 1921. To be exact, the increase in total operating revenues was \$10,184,862, of which \$8,545,168 was carried through in the form of an increase in net operating revenue. This increase in net operating revenue was not accomplished by curtailment in the company's maintenance program. The operating ratio in the year ended December 31, 1921, was 87.2%, while in 1922 it was only 82.5%. The maintenance ratio remained practically the same for the two-year period, the actual saving in operating ratio being made in transportation expenses. This is set forth clearly in the following graph, the upper curve showing

the operating ratio by months for the two-year period and the lower broken curve showing the maintenance ratio. The upper red line shows total operating ratio on a yearly average and the lower red line shows the maintenance ratio on a yearly average.

As a matter of fact, the purchasing power of the dollar, in actual units of maintenance, was greater in 1922 than in 1921, so the conclusion is obvious that the St. Paul's maintenance while not more expensive was greater in amount last year than for the year previous.



ADDITIONAL EQUIPMENT NEEDED TO HANDLE INCREASING BUSINESS

The decade for 1912 to 1921 was, from the standpoint of inadequate rates, the worst in the history of railroads. During that period the purchase of equipment steadily declined from a high point in 1912 to practically zero in 1921. This was also true of the construction of new mileage. During that same period nearly 50,000 miles of railroad having a combined capitalization of more than \$2,500,000,000 were forced into receivership and the roads that managed to survive were unable to carry out their ordinary expansion programs by adding to their terminal facilities, main tracks, and equipment, to meet the constant increase in the demand for transportation requirements. As a further illustration of the continuous decline in the number of freight cars in use in the country during the five years ended June 30, 1907, the number of cars was increased by 480,000 and the next five years the increase was 230,000; to December 31, 1916, the increase was 114,000. In the five years ended December 31, 1921, the number decreased by 18,621.

The St. Paul is one of the carriers deficient in equipment. It had in 1921 11.8% less cars in service per mile of road than in 1912. This shortage has been a handicap to the company in two ways: (1) through a heavy adverse per diem, and (2) in loss of business through the inability to furnish cars to shippers, who, in consequence, routed their business via other roads.

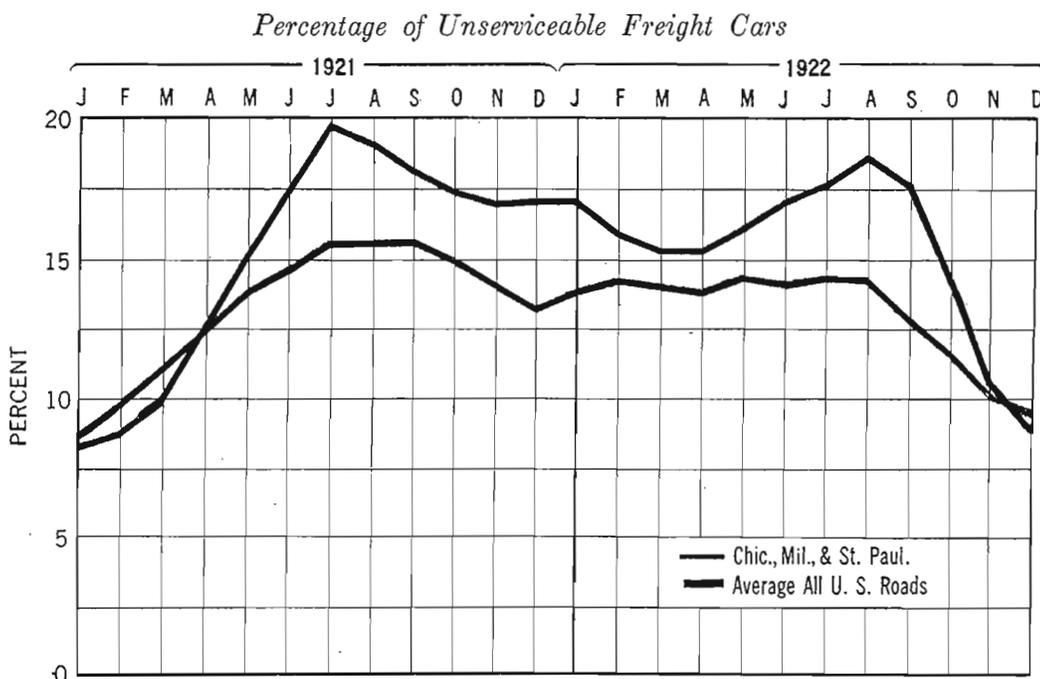
Because of its large movement of refrigerator cars, the St. Paul is naturally subject to a heavier per diem than its competitors, the Great Northern and Northern Pacific. The deficiency of equipment on the St. Paul, however, is evidenced by the fact that in 1921 the freight cars per mile of road amounted to 5.55 and the hire of equipment debit balance in that year was \$3,266,120, while its competitor, the Northern Pacific, had 7.06 freight cars per mile of road and a credit balance for hire of equipment of \$1,445,606. The Great Northern with 6.69 freight cars per mile had a hire of equipment credit balance of \$739,997.

Taking into account the period 1912-1921, the hire of equipment debit balance on the St. Paul was \$14,800,000, while its competitor, the Northern Pacific, had a credit balance in this item of \$12,700,000 and the Great Northern \$5,414,285.

To cut these heavy charges and to enable the company to furnish shippers with cars needed, the St. Paul has negotiated, at a cost of some \$34,000,000, the purchase of 14,000 freight cars of various classes and 200 locomotives since the end of federal control. Delivery of a considerable amount of this equipment has already been made and final deliveries are expected before the traffic peak of the present year. The earning power of the new equipment in the saving per diem will not be reflected in the income account until the close of 1923. Unquestionably, the deliveries of this new equipment should make a substantial reduction in the adverse hire of equipment, if it is not entirely eliminated.

UNSERVICEABLE FREIGHT CARS

Mention has been made of the St. Paul's lack of equipment. During the year 1921 and the first half of 1922 the percentage of unserviceable cars was higher than it should have been, compared with the average of all roads in the United States. However, since the first of August the management has the situation well under control. In November the amount of cars unfit for service on the St. Paul was actually less than the average for all roads in the United States; from March 1 this year the percentage of unserviceable freight equipment is only slightly over 7%, which compares favorably with the best roads in the country. This is shown more clearly in the following graph.



THE ADVANTAGES OF ELECTRIFICATION

The electrification of more than 640 miles of the St. Paul's western extension through the Rocky and Cascade Mountains is unique in the history of railroads and is the greatest undertaking of this character ever attempted. The topography of the country from Harlowton, Mont., to the western slope of the Rockies made operation with steam locomotives difficult and expensive, especially in the winter months when the heavy snowfall and the extreme winter temperature, frequently as low as 40 degrees below zero, caused serious delay in the steam operation, due to blockades and inability of locomotives to make steam. Electric service was started on the St. Paul in the month of December, 1915, and a close check on comparative costs has been kept

ever since, results showing that the initial expense of changing from steam to electricity has been more than justified.

In addition to the improvement in the matter of maintaining train schedules, electrification has resulted in great economies in operating expenses. For example, the same volume of traffic is now moved with only one-third of the locomotives required when steam was used as a motive power. Among other economies resulting from the electrification is the low price at which the electric power was contracted for, the price having been fixed for 99 years without change. Since 1915 the cost of steam locomotive fuel has more than doubled. A saving is also made by the elimination of the transportation cost of engine coal and the releasing of equipment necessary for such transportation for revenue freight service. The adoption of electric locomotives has also effected a substantial saving in maintenance cost, the annual repair expense of electric locomotives being only about 50% of the cost of keeping a steam locomotive in repair.

RECENT ACQUISITIONS BRING ST. PAUL LINES INTO RICH COAL TERRITORY

During the year 1921 the St. Paul acquired two properties, which, notwithstanding the unfavorable conditions that have existed since that time, have more than justified this action. The properties referred to are the Chicago, Terre Haute & Southeastern and the Chicago, Milwaukee & Gary. The fact that no bituminous coal was mined along the lines of the Chicago, Milwaukee & St. Paul was a handicap in the matter of securing an adequate supply of engine coal except at a cost plus freight charges of other lines which made the final cost of the coal excessive. It was deemed advisable, therefore, to obtain access to a coal producing territory which would not only take care of the company's requirements but would be an important contributing factor in its traffic density. In pursuing this investigation, attention of the officials was attracted to the Terre Haute property on account of its penetrating the rich bituminous coal fields of western and southern Indiana and eastern Illinois. After an appraisal had been made, as to the worth of this property to the company, and the plan submitted to the directors, a price was agreed upon which was accepted by the majority of the stockholders. This purchase was made at the low dip of railroad values and upon terms that were especially advantageous to the St. Paul.

In addition to insuring the company a high quality of engine coal at a minimum rate, it also gave it a vast amount of coal tonnage destined to points in the west and northwest, not only to common points, but enabled the St. Paul to secure the long haul to points off the line where formerly they had secured only the short haul. As bituminous coal is largely used for fuel in the northwest, although none is produced in that section, it must be moved from the coal producing centers of Indiana and Illinois. While at the outset nothing more was expected of this property than that the St. Paul would be

able to save the freight charges on its own coal, subsequent developments indicate that not only would this be accomplished, but the benefits from ownership of this property would be sufficiently great to offset, in a large measure, the entire cost of the company's coal. A further benefit accruing from this purchase is the fact that the Terre Haute's connection with the St. Paul is outside of the Chicago zone and traffic moving via this route makes a direct connection without the delay and belt line expense incidental to the moving of this traffic through Chicago; also the average time saved on coal cars is about three days per car.

CHICAGO, TERRE HAUTE & SOUTHEASTERN

	DENSITY PER MILE				Year
	September	October	November	December	
1919	233,863	257,802	51,374	154,964	1,023,219
1920	317,190	299,733	321,647	276,789	1,557,640
1921	143,275	183,883	145,446	167,871	1,384,067
1922	228,558	262,992	275,151	288,309	2,220,521
Total	922,886	1,004,410	793,618	887,933	6,185,447
Average	230,722	251,103	198,405	221,983	1,546,362
FREIGHT REVENUE					
1919	450,641	499,581	104,571	326,039	3,721,650
1920	673,215	675,688	656,528	655,904	5,833,246
1921	369,822	501,790	445,522	475,827	4,540,322
1922	659,523	540,168	588,719	729,459	5,428,332
Total	2,153,201	2,217,227	1,795,340	2,187,229	19,523,550
Average	538,300	554,307	448,835	546,807	4,880,887
TON MILES—REVENUE FREIGHT					
1919	87,506,992	96,464,263	19,222,967	57,984,536	382,863,103
1920	118,686,270	112,154,198	120,353,973	103,568,769	582,370,510
1921	53,610,656	68,805,173	54,422,891	62,814,073	517,890,344
1922	85,521,632	98,406,498	102,955,922	107,879,449	830,874,407
Total	345,325,550	375,830,132	296,955,753	332,246,827	2,313,998,364
Average	86,331,387	93,957,533	74,238,938	83,061,707	578,499,591

CHICAGO, MILWAUKEE & GARY

	DENSITY PER MILE				Year
	September	October	November	December	
1919	23,978	28,416	19,219	20,489	309,879
1920	37,492	59,270	61,559	69,037	456,835
1921	19,644	26,136	20,973	29,955	237,193
1922	17,018	32,890	39,851	58,422	517,842
Total	98,132	146,712	141,602	177,903	1,521,749
Average	24,533	36,678	35,401	44,476	380,437
FREIGHT REVENUE					
1919	42,057	49,840	33,704	35,935	543,484
1920	50,310	79,537	82,606	92,641	613,034
1921	40,504	53,887	43,239	61,763	489,041
1922	30,801	47,133	52,715	60,611	591,078
Total	163,672	230,397	212,264	250,950	2,236,637
Average	40,918	57,599	53,066	62,738	559,159
TON MILES—REVENUE FREIGHT					
1919	3,401,581	4,031,080	2,726,363	2,906,597	43,959,428
1920	5,318,678	8,408,009	8,732,690	9,793,574	64,806,607
1921	2,797,159	3,721,552	2,986,293	4,265,312	33,773,951
1922	2,788,227	5,388,695	6,529,214	9,571,849	73,735,511
Total	14,305,645	21,549,336	20,974,560	26,537,332	216,275,497
Average	3,576,411	5,387,334	5,243,640	6,634,333	54,068,874

A further reduction in the cost of transporting coal from the Terre Haute territory to the northwest was accomplished through the acquisition of the Chicago, Milwaukee & Gary line. This makes a further reduction of 15 miles on traffic from the Illinois and Indiana coal fields to consuming points located along the line of the St. Paul, as well as a large saving in time the equipment is in use in transporting this traffic. In addition, this property will ultimately give the St. Paul a direct connection with all the principal trunk lines operating in that section outside of the congested Chicago zone, enabling it in times of heavy traffic movement and embargoes to make a direct transfer of its business destined to points in the east at a saving of several days' time. In fine, the control of these properties should be of great material benefit to the St. Paul.

As further evidence of the value of these acquisitions to the St. Paul, the density per mile of road, freight revenue and ton miles for the last four months and for the full years 1919, 1920, 1921, and 1922, together with the average of each of these acquired properties, are given in the tables on page 20. It will be noted that for the years the traffic density and ton miles showed a considerable increase in 1922 over any of the preceding years on both properties. The fact that the freight revenue was slightly less was due to maximum rates obtaining in 1920, while since that time there has been a substantial reduction in freight rates. This loss, however, has been almost offset by the increased traffic that has developed by reason of the resultant traffic interchange between these lines and the parent system.

FREIGHT TRAFFIC DENSITY

Reference has previously been made to the freight traffic density of the St. Paul and for further information on this subject a traffic density map is attached to this book in order that a picture of this density may be had for certain portions of the system, especially that portion from Mobridge, S. D., to the Pacific Coast, commonly known as the Puget Sound extension.

The traffic density on the Puget Sound extension, as will be seen, is lighter than on the main arteries of traffic of the eastern portion of the system. However, from the latest statistics available, that portion of the St. Paul has a heavier traffic than the same paralleling stem of the Great Northern and compares favorably with the paralleling portion of the Northern Pacific's coast line. The traffic density as shown on this map covers only the main lines of the system. The shaded portion shows certain figures with an arrow-head denoting the direction of traffic. Each unit of these figures represents 10,000 net tons moved per month. In order that there may be no inflation by reason of seasonal variations, the months selected for the making of this map are June, September, and December, 1921, and March, 1922. While that period was not a representative one for the freight traffic movement, as has been previously stated, a glance at the figures will show that the density was very high considering the per capita population of the territory served.

SUMMARY AND CONCLUSION

Briefly summarized, this book is designed to bring out the following points:

FIRST—That the poor earnings of the St. Paul in the six-year period, 1917-1922, inclusive, were not due to financial excesses or bad management. Compared with the actual value of the property, the company's capitalization is relatively small and fairly well balanced, consisting of bonds outstanding at the rate of \$38,300 per mile and stocks at the rate of \$21,500 per mile; the stocks, aggregating \$232,000,000, represent an equal amount of cash paid into the company's treasury.

SECOND—Its physical property was never in better condition. The Interstate Commerce Commission has not completed its valuation of the St. Paul, but it is expected that it will show a value in excess of total capitalization, as did the Rock Island, Great Northern, and many other lines. When the new equipment which has been ordered has been received, final deliveries of which will be made during the present year, the item, "Hire of Equipment," will be substantially reduced, if not eliminated.

THIRD—The St. Paul now has what the System has needed for many years, a line of its own into the bituminous coal fields, thus insuring a cheap and adequate supply of engine coal.

FOURTH—These recent acquisitions give the St. Paul a strong strategic position in the form of an outer belt into the industrial zone outside of the City of Chicago, which will not only be an important factor in increasing the company's traffic, but will expedite the movement of east and westbound business and eliminate the terminal expense incidental to its movement through Chicago.

FIFTH—Substantial progress is being made in the matter of reducing operating costs and at the same time increasing the operating efficiency.

SIXTH—The company operates the third largest railway system in the United States; it is well located and substantially built. The company has been taking effective measures to correct those troubles which brought about the impairment of its credit. Its future now depends to a great degree on matters over which the management can have little control—the volume of business moved, the wages of labor, and the level of rates. One-fourth of the St. Paul's tonnage comes from the farm. If a further cut is made on agricultural products, it is clear that the financial problems of the company will be sharply intensified.

SEVENTH—The St. Paul's traffic volume in the first two months of 1923 was exceptionally heavy and with a continuation of this movement, with compensatory rates, the financial results of the company in the present year should be more satisfactory than at any time in the past six years.

FINALLY—To show the progress made by the St. Paul in establishing its pre-war record as one of America's foremost trunk lines. It has been demonstrated that this progress has been accomplished in the face of the greatest difficulties, both political and economic, with which the railroads of the United States have ever been confronted. The condition of the roads when returned from government control, the problems which were inherited from federal administration, and the economic readjustment which has taken place since 1919 are all too well known to require any comment.

Despite all these factors, the development of the St. Paul has undergone a very substantial improvement since the property was returned to its owners. Great credit for this achievement is due to the efforts of President H. E. Byram and his official staff, and to the hearty co-operation of loyal employees. It has been this spirit of loyalty and co-operation on the part of railroad officials and employees, rather than the personal pecuniary rewards, that has brought about the splendid development and efficient operation of the railroads of this country. Transportation in the United States may still be had at a lower cost in proportion to the service given than in any of the great countries of the world, notwithstanding the numerous increases in rates which have taken place since 1917.

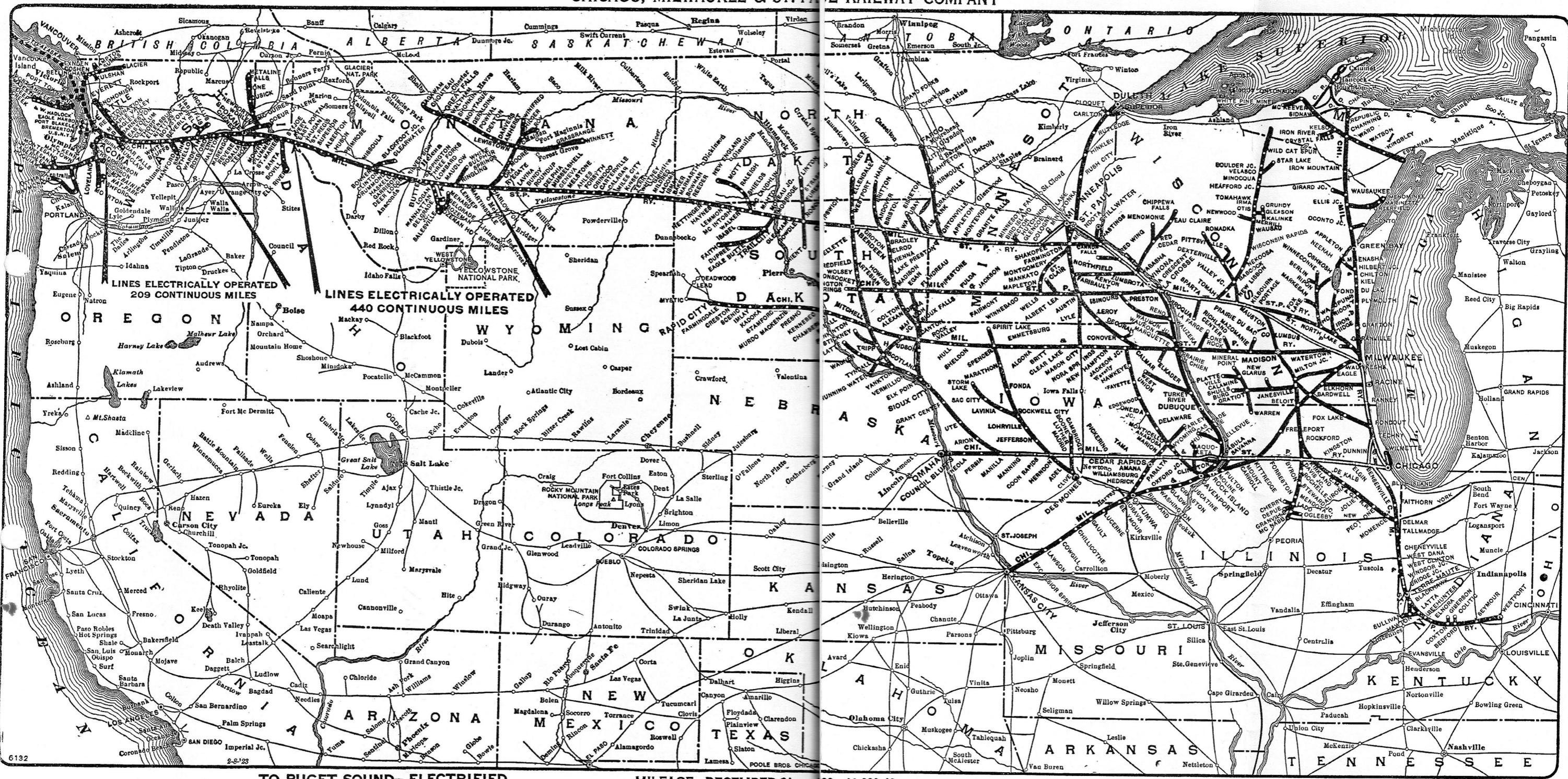
Rate increases afford no permanent solution of the railroad problems and, in addition, are a burden imposed upon the community. What the country needs at this time is a reduction in operating costs which will admit of a proportionate reduction in rates. This, however, cannot be accomplished in the face of laws obviously designed to prevent operating efficiency, such as the full crew law, the limit of tonnage law, anti-double header law, and other measures of like character, many of which are now pending in legislatures of various states. Any Act which tends to make operation more expensive of necessity imposes additional burden on the public at large.

If our railroads are to reduce transportation costs and to continue to progress, they must be unhampered by either state or national legislation, that, in effect, applies a brake to economic and efficiency measures. It is essential that they should enjoy a respite from untried political theories, most of which are unsound in principle and ruinous in practice.

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The information contained in this booklet was gathered from sources which we regard as reliable, and while not guaranteed we believe it correct

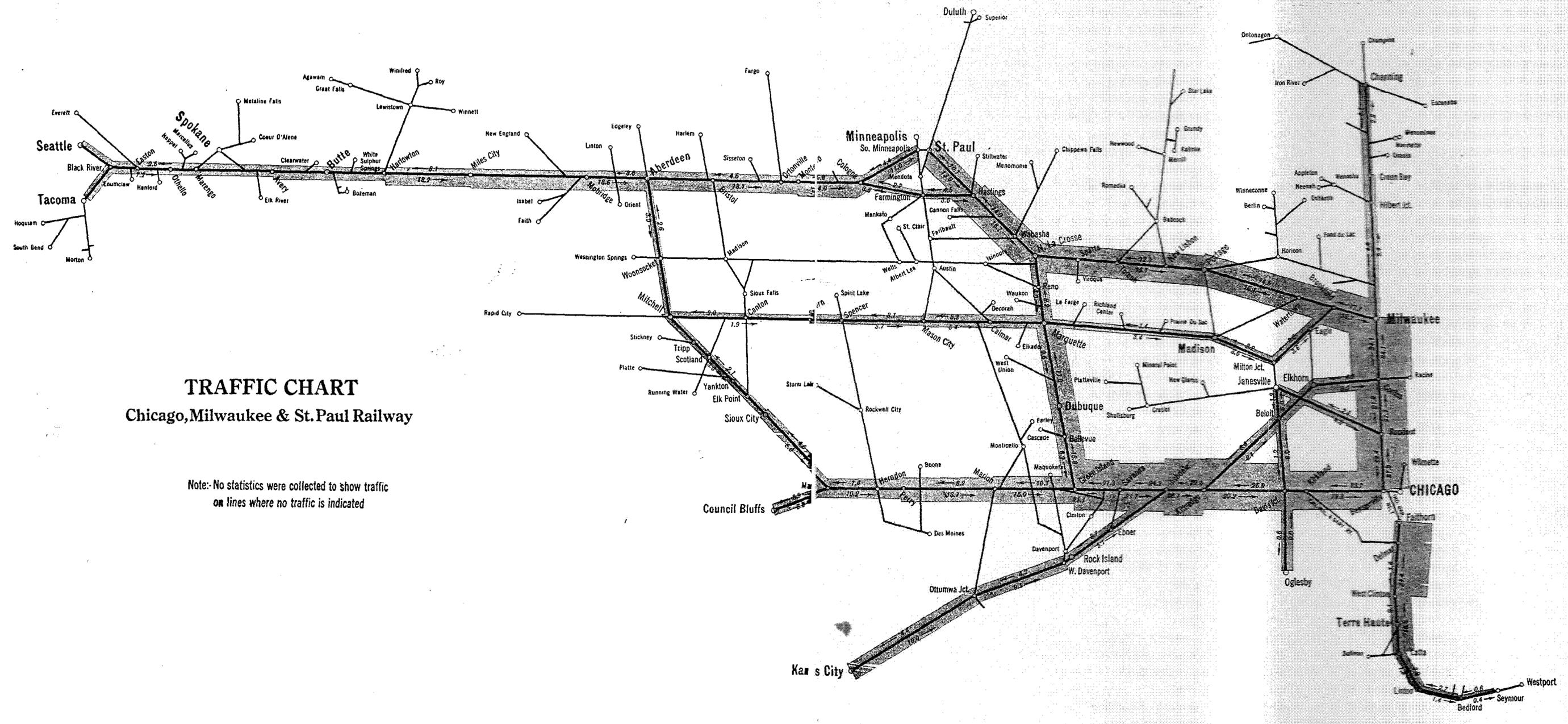
CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY



TO PUGET SOUND—ELECTRIFIED

MILEAGE, DECEMBER 31ST, 1922, 11,032.46

Indicates Double Track
Indicates Traffic Agreement



TRAFFIC CHART
Chicago, Milwaukee & St. Paul Railway

Note: No statistics were collected to show traffic on lines where no traffic is indicated