

SCIENTIFIC AMERICAN

Transcontinental Railroads in the United States

Author(s): William E. Hooper

Source: *Scientific American*, Vol. 104, No. 24 (JUNE 17, 1911), pp. 588-589, 598

Published by: Scientific American, a division of Nature America, Inc.

Stable URL: <http://www.jstor.org/stable/26008863>

Accessed: 26-09-2017 19:41 UTC

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at

<http://about.jstor.org/terms>



JSTOR

Scientific American, a division of Nature America, Inc. is collaborating with JSTOR to digitize, preserve and extend access to *Scientific American*

Transcontinental Railroads in the United States

The Seven Great Systems Which Radiate from Chicago to the Pacific Coast

By William E. Hooper, Associate Editor, Railway Age Gazette

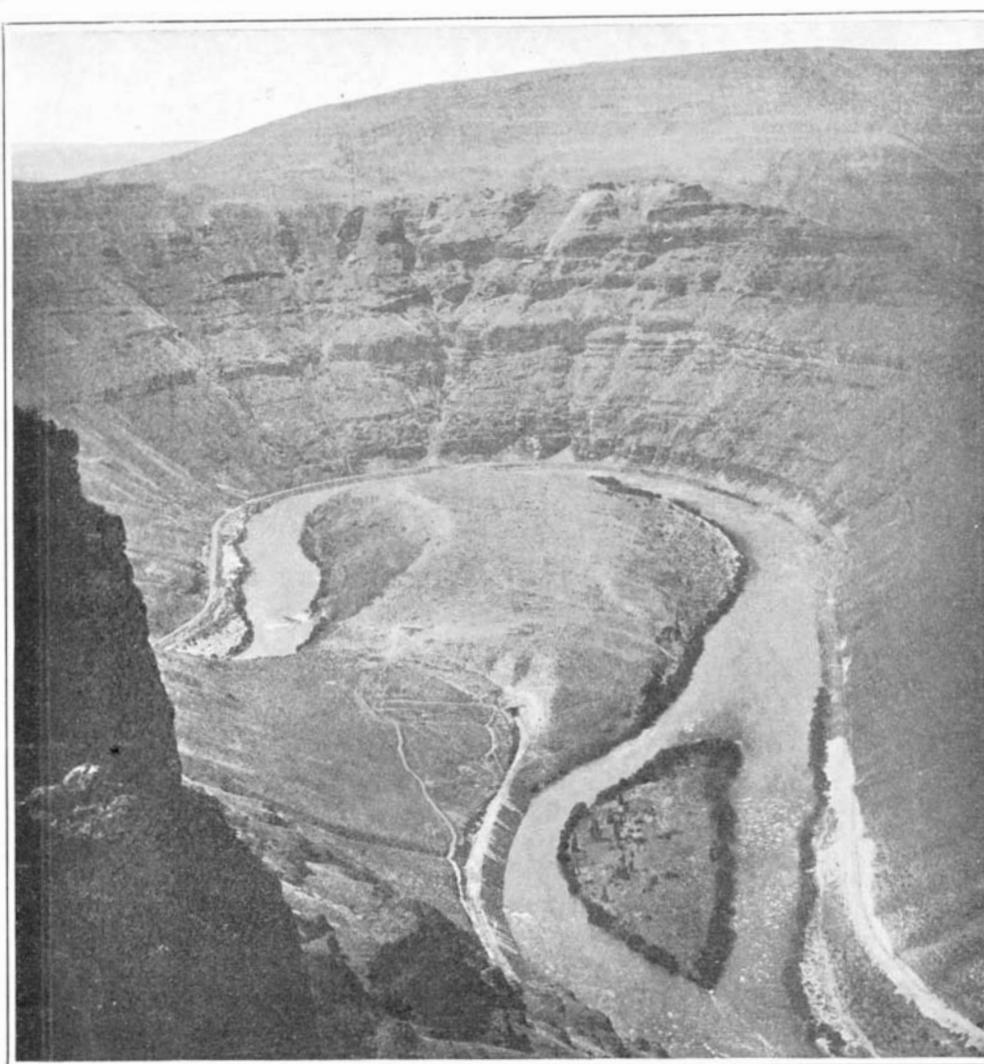
If by the term "transcontinental railroad" one means a line from the Atlantic coast to the Pacific, then there is no transcontinental railroad in the United States, the only one in America in operation being the Canadian Pacific, mentioned elsewhere. Transcontinental, however, as applied to railroads, is generally understood to mean a road running from an eastern terminus, somewhere on the north and south line drawn from Chicago to New Orleans, to the Pacific coast. Because the traffic of the United States, both passenger and freight, has been built up in the way it has, there is very little, if any, advantage to be gained by the operation of a railroad from the Atlantic coast to the Pacific.

A practical traffic man will tell you that there is no advantage for a transcontinental road (meaning a road running from the Pacific coast to Chicago or St. Louis) to have an eastern connection of its own; in fact, he would probably tell you that such a connection would be a disadvantage, in so far as it would hamper a free bargaining on the part of the western road as between the different trunk lines in eastern territory. The accompanying map shows representative transcontinental roads, but no eastern connections are shown, because the map would not permit showing all of them, and it would be misleading to show only part of them.

The transcontinental roads in the United States all have certain

characteristics in common. They all have to climb over the continental divide; they all have to cross long stretches of country which furnish little, if any, local traffic, and they all have to compete on through freight from the Atlantic seaboard to the Pacific coast with water-borne freight going from the eastern United States through the Straits of Magellan to the Pacific coast, or with freight that moves by water down the eastern coast of the United States to the narrow part of Mexico and crosses this strip of land by the Tehuantepec National Railway, and then moves again by water up the west coast. When the Panama canal is finished they will have to compete with a much shorter all-water route.

The first of the transcontinental railroads across the western deserts were built rather more for military and governmental reasons than through any hope of their immediately earning a sufficient amount to make the enormous investment in their construction profitable. Since private owners of capital were not inclined to be philanthropic, the government had to hold out inducements to them to invest their money by giving them land grants and making them loans. Of the seven roads shown on the map, five were extended to the Pacific coast by government help and the other two without. The writer has taken the Chicago, Milwaukee & St. Paul, with its subsidiary, the Chicago, Milwaukee & Puget



The horseshoe curve in the natural coliseum of the Deschutes River. On opposite banks are seen the two lines now being built by the Harriman and Hill systems.

COMPETITION IN A CANYON



THIS MAP SHOWS THE MAIN LINES OF THE ELEVEN TRANSCONTINENTAL RAILROADS OF THE UNITED STATES AND CANADA.

Sound; the Northern Pacific; the Great Northern; the Union Pacific; the Denver & Rio Grande, with its subsidiary, the Western Pacific; the Atchison, Topeka & Santa Fé, and the Southern Pacific, as the more important transcontinentals. Of these the Denver & Rio Grande and the St. Paul were extended to the coast without government aid. In the accompanying table, in which certain rather interesting characteristics of each road are shown, the Denver & Rio Grande is omitted because it is impossible to give any figures for the newly constructed Western Pacific, and it would be quite misleading to give the Denver & Rio Grande's figures by themselves. The Denver & Rio Grande itself only runs from Denver, Col., and Pueblo, on the east, to Ogden, Utah, and Salt Lake City, on the west, with a great number of branches through Colorado. From Salt Lake City west the Goulds, using the Denver & Rio Grande credit, built a line paralleling in many places the Southern Pacific from Salt Lake City to San Francisco. It was built without any government aid, and built with modern standards and with modern standard grades; so that its actual initial cost was far higher than that of the other transcontinental roads. The other roads, with the exception of the St. Paul's Pacific coast extension, were built as cheaply as possible at first, and slowly, as the years have gone on and the freight traffic and passenger business has increased, the properties have been improved, rebuilt and often relocated, so that to all intents and purposes they are entirely different lines than those originally built.

Even with its Western Pacific, the Denver & Rio Grande would not be a transcontinental road if it were not for the fact that it is controlled by the Missouri Pa-

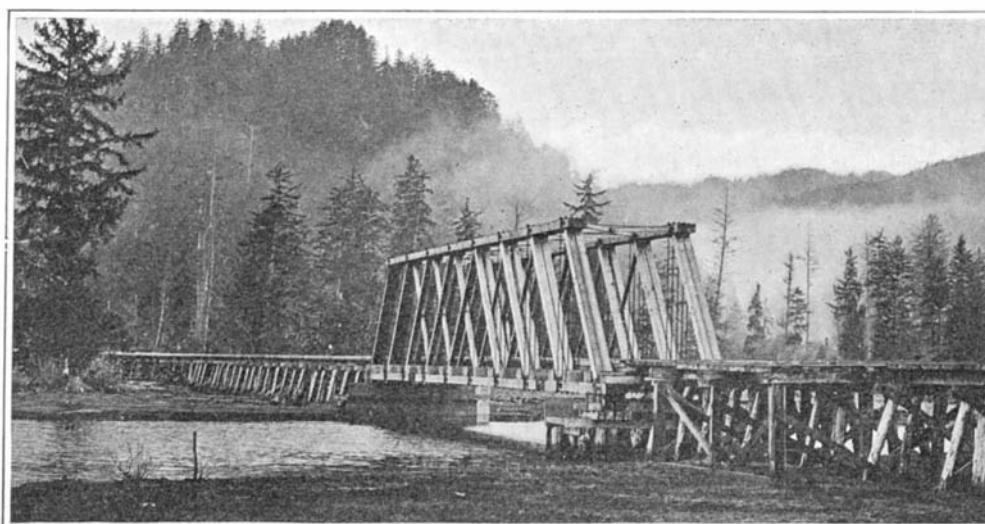
cific as well as by the Goulds; and the Missouri Pacific, which is also controlled by the Goulds, runs from Denver and Pueblo east to Kansas City and St. Louis.

The Chicago, Milwaukee & St. Paul's Pacific coast extension is the other transcontinental that was built without government aid. The Chicago, Milwaukee & St. Paul Railway proper runs from Chicago and St. Paul to the Missouri River at Mobridge, S. D., with a mass of branch lines through Wisconsin, Minnesota, Iowa and South Dakota, and with a line extending as far as Rapid City, S. D., which takes it into the Black Hills. From Mobridge west through the southwestern corner of North Dakota, through the length of Montana and through the breadth of Washington, the St. Paul built a line to Tacoma and Seattle on Puget Sound.

The Chicago, Milwaukee & St. Paul is generally understood to be controlled by the Rockefeller and Standard Oil interests; the Missouri Pacific, Denver & Rio Grande and Western Pacific, as has already been mentioned, are controlled by the Goulds; the Great Northern and the Northern Pacific are both what are known as Hill lines, controlled largely by James J. Hill; the Union Pacific and the Southern Pacific are Harriman lines; and the Atchison, Topeka & Santa Fé, once controlled largely by the English banking house of Baring Brothers, is now not controlled by any one interest.

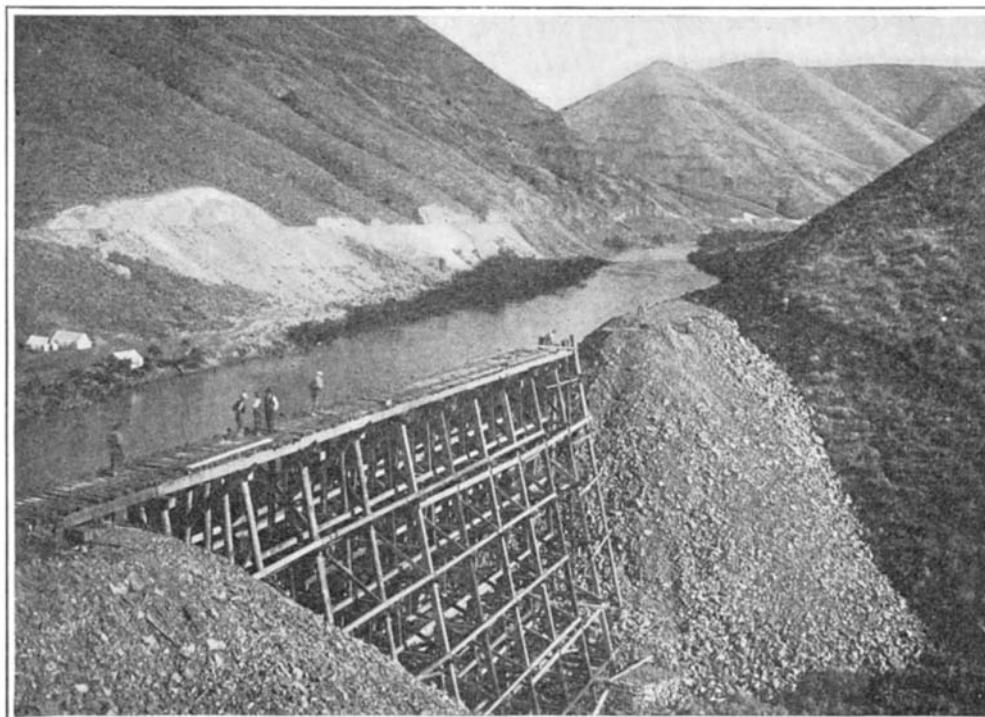
The competition between these seven roads, both for freight and passenger business, is very keen, and although it might seem surprising at first, the competition is nearly as keen between the Union Pacific and the Southern Pacific, for instance, which are controlled by the same financial interests, as it is between the

(Continued on page 598.)



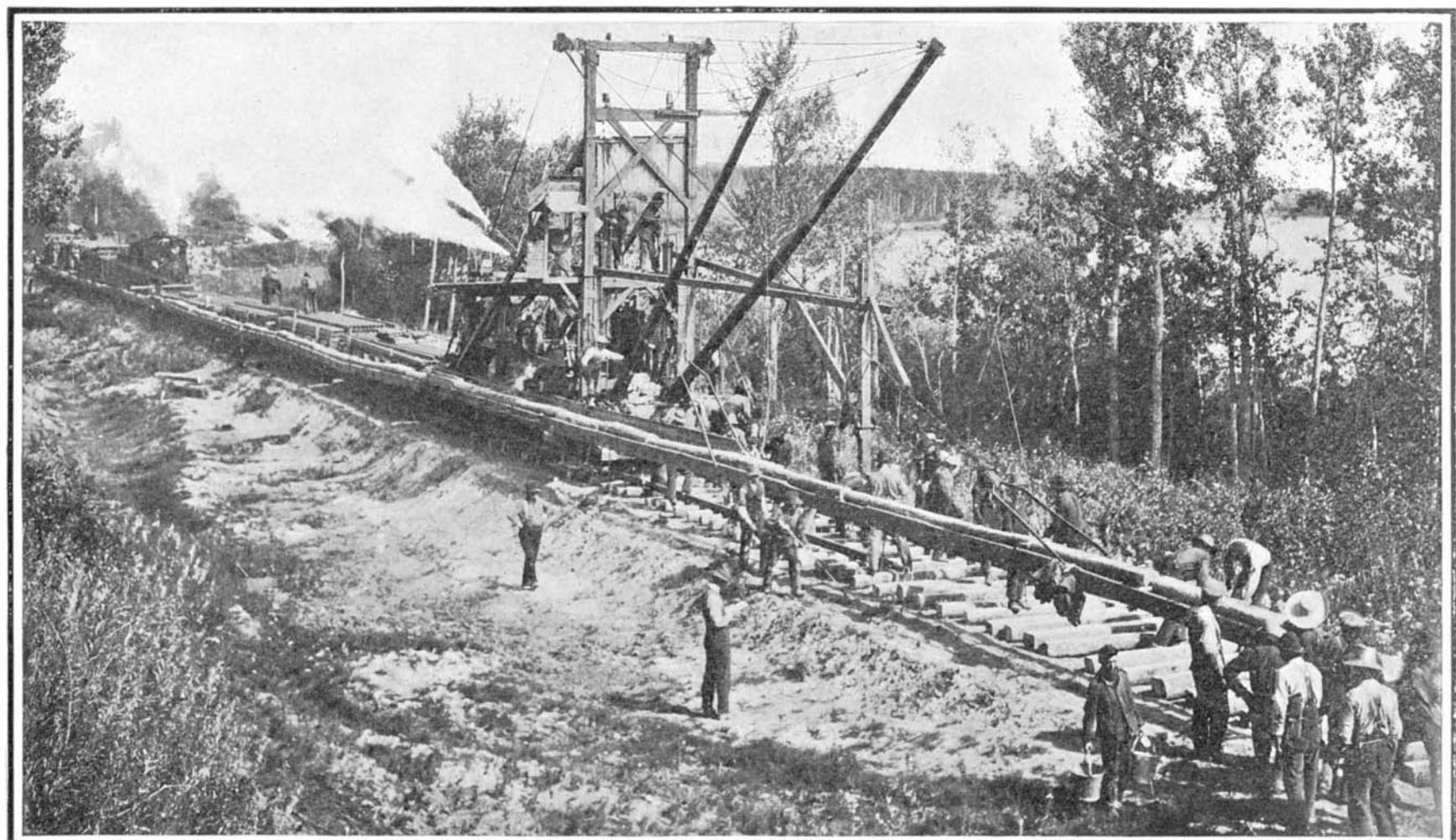
This type of bridge rendered possible the rapid construction of pioneer railroads in the western country where steel was costly and timber plentiful and cheap.

HOWE TRUSS TIMBER BRIDGE ON THE PORTLAND & TILLAMOOK RAILWAY, OREGON



Two competing railroads being built through the desolate Deschutes River Canon. On the right is Harriman's Deschutes Railroad; on the left Hill's Oregon Trunk Line.

THE FIGHT FOR RAILROAD TERRITORY



A track-laying machine which places ties and rails on the roadbed, advancing at the rate of four miles a day. The material is brought forward continuously from the loaded train in the rear and deposited in place.

RAILWAY BUILDING UP TO DATE

not permit the publication of these tables for 1910. It can be stated, however, that although the figures were changed slightly because most of the roads raised wages during the intervening period, the same general variation obtained; the highest and lowest figures for that year (1910) being 17½ and 8.1 cents per mile for locomotive repairs, 8.7 and 2.5 cents per mile for passenger car repairs, and 34.1 and 10.3 for freight car repairs.

It would have been interesting to have had the rates paid workmen published along with these remarkable differences. Some light would probably have been thrown on the relation between high or low costs of work and high or low monthly wage rates of the workmen. I say monthly wage rates, for when work is paid for by the piece the unfortunate and widely prevalent custom of cutting piece rates often results in all sorts of deception on the part of the workmen. And a high hourly rate one day will be followed by the workman decreasing his output the next. He feels, and with justification, that the rates will be cut if he is able to make an unusually high amount in a month. Diminished output of the workmen, with attendant expensive delays, are the results, all of which are paid for dearly by the stockholders.

It would seem from the tables that there is ample opportunity for the railroads to recover several times the twenty-seven million dollars expected from the rate income by effecting reform from within.

After all roads have attained the lowest figures of the "low" road by using that road's methods, the habit of saving will probably have become so fixed that perhaps the "efficiency doctors," as they have been called, will be sent for.

Transcontinental Railroads in the United States

(Continued from page 589.)

Union Pacific and the Atchison, Topeka & Santa Fé. Some idea of what this competition and the potential and often active competition by water has done for freight rates may be gained by understanding that the rate on first class freight from New York city to San Francisco is \$3 per 100 pounds, or \$67.20 per long ton, while the rate on fifth class (highest class) merchandise from London, England, to Birmingham, about 125 miles, is 49s 4d (\$9.84) per long ton.

Transcontinental freight rates are really much lower than is shown by this comparison, because only a very small part of the freight that moves from the Atlantic seaboard to the Pacific coast moves on what are called class rates; and even at these rates only a small part takes the first class rate, there being six classes, and each succeeding class is proportionately cheaper. The great bulk of the freight moves on what are called commodity rates; that is, so much per 100 pounds is charged for a certain commodity—oranges, for instance, or lumber; and commodity rates in general are much lower than class rates.

Competition and the genius of American railroad men have worked along the line of reducing the charge for the freight business, and the results are probably more strikingly shown by the transcontinental roads than by any other class of roads.

Competition and the genius to meet this competition have been just as active in the passenger business as in the freight, but with the result that instead of reducing the cost per passenger per mile as the cost per ton per mile for freight was reduced, the railroads have found that what the public wanted was not so much cheaper passenger rates as a very high class of service. Of course, in the case of each one of the transcontinental roads the freight business is a far more important source of revenue than the passenger business, but the passenger business is absolutely essential to the roads; and to the great majority of the public, passenger service is the criterion by which the efficiency of any given railroad is judged.

The varying seasons have a considerable influence on the movement of freight over the northern or southern lines. For instance, oranges first begin to move east from California in considerable quantities in the early part of January. At this time the southernmost route, the Southern Pacific, can bid successfully for the business. A little later the Atchison, Topeka & Santa Fé puts in its bid also for this business, and by the time spring has come the Southern Pacific-Union Pacific route through San Francisco and Ogden to the East is hauling solid trains of oranges.

In the summer the northern lines—the Northern Pacific, the Great Northern and the St. Paul—get their share of the fruit business, canned fruits, dried fruits, apples, etc., moving from California to the East.

The seasons make a big difference also as to which

	Chicago, Milwaukee and St. Paul. ⁸	Northern Pacific.	Great Northern.	Union Pacific.	Atchison, Topeka and Santa Fé.	Southern Pacific.
Length of main line from East to Pacific. ¹(miles)	1,771 ²	1,907 ³	1,855 ⁴	1,783 ⁵	2,576 ⁶	2,487 ⁷
Total road mileage.....	8,714	5,814	7,020	6,401	9,961	10,077
Total capitalization.....	\$25,000,000	\$546,566,000	\$429,610,909	\$613,594,360	\$581,697,183	\$399,483,171
Number of locomotives.....	1,567	1,430	1,127	1,134	1,923	1,821
Number of passenger cars.....	1,217	1,119	885	825	1,375	1,958
Number of freight cars.....	5,644	44,506	44,832	26,043	57,781	45,185
Total tons of freight	32,236,798	18,268,998	23,224,972	15,312,211	19,448,590	25,962,704
Total ton miles.....	6,242,879,692	5,419,084,365	5,678,787,816	5,997,233,894	7,012,896,589	6,628,685,724
Average length of haul.....(miles)	596	297	245	346	361	243 ¹¹
Average train load of revenue freight ⁹(tons)	387	429	518	452	389 ¹⁰	396
Total number of passengers carried	18,182,361	9,639,994	8,843,557	8,306,930	13,675,343	{ 21,196,324 ¹² 40,190,200 ¹³
Average receipts per passenger per mile (cents).....	2.50	2.18	2.20	2.122	2.06	2.19

¹ The length of main line is from eastern terminus to western terminus of the route. ² The Chicago, Milwaukee & St. Paul main line runs from St. Paul to Tacoma. This includes the Chicago, Milwaukee & Puget Sound, which is the operating company for the Pacific Coast extension of the St. Paul. ³ The Northern Pacific main line runs from St. Paul to Tacoma. ⁴ The Great Northern main line runs from St. Paul to Tacoma. ⁵ The Union Pacific main line really only runs from Council Bluffs to Ogden. The mileage given in our table is the main line mileage from Council Bluffs to San Francisco. ⁶ The Atchison, Topeka & Santa Fé main line runs from Chicago to San Francisco. ⁷ The Southern Pacific main line runs from New Orleans to San Francisco. ⁸ All of the figures in this column are the total figures of the St. Paul itself and the Puget Sound, with the exception of the figures for capitalization, and the averages for length of

haul, train load and receipts per passenger per mile. The \$424,813,231 capital is the outstanding capital of the Chicago, Milwaukee & St. Paul, and the \$25,000,000 represents the outstanding bonds of the Puget Sound not held in the treasury of the parent company.

In the averages, the first figure is for the Puget Sound and the second figure for the St. Paul. ⁹ Does not include company freight. ¹⁰ Includes company freight. This makes the average train load of the Atchison appear considerably larger in comparison with the other roads than it really is. For instance, the Southern Pacific train load as shown in our table is 396 tons. If company material were included in that figure, it would be 476 tons. ¹¹ The tonnage of company material is included in arriving at this average; but it is rather hard to say whether the average is much affected or not. ¹² Omitting ferry and suburban. ¹³ Including ferry and suburban.

4 per cent; on the Atchison, 23 per cent, and on the Southern Pacific, 20 per cent.

On the Great Northern, live stock and animal products, such as dressed meat, etc., form but 1 per cent of the total tonnage; on the Northern Pacific, 2 per cent; on the St. Paul, 5 per cent; on the Union Pacific, 6 per cent; on the Denver & Rio Grande, 1 per cent; on the Atchison, 8 per cent, and on the Southern Pacific, 4 per cent.

Products of mines furnish 58 per cent of the total tonnage of the Great Northern; 24 per cent on the Northern Pacific; 32 per cent on the St. Paul; 34 per cent on the Union Pacific; 84 per cent on the Denver & Rio Grande; 28 per cent on the Atchison, and 28 per cent on the Southern Pacific.

Lumber and products of forests furnish 12 per cent of the total tonnage on the Great Northern; 38 per cent on the Northern Pacific; 13 per cent on the St. Paul; 14 per cent on the Union Pacific; 2 per cent on the Denver & Rio Grande; 12 per cent on the Atchison, and 21 per cent on the Southern Pacific.

Manufactures furnish 6 per cent of the total tonnage on the Great Northern; 10 per cent on the Northern Pacific; 18 per cent on the St. Paul; 13 per cent on the Union Pacific; 6 per cent on the Denver & Rio Grande; 17 per cent on the Atchison, and 17 per cent on the Southern Pacific.

This is all carload business, that is, each shipment consists of at least one carload. The less than carload freight business is generally called merchandise, and of the total tonnage of freight carried by the Great Northern but 3 per cent was merchandise; by the Northern Pacific but 5 per cent; by the St. Paul but 10 per cent; by the Union Pacific but 5 per cent; by the Denver & Rio Grande but 1 per cent; by the Atchison but 7 per cent, and by the Southern Pacific but 8 per cent. The rest of the total tonnage, besides the carload business that we have classified, and the miscellaneous less than carload business, called merchandise, is made up of miscellaneous carload shipments. It should be noted here that the very high percentage of products of mines, carried by the Denver & Rio Grande, is caused by the great quantities of ore which the Denver & Rio Grande hauls out of the mountains in Colorado, and this business is not transcontinental business in any sense of the word. Of course, in giving the above averages, it was impossible to include the Western Pacific's or Missouri Pacific's business with that of the Denver & Rio Grande, and we have not included the St. Paul's Pacific Coast extension with the figures for the St. Paul itself. The only way to get any comparison between roads of different lengths as to what they are earning, is to reduce earnings to a per mile basis. As a matter of fact, a per mile basis does not make even a fairly accurate comparison. Difference in conditions, difference in commodities carried and differences in physical location must be taken into consideration to make any sort of comparison, so that there is shown herewith total earnings in the year ended June 30th, 1910, of each of the roads discussed:

	Total, In- Freight Revenue.	Passenger Revenue.	clud'g Mail, Express, etc.
Great Northern....	\$46,675,734	\$17,025,682	\$64,465,370
Northern Pacific....	48,758,736	24,250,818	74,525,826
C. M. & St. P....	44,909,137	18,689,198	64,846,894
Union Pacific....	61,479,680	25,324,254	88,506,465
D. & R. G.	17,306,613	6,020,407	23,563,437
A. T. & S. Fe....	71,194,056	32,013,919	104,993,195
Southern Pacific..	77,018,554	45,221,129	124,523,905