A report upon the Western Pacific railroad

Kendrick, John William, 1853-1924.
Chicago, 1917.

REPORT

THE WESTERN PACIFIC RAILROAD

KENDRICK

A REPORT UPON

THE WESTERN PACIFIC RAILROAD

J. W. KENDRICK

CHICAGO, 1917

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PREFACE.

The subject matter of this report has, it is believed, been compiled with exceptional thoroughness and with the painstaking care commensurate with its importance. The accumulation of facts relating to about 900 miles of branch lines, the preparation of the estimates of cost and the estimates of the traffic which these branches would have commanded in 1916 if they had been constructed and operated during that year, the making of a forecast of the probable revenues five years later, the computation of the expense of operation, the establishment of operating ratios, the combination of the income of these branch lines with that of the main line as it now exists and of the co-related topics which it is unnecessary to mention in detail, constituted an undertaking the nature of which I understood but imperfectly before traversing the field.

While in California I motored nearly 1,400 miles for the purpose of traversing the routes of all the proposed lines, and more than 200 miles afterwards for the purpose of viewing certain parts of the territory again. I traversed all of the lines of the Northern Electric Railway, made several trips between Oakland and Sacramento over the Oakland, Antioch & Eastern, and motored from Pittsburgh to Stockton, and traveled from the latter city to Sacramento over the line of the Central California Traction Company. Through the courtesy of Mr. John F. Currey, President of the Island Transportation Company, I was enabled to visit all parts of the Delta by launch—a trip that was supplemented by a motor tour of those islands which could be reached in that way.

I have not seen fit to make any extended mention of the Island Transportation Company, with its fleet of nearly fifty boats and barges, because I am not clear in my own

mind as to whether the interests of the COMPANY would be served by acquiring control of its capital stock. This transportation company must apparently continue to do business. Its present rates do not afford much profit. My observation and experience incline me to advise against the operation of a boat, or boats, the direct returns from which would probably be so small as to be unimportant to the RAILROAD. Competition upon the rivers and bays is fierce and the regular lines are deprived of a considerable amount of tonnage because of privately owned and operated boats which have received the name of jitneys.

It should be possible for the COMPANY to secure a community of interest that will result in the earnest support of one of the established boat lines.

The occupation of certain territory in the Delta by two branch lines, the construction of which is recommended, will apparently deprive the boats of a considerable amount of freight that they are now enjoying. It seems to me that action with reference to maritime service can well be deferred until the Delta lines have been completed and it is known to what extent they are likely to control the business, not only of the islands that they occupy but of those that are adjacent, the products of which can be delivered to these new rail termini much more cheaply than to Stockton, Sacramento, Middle River or Antioch.

The traffic, engineering and other forces of THE WESTERN PACIFIC RAILROAD were placed at my disposal and rendered splendid service, lacking which it would have been impossible to have collected the wealth of data that appears between these covers.

The report is voluminous, but is believed to contain nothing that is superfluous. The matter submitted represents what is left after using the much more voluminous data upon which it rests; therefore, the work involved in the preparation of this report is, after all, inadequately represented by the contents of this volume.

The maps necessary for a proper explanation of the characteristics of the country, the portrayal of the branch lines, the construction or acquisition of which are recommended, and so forth, were so large as to make it impracticable to include all of them in the book itself. Therefore, a containing case, or portfolio, accompanies each copy of this report.

It was thought best to include not only the projects that should be considered in the future but also those to which attention has already been given, and which are now in process of construction, or, in some instances, completed, so that, as far as possible, the volume should contain a description and estimates of revenue, and so forth, for all of the proposed branch system, including the lines to which the COMPANY is already committed as well as those which should be included in its future mileage.

J. W. KENDRICK.

CHICAGO, September, 1917.

AN APPRECIATION.

I should be remiss in the sweet obligations imposed by a friendship of many years if I failed to include as a part of this report a tribute to Virgil Gay Bogue, who passed from this life on October 14, 1916. It is difficult to select the chef d'ouvre from his many notable achievements as an engineer, but the WESTERN PACIFIC RAILWAY, as it was left by him, and as it will be in future years, should, and will, perpetuate the name of the engineer who overcame great natural and artificial obstacles and wrought patiently, silently, honorably, and with that rare fidelity that characterized the man. THE WESTERN PACIFIC RAILROAD, the successor of the WESTERN PACIFIC RAILWAY, stands to-day a monument to his genius.

If there be those who criticize the one per cent. maximum grade through Feather River Cañon, and there have been such, that criticism should be directed to the framer of the WESTERN PACIFIC First Mortgage, to the Bowling Green Trust Company, as Trustee, and particularly to Schedule A, attached thereto, which provides, under the head of "Roadway":

> "The main line of the RAILROAD from the eastern limit of the City of Oakland to Salt Lake City shall have a maximum grade not exceeding one per cent. compensated."

But neither the provision of the framer of the mortgage or the engineer should be criticized. THE WESTERN PACIFIC RAILROAD already enjoys a density of freight traffic amounting, in 1916, to 1,082,879 ton miles per mile of road. It has already found it necessary to purchase heavier engines for use on this one per cent. grade. Other roads having heavier grades have found it economical to reduce them at enormous cost, but the WESTERN PACIFIC, thanks to the courage and skill of its engineer, will be spared that expense.

The critics further say, in the case of the summits at Sand Pass and at Antelope Summit, both in Western Nevada,

where one per cent. grades were used to lessen first cost, thereby interrupting the continuity of a four-tenths per cent. maximum grade, that such interruption destroys the value of the lighter grades. Not so. Both of these summits can be surmounted by a grade not exceeding four-tenths per cent. whenever in the somewhat remote future it will be economical to make an investment of about $800,000 for the purpose of dispensing with helper engines.

THE WESTERN PACIFIC RAILROAD, as designed and constructed, affords a channel for the movement of an enormous business at minimum cost. It is the main artery of a vigorous system, which, although situated in the maximum operating cost zone of the United States, is, nevertheless, operated for less than 60 per cent. of its gross earnings.

Had its creator been able to carry out his conception to its finality he would have supplied the necessary veins for a perfect circulatory system, and, these being provided, those who are responsible for the operation of the ROAD will appreciate more than has hitherto been possible the one per cent. maximum grade up the Feather River Cañon.

A better solution of the problem of surmounting an elevation than that afforded by the magnificently fitted one per cent. grade known as "Arnold's Loop" at the western boundary of Utah does not exist, and to this problem Mr. Bogue gave his personal attention.

Unswerving in his loyalty to friends, just to all, bearing his burdens as a man should, and as no one but a man can, unassuming, sympathetic, silent, and therefore frequently unappreciated, the laurel is deserved and may be fittingly placed upon the tomb of the man's man, the genius of the physical WESTERN PACIFIC RAILWAY, the late Virgil Gay Bogue.

J. W. K.

CHICAGO, September, 1917.

OUTLINE.

Northern California.

Delta-Lodi-Stockton District.

Central California.

Mileage and Description of Western Pacific.

Maps, Diagrams and Profiles.

INTRODUCTION.

THE WESTERN PACIFIC RAILROAD was completed from Salt Lake City to San Francisco in the latter part of 1909, and shortly afterwards commenced to handle through freight and passenger business. It was turned over to the Operating Department for operation on July 1, 1911.

The distance from Salt Lake City to San Francisco is 927.22 miles, and 3.5 miles of this distance constitutes the ferry link across San Francisco Bay. At the time of its completion the ROAD had but one branch 13.13 miles in length, extending from Carbona, a point 72 miles east of San Francisco, to Tesla.

The time that has elapsed since the completion of the WESTERN PACIFIC has wrought various changes. The ROAD became bankrupt and Receivers were appointed in March, 1915. The Receivership was terminated and the ROAD returned to the present corporation, THE WESTERN PACIFIC RAILROAD, on July 13, 1916. Its plan of reorganization provided for the issue of $50,000,000 First Mortgage Bonds, 47,500,000 shares of Common and 27,500,000 shares of Preferred Stock, $19,975,560, par value, of the Bonds having been sold up to, and including, July 26, 1917.

The following statement quoted from the first annual report of THE WESTERN PACIFIC RAILROAD COMPANY for the calendar year 1916, pages 4 and 5, shows that the COMPANY earned a sufficient sum in that year to enable it to pay its operating expenses and all obligations, including interest on funded debt, and to carry an income balance amounting to $2,439,913.50 to the credit of profit and loss:

Average Mileage Operated	942.01
Operating Revenues	$8,270,262.21
Operating Expenses	4,950,622.41
Net Revenue from Operations	$3,319,639.80
Less Tax Accruals	376,459.17
Total Operating Income	$2,943,180.63
Other Income	238,800.48
Gross Income	$3,181,981.11
Deductions from Gross Income	742,067.61
Income Balance carried to credit of Profit and Loss	$2,439,913.50

In 1916 the revenue amounted to $8,779.38 per mile, and the PROPERTY was operated for 59.86 per cent. of its gross earnings.

The original corporation lacked the funds necessary for the completion of the ROAD. A great deal of its was unballasted. There were, and are, some bridges of a temporary character and insufficient capacity for modern requirements. There were also numerous tunnels that required lining with masonry as soon as the work could be undertaken, and various unstable and sliding slopes, both in cuts and on fills. It was found necessary to raise the entire embankment across Salt Lake six feet and to riprap it heavily. From the beginning, therefore, it was necessary to make considerable expenditures for improvements involving large charges to operating expenses under the head of Maintenance of Way.

The ROAD lacked equipment from the first. One thousand new steel underframe and superstructure box cars were purchased in 1916, and a contract was let for 800 additional steel underframe box cars, 200 combination ventilated steel underframe box cars and 150 steel underframe stock cars.

Notwithstanding these additions, the equipment is still insufficient, as will be shown.

The vicissitudes of the Denver & Rio Grande and the other so-called Gould Lines undoubtedly militated against the prosperity of the WESTERN PACIFIC. The following statement shows a comparison of its earnings per road mile with those of the Southern Pacific, the Santa Fe and the Los Angeles & Salt Lake Railways. The figures for the WESTERN PACIFIC are for the calendar year 1916, those of the other lines for the fiscal year 1915-16:

	Gross Earnings	Miles of Road	Earnings Per Mile of Road
WESTERN PACIFIC	$ 8,270,262	942.01	$ 8,779
Southern Pacific	102,832,064	6,942.09	14,813
Santa Fe (excluding Gulf, Colorado & Santa Fe)	111,366,307	8,623.85	12,914
Los Angeles & Salt Lake	10,827,114	1,144.80	9,456

The large earnings of the WESTERN PACIFIC per mile of road are partially due to the fact that it has no branch lines, whereas the average western system is usually made up of about 50 per cent. main and 50 per cent. branch line mileage. It is indispensable to the future prosperity of the SYSTEM that it should have its quota of properly located branches. Its financial position at the present time is very strong; indeed, the interest on its funded debt for the year ended June 30, 1916, was only $246,812.67,* or $260 per mile, as compared with net operating revenue amounting to $3,524 per mile.

The average haul of freight—that is, the average length of haul (in miles) per revenue ton, is greater on the WESTERN PACIFIC than upon any other road extending to the Pacific Coast. Its average revenue per ton mile is less than upon any other, as shown by the statement which follows. The unusually long haul is due to the very small local business, and the less revenue per ton mile is attributable to the same cause, and also to the fact that much of the business is for export, and the divisions of rates that accrue afford a low return per ton mile:

	Average Haul Per Ton Mile	Average Revenue Per Ton Mile
WESTERN PACIFIC	573.83	$0.00860
Great Northern	269.98	0.00771
Northern Pacific	334.24	0.00793
Union Pacific	412.23	0.00860
Santa Fe (excluding Gulf, Colorado & Santa Fe)	293.05	0.00964
Southern Pacific	263.75	0.01025

The density of traffic of the WESTERN PACIFIC, measured by revenue ton miles per mile of road operated, in 1915 amounted to 549,683, and in 1916 to 1,082,879. The density of traffic on the lines of its competitors during the fiscal year 1915-16 was as follows:

	Revenue Ton Miles Per Mile of Road
Southern Pacific	905,649
Santa Fe (excluding Gulf, Colorado & Santa Fe)	909,591
Los Angeles & Salt Lake	520,939

* The total authorized outstanding issue of bonds is $20,000,000, none of which have been sold for less than 90 per cent. of par value, the price provided for in the reorganization plan which attached to a maximum of 40 per cent. of the face value of the bonds of the old Company when deposited under said plan. Only $8,102,805.45 of the money derived from the sale of these bonds had been expended up to July 26, 1917, and therefore the fixed charges on that date were at the rate of $405,140.27 per annum. For details regarding the disposition of the moneys received from the sale of bonds see page 16.

Here again the effect of the lack of branch lines may be noted, for if the WESTERN PACIFIC owned a considerable branch line mileage the revenue ton miles per mile of road operated might be diminished, although this is doubtful.

The roads with which comparisons are made, with the exception of the Salt Lake Line in California, have been pioneers in the districts that they occupy. The construction of their main lines and branches necessarily preceded the development of the country. The WESTERN PACIFIC has a singular advantage, due to the fact that it can select the territory within which it will be profitable to acquire existing lines and to build others. The pioneer must incur more or less risk in construcing lines of railroad, whereas it is possible for the WESTERN PACIFIC to determine the productivity of the sections which it desires to exploit and to measure the benefits that will accrue to the feeders themselves and to the main stem with which they connect. The examinations for these purposes have been unusually thorough and the results obtained are much more trustworthy than such estimates usually are.

The WESTERN PACIFIC has been operated much more economically from the beginning of the Receivership than during the Ante-Receivership period. This fact is reflected by the income accounts of the COMPANY which cover the period from 1912 up to the year ended December 31, 1916. The year 1912 was the first in which the property was operated by an organized Operating Department. There were various deterrents to economical operation which it is not necessary to detail. It was not until the discordant elements in the management were eliminated as a result of a Receivership that the property was operated as well as was then possible. It may be said that intelligent, forceful management commenced in March, 1915, and continued under the Receivership until July 13, 1916, a period of a little over fifteen months, and that the reorganized COMPANY has only been in possession of the ROAD a little more than a year. The vast improvement that has taken place, the efficient and energetic operating corps that

has been organized by the President of the COMPANY, the fact that the standards of operation at present compare favorably with those of any road extending to the Pacific Coast, not only afford testimony as to what has been accomplished but give assurance of a successful administration of its affairs in the future.

The best proof of the improvement in the standards of operation is afforded by the following statements, which show the train miles, revenue ton miles and ton miles per train mile of the WESTERN PACIFIC in the fiscal year 1912-13 and the calendar year ended December 31, 1916, which is followed by a statement of the cost of those items of train operation which vary with the number of trains run:

	Fiscal Year 1912-13	Calendar Year 1916
Train Miles	1,625,875	1,843,445
Revenue Ton Miles	601,416,992	1,020,082,624
Ton Miles Per Train Mile	410.5	553.36

	Cents
Locomotive Repairs—actual	12.90
Enginemen's Wages—actual	10.60
Locomotive Fuel—actual	24.40
Water divided between passenger and freight services on the same basis as fuel	1.26
Lubricants (Locomotives)—actual	0.26
Other Locomotive Supplies—actual	0.22
Enginehouse Expenses (engine ton mileage basis)	2.45
Enginemen's Wages—actual	11.80
Train Supplies (no data) say	3.00
Total Variable Cost Per Freight Train Mile	66.89

If the tons per train mile had been the same in 1916 as in 1912 it would have required 2,509,334 train miles of 410.5 tons per train mile to handle the revenue tonnage.

The actual revenue freight train mile in 1916 were 1,843,445, or 665,889 less than would have been required upon the basis of 1912. The saving that resulted from the increased tonnage of freight trains in 1917 was therefore about 665,889 train miles, multiplied by 66.89 cents, the variable cost per train mile, or $445,413, which attaches to transportation expenses.

This annual saving is important in itself—the most important of any single item. To go a step further, the operating

ratio in the fiscal year ended June 30, 1912, was 81.57 per cent. (the highest of record except during the year ended June 30, 1914, when it was 82.78 per cent.). If the same ratio had obtained during the year ended December 31, 1916, when the operating revenues were $8,270,262, the operating expenses would have been $6,746,053, and the net revenue from operation $1,524,209, or $1,795,431 less than the actual net revenue obtained.

These results were accomplished in spite of material increases in the cost of labor and materials, the effect of which was made more acute on account of the very considerable work of improvement that was undertaken and carried on from and after the appointment of Receivers.

The WESTERN PACIFIC operates only two through passenger trains each way per day, and no local passenger trains, and for various reasons has not solicited passenger business as actively as it competitors. Its passenger train mileage amounts to 43.2 per cent. of the total, whereas most of the Western railroads unfortunately have a much larger proportion of this generally unprofitable mileage. Owing to its heavy trainload, and consequent comparatively small freight train mileage, the actual ratio of passenger train mileage to the total is higher than it would otherwise be. If its freight trainload averaged 405 tons, as it did on the Santa Fe during the fiscal year ended June 30, 1916, it would have required 2,518,722 train miles to handle its revenue freight tonnage in that year, and the ratio of its present passenger train mileage to the total passenger and freight would have been 34.5 per cent., which is exceedingly low.

The statement is made that, notwithstanding the extremely low returns afforded by the divisions of passenger rates that governed during the Exposition in San Francisco, freight earnings decreased in one month in 1915 to such an extent as to indicate a decrease as compared with the corresponding period of the previous year, but the receipts from the carriage of passengers were so large as to more than make up for the

OPERATING STATISTICS, 1912 TO 1916, BOTH INCLUSIVE.

	Year ended June 30, 1912	Year ended June 30, 1913	Year ended June 30, 1914	July 1, 1914 to March 4, 1915	March 5, 1915 to June 30, 1915	Year ended June 30, 1915	Year ended June 30, 1916	July 1 to July 13, 1916	July 14 to December 31, 1916	Year ended December 31, 1916
Freight Revenue	$ 3,935,719	$ 4,635,630	$ 4,675,940	$ 2,817,508	$ 1,137,501	$ 3,955,009	$ 5,249,368	$ 295,814	$ 3,570,066	$ 6,740,978
Revenue Tons	1,000,211	1,215,275	1,199,940	744,930	289,930	1,034,860	1,452,137	75,981	963,744	1,777,682
Revenue Ton Miles	489,183,577	601,416,992	595,826,774	345,662,184	144,025,606	489,687,790	760,992,120	44,925,279	518,307,644	1,020,082,624
Non-Revenue Tons	350,244	324,747	330,801	186,334	84,587	270,921	352,908	14,787	202,877	386,751
Non-Revenue Ton Miles	59,933,261	66,009,682	72,140,964	42,448,215	20,462,244	62,910,459	83,491,153	3,583,599	44,420,546	87,931,113
Revenue Ton Miles per Mile of Road Operated	523,998	641,874	634,250	366,595	152,747	519,342	808,663	47,740	549,649	1,082,879
Revenue Train Miles	1,455,421	1,625,875	1,460,248	846,354	325,159	1,171,513	1,581,810	66,646	943,761	1,843,445
Loaded Car Miles	29,706,391	33,946,650	32,628,019	19,560,141	8,105,511	27,665,652	36,817,060	1,744,600	23,221,369	45,239,793
Empty Car Miles	13,323,937	15,637,226	15,821,344	7,787,305	2,781,385	10,568,690	12,840,163	400,333	7,600,721	14,403,750
Loaded and Empty Car Miles	43,030,328	49,583,876	48,449,363	27,347,446	10,886,896	38,234,342	49,657,223	2,144,933	30,822,090	59,643,543
Engine Miles (excluding Switch and Work Train)	1,619,366	1,812,318	1,617,087	911,607	352,894	1,264,501	1,692,980	70,443	1,001,031	1,966,902
Freight Revenue per Mile of Road Operated	$ 4,215.82	$ 4,947.58	$ 4,977.48	$ 2,988.13	$ 1,206.39	$ 4,194.52	$ 5,578.20	$ 314.35	$ 3,785.94	$ 7,155.95
Freight Revenue per Train Mile	2.70	2.85	3.20	3.33	3.50	3.38	3.32	4.44	3.78	3.66
Freight Revenue per Car Mile	9.15c	9.35c	9.65c	10.30c	10.45c	10.34c	10.57c	13.79c	11.58c	11.30c
Freight Revenue per Ton Mile	.80c	.77c	.79c	.81c	.79c	.81c	.69c	.66c	.68c	.66c
Average Revenue Tons per Train	336.11	369.90	408.03	408.41	442.94	418.00	481.09	674.09	549.19	553.36
Average Non-Revenue Tons per Train	41.18	40.60	49.49	50.16	62.93	53.70	52.78	53.77	47.07	47.70
Average Tons per Train	3,377.29	410.50	408.03	458.57	505.87	471.70	533.87	727.86	596.26	601.06
Average Revenue Tons per Car	11.38	12.13	12.30	12.64	13.23	12.81	15.32	20.94	16.82	17.10
Average Revenue Tons per Loaded Car	16.48	17.73	18.26	17.67	17.77	17.70	20.67	25.75	22.32	22.55
Average Non-Revenue Tons per Loaded Car	2.02	1.94	2.21	2.17	2.52	2.27	2.27	2.05	1.91	1.94
Average Tons per Loaded Car	18.50	19.67	20.47	19.84	20.29	19.97	22.94	27.80	24.23	24.49
Average Cars per Train	29.55	30.48	33.18	32.31	33.48	32.64	31.39	32.18	31.87	32.35
Average Train Engines per Train	1.11	1.11	1.11	1.08	1.09	1.08	1.07	1.06	1.06	1.07
Average Haul of Each Revenue Ton (in Miles)	489.08	494.88	496.55	464.02	496.76	473.19	524.05	591.27	537.81	573.83
Mileage of Road Operated	933.56	936.97	939.42	942.90	942.90	942.90	941.05	941.05	942.98	942.01
Passenger Revenue	$ 1,139,608.69	$ 1,354,082.72	$ 1,253,731.12	$ 763,648.42	$ 620,067.07	$ 1,383,715.49	$ 1,700,422.36	$ 52,141.40	$ 560,564.16	$ 1,047,994.84
Excess Baggage Revenue	8,700.11	10,385.80	10,018.57	6,071.30	3,729.22	9,800.52	10,115.88	552.12	3,693.26	7,665.55
Mail Revenue	17,112.97	22,415.26	31,402.59	46,456.00	25,389.40	71,845.40	75,234.66	1,800.75	27,883.34	67,326.85
Express Revenue	85,917.47	88,741.86	78,275.47	51,320.91	32,032.17	83,353.08	171,185.63	9,820.18	100,516.11	199,609.83
Other Passenger Train Revenue	108.35	42.25	176.40	269.95	293.25	563.20	319.10	.....	6,878.43	7,021.63
TOTAL PASSENGER TRAIN REVENUE	$ 1,251,447.59	$ 1,475,667.89	$ 1,373,604.15	$ 867,766.58	$ 681,511.11	$ 1,549,277.69	$ 1,957,277.63	$ 64,314.45	$ 708,535.30	$ 1,329,618.70
Revenue Passengers	256,099	279,854	236,162	139,898	93,243	233,141	262,675	11,331	08,777	193,679
Revenue Passenger Miles	58,721,742	66,100,079	62,075,775	38,914,540	40,199,837	79,114,377	111,416,461	1,540,215	27,393,788	47,072,564
Revenue Passenger Miles per Mile of Road	62,901	70,547	66,078	41,271	42,634	83,905	118,396	1,637	29,050	50,926
Revenue Train Miles	1,416,468	1,369,182	1,318,480	800,862	573,782	1,374,644	1,653,077	48,154	635,275	1,328,747
Car Miles	9,173,482	9,121,226	9,177,263	5,768,983	4,074,749	9,843,732	12,253,800	346,901	4,562,300	9,184,328
Engine Miles	1,480,726	1,428,902	1,360,459	829,122	592,843	1,421,965	1,698,632	49,218	643,537	1,351,227
Passenger Train Revenue per Mile of Road	$ 1,340.51	$ 1,574.94	$ 1,462.18	$ 920.32	$ 722.78	$ 1,643.10	$ 2,079.89	$ 68.34	$ 751.38	$ 1,411.47
Passenger Train Revenue per Train Mile	.88c	1.08c	1.04c	1.08c	1.19c	1.13c	1.18c	1.34c	1.12c	1.00c
Passenger Revenue per Passenger Mile	1.94c	2.05c	2.02c	1.96c	1.54c	1.75c	1.53c	3.39c	2.08c	2.18c
Average Revenue Passengers per Train Mile	41.46	48.28	47.08	48.59	70.06	57.55	67.40	31.99	43.12	36.10
Average Passengers per Train	6.48	6.66	6.06	7.20	7.10	7.16	7.41	7.20	7.18	6.91
Average Train Engines per Train	1.05	1.04	1.03	1.04	1.03	1.03	1.03	1.02	1.01	1.02
Average Haul of Each Passenger (in Miles)	229.29	236.19	262.85	278.16	431.13	339.34	424.16	135.93	277.33	247.69

INCOME ACCOUNT FROM 1912 TO 1916, BOTH INCLUSIVE.

	Fiscal Year ended June 30, 1912	Fiscal Year ended June 30, 1913	Fiscal Year ended June 30, 1914	July 1, 1914 to March 4, 1915	March 5, 1915 to June 30, 1915	Fiscal Year ended June 30, 1915	Fiscal Year ended June 30, 1916	July 1 to 13, 1916	July 14 to December 31, 1916	January 1 to December 31, 1916
Miles of Road	933.56	936.97	939.42	942.90	942.90	942.90	941.05	941.05	942.98	942.01
OPERATING REVENUES:										
Freight	$ 3,935,719.12	$ 4,635,630.55	$ 4,675,940.10	$ 2,817,508.06	$ 1,137,501.22	$ 3,955,009.28	$ 5,249,368.77	$ 295,814.65	$ 3,570,066.56	$ 6,740,978.32
Passenger	1,139,608.69	1,354,082.72	1,253,731.12	763,648.42	620,067.07	1,383,715.49	1,700,422.36	52,141.40	569,564.16	1,047,994.84
Excess Baggage	8,700.11	10,385.80	10,018.57	6,071.30	3,729.22	9,800.52	10,115.88	552.12	3,693.26	7,665.55
Mail	17,112.97	22,415.26	31,402.59	46,456.00	25,389.40	71,845.40	75,234.66	1,800.75	27,883.34	67,326.85
Express	85,917.47	88,741.86	78,275.47	51,320.91	32,032.17	83,353.08	171,185.63	9,280.19	100,516.11	199,609.83
Miscellaneous	42,694.19	.....	18,382.86	16,152.35	7,003.83	23,156.18	31,365.08	1,409.89	21,983.44	38,882.87
Incidental	196,887.73	198,554.78	178,890.35	103,632.17	73,241.53	176,873.70	222,493.89	7,025.50	88,931.90	163,783.26
Joint Facility	4,007.28	4,082.68	4,496.27	3,126.35	1,246.27	4,372.62	5,818.10	378.63	1,931.54	4,020.69
TOTAL OPERATING REVENUES	$ 5,430,647.56	$ 6,342,595.36	$ 6,251,137.33	$ 3,807,915.56	$ 1,900,319.71	$ 5,708,126.27	$ 7,466,004.37	$ 368,403.13	$ 4,384,570.31	$ 8,270,262.21
OPERATING EXPENSES:										
Maintenance of Way and Structures	$ 952,734.76	$ 938,578.78	$ 1,348,591.46	$ 809,987.36	$ 337,486.49	$ 1,147,473.85	$ 1,100,728.98	$ 46,000.12	$ 599,976.86	$ 1,188,935.25
Maintenance of Equipment	489,143.41	517,849.69	796,729.41	507,894.40	207,486.53	715,380.93	737,358.14	29,546.93	391,959.48	767,487.93
Traffic	340,452.32	359,523.06	337,901.37	203,525.65	84,450.33	287,975.98	259,238.40	7,774.52	115,542.45	243,247.60
Transportation	2,156,693.53	2,347,789.33	2,213,715.65	1,307,334.04	579,346.56	1,886,680.60	2,308,935.99	88,044.75	1,181,132.21	2,410,134.84
Miscellaneous Operations	208,276.66	180,602.35	178,716.22	88,405.57	55,461.94	143,867.51	165,110.69	4,963.62	57,121.40	116,687.48
General	282,291.96	315,094.20	298,953.75	173,655.81	64,901.85	238,557.66	216,519.70	7,296.30	111,778.22	224,159.31
TOTAL OPERATING EXPENSES	$ 4,429,592.64	$ 4,659,437.41	$ 5,174,607.86	$ 3,090,802.83	$ 1,329,133.70	$ 4,419,936.53	$ 4,787,891.90	$ 183,626.24	$ 2,457,510.62	$ 4,950,622.41
Net Revenue from Operation	$ 1,001,054.92	$ 1,683,157.95	$ 1,076,529.47	$ 717,112.73	$ 571,077.01	$ 1,288,189.74	$ 2,678,112.47	$ 184,776.89	$ 1,927,059.69	$ 3,319,639.80
Less Tax Accruals	185,233.84	278,096.13	379,259.40	230,018.74	125,014.14	355,032.88	349,173.86	13,742.32	177,359.67	376,459.17
TOTAL OPERATING INCOME	$ 815,821.08	$ 1,405,061.82	$ 697,270.07	$ 487,093.99	$ 446,062.87	$ 933,156.86	$ 2,328,938.61	$ 171,034.57	$ 1,749,700.02	$ 2,943,180.63
OTHER INCOME:										
Rentals of Houses, etc	$ 17,387.92	$ 23,530.72	$ 27,622.09	$ 22,265.34	$ 8,343.39	$ 30,608.73	$ 31,248.76	$ 1,098.54	$ 22,476.88	$ 37,650.31
Hire of Equipment Receipts	79,450.61	35,922.57	38,474.71	36,430.31	8,847.01	45,277.32	56,092.05	1,911.06	32,217.85	53,643.64
Miscellaneous	.....	.....	15,000.00	783.28	.....	783.28	827.10	.....	.....	827.10
Income from Unfunded Securities and Accounts	1,967.86	26,504.73	4,688.48	1,452.82	1,562.89	3,015.71	26,947.47	1,883.28	123,642.97	144,758.04
Income from Funded Securities	.....	.....	.....	.....	.....	.....	.....	.....	1,921.39	1,921.39
	$ 98,806.39	$ 85,957.92	$ 85,785.28	$ 60,931.75	$ 18,753.29	$ 79,685.04	$ 115,115.38	$ 4,802.88	$ 180,259.09	$ 238,800.48
GROSS INCOME	$ 914,627.47	$ 1,491,019.74	$ 783,055.35	$ 548,025.74	$ 464,816.16	$ 1,012,841.90	$ 2,444,053.99	$ 175,837.45	$ 1,929,959.11	$ 3,181,981.11
DEDUCTIONS FROM GROSS INCOME:										
Rent of Leased Property	$ 66,265.54	$ 104,871.63	$ 110,227.60	$ 76,913.58	$ 28,036.84	$ 104,950.42	$ 90,640.74	$ 3,073.14	$ 42,940.56	$ 90,135.35
Hire of Equipment Payments	282,946.04	338,204.24	339,433.87	197,680.25	80,676.09	278,356.34	350,451.27	13,325.17	200,611.61	386,684.33
Miscellaneous Deductions	.....	2,312.50	8,251.84	7,098.35	462.54	7,560.89	1,537.31	18.58	267.82	729.38
Interest on Unfunded Debt	98,801.70	681,804.33	819,788.44	4,389.90	253.49	4,643.39	108.22	.....	21.64	21.64
Amortization of Discount on Funded Debt	341.09	173,186.45	173,186.45	117,319.84	.....	117,319.84	.....	.....	17,684.24	17,684.24
‡Interest on Funded Debt	3,748,245.97	3,752,471.87	3,752,774.98	3,113,435.53	.....	3,113,435.53	.....	.....	246,812.67	246,812.67
TOTAL DEDUCTIONS	$ 4,196,600.34	$ 5,052,851.02	$ 5,203,663.18	$ 3,516,837.45	$ 109,428.96	$ 3,626,266.41	$ 442,737.54	$ 16,416.89	$ 508,338.54	$ 742,067.71
INCOME BALANCE CARRIED TO PROFIT AND LOSS	$ 3,281,972.87	$ 3,561,831.28	$ 4,420,607.83	$ 2,968,811.71	$ 355,387.20	$ 2,613,424.51	$ 2,001,316.45	$ 159,420.56	$ 1,421,620.57	$ 2,439,913.50
Operating Revenue per Mile of Road	$ 5,817.14	$ 6,769.26	$ 6,654.25	$ 4,038.51	$ 2,015.28	$ 6,053.80	$ 7,933.70	$ 391.48	$ 4,649.70	$ 8,779.38
Operating Expenses per Mile of Road	4,744.84	4,972.88	5,508.30	3,277.98	1,409.62	4,687.60	5,087.82	195.13	2,606.11	5,255.38
Net Operating Revenue per Mile of Road	1,072.30	1,796.38	1,145.95	760.53	605.66	1,366.20	2,845.88	196.35	2,043.59	3,524.00
Ratio of Operating Expenses to Operating Revenue	81.57%	73.46%	82.78%	81.17%	69.95%	77.43%	64.13%	49.84%	56.05%	59.86%
‡DETAILS OF INTEREST ON FUNDED DEBT:										
Interest on First Mortgage Bonds	$ 2,498,245.97	$ 2,500,000.00	$ 2,500,000.00	$ 1,666,666.67	.....	$ 1,666,666.67	.....	.....	.....	.....
Interest on Second Mortgage Bonds	1,250,000.00	1,250,000.00	1,250,000.00	833,333.33	.....	833,333.33	.....	.....	.....	.....
Interest on Notes to Denver and Rio Grande	.....	.....	.....	613,307.38	.....	613,307.38	.....	.....	.....	.....
Interest on Equipment Notes	.....	2,471.87	2,774.98	128.15	.....	128.15	.....	.....	.....	.....

Note: Bold face figures denote debits.

loss in freight revenue. It should be remembered, however, that passenger business was handled over the WESTERN PACIFIC at that time in cars belonging to other roads, which bore the burdens incident to ownership, and that the average number of passengers per train mile was much larger than under normal conditions.

The WESTERN PACIFIC now occupies an enviable position with respect to passenger traffic, due to the fact that it is minimized. It is not practicable to operate satisfactorily with less than two trains per day each way. It will be wise if it makes no effort to increase its passenger business to an extent beyond the capacity of the trains that are run at present.

The passenger train revenue per mile of road in the fiscal year ended June 30, 1912, was $1,340.51. In the calendar year 1916 it amounted to $1,411.47, and the revenue passenger miles per mile of road—that is, the density of pasenger traffic, decreased from 62,901 to 50,926 during this period.

The total train earnings of the SYSTEM per mile of road during the calendar year 1916 were:

Freight	$7,155.95
Passenger	1,411.47
Total	$8,567.42

It is a pleasue to testify to the excellence of the undertakings that have already been carried out, both as respects conception and execution, and to the soundness of the general policy that has beeen adopted, which will result, after some further material expenditures, in considerably reducing the annual cost of extraordinary maintenance. Roughly speaking, this has amounted to about $500,000 per year, the appropriations for the present year being $477,000. Extraordinary undertakings of this character will be completed by January 1, 1920, after which operating expenses upon the basis of the present density of traffic and scope of undertakings will be reduced to the extent of about $500,000 annually, from which must be deducted, however, the cost of replacing about 25 miles of steel rails annually for four years

between Oroville and Portola, which, upon the basis of present prices for material and labor, will cost about $225,000. After these rail renewals have been made there will be none to follow for a period of about eight years, and then it will be necessary to make further renewals upon the same section —that is, the west slope of the Sierras. The rails east of Portola to Salt Lake will last from twelve to fifteen years more, except on the sharper curves.

The cost of maintenance of way may not be absolutely less than at present because the growth of business will necessarily increase the cost of operation as a whole and will have a material effect upon maintenance of equipment and some effect upon maintenance of way.

Considering the condition of disorganization that necessarily existed at the beginnng of the Receivership because of the uncertainty of the tenure of service of the officers of the COMPANY, a long period of previous uncertainty and harrying under different administrations, the present quality of operation and of the operating organization is such as to reflect credit on officers and employes alike.

The physical characteristics of the ROAD, with respect to grades and curvature, are favorable to cheap operation. The present organization from the President down is efficient and energetic and the time has arrived when the WESTERN PACIFIC can command the consideration by other railroads which has not been vouchsafed heretofore.

This report is made for the purpose of describing certain undertakings, which, if carried out, will increase the gross and net revenues of the WESTERN PACIFIC very materially.

The investigations covered that portion of California extending from Corning, on the north to Fresno, on the south, including the valleys of the Sacramento, San Joaquin and Russian Rivers, the Sonoma and Napa Valleys, the foot hills extending north from Sacramento and Newcastle and lying between the Yuba and the American Rivers, the Santa Clara

and Pajaro Valleys on the south and the Surprise Valley in the extreme northeastern part of the state.

The problem required the determination of earnings of existing or proposed lines in all of these various districts if, or when, they shall become a part of THE WESTERN PACIFIC RAILROAD SYSTEM. It further required the determination of the approximate cost of acquiring existing lines and building such others as may be necessary.

The methods used in determining the facts as to the productivity of this territory and the cost of the lines necessary to serve it are explained in detail in the section of this report devoted to Traffic.

It is evident that the business obtained by existing electric railways is to a considerable extent secured at the expense of the larger steam railroads because the former afford shorter hauls for farmers, horticulturists, and others, in various districts than are afforded by the latter. It is also true in the case of the proposed lines that will occupy territory that has heretofore been served by the older railways that the business of the new lines must come to some extent through a diversion of some of the traffic at present handled by the older lines. In cases which are to be referred to, in which it is proposed to build new lines and to develop individual territory that is not served to any considerable extent by existing lines, as, for instance, between Turlock and Fresno, it is necessary to base the estimates upon the productivity of adjacent regions served by the older roads.

The services of the Traveling Freight Agents of the WESTERN PACIFIC were invoked for the purpose of making estimates as to the amount of traffic tributary to each of the lines that might possibly be acquired by purchase and such lines as are proposed to be constructed. These men brought to the task a wealth of experience and knowledge that was invaluable for the purpose. There were five such investigators,

each one of whom worked in territory with which he was especially familiar. Their findings were reviewed for the purpose of this report by the Traffic Department of the Western Pacific. The probable destination of all products was taken into consideration and the revenues that the several proposed branches would add to the existing revenues of The Western Pacific Railroad were determined separately for each branch.

BRANCH LINES, OR FEEDERS, THAT MAY BE ADVANTAGEOUSLY ACQUIRED OR CONSTRUCTED BY THE WESTERN PACIFIC RAILROAD.

It has been stated that the total main line mileage of THE WESTERN PACIFIC RAILROAD at the present time is 923.74, not including the mileage of the ferry across San Francisco Bay. As most Western roads have an equal amount of main and branch line mileage, and as the WESTERN PACIFIC has only 31.97 miles of the latter, it is apparent that, upon the basis of the status of other railroads, its branch line mileage is insufficient. The ROAD at present consists practically of one main artery, with few lines extending through the territory adjacent to it for the purpose of gathering up and distributing the commodities produced and consumed therein. For more than 700 miles the main line traverses the States of Utah, Nevada, and that portion of California lying upon the west slope of the Sierras. Utah and Nevada consist largely of broad expanses of desert, with comparatively small areas of irrigable land. That portion of the LINE in the State of California, between Oroville and San Francisco, either skirts or traverses one of the most productive areas to be found in the world—a territory the development of which followed the discovery of gold in California. In no section of the United States, or of the world, is there a region in which it is practicable to so accurately measure the productivity of the cultivated lands, which are so rich and so reliable, where irrigation is possible, as to make the determination of the tonnage that will be enjoyed by any projected railroad a matter of computation.

An investigator who might be content to depend upon his general knowledge and experience, and who did not supplement the judgment so formed by statistics, published, or secured by careful research, would, in all probability, over rather than understate the traffic possibilities of the great and fertile valleys of the Sacramento and San Joaquin

Rivers, together with such coastal valleys as Napa, Sonoma, Santa Clara, Pajaro and Salinas. All of this magnificent terrain is tributary to THE WESTERN PACIFIC RAILROAD, which serves it only to a very limited extent, and which as stated, requires a system of branch lines for the purpose of gathering business, on the one hand, and on the other enabling it to distribute the goods of the jobbers and merchants of the East, and more particularly, perhaps, of San Francisco and Sacramento, so that the ROAD may have more in common with the people of the territory that it serves, and that it should serve to a far greater extent.

It will be made manifest by the statements that follow that the WESTERN PACIFIC can acquire branch line mileage that will bring to it the large traffic which it is so admirably designed to handle economically and with dispatch. The so-called deserts of Nevada and Utah will also yield their rich products of mines as a result of judicious branch line extensions, and thereby increase both tonnage and revenue.

The examinations that have been made with respect to the acquisition of branch line mileage have been conducted under unusually favorable circumstances, and for the purpose of eliciting all of the useful information that could be found in the form of statistics prepared by the Government and the State, relating to the location and areas of arable lands, and also the local conditions in the various sections tributary to THE WESTERN PACIFIC RAILROAD that are already developed.

The proposed feeder lines recommended in this report comprise 306.79 miles to be constructed and 276.40 miles to be acquired, making a total of 583.19 miles. The estimated total cost of constructing new lines is $13,346,695, and of acquiring existing lines, $6,029,725, making the total cost of construction and acquisition $19,376,420, the average cost thus being $33,225 per mile.

The statement on the opposite page, under the caption, "Proposed Feeder Lines, THE WESTERN PACIFIC RAILROAD, Mileage and Cost," shows the mileage and cost of these lines.

PROPOSED FEEDER LINES

THE WESTERN PACIFIC RAILROAD

MILEAGE AND COST.

Feeder Line	Miles to be Constructed	Miles to be Acquired	Total Miles of Feeder Line	Cost of Construction	Cost of Acquisition	Total Cost	Cost per Mile of Feeder Line
Woodland to Vacaville, Napa and Sonoma District	66.29	98.87	165.16	$ 2,932,822	$2,099,840	$ 5,032,662	$30,471
*Northern Electric System Sacramento Valley		147.33	147.33*		3,682,175*	3,682,175	25,000
Newcastle Branch	28.50		28.50	771,508		771,508	27,070
Delta Lines:							
Thornton-Isleton	22.00						
Shima-Rindge	10.00						
Lodi Branch	6.00		38.00	1,659,526†		1,659,526	44,724
Stockton Channel Industrial	5.00		5.00	294,080		294,080	58,816
Tidewater Extension to Fresno	75.00		75.00	2,324,831		2,324,831	30,972
San Jose to Watsonville and Hollister	71.00			4,007,451		4,007,451	42,047
Watsonville to Salinas and Spreckels		30.20	101.20		247,710‡	247,710	
San Jose Branch	23.00		23.00	1,356,477		1,356,477	58,977
Surprise Valley			Not included in this estimate				
	306.79	276.40	583.19	$13,346,695	$6,029,725	$19,376,420	$33,225

* Except Suisun Branch, 14.92 miles, valued at $374,000, which is included in feeder line above. (Woodland—Sonoma District.)
† Cost of the three branches electrified for small feeder system operation.
‡ Cost of acquisition is the cost of standardizing the Pajaro Valley Consolidated Railroad, a narrow gauge line.

The statement, or Income Account, next following, purports to show the gross revenue, net revenue, amount available for fixed charges and surplus, the fixed charges, and, finally, the surplus that will result from the operation of the feeder lines. That is to say, upon the basis of the estimates, the operating ratio of the feeder lines will be 60 per cent. and the amount available for fixed charges and surplus will be sufficient to afford a return of 13.82 per cent. upon the cost of the construction and acquisition of feeder lines.

PROPOSED FEEDER LINES

THE WESTERN PACIFIC RAILROAD

INCOME ACCOUNT.

Feeder Line	Gross Revenue	Net Revenue	Taxes	Available for Fixed Charges and Surplus	Fixed Charges	Surplus
Woodland to Vacaville, Napa and Sonoma Districts	$2,126,063	$ 765,383	$111,618	$ 653,765	$251,633	$402,132
Northern Electric System,* Sacramento Valley	964,320	270,010	50,627	219,383	184,109†	35,274
Newcastle Branch	274,985	131,993	14,437	117,556	38,575	78,981
Delta Lines: Thornton-Isleton) Shima-Rindge) Lodi Branch)	1,590,283	763,336	83,490	679,846	82,976	596,870
Tidewater Extension to Fresno	956,033	458,896	50,192	408,704	116,242	292,462
San Jose to Watsonville, Salinas, etc.	1,298,647	506,472	68,179	438,293	212,758	225,535
San Jose Branch	376,890	154,525	19,787	134,738	67,824	66,914
Surprise Valley	119,920	32,078	6,296	25,782	None	25,782
‡Total of Proposed Feeder Lines	$7,707,141	$3,082,693	$404,626	$2,078,067	$954,117	$1,723,950
Operating ratio				60.00%		
Return on cost of construction and acquisition				13.82%		

* Except Suisun Branch, 14.92 miles, included in feeder line above. (Woodland—Sonoma District.)
† On basis of Northern Electric System value, less value assigned Suisun Branch included in feeder line above.
‡ The income account of the Stockton Channel Industrial Line is not included as an estimate of traffic is not available. Under the most unfavorable condition that may be reasonably anticipated the first year deficit will not exceed $4,000.

The statement shown on the following page gives the combined income account of the feeder lines and THE WESTERN PACIFIC RAILROAD operated as a system. It will be noted that the operating ratio is 59.93 per cent., and that the amount available for fixed charges and surplus will afford a return of 20.46 per cent. upon the capital expenditure of the existing WESTERN PACIFIC ($8,102,808) and the cost of construction and acquisition of feeders, and is also sufficient to pay a return of 19.22 per cent. upon the investments just referred to, and upon $1,766,314.85 of its heretofore accumulated surplus which is invested in the stock of three feeder lines. It may be further noted that the surplus of $4,261,990, capitalized at 5 per cent., amounts to $85,239,800.

THE WESTERN PACIFIC RAILROAD

AND

PROPOSED FEEDER LINES

COMBINED INCOME ACCOUNT.

	Gross Revenue	Net Revenue	Taxes	Available for Fixed Charges and Surplus	Fixed Charges	Surplus
Feeder Lines	$ 7,707,141	$3,082,693	$404,626	$2,678,067	$ 954,117	$1,723,950
The Western Pacific Railroad*	8,270,262	3,319,640	376,459	2,943,181	405,140†	2,538,040
Combined System	$15,977,403	$6,402,333	$781,085	$5,621,248	$1,359,257	$4,261,990

Operating Ratio,	59.93%
Return on capital expenditure of Western Pacific, $8,102,808.45 † and cost of construction and acquisition of feeders	20.46%
Return on total investment ‡ and cost of construction	19.22%
Surplus capitalized at 5%	$85,239,800

* For the calendar year ended December 31, 1916.
(See statement following.)

† Fixed charge is estimated as follows:

Face value of outstanding 5% bonds		$19,975,560.00
Unexpended funds in bank	$12,426,627.05	
Subject to requisition for capital expenditures	553,875.50	11,872,751.55
Total expenditure to July 26, 1917, from proceeds of bond sale		$ 8,102,808.45
Interest on total expenditure of bond money		$ 405,140.42

‡ In addition to the above expenditures from the proceeds of the sale of its bonds, the Western Pacific has invested $1,766,314.85 of its surplus derived from operation in the stock of three feeder lines.

STATEMENT OF DISBURSEMENTS OF MONEY REALIZED FROM SALE OF BONDS.

Amount of Bonds Authorized			$20,000,000.00
Face value of Bonds sold to July 26, 1917			19,975,560.00
Balance to be sold			$ 24,440.00
Cash realized from sale of bonds $19,975,560.00 @ 90		$17,978,004.00	
Disbursement of Funds Paid:			
Reorganization Committee	$2,000,000.00		
Charles Elsey, Treasurer (Free Money)	1,000,000.00		
For 1,000 Box Cars, Pullman Company	973,609.70		
For 650 Box Cars, Mt. Vernon Car Company	798,219.50		
For 125 Box Cars, Mt. Vernon Car Company	153,503.75		
For 2 Mallet Engines, American Locomotive Company	101,820.00		
For 200 Ventilated Box Cars, Mt. Vernon Car Company	260,606.00		
For 100 Stock Cars, Mt. Vernon Car Company	111,068.00		
For 3 Mallet Engines, American Locomotive Company	152,550.00	5,551,376.95	
Leaving unexpended funds deposited in various banks to the credit of First Federal Trust Company and Henry E. Cooper, Trustees, The Western Pacific Railroad Company, First Mortgage			$12,426,627.05

AMOUNT EXPENDED FOR ROAD AND EQUIPMENT BY THE WESTERN PACIFIC RAILROAD COMPANY.

	July 14, 1916 To December 31, 1916	January 1, 1917 To May 31, 1917	June, 1917	July, 1917	Total
Road	$ 166,868.51	$ 36,705.11	$ 45,227.57		$ 248,801.19
Equipment	914,488.41	1,191,369.58	424,877.22	$96,487.21	2,627,222.25
General	93,170.65	21,352.03	4,854.92		119,377.60
Grants Tooele Line		53,149.68	35,946.50		89,096.18
Reconstruction Reno Branch		5,486.14	13,876.23		19,362.37
Niles San Jose Line			1,392.86		1,392.86
	$1,174,527.40	$1,308,062.54	$526,175.30	$96,487.21	$3,105,252.45

Cost of Equipment covered by Requisitions Nos. 1 to 7 inclusive	$ 553,875.50
Leaving balance of Road and Equipment Expenditures, subject to requisition	2,551,376.95

STATEMENT OF SURPLUS FROM OPERATION INVESTED IN SECURITIES OF OTHER COMPANIES.

Capital Stock, Tidewater Southern Railway Company, Purchased to June 30, 1,109,642 Shares	$660,314.85	Investments of Surplus from operation of Western Pacific.
Capital Stock, Deep Creek Railroad Company, 4,000 Shares	400,000.00	
Nevada-California-Oregon Railway, Paid account Contract to purchase property	700,000.00	

The productivity of the proposed feeder lines is shown by the following statement setting forth the tonnage and revenue that will result from their operation, that is, 1,652,409 tons of freight per annum, which will yield $6,580,888 in freight revenue; in addition to which passenger revenue may be expected in the amount of $1,126,253, the total revenue thus amounting to $7,707,141.

The tonnage that will be developed by the feeder lines, and which will be added to existing tonnage of the ROAD, amounts to 93 per cent. of the total tonnage that was handled over THE WESTERN PACIFIC RAILROAD during the calendar year 1916.

*PROPOSED FEEDER LINES

THE WESTERN PACIFIC RAILROAD

TONNAGE AND REVENUE.

Feeder Line	Freight Tonnage				Freight and Passenger Revenue		
	Interstate Outbound	Intrastate Outbound	Inbound	Total	Freight Revenue	Passenger Revenue	Total Revenue
Woodland to Vacaville, Napa and Sonoma District	93,111	137,861	277,514	508,486	$1,608,583	$ 517,480	$2,126,063
Northern Electric System† Sacramento Valley	30,869	38,187	30,685	99,741	519,104	445,216	964,320
Newcastle Branch	24,506	4,795	13,004	42,305	274,985		274,985
Delta Lines:							
Thornton-Isleton	101,496		5,900	107,396	677,488		677,488
Shima-Rindge	113,722			113,722	763,696		763,696
Lodi Branch	15,623	750	4,710	21,083	149,099		149,099
Tidewater to Extension to Fresno	58,622	50,364	38,910	147,896	956,033		956,033
San Jose to Watsonville, Salinas, etc	68,875	192,853	288,393	550,121	1,185,090	113,557	1,298,647
San Jose Branch	20,885	13,500	3,550	37,935	326,890	50,000	376,890
Surprise Valley	15,403		8,321	23,724	119,920		119,920
Total of Proposed Feeder Lines*	543,112	438,310	670,987	1,652,409	$6,580,888	$1,126,253	$7,707,141

* No tonnage or revenue derived from the Stockton Channel Industrial is included in this statement.
† Except Suisun Branch, 14.92 miles included in above feeder line. (Woodland-Sonoma District.)

FREIGHT CAR EQUIPMENT.

Reference has been made elsewhere in this report to the increase in tonnage that may be expected as a result of carrying out the plan of constructing new, and acquiring existing railroads, by the Western Pacific, and it is stated that this increase will amount to 93 per cent. of the tonnage of the ROAD in 1916.

It is evident that the present freight car equipment of the WESTERN PACIFIC is inadequate for its purposes. For instance, during the period under consideration (the calendar year 1916) the ROAD was obliged to pay for the hire of cars $331,-041. It is true that during the present year it has received 1,150 new cars of various types, but it is also true that the per diem charge for the use of cars is 60 cents at present instead of 45 cents, the price that governed until December of last year, when the rate was made 75 cents, which was superseded recently by the present rate of 60 cents per day, so that whatever has been gained through an increase in equipment units and carrying capacity has been much more than offset from a monetary standpoint by the increase in the per diem charge.

It is apparent that the equipment of the WESTERN PACIFIC should be increased in order to properly care for its present volume of traffic and to meet such increases in volume as will be caused by the construction and addition of the mileage recommended.

While it is impracticable to make a statement as to the number of cars of each class that will be required in future, it is desirable to call attention to the fact that THE WESTERN PACIFIC RAILROAD is at present dependent upon the Pacific Fruit Express, an organization owned and controlled by the Southern Pacific, for the refrigerator cars required in its business. This condition of affairs is not likely to be satisfactory in the future for the reason that the greater part of the business that will be secured by the WESTERN PACIFIC must be taken away from its rival, the Southern Pacific. At the pres-

ent time the call for cars in the Imperial Valley, where shippers are entirely dependent upon the Southern Pacific, is such that it has been left to the Santa Fe to care for the citrus fruit of Southern California, and it has been taxed to the utmost to supply cars and ice with which to cool them. If the WESTERN PACIFIC does not acquire a comparatively large number of refrigerator cars, say 1,500 or 2,000, its business will be jeopardized, for it is shown in another section of this report that the traffic tributary to the WESTERN PACIFIC in Central and Northern California is greater by far than that of the Santa Fe north of Tehachapi, and for this reason the WESTERN PACIFIC should not be considered as a small and inconsequential line but as an important carrier that must compete with strong and well equipped rivals.

For the purpose of showing the comparative weakness of the WESTERN PACIFIC in regard to car ownership, the following statement of the ratio of car ownership to traffic for the fiscal year ended June 30, 1916, is submitted:

Road	Tons of Freight Car Capacity Owned	Total Ton Miles Moved	Ton Miles Carried Per Ton of Freight Car Capacity Owned	Rental of Cars (Credit)
Atchison, Topeka & Santa Fe (excluding Gulf, Colorado & Santa Fe)	2,070,630	7,844,315,000	3,790	$275,962
Northern Pacific	1,783,135	7,017,609,000	3,940	301,153
Southern Pacific	1,370,150	6,283,000,000	4,585	315,104
Los Angeles & Salt Lake	140,220	596,474,370	4,250	44,503*
Average of above four roads			4,054	
WESTERN PACIFIC†	111,900	1,020,082,624	9,116	331,041*

* Debit.
† Calendar year 1916.

It will be noted that this statement shows the tons of car capacity owned by five different railroads, the total tons moved one mile by them and the efficiency or sufficiency of the equipment measured by the ton miles carried per ton of car capacity owned. It will also be noted that the results obtained upon each road are about the same, except that the ton miles that must be carried per ton of car capacity owned by the WESTERN PACIFIC are 2.25 times greater than in the case of the

average for the other four roads, which proves that it needs additional cars.

It will be noted, too, in the last column of the statement that three of the roads have very substantial credit balances on account of hire of equipment, one road, the Los Angeles & Salt Lake, has a small debit balance, while the WESTERN PACIFIC has a debit balance in excess of the credit balances shown by any of the other roads, and this goes to show in another way, the insufficiency of the equipment owned by the WESTERN PACIFIC.

If it were not for the difference in the length of the average haul per ton mile of freight handled by the foregoing Roads it would be a simple matter to determine the amount of equipment needed by the Western Pacific upon the assumption that these Roads are adequately equipped, but the average haul per ton mile on the Western Pacific is 573.83 miles, and on the Santa Fe, excluding the Gulf, Colorado & Santa Fe, 293.05 miles. It is evident that the carrying capacity of a freight car is greater on the Western Pacific than on the Santa Fe, or any of the other Roads named.

It is stated on a preceding page that the traffic density of the Western Pacific is 1,082,879, and on the Santa Fe 909,591, revenue ton miles per mile of road. The Santa Fe has a larger car equipment, as measured by the ton miles carried per ton of freight car capacity owned, and also by the number of cars per mile of line operated, and it is well known that its abundant equipment gives it a decided advantage over competing lines in California and elsewhere.

The following statement for the fiscal year ended June 30, 1916, gives a comparison between the various roads named with respect to the number of cars per mile of line:

	Number of All Freight-Carrying Cars	Miles of Line	Cars Per Mile of Line
Santa Fe (excluding Gulf, Colorado & Santa Fe)	57,202	8,648	6.61
Southern Pacific	31,154	6,950	4.48
Los Angeles & Salt Lake	3,005	1,154	2.60

In order to bring the existing WESTERN PACIFIC SYSTEM to a parity with the Santa Fe, 2,920 cars should be purchased. The program for acquisition of equipment should comprise the immediate purchase of this number of cars, and additional equipment as proposed branches are added to the SYSTEM. When the SYSTEM shall have been expanded to the extent recommended in this report it will require a total of 10,675 cars. Deducting from this number the cars now owned, viz., 3,321, leaves 7,354 as the total number of cars to be purchased.

During the year 1916, 1,150 cars of various kinds were purchased, at a cost of $1,399,153, or $1,217 per car. It is estimated that the cars required will cost $2,050 each at this time. The total expenditure for equipment recommended, on this basis of cost, will be as follows:

7,354 cars @ $2,050.....$15,075,700

It must be remembered that the amount of equipment estimated is only sufficient to take care of the *present* volume of business on the main line and the additional traffic which must be moved after the completion of the branches, upon the basis of the equipment that is apparently considered sufficient by other transcontinental lines. Within five years there will be a considerable increase in the business passing over both main and branch lines.

If the market price for labor and material decreases to any considerable extent the sum representing the cost of equipment will be sufficient to buy a larger number of cars, but it will be profitable to purchase equipment at once, and absolutely necessary to do so as mileage is added.

PASSENGER CAR EQUIPMENT.

On December 31, 1916, the COMPANY owned five combination mail, baggage and express cars and rented various cars from the Denver & Rio Grande Railroad Company as follows:

Coaches	20
Baggage cars	20
Dining cars	8
Total	48

or, including the cars owned, 53.

It is possible that the readjustment of the affairs of the Denver & Rio Grande Railroad may make it necessary for the WESTERN PACIFIC to own its passenger equipment, and it may also be necessary to provide a certain amount of passenger equipment for branch line service at a total cost of about $1,000,000.

MOTIVE POWER.

It is assumed for the purposes of this report that no additional passenger engines will be required. It is possible that some light power will be needed for branch lines, but it should be the policy of the COMPANY to minimize its passenger service, which is unprofitable.

The following statement shows that about 60 additional freight engines will be required, and sets forth the method by which this number was determined.

MOTIVE POWER, FREIGHT SERVICE.

		Tractive Power (Pounds)
Present Motive Power:		
20 Class No. 1 Consolidation engines, 43,000 pounds tractive power		860,000
45 Class No. 21 Consolidation engines, 43,000 pounds tractive power		1,935,000
Total tractive power		2,795,000
Present tons carried annually by WESTERN PACIFIC	1,777,682	
Increased tons contributed by proposed feeders	1,652,409	
Ratio of increase to present tonnage	93%	
Tractive power required for tonnage contributed by feeder lines		2,599,350
Total tractive power required for present and prospective business		5,394,350

ENGINE WEIGHTS.

Present Service:	
20 engines @ 360,000 pounds each	7,200,000
45 engines @ 358,000 pounds each	16,110,000
Total weight of engines in present service	23,310,000
Weight of engines required—93% of 23,310,000	21,678,300

COST OF ENGINES PER POUND.

The average cost of each one of five Mallet engines purchased in November, 1916, delivered at Salt Lake City was	$52,896.20	
The weight of engine and tender was	624,000	pounds
The cost per pound of engine and tender was	8.48	cents

Estimating present cost at 150% of cost in November, 1916, would make the present price per pound practically 12.75 cents.

The cost of 21,678,000 pounds required @ 12.75 cents is.....$2,763,945

This would require 60 Consolidation engines weighing practically 360,000 pounds, and costing $46,065 each.

It is assumed for the purposes of the estimate that the lines to be constructed are essentially the same with respect to rates of grades, and that the same number of engines will be required to perform a given service upon the branches or feeder lines as would be required to perform the same service on the lines that now exist, and, since the increased tonnage that will be contributed by the feeders amounts to 93 per cent. of the total now handled, that 93 per cent. of increased engine capacity will be needed. These engines may be of any class desired as long as the necessary total tractive power is provided. It may be found desirable to purchase new and heavier engines for the main line, although it is probable that the locomotives now used are heavier than will be required for branch line service. It may be found desirable to buy a few second-hand engines for these branches, which will result in decreasing the estimate slightly.

Justification of Operating Ratio as Determined.

It is practicable to determine the approximate earnings per mile of road operated, after the feeder lines recommended are provided, and the result may be stated as follows:

Estimated revenue from feeder lines	$ 7,707,141
Present revenue, Western Pacific System (1916)	8,270,262
Total revenue upon completion of system	$15,977,403
Present operated mileage (Main and Branch Lines)	957.95
Mileage of proposed feeders	583.19
Total prospective mileage*	1,541.14
Approximate revenue per mile of operated line after completion of system*	$10,367

* This does not include mileage of branches now under construction as the anticipated increase of revenue from their operation is not included in the sum of $15,977,403.

The Western Pacific is entitled to make a better showing than the Los Angeles & Salt Lake Railroad, whereas it cannot be expected to make as good a showing as either the Santa Fe or the Southern Pacific for some time after the proposed branches are added to the existing system. The result of the

construction of the feeder lines is to increase the average earnings per mile of road of the completed system, as compared with the earnings per mile of road of the system as it exists, to the extent of about $1,600 per mile per annum, and, as a matter of abstract judgment, this seems to be a fair estimate.*

The position of the WESTERN PACIFIC at present is much stronger than ever before because it has ample funds with which to make the necessary extensions for the purpose of securing additional traffic and to provide the equipment with which to handle it. There is no possible reason for a road situated as it is to spend an excessive amount of money for operation.

If the roads with which comparisons have already been made be considered with respect to operating ratio—that is, the ratio of operating expenses to revenues derived from operation, and also with respect to average revenue per ton mile, average revenue tons per freight train, and earnings per freight train mile, the results will be as shown on the following page.

A review of the statements shows that the Northern Pacific operates with greater consistency, apparently, than the other roads named. Particular attention is called to the constant upward trend of its earnings per freight train mile.

The operating ratio of the WESTERN PACIFIC SYSTEM during the calendar year 1916 was 59.86 per cent. The computations made for the purpose of determining the operating ratio following the construction of branch lines, establish it at 59.93 per cent. This figure is, of course, dependent upon the realization of expectations with regard to traffic and earnings of the several feeders and of the SYSTEM as a whole. The analysis of this subject has been made with unusual care, and, as previously stated, the computations and comparisons made with other roads justify the expectation that the operating ratio can be maintained at say 60 per cent.

* See comparison with other roads as to earnings per mile of road, etc., page 2.

WESTERN PACIFIC.

Fiscal Year ended June 30	Operating Ratio (Per Cent.)	Average Revenue Per Ton Mile (Cents)	Average Revenue Tons Per Freight Train	Earnings Per Freight Train Mile
1912	81.57	0.80	336.11	$2.70
1913	73.46	0.77	369.90	2.85
1914	82.78	0.79	408.03	3.20
1915	77.43	0.81	418.00	3.38
1916	64.13	0.69	481.09	3.32
1916*	59.86	0.66	553.36	3.66

* Calendar year 1916.

NORTHERN PACIFIC.

Fiscal Year ended June 30	Operating Ratio (Per Cent.)	Average Revenue Per Ton Mile (Cents)	Average Revenue Tons Per Freight Train	Earnings Per Freight Train Mile
1909	55.54	0.895	434.59	$3.889
1910	61.71	0.900	429.28	3.862
1911	61.20	0.903	461.45	4.165
1912	60.16	0.867	510.54	4.426
1913	61.47	0.839	541.62	4.543
1914	60.50	0.855	566.91	4.840
1915	58.74	0.849	573.06	4.864
1916	53.15	0.793	633.85	5.019

SOUTHERN PACIFIC.

Fiscal Year ended June 30	Operating Ratio (Per Cent.)	Average Revenue Per Ton Mile (Cents)*	Average Revenue Tons Per Freight Train*	Earnings Per Freight Train Mile
1909	60.61	†	†	†
1910	59.04	1.162	395.75	$4.53
1911	61.13	1.175	396.79	4.56
1912	62.82	1.168	381.97	4.42
1913	63.01	1.123	388.92	4.33
1914	67.61	1.104	405.30	4.44
1915	67.57	1.099	402.62	4.39
1916	63.81	0.977	466.12	4.52

* Figures previous to 1914 based on commercial freight only.
† Data not available.

SANTA FE.

Fiscal Year ended June 30	Operating Ratio (Per Cent.)	Average Revenue Per Ton Mile (Cents)	Average Revenue Tons Per Freight Train	Earnings Per Freight Train Mile
1909	60.99	1.015	297	$3.05
1910	66.44	1.015	295	3.00
1911	65.79	1.028	274	3.19
1912	66.14	1.026	318	3.26
1913	66.42	1.002	347	3.48
1914	66.12	1.007	345	3.47
1915	64.67	0.974	365	3.55
1916	62.60	0.929	402	3.74

Effect of System Expansion upon Average Revenue Per Ton Mile.

The average earnings of the Western Pacific per freight train mile in the calendar year 1916 were $3.66. It will be noted by the preceding comparisons between these railroads that the revenue per ton mile of the Western Pacific is much less than upon the other roads. The effect of the construction of branch lines, and the consequent increase of local traffic, will be to increase the average earnings per ton mile, which were 0.66 cents in 1916 as compared with 0.793 cents on the Northern Pacific. The average revenue per train mile is evidently made up of the ton miles per train mile multiplied by the revenue per ton mile. In 1916 the ton miles of revenue freight per train mile on the Northern Pacific were 632.85, and on the Western Pacific they were 553.36, so that it is not unreasonable to suppose that with the increased tonnage per train mile which will result from increased density of traffic and from the operation of heavier freight power, five Mallet engines having been recently purchased, and also because of the increased revenue per ton mile that will follow the construction of feeders and the increase in local and less-than-carload business commanding higher rates than does the freight now handled, the earnings per freight train mile will be about the same on the Western Pacific as on the Northern Pacific and will be greater upon the former than upon the Santa Fe or Southern Pacific.

ESTIMATED GROSS REVENUE OF THE WESTERN PACIFIC RAILROAD COMPANY AT THE END OF A FIVE-YEAR PERIOD FOLLOWING CONSTRUCTION AND ACQUISITION OF BRANCH LINES RECOMMENDED.

The gross revenue of five of the proposed feeder systems and branch lines has been estimated by methods shown in the article entitled, "Traffic Survey," which will be found in the Traffic Section of this report. These five lines are:

Woodland to Vacaville, Napa and Sonoma Districts.
Northern Electric System.
Newcastle Branch.
Extension of Tidewater Southern to Fresno.
San Jose to Watsonville and Salinas, etc.

For the purpose of arriving at the approximate gross revenue of the WESTERN PACIFIC at the end of a five-year period following the construction and acquisition of the system of feeder and branch lines recommended, the following analysis has been made. It is to be noted that the results of this analysis are not as reliable as those deduced by the methods employed in determining gross revenue for the five lines first mentioned. They are, however, very conservative.

In discussing the probable increase in the traffic of the Delta Lines and in the Lodi District, the statement has been made elsewhere that the increase would certainly be very large, without assigning any definite ratio of increase. This district, located at the north end of the San Joaquin Valley, is probably susceptible of the most intensive cultivation of any in the State. When provided with efficient rail transportation, which it has lacked heretofore, it is entirely safe to conclude that the increase of traffic in the immediate future will certainly be as large as that of the San Joaquin Valley, where the ratio of increase in five years was determined by accurate methods as being 54 per cent. of present traffic. In the following statement this ratio has been applied to the traffic estimated as tributary to these lines at the present time.

The increase of traffic on the San Jose Branch is estimated by the same methods as were used in determining the first mentioned five lines, viz., on ratio of non-bearing to bearing orchard area and increase in population. The ratios of increase in these more highly developed sections, it will be noted, are much lower than in the Sacramento and San Joaquin Valleys.

The Traffic Department of the WESTERN PACIFIC in 1912 made an estimate of the traffic of Surprise Valley. In 1917 it made an estimate of the same traffic for this report. The increase in the five years has been more than 50 per cent. without any additional transportation facilities. It is, therefore, safe to assume a ratio of increase of 50 per cent. for the traffic five years hence.

The total revenue of the WESTERN PACIFIC has increased from $5,430,647 in 1912, to $8,270,262 in 1916, the ratio of increase being at the rate of 9.375 per cent. per year, or 46.87 per cent. for a five-year period. During the period 1910-1915 the increase of population in the seven California valley counties traversed by the main line has been 30 per cent. The ratio of increase of population of the five largest cities at the west end of the line has been the same. As shown elsewhere in this report, 90 per cent. of WESTERN PACIFIC revenue is derived from business originating in or destined to this territory.

The ratio of increase for the Northern Electric, which serves the Sacramento Valley only, has been determined for the five-year period as 71 per cent. For the Fresno extension, serving the San Joaquin Valley, the ratio has been determined for the same period at 54 per cent.

None of these considerations are conclusive in themselves, but considered together they afford a basis for a conservative approximate estimate of the ratio of increase for the end of the five-year period over the existing traffic of the WESTERN PACIFIC. It would be assuming too much to estimate that the traffic of the entire WESTERN PACIFIC SYSTEM will increase as

rapidly as upon that portion that lies in the Sacramento Valley, 71 per cent., or in the San Joaquin Valley, 54 per cent. In view of the fact that without additional feeder lines, the revenues of the WESTERN PACIFIC have increased at the average rate of 9.375 per cent. per year for the last four years, and that the estimated average rate of increase in nearly 90 per cent. of its revenue-producing territory is much larger, an estimate based on an average rate of increase of 8 per cent. per annum for a five-year period—that is, 40 per cent.—is very conservative and is used in the following statement. The earnings for the calendar year ended December 31, 1916, amounted to $8,270,262, and it is estimated that they will amount to $13,578,367 at the end of the five-year period. As a matter of fact, they will amount to $10,000,000 this year, and if present conditions continue they will increase much more rapidly than at the rate of 8 per cent. per annum.

The statement on the opposite page shows in tabular form the estimated revenue of the WESTERN PACIFIC at the end of the five-year period.

It will be noted that the gross earnings per mile of road at the end of the five-year period, $14,842, are practically the same as the present gross earnings per mile of road ($14,813) of the Southern Pacific. The present mileage of the WESTERN PACIFIC earns $8,779 (calendar year 1916) annually per mile of road. All of the proposed new mileage occupies very productive territory. The percentage of increase of production has been demonstrated to be conservative, and it is reasonable to expect that the increase of about $6,000 per mile of road will be realized. Of course, the earnings of the Southern Pacific may then be much larger than at present.

No account has been taken of the competition of the Panama Canal because it is believed to be negligible for at least five years on account of the probable scarcity of vessels. Moreover, when it was opened it was practicable for vessels to

ESTIMATE OF REVENUE
AT END OF A FIVE-YEAR PERIOD
WESTERN PACIFIC AND PROPOSED BRANCH LINES.

Branch Line	Earnings Following Completion	Earnings at end of Five-Year Period	Increase
Woodland to Vacaville-Napa-Sonoma	$ 2,126,063	$ 2,428,779	
Northern Electric System	964,320	1,647,264	71%
Newcastle Branch	274,985	318,031	
Extension to Fresno	956,033	1,470,721	54%
San Jose to Watsonville and Salinas, etc.	1,298,647	1,445,243	
Delta-Lodi-Stockton	1,590,283	2,449,035	On Same Basis as Fresno Extension.
San Jose	376,890	455,987	21%
Surprise Valley	119,920	179,880	50%
Western Pacific, Year 1916	8,270,262	13,578,367	40%
Total Gross Revenue	$15,977,403	$23,973,307	50%

The mileage of the System covered by the above estimate, is comprised of the following:

	Miles
Main Line—Oakland to Salt Lake City	923.74
Branch Lines Now Operated	31.97
Branch Lines Under Construction	76.28
Feeder Lines Proposed in this report	583.19
	1615.18

The gross earnings on this basis of mileage and estimated revenue will be, at the end of the five-year period, $14,842 per mile.

With gross revenue as above, and assuming an operating ratio of 60 per cent. and 5¼ per cent. for taxes, the income account at the end of the five-year period will stand as follows:

		Per Mile
Gross Revenue	$ 23,973,307	$ 14,842
Net Revenue 40% of Gross	9,589,323	5,938
Taxes, 5¼% of Gross Revenue	1,258,598	780
Available for fixed charges and surplus	$ 8,330,725	$ 5,158
Capitalized at 5%	$166,614,500	$103,167

make rates competing with rail rates which were much higher than those now in effect. The conditions that would follow vessel competition via Panama were not then known. Now they are, and are provided for. Finally, it seems certain that charters can be obtained for a long time to come that will be more profitable than coastwise transcanal cargoes. After five years it is believed that the WESTERN PACIFIC can dispense with export traffic—at least, it can do so more easily than at present, or in the past.

The statement on the opposite page is a summary of the cost of constructing and acquiring the branch lines and equipment herein recommended. It also includes a statement of the approximate cost of improvements tentatively recommended which are referred to in a following section under the caption "Principal Traffic Centers."

SUMMARY OF COST OF CONSTRUCTING OR ACQUIRING BRANCH LINES, EQUIPMENT AND IMPROVEMENTS RECOMMENDED.

Branch Lines.

	Cost	Total Cost
Woodland to Vacaville, Napa and Sonoma Districts	$ 5,032,662*	
Northern Electric System	3,682,175†	
Newcastle Branch	771,508	
Delta Lines: Thornton-Isleton)		
Shima-Rindge)	1,659,526	
Lodi Branch)		
Stockton Channel Industrial Branch	294,080	
Tidewater Southern Extension to Fresno	2,324,831	
San Jose to Watsonville and Salinas, Etc	4,255,161	
San Jose Branch	1,356,477	
Surprise Valley (Cost not included in this statement)		
TOTAL COST OF PROPOSED BRANCH LINES		$19,376,420

Equipment.

Freight Cars	$15,075,700	
Passenger Cars	1,000,000	
Motive Power	2,763,945	
TOTAL COST OF EQUIPMENT RECOMMENDED		$18,839,645
TOTAL COST OF ROAD AND EQUIPMENT RECOMMENDED		$38,216,065

Improvements Tentatively Recommended.

San Francisco: Wharf at Ferry Slip			$ 12,000
Oakland: Dock and Wharf	$ 475,000		
Wood Street Connection	135,000		
Adams Tract Connection	7,500		
Union Belt Connection	3,800		
		$ 621,300	
Salt Lake City: Freight Line		280,000	
TOTAL COST OF IMPROVEMENTS TENTATIVELY RECOMMENDED			$ 913,300

* Cost of Suisun Branch of the Northern Electric included in this amount.
† Cost of Suisun Branch not included in this amount.

COMPARATIVE COST OF CONSTRUCTING RAILROADS. 1915 v. 1917.

To determine the comparative cost of constructing railroads in 1915 and 1917 the accompanying unit prices used by the Engineering Department of the WESTERN PACIFIC in each of those years, as hereinafter set forth were applied to the quantities used in estimating the cost of the line from Woodland to Willota, a distance of 26 miles, the results being shown in the following statement. The last column shows the ratio that the cost of 1915 bears to the cost of 1917:

Class	Cost in 1917	Cost in 1915	Ratio of cost 1915 to 1917
Right of Way	$ 63,200	$ 63,200	100%
Grading	188,100	126,000	67%
Bridging	84,210	57,305	68%
Track	171,447	121,741	70%
Ties	58,957	33,311	58%
Buildings	55,300	46,900	85%
Stock Pens	4,250	4,000	93%
Fencing	39,000	28,600	73%
Telegraph Lines	9,100	5,850	64%
Ballast	34,200	23,940	70%
Railroad Crossing	500	385	77%
Interlocking Plants	20,000	15,000	75%
Track Labor	43,470	31,950	73%
All items except electrification of track	$771,734	$558,182	72%

These data are presented for the purpose of discussing the relative advantages of constructing the lines and facilities that are suggested in this report under present conditions as to the cost of labor and materials, or deferring such construction until a recession of cost restores the general conditions of 1915. It should be remembered that this country has always lacked native labor for the development and conduct of its undertakings, and has depended upon foreign labor. If the war extends over a long period the drain upon the labor of this country will be serious, and the European supply has already disappeared. The rehabilitation of the devastated areas of Europe and of its industries will apparently afford employment at home for all of the subjects of the various governments, and prohibition of emigration is to be expected.

COMPARATIVE UNIT PRICES.

GRADING.

	Unit	Year 1917	Year 1915
Solid Rock Excavation	Cu. Yd.	$ 1.00	$ .65
Loose Rock Excavation	Cu. Yd.	.50	.40
Earth Excavation	Cu. Yd.	.30	.20
Borrow	Cu. Yd.	.30	.20

BRIDGING.

	Unit		
Concrete Masonry	Cu. Yd.	$ 10.00	$ 7.50
Piling, driven	Lin. Ft.	.28	.19
Bridge Timber	M. F. B. M.	30.00	18.00
Bridge Steel	Ton	128.00	77.00
Corrugated Iron Pipe, 18"	Lin Ft.	3.65	2.80
Corrugated Iron Pipe, 24"	Lin Ft.	4.50	3.50
Corrugated Iron Pipe, 30"	Lin. Ft.	5.55	4.40
Corrugated Iron Pipe, 36"	Lin. Ft.	6.50	4.80

TRACK.

Frogs and switches, 75#—No. 10	Set	$ 170.00	$ 130.00
Rail, 75#	Ton	55.00	38.00
Angle Bars, 75#	Pair	1.25	1.00
Bolts, 75#	Keg	10.00	6.15
Spikes, 75#	Keg	8.00	5.15
Nut Locks, 75#	Thousand	10.00	6.50
Joint Tie Plates, 75#	Each	.16	.16
Intermediate Tie Plates 75#	Each	.12	.12

TIES.

Set No. 10 Switch Ties	Set	$ 20.00	$ 16.00
Redwood Track Ties	Each	.75	.42

BUILDINGS.

Depots	Each	$ 3,500.00	$ 3,000.00
Warehouses	Each	15,000.00	12,500.00
Section Houses	Each	1,200.00	1,125.00
Bunk Houses	Each	750.00	600.00
Railroad Crossings	Each	500.00	385.00
Interlocking Plants	Each	20,000.00	15,000.00
Standard Stock Yard—4-Pen	Each	850.00	800.00
Fuel Station	Each	15,000.00	12,000.00
Telegraph Line	Mile	350.00	225.00
Fencing	Mile	1,500.00	1,100.00
Water Stations	Each	5,000.00	4,800.00
Ballast	Mile	1,200.00	840.00
Labor—Track	Mile	1,500.00	1,100.00
Labor—Switches	Each	45.00	37.50

It seems improbable that the prices of labor and materials will decrease appreciably for a considerable period after the war. Apparently, the purchase or construction of the various lines referred to in this report must be accomplished at the earliest possible time.

As long as the war continues there will be a large demand for foodstuffs of all kinds. Business activity will probably continue for a considerable length of time after peace is declared.

It is desirable to compare the results that will follow the construction of one of the contemplated lines at the present time, or, on the other hand, deferring its construction say for a period of five years. The line selected for the purpose of illustration in this connection is the proposed extension from San Jose to Watsonville and Salinas. The proposition is discussed upon the basis of the assumption (a) that the line has already been constructed at the high prices current in 1917; (b) that its traffic is fairly represented by the statement in connection with that extension; (c) that the business of the extension will increase in five years to the extent shown in the same statement. The result of the operation of this line in 1917 and 1922 can be stated as follows:

	1917	1922
Gross Revenue	$1,298,647.00	$1,445,243.00
Net Revenue—35% of Gross	454,526.55	505,835.05
Less Taxes—5¼% of Gross	68,178.96	75,875.26
Operating Income	$ 386,347.59	$ 429,959.79
Interest on cost of construction	212,758.05	212,758.05
Surplus	$ 173,589.54	$ 217,201.74

The average surplus for five years would be the mean of these two amounts, or $195,395.64 per year. The surplus over taxes and fixed charges for five years would thus be $976,978.20.

In view of the certain increase in 1922 of the cost of right of way, and of the probability that the labor wage of 1922 will be higher than in 1915, it is a very conservative statement that

the 1922 cost, under the most favorable conditions as to prices that could be reasonably anticipated, will be 80 per cent. of the 1917 cost. On this basis the cost of constructing the extension in 1922 would be $3,205,961. The cost in 1917 being $4,007,451, the difference would be $801,490 in favor of 1922 construction.

As shown above, the surplus after taxes and fixed charges for the five years would be $976,978, or a sum sufficient to extinguish the difference in cost of construction of the two periods, with $175,488 in addition.

If construction is undertaken at once at the end of five years the ROAD will be firmly established and will occupy a position which will enable it to compete for an equal division of the traffic of the territory. In the meantime, the welfare of the SYSTEM will be materially advanced by a substantial increase in its earnings and the object of the campaign of construction and acquisition of mileage by purchase will have been attained.

TIME REQUIRED FOR CONSTRUCTION.

It is probable that by prosecuting the work of construction vigorously the branch lines recomended in this report may be completed within two years. Time may not be the essence of the construction of these lines—that is, it may be considered wise to defer construction with the hope that the unit prices of 1915 may be realized again. Expression has been given to the belief that this will be an unwise method of procedure. The lines should be built in the order of their importance from an earnings standpoint, with possible preference in some cases for strategic reasons. That is, it may be desirable to control a certain district or location through the actual construction or acquisition of a line rather than to defer it and thus incur the risk of having the field occupied by some other railroad.

The WESTERN PACIFIC by its acquisition of the Tidewater Southern Railway and its extension toward Fresno, and by making public its purpose to construct a line from Niles to San Jose, has practically announced its intention to acquire for itself those feeders that are indispensable to its future prosperity. The sooner the territory is occupied the sooner the benefits herein set forth will begin to be realized, and this is a very important matter, for, following the construction of some of these lines, various undertakings will be set on foot which will be of great benefit to the ROAD. New orchards will be planted and new industries will be established. Considering the fact that it requires five years after the planting of fruit trees before they begin to bear, and seven or eight years before they become prolific, and that vines will not produce grapes in considerable quantities in less than three years, it is evident that the sooner various districts like those to be served by the Fresno extension of the Tidewater Southern are provided with the transportation facilities recommended the sooner the COMPANY will begin to enjoy a return from its investments in branch lines, as well as on the investment already made and represented by its main line.

PRINCIPAL TRAFFIC CENTERS.

San Francisco.

The location of the tracks of the WESTERN PACIFIC in San Francisco, with reference to the other railroads, is shown by the accompanying map.

So much has been written in the past about the terminal facilities of the COMPANY at San Francisco that it seems unnecessary to discuss this subject in detail. Suffice to say that the COMPANY owns extensive freight facilities consisting of a centrally located freight house and team tracks between Seventh and Ninth Streets and Bryant and Townsend Streets, which are connected with the water front at the Twenty-fifth Street Freight Slip between Yolo and Sonoma Streets.

There is a small wharf that is used in conjunction with the Twenty-fifth Street Freight Slip which was used to a limited extent for some time by small shipping. It has fallen into disuse and has become unsafe, and the track serving it has been removed, as the traffic that could be secured by its maintenance was insufficient to warrant the necessary expenditure for replacing it. The conditions on the water front are so congested at present that this facility might be used in connection with the interchange of traffic with the Petaluma & Santa Rosa boats now using Pier 9, and possibly some other boats that ply between San Francisco and various bay and river points. This facility would be served by WESTERN PACIFIC locomotives, thus saving the switching charges now paid the State Belt Line Railway, owned and operated by the State of California and, as it is outside the zone controlled by the State Board of Harbor Commissioner, the State toll of five cents per ton of freight. There are apparently a number of uses to which the property can be put, for recently an application for its use was made by a firm of mahogany importers.

Its reconstruction, at a cost of about $12,000, should be seriously considered.

The COMPANY owns a commodious switching yard located upon the extension to this slip, covering the ground between Illinois Street and Delaware Street, south of, and adjacent to, Yolo Street. These tracks serve various industries, and can be made to serve many more as the general district develops.

In consummating any arrangement with the Santa Fe for the joint occupation of territory it should be insisted upon that the latter should use its influence to secure the admission of the Western Pacific as a participant in the use of the spur-tracks that extend from the franchise track on Illinois Street. This franchise track can be used by the WESTERN PACIFIC under the terms of the ordinance which makes it available for the purposes of the Santa Fe and the Southern Pacific, but the spur tracks to the various industries are owned by these two railroad companies and the tracks over Illinois Street are of no value to the WESTERN PACIFIC unless it can secure the right to use the spurs.

The WESTERN PACIFIC is the lessee of Pier 34 abutting on the State Belt Railway at the foot of Beale Street. This pier belongs to the State and was improved by the WESTERN PACIFIC by the construction of a wharf and warehouse. The State remits the agreed rental, and will continue to do so until 1924. This lease runs 15 years from 1909, when all of the money originally advanced by the WESTERN PACIFIC for the improvement of the property will have been refunded. The facility then becomes the *de facto* property of the State and under the terms of the present contract a new lease will be negotiated, thus assuring the WESTERN PACIFIC of the continued use of the property. The Santa Fe and the Southern Pacific are joint occupants of this pier under an agreement with the WESTERN PACIFIC.

The WESTERN PACIFIC also owns certain storage tracks located between First and Fremont Streets, and south of Brannan Street, on ground leased from the State, which are used in connection with Pier 34.

The WESTERN PACIFIC is also the occupant under lease from the State of a somewhat limited, though valuable, piece of property occupied by storage tracks and used for switching purposes and team tracks, which is located at the intersection of Chestnut and Montgomery Streets, and north of the former, in that section of the city that is generally referred to as North Beach.

All of the water front between the property last described and Pier 44 is controlled by the State, which operates a belt railroad serving it.

PASSENGER TERMINAL.

The WESTERN PACIFIC and the other transcontinental lines entering San Francisco have passenger terminal facilities in the Ferry Building at the foot of Market Street. The WESTERN PACIFIC has a sufficient space for its purposes and as favorable a location in this building as any of the other railroads.

Oakland.

The property of the WESTERN PACIFIC in the City of Oakland, extending from the Oakland Mole eastward to a point near Fruitvale Avenue, are shown upon the accompanying map. A portion of the property is owned in fee and a portion is covered by a franchise granted by the City of Oakland extending over a term of forty-nine years from 1905. This franchise is renewable.

The map shows the properties at the Oakland Mole, and east thereof, which are held in fee, as well as those occupied by virtue of franchise, and the areas thereof, which amount in the aggregate to about 252 acres. While the WESTERN PACIFIC has about 2,600 feet of valuable water front abutting upon the Oakland Inner Harbor, or Estuary, its present dock facilities, which are located at the Oakland Mole, are inadequate to handle the existing business. A great deal of tonnage might

be diverted from San Francisco to a modern commodious and partly covered dock constructed alongside, or adjacent to, the existing ferry slips at the Oakland Mole so as to afford say thirty feet of water at low tide. The wharves on the San Francisco side are overtaxed and subject to a great deal of congestion under existing conditions. The State Belt Line Railroad is also overtaxed, consequently switching movements are very slow and unsatisfactory and cause interruption and delay to railway barge service—that is, barges are often unable to land their cars, both on account of the congestion referred to and tide conditions as well.

There seems to be some question as to the advisability of constructing a suitable dock at the Oakland Mole on account of the shoaling of the berthing space and adverse tidal currents. The necessity for dredging should not decide this problem, and tidal currents are no more adverse or to be feared than those along the San Francisco front. There is also a question as to whether deep water ships can be induced to use such a dock for loading and unloading traffic to be transferred to and from rail connections.

The construction of a proper dock upon or adjacent to the Oakland Mole, is hereby recommended if upon investigation it is found feasible, as it would bring to the WESTERN PACIFIC at Oakland the support of shippers handling such commodities as straight cargoes of coastwise lumber for eastern and local destinations, practically all of which now goes to the "long wharf" of the Southern Pacific at Oakland. It would also bring to the WESTERN PACIFIC full and partial cargoes of such Trans-Pacific commodities as nitrate, zinc concentrates, Philippine lumber, rice and wool; also Alaskan salmon and Hawaiian pineapples. A very material saving of money would be effected by the avoidance of the San Francisco belt line charge for switching and the California state toll of five cents per ton for all freight passing over its wharves at San Francisco.

Some ships use the present mole at Oakland, but when it is so used the daily bay transfer traffic, in such commodities as sugar and alcohol from local bay points, must be diverted to San Francisco.

The proposed dock might also be used for the purpose of releasing cars held loaded with export traffic awaiting the clearance of ships. It should be about a thousand feet long, one hundred feet wide, with one-half of its area covered. Its cost at the present time will be about $475,000.

Connections Between Santa Fe and Western Pacific Tracks.

Wood Street Connection.

The Santa Fe enters Oakland over a track which extends from Richmond through Berkeley, its depot being located at Fortieth Street and San Pablo Avenue. The map shows the extension of this track parallel with Yerba Buena Avenue to the right of way of the main line of the Southern Pacific Railroad, thence in a general southerly direction to the northerly side of Bay View Park. The map further indicates the proposed connection of this track with the Western Pacific by means of a track to be constructed through Wood and Third Streets. The Western Pacific owns most of the property that is required for the construction of this connection, which is very desirable for both railroads. The approximate cost of constructing this connecting track, as estimated by the Chief Engineer of the Western Pacific, will be $135,000.

The district that will be served by the proposed connecting line from Yerba Buena Avenue to Third Street, in Oakland, is likely to become important on account of the location of industries which could be served by this line, and, moreover, the connection will be of great value if there is an enlarged or complete community of interest between the Santa Fe and the Western Pacific.

Connection With Adams Tract.

The map shows that the Santa Fe owns a piece of land known as the Adams Tract, located on the Oakland Inner Harbor immediately south of the main line of the Southern Pacific. It has no connection between its rails and this property except by ferry transfer, and switching service now performed by the Southern Pacific, which has a connection with the tracks located upon the property. When the Santa Fe and the Western Pacific are connected by the proposed line in Wood and Third Streets it will be necessary to provide a connecting track between the Western Pacific main line and the Adams Tract. Under existing conditions any business that may originate on the Adams Tract which is to be forwarded over the Western Pacific, is not delivered to that Company until it reaches Stockton over the Santa Fe tracks, which results in a division of the through rates. If a direct connection between the Adams Tract and the Western Pacific is provided, the latter will receive any business intended for it upon the payment of a switching charge instead of the larger amount resulting from the division of the through rate. A direct track connecting the sidings and spurs upon the Adams Tract with the main line of the Western Pacific is recommended.

The approximate cost of constructing this connection is estimated at $7,500 by the Chief Engineer of the Western Pacific.

Union Belt Line.

At the time of the construction of the Western Pacific certain manufacturers and shippers obtained a franchise for the line shown in red, designated by a note on the accompanying map as the Union Belt Line. The Western Pacific purchased this line from the promoters for about $11,000. There is no physical connection between this industrial track and the main line of the Western Pacific, all of the switching being performed by the Southern Pacific.

It is now proposed to effect a connection between the WESTERN PACIFIC main line and the Union Belt Line by constructing a short track in Alameda Avenue from the WESTERN PACIFIC main line to the line of the Key Route System (San Francisco-Oakland Terminal Railways) now operated over Alameda Avenue to a connection with the dotted line shown in red, which connects the line in Alameda Avenue with the Union Belt Line. It will be necessary to pay a small switching charge per car to the Key Route for the use of its tracks. This connection should be effected in the manner stated and thus make the important business that is reached by the Union Belt Line directly tributary to the main line of the WESTERN PACIFIC. The approximate cost of completing this connection, as estimated by Chief Engineer Wyche of the WESTERN PACIFIC, will be $3,800.

Stockton.

Reference has been made to Stockton in connection with the proposed construction of the Stockton Channel Industrial Line, the location of which is shown upon the map of the City of Stockton which will be found in the book of maps accompanying this report. This map was prepared for the purpose of showing the location of all the tracks of the different railroads that enter Stockton and the spurs leading from these tracks to the industrial districts and the water front. That portion of the line of the WESTERN PACIFIC which extends along McKinley Avenue and Hunter Street to a connection with the WESTERN PACIFIC track in Hazelton Avenue was formerly a part of the Stockton and San Joaquin Valley Railroad. It was purchased by the WESTERN PACIFIC, which used the larger portion of it for its main line south of Stockton.

The main line of the WESTERN PACIFIC in Stockton is located east of the line just described, and one-quarter of a mile south of the lower limit of the map is Ortega Junction where these two lines intersect.

The Tidewater Southern Railway, which is controlled by the WESTERN PACIFIC, will abandon the use of the line colored yellow extending along Henrietta Avenue and Pilgrim Street to Weber Street, and thence west on Weber Street to Eldorado Street, and the traffic will be turned over to the westerly track of the WESTERN PACIFIC from Ortega Junction northward.

The various dotted lines in the district south of the Mormon Channel and east of Edison Street represent extensions to various industries. Attention is invited to the route followed by the track extending from the main line of the WESTERN PACIFIC at Worth Street to its water front property on Stockton Channel. It will be noted that the construction of the proposed Stockton Channel Industrial Line will secure to the WESTERN PACIFIC undivided access to more water front property than is afforded to all of the lines upon the south side of the channel, and will also enable the WESTERN PACIFIC, if it seems desirable to do so, to secure entrance to the important business center at the intersection of Eldorado and Weber Streets.

Sacramento.

The accompanying map shows the location of the main line of THE WESTERN PACIFIC RAILROAD through Sacramento and across the American River, and also what is known as the water front line upon which its freight terminals are located. This map also shows the lines and terminals of the Southern Pacific Railroad, the Northern Electric Railway, the Oakland, Antioch & Eastern Railway and the Central California Traction Company, the latter three being electric lines.

The City of Sacramento is located upon ground which is much lower than the flood plane of the Sacramento River, and is protected by a system of levees. The ordinance which grants the WESTERN PACIFIC the right to occupy the streets,

alleys and other public places with its tracks requires it to elevate them on demand at any time after October, 1917. It seems improbable that the COMPANY will be immediately called upon to make this separation of grades, which will cost about $1,600,000. The main line of the WESTERN PACIFIC in Sacramento crosses twenty-six streets, and approximately twenty-three streets are crossed and occupied by its water front line. City governments are periodically seized by a desire to effect grade separation, and whenever the density of traffic over the WESTERN PACIFIC becomes large enough to be a detriment to the public the ordinance provisions will certainly be invoked and enforced.

It is said that such action can be averted by building a line on top of the levee encircling part of the city, thus avoiding movement of through freight trains on the present line.

It will be noted that the tracks of the Northern Electric Railway are so located as to enable it to perform all of the switching and transfer service that devolves upon the WESTERN PACIFIC, and in case the electric line comes under the control of the WESTERN PACIFIC it may sometime in the future be used to very good purpose.

It will be noted, in connection with the accompanying map, that the line of the Northern Electric Railway in C, Thirty-first, X and Front Streets has been constructed for the purpose of affording a freight line connection between the Northern Electric main line and its Woodland Branch.

Salt Lake City.

The map on the opposite page shows the location of the WESTERN PACIFIC and the Denver & Rio Grande Railroads in Salt Lake City, Utah. All of the interchange between those two roads is effected within the heart of the business district of the city. Only a very small part of the freight traffic of the WESTERN PACIFIC is destined to, or originates in, the city,

practically all of it consisting of through traffic originating at, or destined to, points located beyond it which are reached by the Denver & Rio Grande and its eastern connections.

The large number of street crossings and the restricted yard room within the city increase the time in transit of all through freight traffic. This is of particular importance in connection with the movement eastward of California fruit and vegetables and all commodities requiring refrigeration and rapid transit.

To facilitate the rapid interchange of through freight traffic with the Denver & Rio Grande it is necessary to construct a freight line which will avoid the crossing of numerous busy city streets and effect a connection between the two roads at a location where land may be acquired for an interchange yard at reasonable cost.

The dotted red line drawn on the map shows very approximately the location of such a freight line connecting with the WESTERN PACIFIC main line west of Brighton and with the Denver & Rio Grande main line at a point about three miles south of the Union Depot in Salt Lake City. The proposed freight line will be about six and one-half miles long, and the cost of its construction approximately $280,000, according to the estimates of Chief Engineer Wyche of the WESTERN PACIFIC. The building of the line will probably involve the construction of an overhead crossing of the main line of the Los Angeles & Salt Lake Railroad.

The freight traffic interchanged by the WESTERN PACIFIC and the Denver & Rio Grande will always be of large volume without regard to the relations which now, or may in the future, exist between them. For this reason, the construction of this freight line at Salt Lake City should be given timely consideration.

RELATION BETWEEN THE WESTERN PACIFIC RAILROAD AND THE ATCHISON, TOPEKA & SANTA FE RAILWAY.

Contract for Joint Use of Facilities.

For some time past The Western Pacific Railroad and the Atchison, Topeka & Santa Fe Railway have had under consideration a contract for trackage, under the terms of which the latter would use the tracks of the former between Stockton and Sacramento, and any branches, sidings or spurs appurtenant thereto that may exist at the present time, or that may be constructed in the future. The purpose of the joint use of tracks in Stockton is not apparent. Each road now has certain industrial tracks and each switches for the other upon the basis of long established rates. The situation in Stockton is very different in this respect from that which exists in Sacramento, where the Santa Fe has no facilities at the present time, and seeks to occupy not only the main line but all of the sidings and industrial tracks which are now owned, or may be acquired, by the Western Pacific, and a contractual arrangement to this end is eminently proper.

On the other hand, if the Santa Fe is to occupy, and use to practically the same extent as though it owned them, the various industrial tracks of the Western Pacific in Stockton, then the latter Company should have a right to occupy and use to the same extent and in the same manner all of the industrial tracks of the Santa Fe in that city. Inasmuch as each is bound to perform switching service for the other, there seems to be no possible reason for establishing a method for switching cars which must necessarily be more costly than if each performed the service upon its own industrial tracks for the benefit of the other.

In drawing the contract so as to cover the use by the Santa Fe of the spurs and industrial tracks that may be constructed by the Western Pacific in the future in the territory between

Stockton and Sacramento, and in the latter city, the officers of the Santa Fe are said to have had in mind a track extending from the WESTERN PACIFIC to Lodi, on the line of the Central California Traction Company, and from some point on the main line of the WESTERN PACIFIC to some points located upon the islands of the Delta of the Sacramento and San Joaquin Rivers. It is further proposed by the parties named to acquire such existing lines as may be valuable for their purposes and afterwards to operate them on joint account. This plan may be objectionable because of the fact that the proper development by THE WESTERN PACIFIC RAILROAD of the territory tributary to its line will give it much greater and more valuable interests in this territory than are possessed by the Santa Fe in what may be called its territory between Stockton and Tehachapi.

In order to establish the facts in this connection, attention is called to the following comparison of WESTERN PACIFIC and Santa Fe territories in Central and Northern California:

COMPARISON OF WESTERN PACIFIC AND SANTA FE TERRITORIES IN CENTRAL AND NORTHERN CALIFORNIA.

The Products of Agriculture, which form the greater part of the outbound interstate commerce from California are fruit, including grapes, and various products of orchards and vineyards; staple vegetables, principally potatoes and beans; barley, rice and hops. While only a smaller part of the total production of these commodities is moved out of the state by rail, there can be no doubt that the interstate rail movements from various districts of the state are proportional to their total production. As the production depends on acreage planted with these various crops, acreage affords a fair basis for comparing the amount of outbound interstate rail traffic originating in various territories.

The demand of any territory for such commodities as fuel, building materials, agricultural implements, automobiles, mer-

chandise and a large list of miscellaneous commodities, depends on population. The inbound interstate rail traffic of various territories in such commodities may be compared therefore on the basis of their population.

For the purpose of comparing the interstate rail traffic of the territory now served by the WESTERN PACIFIC, together with that which it is proposed to make tributary to it, with the traffic of the territory now served by the Santa Fe, the tables shown on the opposite page have been compiled. It will be noted that the figures shown in the last column of the tables under the caption "Interstate Outbound Rial Shipments of Products of Fruit and Vegetables, Carloads" depend on the acreage planted with orchards, vineyards, cantaloupes and other melons, potatoes and beans, the acreage being given to support the statement as to actual traffic.

Converting the acreage of barley, rice and hops into tons for the purpose of comparison, the following table shows the relative traffic produced by the territories served by these two systems, respectively:

	WESTERN PACIFIC	Santa Fe	WESTERN PACIFIC	Santa Fe
Fruits, Vegetables and their products			29,112 cars	15,259 cars
*Barley	588,943 tons	96,600 tons		
*Rice	69,860 tons	1,500 tons		
*Hops	7,430 tons	None		
Total	666,233 tons	98,100 tons		
Population	502,271	190,981		

It will be noted from the table showing population, productive area and interstate shipments from common territory—that is, territory served by both of the railroads—that six counties are included in such territory.

The first of these, Alameda, is the county in which Oakland is located which is reached by the Santa Fe over a branch line extending from Richmond, in Contra Costa County. The

* Barley, 0.7 tons per acre; rice, 1 ton per acre; hops, 0.75 tons per acre.

WESTERN PACIFIC's main line passes through, and serves, Oakland to a greater extent than does the Santa Fe. As its main line crosses the county, going through its principal towns and best agricultural sections, it serves the whole county to a much greater extent than does the other System.

Merced, Madera and Fresno Counties are to be served by the proposed extension of the Tidewater Southern. The Santa Fe serves the third to a much greater extent than the proposed extension will, while the Tidewater Southern will serve the other two counties to a greater extent than the Santa Fe does. The existing Tidewater Southern and the WESTERN PACIFIC, when provided with the branches recommended, will serve Stanislaus and San Joaquin Counties to a greater extent than the Santa Fe does.

Denoting the amount of traffic that the two roads together may control by 100, the WESTERN PACIFIC proportion may be roughly approximated as 75 and the Santa Fe proportion as 25. Applying these as percentages to the table of traffic from common territory, the following shows the production of the portion of that territory served by each railroad:

	WESTERN PACIFIC	Santa Fe	WESTERN PACIFIC	Santa Fe
Fruits, Vegetables and their Products			15,513 cars	5,171 cars
Barley	35,550 tons	11,850 tons		
Rice	323 tons	107 tons		
Hops	750 tons	200 tons		
Total tons	36,623 tons	12,157 tons		
Population	461,082	153,694		

Combining the traffic strength of the two Systems in their exclusive and common territory in Central and Northern California, the following statement results:

	WESTERN PACIFIC	Santa Fe
Fruits, Vegetables and their Products	44,625 cars	20,430 cars
Barley, Rice and Hops	702,856 tons	110,257 tons
Population	963,353	344,675

POPULATION, ACREAGE, PRODUCTION AND INTERSTATE SHIPMENTS.

WESTERN PACIFIC TERRITORY

IN

NORTHERN AND CENTRAL CALIFORNIA.

YEAR 1916.

County	Population	Acres								Interstate Outbound Rail Shipments of Products of Fruit and Vegetables (Carloads)
		Orchards	Vineyards	Cantaloupes and Other Melons.	Potatoes	Beans	Barley	Rice	Hops	
Butte	34,092	20,000	600	.....	.....	.....	15,700	19,000	800	1,039
Colusa	9,550	10,875	1,100	.....	500	2,500	180,000	30,000	.....	639
Glenn	11,986	11,353	50	.....	.....	60	52,475	16,000	.....	111
Monterey	28,346	5,354	150	.....	500	3,000	115,000	.....	.....	1,098
Napa	19,682	9,098	13,000	.....	2,000	.....	.....	.....	.....	2,293
Placer	21,448	19,644	2,500	15	15	15	9,500	.....	100	2,749
Sacramento	95,803	20,989	20,000	.....	.....	35,000	43,000	.....	3,000	6,012
San Benito	8,846	9,105	400	.....	.....	.....	23,000	.....	.....	452
Santa Clara	109,791	94,589	15,000	.....	925	600	13,000	.....	.....	5,629
Santa Cruz	30,218	20,691	2,000	.....	.....	.....	.....	.....	.....	1,266
Solano	29,038	20,151	3,000	.....	.....	900	200,000	280	.....	1,924
Sonoma	65,487	26,199	24,000	.....	1,080	.....	2,000	.....	3,100	2,693
Sutter	9,256	12,600	4,500	.....	.....	.....	15,872	.....	.....	581
Yolo	17,186	13,155	5,000	.....	.....	575	97,500	13,500	1,000	1,061
Yuba	11,512	6,720	400	.....	120	1,645	75,000	1,080	640	565
	502,271	301,383	101,700	15	5,140	44,295	841,347	69,860	9,240	29,112

POPULATION, ACREAGE, PRODUCTION AND INTERSTATE SHIPMENTS.

ATCHISON, TOPEKA AND SANTA FE TERRITORY

IN

CENTRAL CALIFORNIA.

YEAR 1916.

County	Population	Acres								Interstate Outbound Rail Shipments of Products of Fruit and Vegetables (Carloads)
		Orchards	Vineyards	Cantaloupes and Other Melons.	Potatoes	Beans	Barley	Rice	Hops	
Contra Costa	51,064	10,480	6,600	.....	7,500	3,000	60,000	.....	.....	2,982
Kern	50,000	8,731	900	.....	500	400	35,000	.....	.....	1,297
Kings	23,500	11,912	11,000	.....	.....	.....	11,000	.....	.....	1,742
Tulare	66,417	66,930	12,000	.....	940	730	32,000	1,500	.....	9,238
	190,981	98,053	30,500	.....	8,940	4,130	138,000	1,500	.....	15,259

COMMON TERRITORY

SERVED BY BOTH THE

WESTERN PACIFIC AND ATCHISON, TOPEKA AND SANTA FE.

CENTRAL CALIFORNIA.

Alameda	320,905	9,920	5,000	10	7,000	300	33,000	.....	800	1,957
Fresno	135,213	44,797	110,000	.....	.....	.....	31,730	100	.....	7,980
Madero	13,455	3,728	3,500	.....	.....	.....	65,416	.....	.....	416
Merced	26,734	10,175	3,000	150	3,700	2,100	82,000	30	.....	1,592
San Joaquin	70,226	20,185	45,000	350	25,000	30,000	140,000	.....	200	6,841
Stanislaus	48,243	10,399	5,000	40,000	.....	15,000	110,000	300	.....	1,898
	614,776	99,204	171,500	4,510	35,700	47,400	462,146	430	1,000	20,684

The relative traffic strength of the WESTERN PACIFIC after the addition of its proposed feeder system, and the Santa Fe, in various classes of traffic, may be stated approximately as follows:

	WESTERN PACIFIC	Santa Fe
Interstate Outbound Traffic in		
Fruits, Vegetables and their Products	2.18	1
Field Crops	6.37	1
Merchandise and Miscellaneous Products—		
Interstate Inbound and Intrastate Traffic	2.8	1

Stated in another form, when the WESTERN PACIFIC has added the proposed feeder lines to its present system and has acquired enough new equipment and motive power to serve its territory efficiently, it will be 2.18 times as strong as the Santa Fe System in interstate outbound traffic in fruits and vegetables; 6.37 times as strong in the traffic of such field crops as barley, rice and hops; 2.8 times as strong in interstate inbound and intrastate traffic in merchandise and miscellaneous commodities. This statement applies to all of Northern and Central California, except San Francisco.*

The relations of the Santa Fe and WESTERN PACIFIC are of an intimate character.

The principle of joint acquisition and operation of lines by two railroad companies is objectionable on two accounts; first, the impossibility of foreseeing whether the community of interest that is suggested by such a plan will be lasting; second, because it usually involves a rotation of management, resulting in laxity which is prejudicial to the interests of the jointly owned property. Everyone knows that, however badly a single railroad may handle its business, the quality of its management will be very much better than that of a jointly owned and managed property, and the larger the number of companies that engage in an undertaking the worse the quality of the administration of its affairs will be.

* These figures are based upon the volume of traffic in the respective territories of the two Systems in 1916. Their application to any future year, say 1922, will be justified if the proportion of the volume of traffic produced in the territory of each is the same as in 1916.

The WESTERN PACIFIC has abundant funds with which to build and equip the lines that are required for its business. What can the Santa Fe give it in exchange for a preponderance of traffic within WESTERN PACIFIC territory, which amounts to 2.18 times as much with respect to interstate outbound traffic, 6.37 times as much with respect to field crops, and 2.8 times as much with respect to interstate inbound and intrastate traffic, as that controlled by the Santa Fe?

It is true that the Santa Fe is in nowise dependent upon the WESTERN PACIFIC for an entrance into Sacramento and the intermediate territory, or as respects the territory west and north of Sacramento.

The amount of rental that would be paid by the Santa Fe under the terms of the proposed contract for the use of the WESTERN PACIFIC's line between Stockton and Sacramento would be approximately $80,000 per year and a wheelage proportion of the cost of maintenance of its facilities.

Of course, it is recognized that this rental is a minor consideration when taken in connection with the vast import of the joint occupancy of the territory that will be traversed by the proposed feeders of the WESTERN PACIFIC. From all that was said upon the subject it seems that the negotiations with the WESTERN PACIFIC were confined to the joint trackage proposition between Stockton and Sacramento and the acquisition of the Northern Electric Railway, and, of course, its subsequent extension, and, in that connection, it is stated that there was never any other understanding, than that the WESTERN PACIFIC should enjoy the haul upon transcontinental business originating on these lines as far as Salt Lake, and that it should be turned over, as far as practicable, to the Santa Fe at Pueblo.

It was also stated, however, at another time that the purpose of the local management of the Santa Fe in California

was to secure an entrance to the Delta by means of a spur track to be constructed from the WESTERN PACIFIC at some point north of Stockton, and also an entrance to Lodi, and certainly these branches would be of no value to the Santa Fe if it did not intend to haul the transcontinental business originating thereupon east through Barstow over its own rails.

Now, the Santa Fe will doubtless seek permission to solicit business upon any additional mileage that is acquired by the WESTERN PACIFIC, and whatever disposition may be made of this matter in future it should be understood that unless something can be given the WESTERN PACIFIC in return, say by opening to it some new territory in Southern California, or through securing for it the use of the industrial tracks extending from the Illinois Street, and other franchise tracks, in San Francisco, the result of this close union will be that the Santa Fe will derive very much more benefit from the joint occupation of territory with the WESTERN PACIFIC than the latter can do.

It must be remembered, moreover, that the interchange business of the Denver & Rio Grande amounts to about $5,000,000 per annum, and that a great deal of the business which moves over the Denver & Rio Grande also moves over the Missouri Pacific, so that the WESTERN PACIFIC must carefully consider the effect of an arrangement which involves an undertaking upon its part to make the Santa Fe a part of a preferential route to the East.

Another question that arises in this connection is that of the status that is to exist between the Denver & Rio Grande and the WESTERN PACIFIC in the immediate future, and perhaps for some years. As the former is unable to handle the present volume of traffic interchange, it is evident that the

conditions that will result from a material increase in the volume of such interchange will be intolerable. If the Denver & Rio Grande is to engage in litigation with the WESTERN PACIFIC for a term of years and, in the meantime, does not improve its property, add to its equipment and increase its efficiency materially the latter may be obliged to adopt measures to protect its own interests by effecting other connections.

All of these points should be considered before the WESTERN PACIFIC commits itself to a contract whereby the Santa Fe will be given joint trackage or become a joint owner or occupant with it in trackage north of Stockton.

If it is true that the negotiations with respect to the Northern Electric Railway have thus far been conducted upon the understanding that the WESTERN PACIFIC is to haul the eastbound business that it originates as far as Salt Lake, and that it is to be turned over to the Santa Fe at Pueblo, then it would seem that the same understanding should exist with respect to the products tributary to the line between Stockton and Sacramento, and provision should be made whereby the Santa Fe will use its influence to route westbound business destined to what may be called joint territory, over the WESTERN PACIFIC, but this too may be a very minor consideration because the westbound traffic to points north of Stockton, including Sacramento, would not amount to much compared with the volume of eastbound transcontinental business.

The conclusions that are reached with respect to the right of joint use of feeders which should belong to the WESTERN PACIFIC will permanently affect the future value of that property. If it can, and does, turn over a certain amount of business originating on these lines to the Santa Fe, and if the Santa Fe, on the other hand, turns over to it business of equal tonnage or value, both of the Roads will

be in precisely the same position after this exchange of business as they were before—that is, neither one is advantaged, and obviously it is the legitimate design of each Company to get all of the traffic it can for itself. There seems to be no possible advantage to be gained by the WESTERN PACIFIC in agreeing to an arrangement under which the Santa Fe will participate with it, either in ownership or traffic, of the various feeders that the WESTERN PACIFIC intends to acquire and construct.

TRAFFIC SURVEY.*

The task of gathering the data upon which this report is based covered a very large field and involved both the determination of the amount of existing and prospective traffic, and the most economical plan for reaching and serving it. This latter consideration has required the determination of the approximate cost of constructing new and acquiring existing railroads.

The work has been divided broadly under four general heads, viz.:

(a) Traffic which necessitated making a survey of the present traffic of various districts and obtaining data to estimate the probable increase within a five-year period.

(b) Engineering, which involved the determination of the approximate location of the line which could serve the traffic most effectively and the cost of constructing it.

(c) Investigation of the operating and traffic conditions and the financial organization of various electric lines which might be used as branch lines or parts of feeder systems for the main line.

(d) Operation, requiring the determination of the operating ratios of proposed branch lines or feeder systems.

Most of the territory investigated may be developed by branch lines or feeder systems which can be operated profitably. In several instance, however, what seemed promising fields for development at first sight were found to be unprofitable upon thorough investigation.

The methods employed in making estimates of traffic, estimates of cost of constructing new lines, valuation of existing electric lines and in determining the operating ratios of proposed lines is described on other pages. The following is a statement of the territory covered and the work performed in making this report:

* The map on the opposite page shows the territory covered by this survey and the possible feeder lines investigated, except the Surprise Valley Branch.

Traffic Estimates.

The districts for which traffic estimates have been made are as follows:

1. Sonoma County.
2. Napa Valley.
3. Fairfield—Vacaville—Winters District.
4. Sacramento Valley—West side.
5. Sacramento Valley—East side.
6. Grass Valley District—Sierra Nevada foothills.
7. Fair Oaks—Orangevale—Newcastle District—Sierra Nevada foothills.
8. Delta of the Sacramento and San Joaquin Rivers.
9. Sacramento—Lodi—Stockton District.
10. San Joaquin Valley—East side.
11. Santa Clara—Gilroy—Hollister—Watsonville—Salinas Districts.
12. Surprise Valley, in the Sierra Nevada Range.

Engineering.

The cost of constructing the following branch lines and feeder systems has been determined:

1. A feeder system 165 miles in length serving the Sonoma-Napa-Vacaville districts, to be formed by extending the existing Woodland Branch of the Northern Electric System to a connection with its isolated Suisun Branch and extending that branch to connect with the existing electric lines serving the Napa Valley and Sonoma County.

2. An alternative feeder system serving the same districts to be constructed from Sacramento without regard to the existing branches of the Northern Electric System.

3. A branch line, 42 miles long, to be constructed from the Western Pacific main line at Marysville serving the Grass Valley District.

4. An electric branch line 28.5 miles long to be constructed from the eastern terminus of the Swanston Branch of the Northern Electric to a point near Newcastle, passing through the Fair Oaks-Orangevale districts.

5. A steam branch line 6 miles long extending from the Western Pacific main line east through Woodbridge to Lodi.

6. An electric branch line 22 miles long extending from Thornton on the Western Pacific main line through Isleton, in the delta, to a terminus on the San Joaquin River.

7. An electric branch line 10 miles long, extending from near Harte on the WESTERN PACIFIC main line, through the delta lands, to a terminus on the San Joaquin River.

8. A small electric feeder system composed of the three branch lines last mentioned.

9. An industrial line 5 miles long serving the north side of the Stockton Channel in the City of Stockton.

10. An electric system composed of the last four branch lines mentioned.

11. An extension of the Tidewater Southern Railway 75 miles long from its present terminus at Hilmar to Fresno.

12. A 71-mile extension of the San Jose Branch of the WESTERN PACIFIC, heretofore authorized as far as San Jose, through Gilroy to Watsonville, with a branch to Hollister.

13. The standardizing of 30 miles of the present Pajaro Valley Consolidated Railroad, narrow gauge, from Watsonville to Spreckels and Salinas.

14. A narrow gauge railroad 56 miles long extending from a point on the WESTERN PACIFIC near Reynard to the southern end of Surprise Valley.

INVESTIGATION OF EXISTING ELECTRIC RAILWAYS.

The following electric interurban railways have been investigated as to their physical condition and value as feeders for the WESTERN PACIFIC:

		Mileage
1.	Northern Electric System	162.25
2.	San Francisco, Napa & Calistoga	41.60
3.	Petaluma and Santa Rosa	42.35
4.	Central California Traction	78.51
5.	Oakland, Antioch and Eastern	110.99
	Total	435.70

While no definite valuation has been placed on these properties their value as constituent parts of a feeder system for the WESTERN PACIFIC, is indicated by a discussion of their physical, operating and financial characteristics.

Operation.

The cost of operating the proposed branch lines and feeder systems has been determined upon the basis of the foregoing data and an analysis of the conditions found on existing railroads, both steam and electric. An income account has been constructed for each of the following proposed lines and existing railroads:

1. Feeder System, 165 miles long, extending from Woodland through Vacaville, to the Napa Valley and Sonoma County.
2. An independent system, in lieu of No. 1, extending from Sacramento.
3. Northern Electric System, except Suisun Branch.
4. Newcastle Branch.
5. Lodi Branch and the two Delta Lines separately (three statements).
6. The three branches just mentioned in combination.
7. Central California Traction Company.
8. Extension of Tidewater Southern Railway to Fresno.
9. San Jose Branch of the Western Pacific.
10. Extension of San Jose Branch, through Gilroy and Watsonville, to Salinas and Spreckels with a branch to Hollister.
11. Surprise Valley Branch.
12. An income account for the combined operation of the proposed feeder lines and the present Western Pacific.

These various estimates and income accounts, with summaries for convenient reference, will be found in the following pages.

TRAFFIC ESTIMATES.

Methods Employed in Making Traffic Estimates.

To estimate the traffic of a territory served by competing lines of railroads it is necessary to determine specifically four separate things.

A. The total amount of rail traffic existing in the territory at the time of the estimate.

B. The general direction of traffic movements; that is, the destination of the outbond traffic and the points of origin of the inbound.

C. The division of the traffic—that is, the amount that may be secured by each of the competing lines.

D. Probable future increase of traffic over that existing at the time of the estimate.

Total Amount of Traffic.

In estimating the total amount of existing traffic such data as the total production of the territory is not conclusive, as the home consumption and many factors affecting it are not known. In a dairy country the total production of alfalfa is no indication of hay shipments by rail for the reason that most of it is fed to dairy cattle on the farms where it is raised or in the immediate vicinity.

Traffic estimates based on general averages and population are useless as to many items, especially in districts of specialized industries. Pittsburgh produces the largest tonnage for shipment by rail of any city in the country, and yet there are several cities of greater population. Its large tonnage is accounted for by its special industries, which relate principally to the production of iron and steel. California traffic is also highly specialized, and relates in very large part to horticultural and vitacultural products.

An accurate estimate requires an actual survey of the existing traffic in the particular district under investigation.

This necessitates field reports covering the traffic handled at each railroad station, made by men familiar with the railroad traffic of the territory. The information is obtained from large shippers, merchants, bankers, and similar sources. In California it is obtained very largely from the traffic officials and traffic departments of canneries, fruit growers, packers, wine manufacturers' associations, sugar refineries, and similar sources. The State has many boards and commissions, such as the California Development Board and the State Market Commission, some of which publish accurate data on rail shipments from specific districts. The reports of the Horticultural and Vitacultural Commission show the fruit acreage by counties, and that of the State Board of Equalization the acreage in farm crops by counties. These last three, while not conclusive within themselves, afford an excellent general check on the detailed field reports of the traffic men. In addition, there are special publications in the interest of canners and wine and spirit manufacturers which in their annual review of the affairs of such shippers give available data as to rail and water shipments and total production. Accurate information as to the rail shipments of large manufacturers is obtained by conference between the general traffic officials of the railway and the manufacturers as to the extent and destination of traffic and the general policy of the industry in dividing business between competing railways.

The following extracts from some of the field reports of the traffic men will indicate the manner in which they perform their work:

WATSONVILLE.

Outbound:	Tons
Apples	57,600
Dried Fruit	5,000
Canned Fruit	2,000
Vinegar	4,500
Berries	3,300
Potatoes	5,000
Beans	3,000
Inbound:	
Coal	1,000
Lumber	6,000
Box shooks	7,000

> There are about 15,000 people tributary to Watsonville, and it is a trading center of considerable importance. Mr. Otto Stosser, who is one of the best known men in the Pajaro Valley, told me that at the time they were contemplating a boat line out of Port Watsonville they calculated there was a total tonnage in and out amounting to between 350,000 and 400,000 annually.

The traffic of Watsonville, and the amount that can be controlled by the WESTERN PACIFIC, caused much discussion among those interested in making the traffic estimates. A further survey as to conditions at Watsonville was undertaken, and the following is an abstract from the report of the field man covering that particular feature:

> The situation at Watsonville is peculiar as to the amount of traffic loaded on team tracks. I would estimate that in the past fully 50 per cent. of all the outgoing business has thus been loaded and the present percentage will probably not fall far short of this figure.

The report of the traffic in the territory to be served by the proposed extension of the Tidewater Southern Railway to Fresno, after giving in detail the shipments to and from Southern Pacific stations south of Turlock, to, and including, Fresno, states some general conditions in the territory as follows:

> "The land lying south of Irwin City, between the east and west side lines of the Southern Pacific, comprises mostly good, fertile soil, and is capable of great development. It has been planted mostly to grain and forage crops and used for pasturage on account of lack of irrigation water and distance from transportation. This season the American Vineyard Company planted 1,000 acres of Thompson Seedless Grapes about four miles west of Livingston and Arkelian Brothers Company, are developing a tract of 300 or 400 acres close by; this latter is now planted to cantaloupes. A little further south the Chowchilla Ranch, comprising 100,000 acres, was recently purchased by interests identified with Swift & Company, Chicago. It will be used for a live stock ranch and several thousand acres will be planted to sugar beets. A sugar factory will be established on the grounds and the beet pulp used to fatten stock.

> Arkelian Brothers Company are developing a tract of 1,500 acres in Madera County, just north of the San Joaquin River. They have stated that if given satisfactory assurances before next planting season, that the Tidewater Southern would be extended south to serve this district, they will guarantee to deliver 1,500 carloads of fruit and cantaloupes, mostly for eastern shipment.
>
> South of the San Joaquin River lies a rich orchard and vineyard belt producing at the present time about 4,000 tons of raisins and dried fruit and 200 carloads of green fruit, which now is tributary to Biola or Kerman."

It will be noted that the report refers to three separate propositions requiring consideration in making a traffic estimate. First, a statement in regard to Swift & Company of Chicago, having reference to what *may* be done in the future; second, a statement that the Arkelian Brothers Company will *guarantee* to deliver 1,500 cars of fruit and cantaloupes if the extension is made; third, that south of the San Joaquin River there are *at the present time* 4,000 tons of raisins and 200 cars of green fruit which are not otherwise included in the estimate of traffic. In making up the statement of the traffic existing in the territory at the time no addition was made on account of what Swift & Company propose to do in the future, but the shipments guaranteed by the Arkelian Brothers Company and the traffic stated as being in existence at the time the report was made were included in the estimate.

This illustration is given merely to show the manner in which the reports of the field men were treated in compiling the traffic estimates used in this report.

The following extract from the reports, taken at randon, shows the general form in which the estimates have been prepared by the field men and the care they have taken in noting conditions having a bearing both on the present and prospective business of the territory under consideration:

ARBUCKLE—POPULATION 900 (ESTIMATED).

Forwarded:		
Deciduous fruit	150 tons (approximate)	to East
Almonds	100 tons (actual)	to East
Grain	8000 tons (actual)	
Raisins	100 tons (actual)	to East
Live stock.....	76 cars (actual)	local
Wine grapes...	200 tons (actual)	local
Received:		
Coal	200 tons (approximate)	Utah and Wyoming
Lumber	800 tons (approximate)	Chico.
Oil	850 tons (approximate)	
Grain bags....	100 tons (approximate)	local

ALMOND ACREAGE.

Five thousand acres now planted. Six hundred acres more will be planted this coming Fall. Mostly all new or young trees and very few in bearing. This industry started here less than seven years ago. No irrigation.

There are certain items of traffic which are directly dependent upon population, and with sufficient reliable data to determine the factor to be used, such a basis furnishes an accurate and convenient method of estimating. This refers particularly to merchandise and miscellaneous shipments inbound. The method and the factor used in the estimates submitted in this report are based on the following facts:

The field report of Napa Valley traffic shows that the items of merchandise, flour and feed amount to $6.86 per capita on basis of total population of the stations on the line. This figure per capita does not include building material, figures for which could not be obtained.

The report on the San Joaquin Valley traffic shows that the items of miscellaneous, vegetables, grain and feed, automobiles and agricultural implements and building material amount to $7.72 per capita on the basis of population of stations on the railroad line. The amount of this class of traffic on lines where it has not been possible to obtain accurate data has been estimated at $8 per capita of the total population of the stations on the line. The small local traffic between stations on the line has been computed at the usual rate of $500 per annum per mile of line under consideration.

Railroad stations that ship large quantities of fresh deciduous fruits generally ship a portion by express to far eastern markets. These express shipments often cannot be segregated from the freight shipments by the traffic men reporting on the district. In one of the districts reported on, where the sources of information were particularly good, the total shipments of deciduous fruit in 1916 were 31,405 tons by freight and 4,585 tons by express. The tonnage by express was 14 per cent. of the freight tonnage, consequently at stations where express shipments are known to form an important part of the traffic, and about which no definite information is obtainable, the tonnage of express shipments is taken as 15 per cent. of the tonnage of freight shipments of fresh deciduous fruits. This is in addition to the normal express earnings arising from the transportation of high class merchandise requiring rapid movement. The thing to be remembered in this connection is that the normal express earnings are dependent upon such factors as population and mileage of the railroad line, and the abnormal express earnings upon the production of fruit in the district without reference to such factors.

Direction of Traffic Movements.

In order to obtain the revenue that will attach to the freight tonnage of any district it is necessary to know the points of origin and destination in order to apply the proper rate to the ascertained tonnage. The sources of information used in determining these points of origin and destination are varied. When the information is obtainable locally the reports of the field men will show these points of origin and destination. The field report last quoted from above indicate this.

There are certain general traffic movements with which the traffic officials of railroads are familiar. For instance, wheat for milling purposes comes from Kansas and other western states to California mills. Only a very small part of Cali-

fornia wheat is milled in the state, as it is too soft for the better grades of flour. Most of it is exported by vessels to foreign countries or sold locally for feeding purposes. Coal is supplied all stations on the WESTERN PACIFIC and its immediate connections from the mines at Castle Gate on the Denver & Rio Grande. Lumber for box shooks used by the fruit packers comes from known sawmill districts. Much of the redwood lumber used in building construction comes via vessel to bay points and moves thence via rail to interior points.

In the case of commodities like California wheat or hay, which are shipped to and from points all through the state, the average rate per ton shown by the traffic statistics of the railroad company is applied instead of attempting to make a detailed statement which would involve analysis of all wheat and hay shipments separately.

In the case of fruit shipments there are four distinct movements: first, direct transcontinental movement in carloads; second, movement of fresh fruit to such markets as San Francisco and Oakland; third, shipment by small producers to assembling points for carload shipments; fourth, movement to packers and canners for subsequent shipment after manufacture or packing.

The transcontinental shipments are most important to the trunk line railroads, as they produce the greater revenue. To obtain a basis for dividing accurately the interstate and intrastate shipments of fruit products, the records of the California Railroad and Horticultural Commissions have been used. All railroads report to the Railroad Commission the tonnage of shipments of fruit products, under prescribed classification, to points outside of California. The reports of the Horticultural Commission show by counties the acreage of each variety of fruit. Certain varieties, such as apples, apricots, berries, peaches, pears and plums are shipped as fresh fruit. Certain varieties, such as apricots, peaches and

prunes are shipped in large amounts as dried fruit. Nearly all varieties of fruit are canned.

To obtain the shipments of various classes of fruit products from each county the total shipment of any particular class from the whole state was apportioned to each county on the basis of its acreage of fruit trees of the varieties commonly used in producing that class of fruit product. In view of the importance of dividing the total traffic between state and interstate business the large amount of clerical labor involved in this method is justified.

The following tabulated statement which was used in compiling the traffic estimates, shows the result of these computations:

RAIL SHIPMENTS OUT OF CALIFORNIA IN 1916.

FRUIT, VEGETABLES, WINE, BRANDY, FROM VARIOUS COUNTIES (CARS).

Counties	Green Deciduous Fruits	Citrus Fruits	Dried Fruits	Raisins	Nuts and Olives	Canned Fruits and Vegetables	Raw Vegetables	Wine and Brandy	Total Cars
Minimum carloads....	26,000 lbs.	26,500 lbs.	40,000 lbs.	40,000 lbs.	28,000 lbs.	50,000 lbs.	40,000 lbs.	30,000 lbs.	
Alameda	494	17	136	....	13	799	400	98	1,957
Butte	189	519	109	....	118	104	....	....	1,039
Colusa	212	12	45	150	8	17	160	35	639
Contra Costa	437	....	59	....	44	1,454	640	348	2,982
Fresno	1,623	578	217	3,766	15	269	....	1,512	7,980
Glenn	48	42	....	....	4	17	....	....	111
Madera	80	....	28	120	6	56	....	126	416
Merced	434	17	118	43	14	446	310	210	1,592
Monterey	686	....	13	....	....	37	185	175	1,098
Napa	115	12	260	....	12	36	106	1,652	2,293
Placer	1,494	105	146	....	13	844	....	147	2,749
Sacramento	2,022	330	70	....	46	429	1,855	1,260	6,012
San Benito	196	....	120	....	3	133	....	....	452
San Joaquin	1,790	....	177	....	45	1,100	3,050	679	6,841
Santa Clara	1,328	17	2,266	....	54	1,461	90	413	5,629
Santa Cruz	1,042	4	36	....	....	107	....	77	1,266
Solano	669	4	243	....	23	674	45	266	1,924
Sonoma	631	40	314	....	25	484	58	1,141	2,693
Stanislaus	544	40	94	18	39	207	795	161	1,898
Sutter	183	....	80	145	35	138	....	....	581
Tulare	852	6,780	263	766	31	400	88	58	9,238
Yolo	427	17	130	115	90	252	30	....	1,061
Yuba	166	60	66	15	19	126	92	21	565
Total cars from California.	24,000	42,213	6,758	6,000	1,617	14,515	17,563	9,900	

The direction of movement of other crops of importance from a railroad traffic standpoint has been determined in various ways. The following is a statement bearing on the movement of beans.

BEANS.

	Tons in 1916
Total production in state	217,634
Total rail shipments	180,640
Total rail shipments out of state	70,368
Total sea shipments from San Francisco	9,238
Receipts at San Francisco, all sources	81,028
(1,306 tons recived at San Francisco by sea from Washington and Oregon.)	

On the above basis the water shipment, by boats on the river, seems to be the difference between total production and total rail shipments. Shipments to San Francisco are total receipts from all sources, less shipments from Oregon and Washington. Assuming that all water shipments are to San Francisco, the rail shipment is the total less water shipments.

The following traffic movement is indicated:

	Tons in 1916
Total water shipments	37,000
Total rail shipments	180,640
Shipments to San Francisco from California points (water and rail 79,722; say 37,000 water, 42,722 rail)	42,722
Shipments to California distributing points, say,	67,550
Interstate outbound	70,368

Potatoes.

The movement of potatoes is perhaps more important than that of any other staple vegetable for California railroads. In the recent proceeding before the Interstate Commerce Commission, relating to rates charged for movement of potatoes to Southwestern point, the following information developed:

Actual consumption in California is 5,000,000 bushels, leaving a surplus of from 3,000,000 to 5,000,000 bushels per year. (California production is 8,000,000 to 10,000,000 bushels.)

California shipments to the Southwest move about as follows:

Arizona	600,000 bushels	18,000 tons
New Mexico	200,000 bushels	6,000 tons
Texas	2,500,000 bushels	75,000 tons

Two principal producing districts are:

Stockton District (Delta)	85%
Los Angeles District	15%

The movements of all important commodities have been determined upon the basis of information derived from various sources and the proper rates have been applied to the tonnages reported as moving to and from the various districts investigated.

After determining the points of origin and destination it is necessary to obtain the legal tariff rates that apply to the various commodities. Such rates must then be divided and the portion of the through rates accruing to the WESTERN PACIFIC on each class of traffic must be obtained from division sheets. This involved a very large amount of labor by experienced rate clerks.

DIVISION OF TRAFFIC BETWEEN COMPETING RAILROADS.

This is a matter requiring judgment and a knowledge of local conditions, and often acquaintance with the business alliances of large shippers. As a general proposition, the division of traffic between competing roads is based on the quality of service they are able to render. This is affected to a greater or less extent by the personal equation of the solicitor and the general feeling of the public toward the company. Often it is of no interest to a shipper which road carries his freight so long as the service is equal from either.

The conditions at any station, however, must be studied closely to determine their effect on the division of business. For instance, if a large shipper is leasing the building he occupies, or his building is located on land leased from a railroad, the chance that another railroad may obtain his business is usually quite small.

At some points the plant of a shipper has been built with reference to the industrial track of the competitive line. In such instances a new road entering the territory and seeking to secure the business of such a shipper has little chance of success until a new plant is constructed.

The manner in which shipments are received at the railroad stations must have consideration, that is, it is very important to know whether the shipments are handled directly from packing house to cars alongside or whether the loading is done directly from wagons or trucks into cars on team tracks. The situation at Watsonville heretofore noted is an illustration of the importance of this matter.

Certain manufacturers have adopted a general policy which they apply in dividing their business between competitive railroads. It is the general rule among sugar refineries to apportion the tonnage of their outbound sugar movement among the railroads on the basis of the tonnage of sugar beets which such railroads bring to the refinery.

There are other matters which have an important bearing upon the division of traffic, such as the ability of the railroad to supply special equipment in the season of large movements. This applies particularly to refrigerator cars used in transcontinental movement of fresh fruits. The time in transit by various railroads into the several destination territories influences the ability of the line to secure this class of business. A case in point is one in which the shipper gave the Western Pacific a certain amount of fresh fruit tonnage to move to far eastern points, with the stipulation that such shipments should be turned over to the Union Pacific at Salt Lake.

Speaking generally, the effect of many of the conditions just referred to is transitory, the tendency being toward a more equal division of traffic between competing railroads, provided the service of the several carriers is satisfactory in all respects. The most important items of service are ample car supply, prompt movement, courteous dealing, and prompt settlement of claims. Observance of these features will greatly popularize any new lines of the Western Pacific.

Estimated Probable Future Increase in Traffic.

The traffic of a railroad depends on the production of the districts it serves and the ability of such districts to find markets for their products. If increase in production of a certain commodity is assured, and the ability of a distant market to absorb it is also assured, increase in the traffic of a railroad connecting the point of production with the place of consumption may be predicted with practical certainty. In a district having 50,000 acres in bearing fruit trees and 5,000 acres in non-bearing fruit trees, all of which will be bearing within five years, it is safe to assume that the outbound fruit traffic of the district will increase ten per cent. in the following five years, provided its market can absorb the increase. If the record also shows that the market has been absorbing a constantly increasing quantity of fruit during a period of five years it is safe to assume that its capacity for absorption will continue to increase during another period of five years. At times traffic will fall below or rise above the estimated rate of increase, but the average for the five years can be predicted with substantial accuracy.

If in 1917 there is an area of 78,000 acres producing rice at a profit to the grower and there is a total area of 200,000 acres of idle land adjacent to it which is better adapted to growing that crop than any other, it is safe to assume that there will be 200,000 more acres producing rice within a short time if water for irrigation and a consuming market is assured. It follows that a railroad serving such a district is assured of an increased traffic in rice.

The California Horticultural Commission has an officer in each county of the state who reports yearly the bearing acreage of each variety of orchard fruit and nuts, and also the acreage planted which is non-bearing. The Commission publishes a report showing in tabulated form by counties the bearing and non-bearing acreage of each variety of fruit.

The interstate railroads report to the California Railroad Commission separately their annual shipments in tons to points outside of California of deciduous fruit, citrus fruit, dried fruit, raisins, nuts and olives, canned fruit and vegetables, raw vegetables, wines and brandy. The record of such shipments for a seven-year period, 1910-1916, is available. The diagrams on the opposite page are prepared from this data and afford an accurate index of the increasing capacity for the absorption of these commodities by eastern markets. They show the tonnage of interstate shipments for each commodity and diagrams for all of them combined.

The estimates of increased traffic in fruit and vegetables from the several districts reported upon are made on the basis of these data, and as they are authoritative the estimates are offered with assurance of practical accuracy.

There are certain items of traffic whose volume varies directly with the population. These relate usually to the inbound traffic of a district, such as fuel, flour, lumber and building material, automobiles, agricultural implements, general merchandise, and a large variety of commodities classed in all traffic statistics as miscellaneous.

The population for 1916 is based on the school census and the increase over the Federal census of 1910, gives the increase for a six-year period, which is used as a basis for estimating increase in traffic of the character named.

In the Sacramento Valley, and in Butte, Glenn and Colusa Counties, the estimate of increase in rice tonnage is based on the statement of the agronomist of the United States Department of Agriculture, which was made after a survey of the valley, that there was an area of 200,000 acres of land in these counties not now under cultivation which is particularly well adapted to rice culture, and the further fact that the acreage in rice has increased from 5,000 acres in 1913 to 78,000 acres in 1917, the crop proving a very profitable one for producers and the market capacity beyond the possible total production.

These instances are given to show the methods employed in making the estimate of future increase of traffic from Products of Agriculture. The same general methods have been applied to other commodities throughout. Each estimate has been based on authoritative data and where no data was available no increases have been estimated.

The following statements show the estimated increase of population in five years and the relation between bearing and non-bearing orchard area for the districts covered by the traffic estimates:

ESTIMATED INCREASE OF POPULATION IN FIVE YEARS, 1917—1922.

Traffic District.	Counties Included.	Population 1910 (U. S. Census).	Population 1916 (School Census).	Estimated Population end of 5-Year Period.	Percentage of Increase in 5 Years.
Vacaville	Solano	27,559	29,068		
	Yolo	13,926	17,186		
		41,485	46,254	50,230	8.6%
Napa Valley	Napa	19,800	19,800		
	Solano	27,559	29,068		
		47,359	48,868	50,126	2.6%
Sonoma County Valleys.	Sonoma	48,394	65,487	79,746	21.8%
Newcastle	Placer	18,237	21,448		
	Sacramento	67,806	95,803		
		86,043	117,251	143,258	22.2%
Lodi-Woodbridge	SanJoaquin	50,731	70,226	86,472	23.1%
Tidewater Extension	Fresno	75,657	135,213		
	Madera	8,368	13,455		
	Merced	15,148	26,734		
	SanJoaquin	50,731	70,226		
	Stanislaus	22,522	48,243		
		172,426	293,871	395,075	34.4%
San Jose to Watsonville and Salinas, Etc.	Monterey	24,146	28,346		
	San Benito	8,041	8,846		
	SantaClara	83,539	109,791		
	SantaCruz	26,140	30,218		
		141,866	177,201	206,647	16.7%

RELATION BETWEEN BEARING AND NON-BEARING ORCHARD AREA (IN ACRES).

1916

Sonoma County (in Connection with Sonoma Valley).

	Bearing	Non-Bearing.
Almonds	108	40
Apples	5,379	3,136
Apricots	599	133
Berries	1,600	.....
Cherries	714	472
Figs	79	.....
Lemons	9	3
Olives	650	.....
Oranges	108	16
Peaches	807	421
Pears	1,149	609
Plums	107	58
Prunes	8,905	447
Total	20,214	5,335

Percent of Non-Bearing to Bearing Acreage.....26.4%

Placer and Sacramento Counties (in Connection with Fair Oaks-Orangevale-Newcastle Districts.)

1916.

	Placer		Sacramento		Total	
	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.
Almonds	250	116	.....	.....	250	116
Apples	450	20	.....	.....	450	20
Apricots	45	13	.....	.....	45	13
Berries	500	.....	.....	.....	500	.....
Cherries	350	78	.....	.....	350	78
Figs	.....	.....	.....	.....	.....	.....
Lemons	20	.....	.....	.....	20	.....
Olives	320	.....	.....	.....	320	.....
Oranges	314	16	1,030	730	1,344	746
Peaches	7,500	352	.....	.....	7,500	352
Pears	1,800	800	.....	.....	1,800	800
Plums	6,000	700	.....	.....	6,000	700
Prunes	.....	.....	.....	.....	.....	.....
Total	17,549	2,095	1,030	730	18,579	2,825

Percent of Non-Bearing to Bearing Acreage 15.2%

It will be interesting to note, in connection with these statements of orchard acreage, that only a small part of the total acreage available is now actually so used. Statements of total agricultural area are shown in connection with the description of the territory to be served by each of the proposed feeder lines.

COMPARATIVE STATEMENT OF BEARING AND NON-BEARING ORCHARD AREA (IN ACRES).

1914

Solano County (in Connection with Vacaville District).

	Bearing.	Non-Bearing.
Almonds	1,000	415
Apples	.....	.....
Apricots	1,300	150
Berries	.....	.....
Cherries	700	300
Figs	.....	.....
Lemons	.....	20
Olives	20	.....
Oranges	10	20
Peaches	4,200	600
Pears	1,000	230
Plums	2.521	1,520
Prunes	4,345	1,800
Total	15,096	5,055

Percent of Non-Bearing to Bearing Acreage.....33.5%

Napa County (in Connection with Napa Valley).

1916

	Bearing.	Non-Bearing.
Almonds	170	97
Apples	450	172
Apricots	178	197
Berries	65	12
Cherries	360	165
Figs	50	8
Lemons	22	22
Olives	200	2
Oranges	23	24
Peaches	500	80
Pears	440	396
Plums	100	104
Prunes	4,000	1,586
Total	6,558	2,865

Percent of Non-Bearing to Bearing Acreage.....43.7%

COMPARATIVE STATEMENT OF BEARING AND NON-BEARING ORCHARD AREA (IN ACRES).

1916

San Benito, Santa Clara and Santa Cruz Counties (in Connection with a line from San Jose to Watsonville, Salinas, Etc.)

	San Benito		Santa Clara		Santa Cruz		Total	
	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.	Bearing.	Non-Bearing.
Almonds.	125	60	258	80	.....	.....	383	140
Apples .	325	125	400	443	15,800	900	16,525	1,468
Apricots..	1,500	1,300	8,561	457	1,300	1,000	11,361	2,757
Berries.	600	.....	1,000	.....	500	.....	2,100	.....
Cherries.	70	10	1,970	2,000	150	250	2,190	2,260
Figs ..	.....	.....	39	21	.....	.....	39	21
Lemons	.....	.....	31	120	15	.....	46	120
Olives.	.....	.....	1,500	51	.....	.....	1,500	51
Oranges	.....	.....	20	12	1	.....	21	12
Peaches.	525	225	5,300	200	100	.....	5,925	425
Pears. . .	250	400	1,530	223	50	325	1,830	948
Plums.	.....	.....	2,987	153	.....	.....	2,987	153
Prunes.	2,500	1,000	61,611	4,722	300	.....	64,411	5,722
Total	5,895	3,120	85,207	8,482	18,216	2,475	109,318	14,077

Percent of Non-Bearing to Bearing Acreage 12.9%

COMPARATIVE STATEMENT OF BEARING AND NON-BEARING ORCHARD AREA (IN ACRES)

1916

	Fresno*		Madera		Merced		San Joaquin		Stanislaus		Total	
	Bearing	Non-Bearing	Bearing	Non-Bearing	Bearing	Non-Bearing	Bearing	Non-Bearing	Bearing	Non-Bearing	Bearing	Non-Bearing
Almonds	....	....	50	10	450	1,000	1,200	600	1,610	1,050	3,310	2,660
Apples	250	30	200	15	50	25	50	30	120	7	670	107
Apricots	2,137	613	200	50	250	90	1,000	....	425	520	4,012	1,273
Berries	....	....	20	....	50	....	....	....	120	....	190	....
Cherries	....	....	....	2	8	7	1,800	600	40	30	1,848	639
Figs	2,919	....	100	315	625	1,315	80	25	360	50	4,084	1,705
Lemons	75	....	1	....	16	10	....	....	8	3	100	13
Olives	502	....	200	800	150	207	600	300	100	200	1,552	1,507
Oranges	1,788	....	10	....	45	40	....	....	120	75	1,903	115
Peaches	35,000	....	1,000	500	4,600	750	7,000	2,000	3,846	450	51,446	3,700
Pears	....	....	15	5	75	33	800	800	120	90	1,010	928
Plums	343	....	10	45	35	75	500	300	55	125	943	545
Prunes	981	....	65	65	20	129	600	700	75	250	1,741	1,144
Total	43,995	643	1,871	1,807	6,374	3,681	13,630	5,355	6,999	2,850	72,869	14,336

Per cent. of Non-Bearing to Bearing Acreage, 19.7%

*1914

METHOD OF ESTIMATING COST OF PROPOSED FEEDER LINES.

It has been necessary to estimate the cost of constructing the various feeder lines investigated for the purpose of setting up an income account separately for each line and finally for all proposed feeder lines and the present WESTERN PACIFIC lines operated in combination.

These estimates are based on the most reliable available data as to quantities and current prices. As the unit prices of all material entering largely into railroad construction are changing constantly and cover a wide range, the estimates have been made in as much detail as possible as to quantities of material so that they may be adapted to any scale of prices current at the time construction may be under consideration. Lump sum estimates have been avoided for this reason.

The length of line stated in the estimates has been obtained from actual surveys in some instances and in others has been scaled from the best available maps of the district.

Mr. T. J. Wyche, Chief Engineer of the WESTERN PACIFIC, has estimated the quantities and cost on all of the following items included in these estimates: Track, Ties, Buildings, Railroad Crossings, Interlocking Plants, Stock Yards, Oil Stations, Telegraph Line, Fencing, Water Tanks and Piping, Ballast and Labor in connection with track laying and surfacing.

In addition he has estimated the cost of Right-of-Way, Grading and Bridging on the San Jose Branch and the proposed extension from San Jose to Watsonville, Salinas and Hollister.

Mr. J. C. Lindsay, Chief Engineer of the Tidewater Southern, has estimated the quantities of Right-of-Way, Grading and Bridging involved in the extension of that railroad from Hilmar to Fresno, except real estate at the latter point. The

unit prices of Mr. Wyche are applied to such quantities. The estimate of cost of real estate at Fresno is taken at the same amount as that estimated at San Jose for the reason that conditions at the two cities are similar and it has not been possible within a reasonable time to make a proper investigation of such cost, neither is it desirable that it be done at this time.

The quantities of Grading and Bridging in the estimate for the proposed extension of the Woodland Branch of the Northern Electric System (and the alternate line constructed independently of that system) to the Vacaville, Napa Valley and Sonoma County districts were obtained from an estimate found in the file of the President of the WESTERN PACIFIC. The estimate referred to a proposed railroad the location of which coincided in large part with that of the proposed extension from Woodland. The prices applied are those used by Mr. Wyche in his estimates of other lines, in order that all estimates submitted might be upon the same basis of unit cost.

The Electric Facilities are estimated on the basis of actual cost obtaining on the Northern Electric in 1915 with proper allowance for increases which 1917 prices show over those of 1915.

The quantities of Grading and Bridging and the cost of Right-of-Way in the estimate of cost of the Newcastle Branch are based on a reconnaissance of the district, topographical maps and information contained in the files of the WESTERN PACIFIC relating to that branch. Electric facilities are estimated on the same basis as the line last referred to.

The quantities of Grading and Bridging and the cost of Right-of-Way used in the estimate of cost of the Lodi Branch and the two Delta Lines are based on information of a similar nature to that mentioned in connection with the Newcastle Branch. The quantities and cost of the overhead trolley and all electric appurtenances proposed for this small electric

freight system, have been carefully investigated by Mr. A. S. Kibbe, Consulting Electrical Engineer, of Berkeley, California, and the estimate of the cost submitted is the result of his investigation.

The estimate of cost of the Stockton Channel Industrial Line is to be regarded as a very rough approximation only. The quantities and cost of all items except real estate have been determined in the same general manner as that used in the Delta Lines estimate. The real estate estimate is that of E. L. Gamble, Agent of the WESTERN PACIFIC at Stockton. For obvious reasons it would be unwise to make detailed investigation of such cost by inquiry at this time.

In this connection attention is directed to the fact that all estimates of the cost of real estate made in advance of acquisition are unreliable. Current prices of real estate used for purposes other than that of a railroad do not furnish a basis for accurately estimating its cost when obtained for a railroad. Due allowance must be made for this fact in connection with all estimates of cost shown in this report.

ANALYSIS OF OPERATING RATIO.

In order to show the income account resulting from the operation of the proposed extensions and feeder systems of the WESTERN PACIFIC, it is necessary to determine the operating ratios of each one of such lines separately and finally to determine the operating ratio of the WESTERN PACIFIC SYSTEM as a whole after these feeder lines shall have been combined with the parent system.

It is clear that the present main line facilities of the SYSTEM are not employed to the fullest extent possible. Analysis shows that there are certain operating expenses which do not vary with the volume of traffic carried. As a general average of conditions, one-third of total operating expense is fixed and only two-thirds is affected by the volume of traffic. This applies as long as the total traffic carried is within the capacity of existing facilities. At the present time only five daily trains in each direction are operated between San Francisco and Sacramento. It is evident that the traffic carrying capacity of the main line greatly exceeds its existing traffic.

A careful analysis of the traffic movements of the proposed feeder system extending from Woodland to Vacaville, Napa Valley and Sonoma County, has been made to determine the factors required in estimating the cost of operating it. The factors are the ton miles involved in moving the traffic, the unit cost of moving it on both feeder line and main line, and the relation which such operating cost bears to operating revenue.

The operating ratios used in the income accounts shown for the various proposed feeder lines and extensions are based on the following analysis. It will be noted that the ratio varies with the character of the operation, the operating ratio for freight lines being less than for those lines operated for both freight and passenger service.

ANALYSIS OF OPERATING RATIO.

Sonoma County.

FEEDER LINE.						WESTERN PACIFIC MAIN LINE.					
Tons	Average Haul (Miles)	Ton Miles	Revenue	*Percent of Total	Revenue per Ton Mile (Cents)	Tons	Average Haul (Miles)	Ton Miles	Revenue	Percent of Total	Revenue per Ton Mile (Cents)
INTERSTATE OUTBOUND.											
18,351	106	1,945,106 (12% of total)	$ 31,200	25%	1.60	18,351	789	14,47[illegible],939 (88% of total)	$ 93,600	75%	0.647
INTRASTATE OUTBOUND.											
Local to Feeder Line:											
10,295	50	514,750	26,110	100%	5.07	.....	.....	.....	.....	.....	.....
Interline:											
18,583	106	1,969,798	18,861	50%	0.96	18,583	106	1,969,798	18,861	50%	0.96
INBOUND											
6,100	106	646,600	10,000	25%	1.55	6,100	789	[illegible],812,900	30,000	75%	0.623
Local:											
6,266	50	313,300	7,676	100%	2.45	.....	.....	.....	.....	.....	.....
Intrastate:											
125,554	106	13,308,724	110,453	50%	0.83	125,554	106	13,308,724	110,453	50%	0.83
Totals....	100	18,698,278	.....	.....	1.04	.....	193	34,570,361	.....	.....	0.731

* Through rates divided on basis of 25% minimum to branch line.

Napa Valley-Vacaville Districts

STATEMENT OF TON MILES

Napa Valley:

Average haul 20 miles less than Sonoma County; 100 miles—20=80 miles for Feeder Line.
179,237 tons x 80 miles = 14,338,960 ton miles, Feeder Line.
Average haul on main line same as Sonoma County, 193 miles.
179,237 tons x 193 miles = 34,592,741 ton miles, Main Line.

Vacaville District:

Average haul 15 miles less than Napa Valley. 65 miles for Feeder Line.
144,099 tons x 65 miles = 9,366,435 ton miles, Feeder Line.
Average haul on main line same as Sonoma County, 193 miles.
144,099 tons x 193 miles = 27,811,107 ton miles, Main Line.

TOTAL TON MILES FOR SONOMA—NAPA—VACAVILLE LINE

	Feeder Line	Main Line
Sonoma	18,698,278	34,570,361
Napa	14,338,960	34,592,741
Vacaville	9,366,435	27,811,107
	42,403,673	96,974,209

Total Ton Miles Feeder Line and WESTERN PACIFIC Main Line..... 139,377,882

FREIGHT REVENUE

The accompanying traffic estimates show the following estimated freight revenue:

Sonoma County	$ 457,216
Napa Valley	581,075
Vacaville District	537,292
Total Freight Revenue	$1,575,583

OPERATING EXPENSE.

FEEDER LINE:

The following statement is based on the operating statistics of the Northern Electric System of 162 miles; this feeder system comprises 165 miles. The fixed operating expense is taken at one-third of total operating expense, the variable at two-thirds of the total.

Ton Miles	Operating Expenses	Cost Per Ton Mile	Fixed Cost	Variable Cost
9,562,400	$137,961	1.44 cents	0.46 cents	0.98 cents

The total operating cost of the feeder system in moving the freight traffic will be:

Fixed Operating Expense (1/3 of $137,961)	$ 45,987
42,403,673 ton miles @ variable cost 0.98 cents	415,556
Total Freight Operating Expense, Feeder Line	$461,543

Cost per ton mile, 1.088 cents.

WESTERN PACIFIC MAIN LINE:

The following statement is based on the operating statistics of the WESTERN PACIFIC for the year ended December 31, 1916. Freight operating expense is obtained by deducting Passenger Revenue from Total Operating Expense on the assumption that Passenger Revenue equals Passenger expense.* Fixed operating expense is one-third of total Freight Operating Expense; Variable Expense is two-thirds of same total:

Ton Miles			Cost Per Ton Mile	Fixed Cost Per Ton Mile	Variable Cost Per Ton Mile
	Total Operating Expense	$4,950,622			
	Passenger Operating Expense	1,047,995			
1,020,082,624	Freight Operating Expense	$3,902,627	0.3826 cents	0.1273 cents	0.2553 cents
	Fixed Operating Expense (1/3 of $3,902,627)				$1,300,875
	†1,117,056,833 ton miles at variable cost 0.2553 cents				2,851,846
	Total Freight Operating Expense, WESTERN PACIFIC Main Line				$4,152,721

Cost per ton mile, 0.3718 cents.

*In 1916 Passenger Train Revenue was $1 per train mile, or practically the same as the cost of operation.
†Present Western Pacific ton miles plus ton miles from Feeder System.

The cost of moving the tonnage contributed by the Feeder Line over the WESTERN PACIFIC Main Line will be:

96,974,209 Feeder Line ton miles @ 0.3718 cents per ton mile..$360,550

Combining the operating expense of the Feeder Line with that of the Main Line on account of the added Feeder Line tonnage, the total operating expense account of Feeder Line freight traffic will be as follows:

42,403,673 ton miles on Feeder Line @ 1.088 cents.....$	461,543
96,974,209 ton miles on WESTERN PACIFIC Main Line @ 0.3718 cents	360,550
Total Freight Operating Expense.....$	822,093
Total Freight Operating Revenue	1,575,583

Freight Traffic Operating Ratio, 52.2%

Following the same assumption for Feeder Line passenger operation as that assumed for Main Line operation, viz.: that the Passenger Operating Expense equals revenue, the total operating ratio to be allowed for the traffic contributed by this Feeder Line to existing WESTERN PACIFIC revenue will be as follows:

Total Passenger Revenue.$	517,480	Operating Expense 100%.$	517,480
Total Freight Revenue...	1,608,583	Operating Expense 52.2%	839,680
Total Operating Revenue.$	2,126,063		$1,357,160

Combined Freight and Passenger Traffic Operating Ratio, 63.83%

The following statement shows the effect of applying these factors to the various proposed Feeder Lines and extensions:

OPERATING RATIOS FOR VARIOUS BRANCHES.

Extension from Woodland to Vacaville, Napa Valley and Sonoma County—Electric Traction, as above, 63.83%.....Use 64%

END OF FIVE-YEAR PERIOD

Passenger Train Revenue.	$ 562,749	Operating Expense 100%.	$ 562,749
Freight Revenue	1,866,030	Operating Expense 52.2%.	974,068
	$2,428,779		$1,536,817

Operating ratio, 63.3%.....Use 63%

Newcastle Branch—Passenger service not included in income account, as above, 52.2%.....Use 52%

Lodi Branch—Steam line, freight service only, as above, 52.2%.....Use 52%

Delta Lines—Electric traction, freight service only, includes the following:

Thornton—Isleton Line.
Shima—Rindge Line.
Lodi Branch—Electric Traction.
Stockton Channel—Industrial.

Combination of above in Electric System, as above, 52.2%.....Use 52%

Tidewater Southern Extension to Fresno—Passenger service not included in income account, as above, 52.2%.....Use 52%

San Jose Branch of WESTERN PACIFIC—Extension to Watsonville and Salinas, Etc.

Passenger Train Revenue.	$ 113,557	Operating Expense 100%.	$ 113,557
Freight Revenue	1,185,090	Operating Expense 52.2%.	677,894
	$1,298,647		$ 791,451

Operating ratio 60.9%.....Use 61%

END OF FIVE-YEAR PERIOD

Passenger Train Revenue.	$ 132,862	Operating Expense 100%.	$ 132,862
Freight Revenue.....	1,312,381	Operating Expense 52.2%.	685,063
	$1,445,243		$ 817,925

Operating ratio 56.6%.....Use 57%

Central California Traction Company, Electric, Freight and Passenger Service.

Passenger Train Revenue.	$ 182,601	Operating Expense 100%.	$ 182,601
Freight Revenue	281,406	Operating Expense 52.2%.	146,894
	$ 464,007		$ 329,495

Operating ratio 71.01%.....Use 71%

Northern Electric Railway System (except Suisun Branch) Electric, Freight and Passenger Service.

Passenger Train Revenue.	$ 445,216	Operating Expense 100%.	$ 445,216
Freight Revenue	646,180	Operating Expense 52.2%.	337,306
	$1,091,396		$ 782,522

Operating ratio 71.7%.....Use 72%

END OF FIVE-YEAR PERIOD

Passenger Train Revenue.	$ 650,015	Operating Expense 100%.	$ 650,015
Freight Revenue	997,249	Operating Expense 52.2%.	471,492
	$1,647,264		$1,121,507

Operating ratio 68.8%.....Use 69%

METHOD OF CONSTRUCTING THE INCOME ACCOUNTS.

Feeder Lines.

The Gross Revenue of proposed Feeder Lines is taken from the sheets showing their estimated tonnage and revenue which accompany the discussion of each district investigated.

The Net Revenue is obtained by applying the operating ratios which were deduced in the manner set forth in the article entitled "Analysis of Operating Ratio."

Taxes in California are prescribed by legislative enactment. The Constitution of the State provided that railroads should be taxed 4 per cent. on their annual gross earnings during the period immediately following the adoption of that instrument, and subsequently at a rate to be determined by the State Legislature. In 1913 the rate was increased to 4.75 per cent.; in 1915 to 5.25 per cent. of gross revenue. The legislature of 1917 did not change the rate established in 1915. In constructing the income account taxes are estimated at 5.25 per cent. of gross revenue.

The amount Available for Fixed Charges and Surplus is that which remains after deducting Taxes from Net Revenue.

Fixed Charges are estimated at 5 per cent. (the present rate of bond interest) of the cost of constructing new lines and of acquiring existing lines which are necessary to form the proposed Feeder Lines or Systems. Estimates of cost of constructing new lines and valuation of existing lines that may be acquired accompany the discussion of each district investigated.

Surplus is the amount remaining after deducting Fixed Charges from the amount Available for Fixed Charges and Surplus.

On other pages a statement will be found summarizing the Income Account of all proposed Feeder Lines the construction or acquisition of which is recommended.

WESTERN PACIFIC.

Gross and Net Revenue and Taxes used are taken from the annual report of the WESTERN PACIFIC for the calendar year ending December 31, 1916. The amount Available for Fixed Charges and Surplus is the remainder after deducting Taxes from Net Revenue.

Fixed Charges are estimated at 5 per cent. of the expended proceeds of the sale of the $19,975,560 outstanding Bonds of the COMPANY, as shown by the following statement:

Face value of outstanding 5% bonds		$19,975,560
Unexpended funds in bank	$12,426,627	
Capital expenditures not yet requisitioned	553,875	
Amount now available for capital expenditure		11,872,752
Total expenditure from proceeds of bond sale		$8,102,808

Surplus is the amount remaining after deducting Fixed Charges from the amount Available for Fixed Charges and Surplus.

On another page will be found a statement showing the income account of the proposed FEEDER LINES and the present WESTERN PACIFIC when combined for operation as one System.

NORTHERN CALIFORNIA.

For the purpose of convenient reference in this report California is divided into three general subdivisions, viz.:

Northern California, embracing that portion of the State North of San Francisco, San Pablo and Suisun Bays, and North of the San Joaquin and Mokelumne Rivers; Central California, extending from the water boundary just described to the Tehachapi Range; Southern California, lying South of the Tehachapi Range.

The WESTERN PACIFIC, and the feeder system proposed for it in this report, lie in Northern and Central California. The territory in Northern California which it is proposed to occupy by this railroad and its feeders, may be divided, for the purpose of discussion, as follows:

1. **Coastal Valleys of Sonoma and Napa Counties.**
2. **Sierra foothills.**
3. **Sacramento Valley.**

*SONOMA COUNTY.

The Sonoma County Valleys with their areas of valley agricultural land, are as follows:

	Acres
Russian River	35,000
Dry Creek	8,000
Knights	2,500
Santa Rosa	90,000
Las Guilicos	16,000
Sonoma	23,000
Total	174,500
	272 square miles

The three valleys first named are tributary to Healdsburg, a town having a population of 3,000. The important traffic points of the Santa Rosa and Los Guilicos Valleys are Santa Rosa, Petaluma and Sebastopol, having an aggregate population of 20,400. Sonoma, with a population of 1,280, is the traffic center of the Sonoma Valley. The population of Sonoma County is 65,487.

Practically all of the valley agricultural land is under intensive cultivation, with a very large percentage of the area covered by orchards and vineyards. The State Horticultural Commission has made an accurate survey of the whole State, and its report shows the area planted with fruit trees in these valleys to be 26,199 acres. The Vitacultural Commission reports an area of 24,000 acres in vineyards. The bearing orchard land has a present selling value of $600 to $700 per acre; vineyards $500 to $600 per acre. Irrigation is not required, less than one-half of one per cent. of the area being under irrigation.

The most important outbound transcontinental traffic derived from orchards and vineyards consists of apples from the Sebastopol District, dried fruit, canned goods and hops

*The description and data relating to Sonoma County, Napa County and the Vacaville Districts, is submitted for the purpose of discussing the creation of a feeder system serving those three districts, and connecting with the Western Pacific Railroad at Sacramento.

from Santa Rosa, and dried fruit and wine from Healdsburg. The most important items of outbound intrastate traffic are prepared poultry food, eggs, fresh and dried fruits, box shooks, egg cases, flour and leather. The principal items of inbound shipments are poultry and animal food (178,800 tons), lumber and cement.

The following is a statement of the railroad mileage within Sonoma County:

	Miles
Southern Pacific Company	32.58
Northwestern Pacific Railroad	141.78
Petaluma and Santa Rosa Railway (electric)	42.35
Total	216.71

The Southern Pacific line lies within the Sonoma and Los Guilicos Valleys, terminating at Santa Rosa. The Northwestern Pacific serves all of the valley areas of the county, but a large part of its mileage lies in unproductive areas adjoining San Pablo Bay and the narrow valleys of streams flowing directly into the Pacific Ocean.

The Petaluma & Santa Rosa Railway—electric interurban—serves the Santa Rosa Valley, and parts of the Russian River and Los Guilicos Valleys. The whole of its line lies within the most highly developed areas of the county. If it were extended from Forestville, its present northern terminus, to Healdsburg, it would serve directly all of the valleys heretofore mentioned excepting the Sonoma Valley.

If it were connected with, and made a part of, the WESTERN PACIFIC, it would add to the gross freight tonnage and revenues of that SYSTEM, the following:

18,351 Tons of	(1) Interstate Outbound Traffic	$124,800
28,878 Tons of	(2) Intrastate Outbound Traffic	63,833
137,921 Tons of	(3) Inbound Traffic	268,583
185,150		$457,216

(1) Traffic from its stations to points outside of California, practically all of which is transcontinental traffic.
(2) Traffic from its stations to points in California.
(3) Traffic from points within and without California, to stations on its line.

The annual report of the Petaluma & Santa Rosa for the year ending December 31, 1916, shows earnings, other than freight, as follows:

Passenger	$78,614.75
Other Transportation	3,284.41
Miscellaneous Railway	2,000.00
Total	$83,899.16

If a direct connection is provided for this line with the adjacent Napa Valley, the Vacaville District and the City of Sacramento, the passenger and miscellaneous revenue of this line will be immediately and very materially increased. It is the opinion of the General Passenger Agent of the Western Pacific that this increase will amount to at least 25 per cent. of the present revenue, or $20,975. The total gross earnings which this line will contribute to the WESTERN PACIFIC, as a part of that SYSTEM, will be:

Freight	$457,216
Passenger and Miscellaneous	104,874
Total	$562,090

The following constitutes a detailed estimate of the total freight tonnage and revenue of the Sonoma County Valleys described and the WESTERN PACIFIC proportion thereof, the foregoing statement as to freight traffic being a summary of this estimate:

SONOMA COUNTY.

Estimated Revenue.

INTERSTATE OUTBOUND.

				Total Revenue.	Western Pacific Proportion. Tonnage.	Revenue.
Apples	7,500 tons	@	$8.41	$63,075	3,750	$31,537
Deciduous Fruit	700 tons	@	9.06	6,342	350	3,171
Dried Fruit	6,280 tons	@	7.90	49,612	3,000	23,700
Canned Goods	10,620 tons	@	5.74	60,959	3,685	21,152
Wine	12,650 tons	@	5.24	66,286	6,016	31,524
Hops	2,450 tons	@	6.96	17,052	875	6,090
Leather	600 tons	@	10.58	6,348	200	2,116
Egg Cases	950 tons	@	11.60	11,020	475	5,510
Total Interstate Outbound					18,351	$124,800

INTRASTATE OUTBOUND (CALIFORNIA).

Deciduous Fruit	2,950 tons	@	$ 2.20	$ 6,490	1,475	$ 3,245
Dried Fruit	9,120 tons	@	2.60	23,712	4,000	10,400
Leather	250 tons	@	2.20	550	83	183
Flour	4,500 tons	@	.80	3,600	2,250	1,800
Prepared Poultry Food	11,500 tons	@	2.30	26,450	5,750	13,225
Eggs	8,500 tons	@	1.70	14,450	4,250	7,225
Poultry	350 tons	@	1.40	490	175	245
Box Shooks	6,500 tons	@	2.50	16,250	3,250	8,125
Egg Cases	1,000 tons	@	2.20	2,200	500	1,100
Shoes	200 tons	@	3.00	600	100	300
Tomatoes	4,500 tons	@	1.60	7,200	2,250	3,600
Merchandise	10,675 tons	@	3.00	32,025	4,795	14,385
Total Intrastate Outbound					28,878	$63,833

INBOUND.

Box Shooks	175 tons	@	$ 0.90	$ 158	88	$ 79
Lumber	129,595 tons	@	3.40	440,623	32,124	109,222
Poultry and Animal Food	178,800 tons	@	1.10	196,680	86,433	95,076
Flour	4,450 tons	@	1.50	6,675	1,808	2,712
Coal	1,685 tons	@	3.95	6,656	840	3,318
Hides	350 tons	@	1.00	350	116	116
Barrels and Puncheons	1,750 tons	@	3.20	5,600	641	2,051
Lime	330 tons	@	0.80	264	115	92
Strawboard	1,750 tons	@	1.50	2,625	875	1,312
Leather (covered above)	250 tons	.....		.....	.....	.....
Cement	13,500 tons	@	1.00	13,500	5,625	5,625
Automobiles	2,100 tons	@	22.79	47,859	875	19,941
Agricultural Implements	1,140 tons	@	13.41	15,287	350	4,693
Galvanized Iron	80 tons	@	9.32	746	40	373
Merchandise	35,450 tons	@	3.00	106,350	7,991	23,973
Total Inbound					137,921	$268,583
Grand Total Outbound and Inbound					185,150	$457,216

ESTIMATED FIVE-YEAR INCREASE OF FREIGHT REVENUE.

The non-bearing acreage of apples at this time is 58 per cent. of the bearing acreage. Increase in this item is estimated at 58 per cent.

The present acreage of other non-bearing orchards is 26.4 per cent. of the bearing acreage. Increase in fruit, other than apples, and fruit products, except wine, is estimated on a basis of 26 per cent. No increase in wine or hops is estimated.

As no data is available as to the increase in the poultry business, which is very large, no increases in such items as prepared food, egg cases and food for poultry are included.

The increase in such items as lumber, flour, coal, building material and merchandise, is estimated on the basis of an increase of 21.8 per cent. in population, 22 per cent. being the figure actually used.

The basis applied to the estimated revenue now available gives the following result:

INTERSTATE OUTBOUND.

Apples	$18,291
Fruit and fruit products	12,486
	$30,777

INTRASTATE OUTBOUND.

Fruit and fruit products	3,530
Box shooks	2,112
Canning vegetables	936
	$6,578

INBOUND.

Lumber	$24,029
Flour and coal	1,319
Merchandise and miscellaneous	11,968
	$37,316

Total Increase in Freight Revenue..... $74,671

NAPA VALLEY.

This valley lies east of, and parallel with, the Sonoma County Valleys just described, the spur of the Coast Range which separates them attaining an elevation of nearly 2,500 feet at its highest point. From Vallejo, on San Pablo Bay, to its extreme northern end, the valley has a length of 41 miles, and, just north of the City of Napa, an extreme width of 6 miles. It has a total area of valley agricultural land of 42,800 acres, all of which is under intensive cultivation. Irrigation is not required, less than 3/4 of 1 per cent. of the total area being irrigated.

The Horticultural Commission reports the area in orchard as 9,698 acres, nearly 60 per cent. of the total area being planted with prunes. The Vitacultural Commission report an area of 13,000 acres in vineyards, practically all of which are wine grapes. The land has a present selling value of $600 to $700 per acre for bearing orchards and $500 to $600 per acre for vineyards.

The entire area is efficienctly tilled and the sale of its products is skillfully managed. There are a large number of wine cellars in the valley, many of them constructed of stone masonry, in the most substantial manner. Excellent improved roads traverse the entire area which, with the high character of the residences, buildings and condition of the orchards and vineyards, give a particularly prosperous air to the whole valley.

In the mountains bordering the valley are deposits of magnesite, which is shipped from Rutherford in large quantities to Eastern markets, particularly to steel manufacturing plants in the Pittsburgh District.

At Napa Junction is the large plant of the Standard Portland Cement Company. At South Vallejo, on San Pablo Bay, is the large flour mill of the Sperry Company and a very large lumber interest.

Directly across the channel from Vallejo is Mare Island, on which is located the shipbuilding and repair plant of the United States Navy.

The most important traffic points in the Valley are Vallejo* population 15,000, and Napa, the county seat, with 6,500; the population of Napa County is 19,682.

The most important outbound transcontinental traffic is wine, of which 65 per cent. moves east, and dried fruit, of which 90 per cent. moves east.

There is also a movement east of 20,000 tons of magnesite, 1,730 tons of leather and 6,480 tons of chemicals.

The most important items of intrastate outbound traffic are 77,500 tons of cement and 9,180 tons of merchandise.

The important items of interstate inbound traffic are coal and coke from Utah, and wheat from Kansas and other western states. The inbound local tonnage of lumber by rail amounts to 114,300; wheat 40,000 and merchandise 49,975. The volume of rail traffic to and from this valley is very high per unit of area and per mile of railroad serving it.

The rail traffic is carried by the Southern Pacific and the San Francisco, Napa & Calistoga, the latter being an electric interurban line. The length of the latter from Vallejo to Calistoga is 41.6 miles. The two lines parallel each other and for a large part of the distance their rights-of-way abut.

Under existing conditions the electric line serves the territory as well as the Southern Pacific, except as to the traffic of the cement plant at Napa Junction and that of Vallejo and South Vallejo.

As the electric line does not reach any extensive cement consuming market, it is not provided with a spur track connecting it with the cement plant, although its main line passes close to it and may be connected with it at small expense.

The electric line runs through the heart of the retail business district of Vallejo and it is, therefore, not permitted to

*Vallejo, while at the Southern end of the Napa Valley, is in Solano County.

haul any considerable amount of freight over its main line. It would be unable to do so economically, even if it were allowable, on account of the excessive grades of the city streets. A freight line 0.66 miles long may be constructed around the north limits of Vallejo, reaching the water front and following it to the steamer landings. The Electric Company has some right-of-way for such a line. It may be further extended to reach the Sperry Flour Mills and lumber yards at South Vallejo. Such a line may be constructed without excessive grades or large expenditure.

With a spur track to the cement plant and the freight line at Vallejo in operation, the electric line will serve the traffic of the whole Napa Valley equally as well as the Southern Pacific does.

If the San Francisco, Napa & Calistoga Electric Line is connected with and made a part of the WESTERN PACIFIC, it will increase the freight tonnage and revenue of that SYSTEM as follows:

29,010 Tons Interstate Outbound Traffic	$172,184
32,250 Tons Intrastate Outbound Traffic	39,434
117,977 Tons Inbound Traffic	379,457
Total Freight	$591,075

The annual report of the San Francisco, Napa & Calistoga for the year ending December 31, 1916, shows earnings other than freight, as follows:

Passenger Revenue	$188,836.92
Other Transportation Revenue	6,288.59
Miscellaneous Railway Revenue	1,190.61
	$196,316.12

A direct connection for this line with the adjacent Sonoma County, the Vacaville District and the City of Sacramento, will, in the opinion of the General Passenger Agent of THE WESTERN PACIFIC RAILROAD, result in immediately increasing the passenger and miscellaneous revenue of this line $39,079.

The total gross earnings which this line will contribute to the WESTERN PACIFIC, as a part of that SYSTEM will be:

Freight	$591,075
Passenger and Miscellaneous	235,395
	$826,470

The following is a detailed estimate of the total freight tonnage and revenue of the Napa Valley traffic and the WESTERN PACIFIC proportion thereof, the foregoing statement as to freight traffic being a summary of this estimate:

NAPA VALLEY.

Estimated Revenue.

INTERSTATE OUTBOUND (EASTERN).

				Total Revenue.	Western Pacific Proportion. Tonnage.	Revenue.
Wine	24,505 tons	@$	5.24	$128,406	12,252	$64,200
Dried Fruit	5,225 tons	@	7.90	41,278	2,613	20,643
Leather	1,730 tons	@	10.58	18,303	865	9,152
Hair	80 tons	@	4.72	378	40	189
Magnesite	20,000 tons	@	3.98	79,600	10,000	39.800
Chemicals	6,480 tons	@	11.79	76,339	3,240	38,200
Total Interstate Outbound					29,010	$172,184

INTRASTATE OUTBOUND (CALIFORNIA).

Wine	13,195 tons	@	1.20	15,834	6,595	7,914
Wine, Barrels (From St. Helena	2,800 tons	@	1.40	3,920	1,400	1,960
Dried Fruit	580 tons	@	1.00	580	290	290
Cement	77,500 tons	@	.80	62,000	19,375	15,500
Merchandise	9,180 tons	@	3.00	27,540	4,590	13,770
Total Intrastate Outbound					32,250	$39,434

INBOUND.

Barrels and Puncheons	875 tons	@$	8.00	$ 7,000	438	$ 3,504
Wine Barrels (included above)	1,175 tons					
Wine Barrels (Napa)	650 tons	@	1.60	1,040	325	520
Cooperage	2,100 tons	@	2.60	5,460	1,050	2,730
Lumber	114,300 tons	@	3.40	388,620	38,100	129,540
Coal	8,405 tons	@	3.95	33,200	4,202	16,598
Wheat	21,600 tons	@	7.00	151,200	10,800	75,600
Wheat	40,000 tons	@	1.80	72,000	20,000	36,000
Coke	900 tons	@	4.62	4,158	450	2,079
Hides	4,550 tons	@	2.00	9,100	2,275	4,550
Soda Ash	950 tons	@	6.80	6,460	475	3,230
Salt	700 tons	@	1.20	840	350	420
Dried Fruit	3,900 tons	@	2.00	7,800	1,950	3,900
Grapes	6,300 tons	@	1.00	6,300	3,150	3,150
Flour and Feed	16,350 tons	@	1.00	16,350	8,175	8,175
Chemicals	2,500 tons	@	11.60	29,000	1,250	14,500
Merchandise	49,975 tons	@	3.00	149,925	24,987	74,961
Total Inbound					117,977	$379,457
Grand Total Outbound and Inbound					179,237	591,075

ESTIMATED INCREASE OF FREIGHT REVENUE, FIVE-YEAR PERIOD.

No increase is included for wine. The acreage of non-bearing prune orchards to bearing orchards is 39.6 per cent. In estimating the increase in dried fruit 40 per cent. was used.

Increase in lumber, coal, coke, wheat inbound, was estimated on the basis of estimated increase in population, viz., 3 per cent.

No increase in materials required for manufacture or manufactured products is included, as reliable data is not available.

These factors applied to revenue now available produce the following results:

INTERSTATE OUTBOUND.

	Increase.
Dried fruit	$ 8,377

INTRASTATE OUTBOUND.

Dried fruit	$ 116

INBOUND.

Lumber, coal, flour and grain	$ 8,039	
Fruit	2,820	
Merchandise	2,249	
	$13,108	
Total Increase in Freight Revenue		$21,601

FAIRFIELD-VACAVILLE-WINTERS DISTRICT.

This district is located in the extreme southwest corner of the Sacramento Valley. It is one of the oldest fruit growing districts in Northern California and is generally described as the Vacaville District, as the first development occurred in the Vaca Valley, in which the town of Vacaville is located.

Practically all of the orchard area of Solano County is included within this district. The Horticultural Commission report a total area of 20,151 acres of orchards in Solano County. The Vitacultural Commission report 3,000 acres of vineyards.

In that part of the district south of Winters, irrigation is not required, the area artificially watered being insignificant. Between Winters and Woodland, which is devoted more generally to grain crops than to fruit, there is some irrigation.

A large part of the orchard acreage is planted with apricots, cherries, peaches, pears and plums, which accounts for the very large shipment of green deciduous fruit from the district to eastern markets. There is also a large area, 4,345 acres, planted in prunes, which produces a large traffic movement of dried fruit.

The orchard areas of the district present much the same appearance as that of the Napa Valley, as to roads, character of residences and buildings, except that the wine cellars are lacking.

About two miles east of Fairfield, at Tolenas, is located a very large cement plant with a total output of 242,000 tons of cement annually and a large inbound tonnage of miscellaneous freight.

There are no large towns in the district, the most important being Vacaville with a population of 1,250; Winters, 1,200; Fairfield, 1,000; Suisun, 800. The population of Solano County, in which the larger part of the district lies, is 29,068.

The most important outbound transcontinental traffic consists of deciduous fruits—green and dried—canned goods, barley and rice. The outbound traffic to points in California is made up of the same products, with the large tonnage of cement from Tolenas added. The inbound traffic consists largely of lumber, box shooks and other materials required in packing green, dried and canned fruits and miscellaneous supplies for the cement plant.

The district is now served by the Sacramento-San Francisco main line of the Southern Pacific and two of its branches and, in addition, by an isolated line of the Northern Electric Railway 14.92 miles long, extending from Willota (near Cordelia) through Fairfield and Tolenas to Vacaville, with a short branch to Suisun.

It is entirely practicable to extend this line of the Northern Electric so that it will serve the orchard area of the district better than the Southern Pacific now serves it. The line can be made to serve the cement plant as to all of its traffic, except the inbound shipment of rock used in manufacturing cement, quite as well as the Southern Pacific does. It is also practicable to serve the district in the manner described by constructing a new line independent of any existing railroad in the district.

Such a line—either constructed new or acquired by purchase and extended—would, if connected with and made a part of the WESTERN PACIFIC SYSTEM, add to its freight tonnage and revenue as follows:

45,750 Tons of *Interstate Outbound Traffic.....	$344,565
76,733 Tons of Intrastate Outbound Traffic.....	102,095
21,616 Tons of Inbound Traffic	90,632
	$537,292

*Transcontinental traffic eastbound.

If the isolated Suisun Branch of the Northern Electric is connected with the City of Sacramento via Woodland, and with the Napa Valley and Sonoma County by an extension to

the two electric railways serving those two districts, it will earn from its passenger service at least as much per mile as the entire Northern Electric earned in 1915, or $2,360, which, for the 14.92 miles amounts to $35,211. The total additional gross earnings of the WESTERN PACIFIC through the ownership of such a line will be $572,503 per annum.

The following is a detailed estimate of the total freight tonnage and revenue of this district and the WESTERN PACIFIC proportion thereof, the foregoing statement of freight traffic being a summary of this estimate:

FAIRFIELD-VACAVILLE-WINTERS DISTRICT.

Estimated Revenue.

INTERSTATE OUTBOUND (EASTERN).

				Total Revenue.	Western Pacific Proportion. Tonnage.	Revenue.
Green Deciduous Fruit..	32,604 tons	@$	9.06	295,392.24	25,268	$228,928
Dried Fruit	6,585 tons	@	7.90	52,021.50	5,070	40,053
Canned Goods	2,177 tons	@	5.74	12,495.98	1,087	6,239
Barley	13,650 tons	@	4.60	62,790.00	6,825	31,395
Rice	15,000 tons	@	5.06	75,900.00	7,500	37,950
Total Interstate Outbound					45,750	$344,565

INTRASTATE OUTBOUND (CALIFORNIA).

Dried Fruits	4,155 tons	@$	1.60	$ 6,648.60	2,696	$ 4,314
Barley	4,550 tons	@	1.80	8,190.00	2,275	4,095
Wheat	4,220 tons	@	1.80	7,596.00	2,110	3,798
Corn	980 tons	@	2.10	2,058.00	490	1,029
Rice	5,000 tons	@	2.70	13,500.00	2,500	6,750
Hay	8,925 tons	@	1.75	15,618.75	4,462	7,809
Canning Fruit	3,400 tons	@	1.00	3,400.00	1,700	1,700
Cement . . . .242,000 tons		@	1.20	290,400.00	60,500	72,600
Total Intrastate Outbound					76,733	$102,095

INBOUND.

Lumber	6,185 tons	@$	3.30	$20,410.50	3,092	$10,204
Box Shooks	3,815 tons	@	3.30	12,589.50	1,908	6,296
Cans	240 tons	@	7.90	1,896.00	120	948
Nails and Paper	775 tons	@	3.40	2,635.00	387	1,316
Canning Fruit	1,000 tons	@	2.00	2,000.00	500	1,000
Dried Fruit	3,400 tons	@	1.00	3,400.00	1,700	1,700
Sugar	650 tons	@	1.60	1,040.00	325	520
Miscellaneous to Tolenas	30,536 tons	@	2.60*	79,393.60	7,634	19,848

MERCHANDISE AND MISCELLANEOUS.

Population	5,950	@	8.00	47,600.00	5,950†	23,800
50 miles local station interchange		@$500	. . . .			25,000
Total Inbound					21,616	$ 90,632
Grand Total Outbound and Inbound					144,099	$537,292

*80% of San Francisco rate and 20% of $5 rate from Eastern points.
†Estimated.

Estimated Increase of Freight Revenue in a Five-Year Period.

The non-bearing acreage of orchards at this time is 33.5 per cent. of the bearing acreage. Increase in fruit and fruit products is estimated as 34 per cent.

The present area of rice in the Sacramento Valley is 78,000 acres. There will probably be 200,000 acres more producing this commodity within 5 years. The ratio of the present to the future acreage is 113 per cent. and the increase in rice tonnage is based on that ratio.

Increases in box shooks and other fruit packing supplies are based on the same percentage of increase as fruit and fruit products.

Increase in merchandise and miscellaneous is based on the estimated increase in population, 8.6 per cent. Nine per cent. is actually employed.

No increases are included for such items as grain, hay and cement.

This basis, applied to the estimated revenue now available gives the following results:

INTERSTATE OUTBOUND.

	Increase
Fruit and Fruit Products	$ 93,575
Rice	42,884
	$136,459

INTRASTATE OUTBOUND.

Fruit and Fruit Products	$ 2,623
Rice	7,628
	$ 10,251

INBOUND.

Lumber	$ 878
Fruit Packing Supplies	4,005
Merchandise and Miscellaneous	4,297
	$ 9,180

Total Increase of Freight Revenue..... $155,890

CONNECTION OF WESTERN PACIFIC MAIN LINE WITH VACAVILLE, NAPA VALLEY AND SONOMA COUNTY DISTRICTS.

The WESTERN PACIFIC may be connected with the three territories just described, viz: Sonoma County, Napa County and the Vacaville District by either one of two possible plans.

1. By acquiring the Northern Electric Railway and extending the Woodland Branch of that line through Winters, to the northern end of the Suisun Branch, an isolated line 14.92 miles long owned by it, and extending the Suisun Branch westerly to connections with the San Francisco, Napa & Calistoga at Soscol and the Petaluma & Santa Rosa at Petaluma.

2. The alternative plan would involve the construction of a line from Sacramento through Plainfield to and through Winters to Vacaville, thence parallel with the Suisun Branch of the Northern Electric to the west end of that branch, thence westerly through Soscol to Petaluma.

Both of the lines are shown on the accompanying sketch, the latter being marked "A." Plan No. 1 will be discussed first.

PLAN No. 1.

The total length of line to be constructed to extend the Northern Electric branch from Woodland to Petaluma would be 55.29 miles. To extend the Petaluma & Santa Rosa from its present terminus at Forestville to Healdsburg, would involve the construction of 10 miles of railroad. The freight line around the City of Vallejo to provide the San Francisco, Napa & Calistoga with proper facilities for reaching the industries in Vallejo and South Vallejo located on and near the water front and for interchange with bay steamers, will be practically one mile long. The total length of new line to be constructed to connect the WESTERN PACIFIC main line with these three districts and to extend the existing electric lines serving them would thus be 66.29 miles, or say 66 miles.

The only additional freight revenue that will be secured on account of this mileage will be that arising from the local interchange between stations on this feeder system, which, upon the usual basis of $500 per mile, would amount to $33,000.

The average passenger earnings per mile for the entire Northern Electric System in 1915, was $2,360. The added connecting mileage would earn somewhat less than the entire system immediately after construction, say $2,000 per mile, which would add to the revenue of this feeder system, not otherwise estimated, $132,000.

For the purpose of showing the result of the operation of the feeder system serving these three districts, it is necessary to assign a value to the two existing electric lines.

The income account of the Petaluma & Santa Rosa shows a steady decrease in both gross revenue and net income from 1912 to June 30, 1916. Its bonds are inactive and records of bona fide sales of them are unobtainable. The nominal selling price is 75 for 1st 5's and 50 for 2nd 6's. On this basis the value of the outstanding bonds is $632,500.† No dependence can be placed on this valuation, however.

The income account of the San Francisco, Napa & Calistoga shows that in seven years, 1909-1916, there were three years in which there was a deficit from operation and four years in which there was a surplus after paying taxes and fixed charges. The sum of the deficits is $39,227; of the surpluses $28,603, the net deficit in seven years being $10,624.

Its bonds are inactive and no reliable quotations on them can be obtained. The nominal prices quoted (upon which no reliance may be placed) are 92 for 1st 6's and 50 for the Debenture 5's. On this basis the value of the outstanding bonds is $832,414.*

Neither of these electric lines have paid any dividends.

A statement showing the income account and capitalization of these two lines, taken from their annual reports for the

†Does not include bonds pledged for loans, $113,000.
*Does not include bonds pledged for loans, $29,900.

year ended December 31, 1917, is shown on following pages.

For the sole purpose of estimating net earnings, a valuation of 80 per cent. of the par value of the outstanding bonds of the two electric lines is used in order that the estimate of net earnings may be ultra conservative. On this basis of valuation the two electric lines are worth:

Petaluma & Santa Rosa—*Outstanding Bonds and Construction Notes†

First Mortgage 5%	$655,000
Second Mortgage 6%	217,000
	$872,000
80% of Outstanding Bonds	$697,600
†Demand notes, to cover cost of constructing branch lines	59,600
Total Value	$757,200

San Francisco, Napa & Calistoga—*Outstanding Bonds and Notes†

First Mortgage 6%	$579,200
Debenture Bonds 5%	599,100
	$1,178,300
80% of Outstanding Bonds	$942,640
Notes Payable	26,000
Total Value	$968,640

*Not including bonds pledged to secure indebtedness.
†Notes for current expenses not included.

Assuming a value of $25,000 per mile for the entire Northern Electric System of 162.247 miles, the total valuation of that property would be $4,056,175. This is in excess of the amount asked by the owners of the property in any of the bona fide negotiations of the last few months.

The Suisun Branch of the Northern Electric, which is 14.92 miles long, would be worth $374,000 on this basis.

The cost of the lines to be constructed and the value of the properties to be acquired in forming this feeder system will be, on the basis outlined, as follows:

COST OF FEEDER SYSTEM SERVING VACAVILLE DISTRICT, NAPA VALLEY AND SONOMA COUNTY.

Railroad, Branch Line or Extension	Cost or Value	Length of Line. (Miles)	Cost per Mile of Line	Railroad to be Constructed (Miles)
*Extensions:				
Woodland to Vacaville	$ 977,607	26.00		26.00
Willota to Soscol	422,301	9.29		9.29
Soscol to Petaluma	944,534	20.00		20.00
Suisun Branch of Northern Electric	374,000	14.92		
San Francisco, Napa & Calistoga	968,640	41.60		
*Vallejo Freight Line	100,045	1.00		1.00
Petaluma & Santa Rosa	757,200	42.35		
*Extension, Forestville to Healdsburg	488,335	10.00		10.00
	$5,032,662	165.16	$30,470	66.29

*Details of these estimates will be found at the end of this section.

The revenue which will be added to WESTERN PACIFIC revenue when this feeder system is made a part of the parent system, is shown in the following statement:

District	Freight Revenue	Passenger and Miscellaneous Revenue	Total Revenue
Vacaville District	$ 537,292	$ 35,211	$ 572,503
Napa Valley	591,075	235,395	826,470
Sonoma County	457,216	104,874	562,090
Connecting Line	33,000	132,000	165,000
	$1,618,583	$507,480	$2,126,063

On the basis of an operating ratio of 64 per cent., taxes 5¼ per cent. of gross earnings and fixed charges 5 per cent. on cost and value of the constituent parts of the feeder system, its income statement would stand as follows:

	Plan No. 1
Gross Revenue	$2,126,063
Net Revenue 36% of gross	765,383
Taxes 5¼% of gross revenue	111,618
	$ 653,765
5% of $5,032,662 cost and value	251,633
Surplus	$ 402,132

The following is a statement of the income account of the feeder system at the end of the fifth year, based on the estimates of increased revenue. The gross earnings at the end of the five-year period are shown on a following page under the caption "Summary of Estimates of Traffic":

INCOME ACCOUNT AT END OF FIVE-YEAR PERIOD.

	Plan No. 1
Gross revenue	$2,428,779
Net revenue—37% of gross	898,648
Taxes 5¼% of gross revenue	127,511
	$ 771,137
5% of $5,032,662, cost and value	251,633
Surplus	$ 519,504

Plan No. 2.

To construct a line under this plan from Sacramento through the Vacaville District to a connection with the electric lines in the Napa Valley and Sonoma County, as shown on the sketch map, would involve the construction of 97.21 miles of new line as compared with 66.29 miles if the existing branches of the Northern Electric are used, as contemplated in Plan No. 1 just described. The line would cross the Sacramento River at the City of Sacramento on the bridge now constructed, and used jointly by the Northern Electric, the Oakland, Antioch & Eastern and the public highway.*

In addition to the fixed charges incurred through the cost of construction of new line, the feeder system would pay an annual rental probably based on one-quarter of the total cost of the bridge, at the rate of 5 per cent. annually.**

25% of entire cost, $200,000	$50,000
Rental on basis of 5% annually	2,500

*Bridges over navigable streams, and therefore under the jurisdiction of the War Department, may be used by other railroads.

**This statement is probably approximately correct, but is made without knowledge of the facts as to rate of interest, sinking fund, if any, etc.

The cost of constructing the line from the Sacramento River Bridge through Plainfield, Winters and Vacaville to Willota, a distance of 56.92 miles, would be approximately as follows:

†Sacramento to Plainfield (17 miles @ $54,138)	$ 926,301
‡‡Plainfield to Willota (practically 40 miles @ $37,600)	1,504,000
Total cost, Sacramento to Willota	$2,430,301

†Estimated to cost the same as the reproduction cost allowed in the State Valuation of the Woodland Branch of the Northern Electric, which is 17.11 miles long.

‡‡Estimated at the same rate per mile as the estimate of cost of the line Woodland to Vacaville used in Plan No. 1.

From Willota through Soscol to Petaluma the details of Plan No. 2 are identical with those of Plan No. 1, and the same is true as to the extension of the existing electric lines in the Napa Valley and Sonoma County.

The Cost and Value under Plan No. 2 on this basis, is as follows:

COST OF FEEDER SYSTEM SERVING VACAVILLE DISTRICT, NAPA VALLEY AND SONOMA COUNTY.

Railroad, Branch Line or Extension	Cost or Value	Length of Line (Miles)
Extensions:		
Sacramento to Willota	$2,430,301	56.92
Willota to Soscol	422,301	9.29
Soscol to Petaluma	944,534	20.00
San Francisco, Napa & Calistoga	968,640	41.60
Vallejo Freight Line	100,045	1.00
Petaluma and Santa Rosa	757,200	42.35
Extension, Forestville to Healdsburg	488,335	10.00
	$6,111,356	181.16

This alternate line would add to the revenue of the WESTERN PACIFIC the amounts shown under Plan No. 1, and, in addition, the earnings of the line between Sacramento and Plainfield. These latter earnings may be assumed to be the same as total earnings of the Woodland Branch of the Northern Electric for 1915, viz.: $128,583.

Total Amount shown for Plan No. 1	$2,126,063
Additional Revenue as above	128,583
	$2,254,646

On the basis of an operating ratio of 64 per cent., taxes 5¼ per cent. of gross earnings and fixed charges 5 per cent. on cost and value of the constituent parts of the feeder system, its income statement under Plan No. 2 would stand as follows:

		Plan No. 2.
Gross Revenue		$2,254,646
Net Revenue 36% of Gross		811,673
Taxes, 5¼% of Gross Revenue	$118,369	
Bridge Rental at Sacramento River	2,500	120,869
Net Operating Revenue		$ 690,804
5% of $6,111,356, Cost and Value		305,568
Surplus		$ 385,236

Summary of Estimates of Traffic of Feeder System

Serving Sonoma County, Napa Valley and Vacaville Districts.

Estimated traffic at beginning of operation.

Tonnage and Revenue—Freight

District	Interstate Outbound Tonnage	Interstate Outbound Revenue	Intrastate Outbound Tonnage	Intrastate Outbound Revenue	Inbound Tonnage	Inbound Revenue	Total Freight Tonnage	Total Freight Revenue	Passenger and Miscellaneous Revenue	Total Earnings
Sonoma County	18,351	$124,800	28,878	$ 63,833	137,921	$268,583	185,150	$ 457,216	$104,874	$ 562,090
Napa Valley	29,010	172,184	32,250	39,434	117,977	379,457	179,237	591,075	235,395	826,470
Vacaville District	45,750	344,565	76,733	102,095	21,616	90,632	144,099	537,292	35,211	572,503
Connecting Lines	.....	.....	.....	.....	.....	.....	.....	33,000	132,000	165,000
Total	93,111	$641,549	137,861	$205,362	277,514	$738,672	508,486	$1,618,583	$507,480	$2,126,063

Estimated Traffic Increase in Five Years—Revenue

Sonoma County	.....	$ 30,777	.....	$ 6,578	.....	$37,316	.....	$ 74,671	$18,458†	$ 93,129
Napa Valley	.....	8,377	.....	116	.....	13,113	.....	21,606	7,362	28,968
Vacaville District	.....	136,459	.....	10,251	.....	9,180	.....	155,890	3,609	159,499
Connecting Lines	.....	.....	.....	.....	.....	.....	.....	5,280‡	15,840*	21,120
Total	.....	$175,613	.....	$ 16,945	.....	$59,609	.....	$257,447	$45,269	$302,716

Estimated Traffic at End of Five-Year Period—Revenue

Sonoma County	.....	$155,577	.....	$ 70,411	.....	$305,899	.....	$ 531,887	$126,332	$ 658,219
Napa Valley	.....	180,561	.....	39,550	.....	382,570	.....	602,681	252,757	855,438
Vacaville District	.....	481,024	.....	112,346	.....	99,812	.....	693,182	38,820	732,002
Connecting Lines	.....	.....	.....	.....	.....	.....	.....	38,280	147,840	186,120
Total	.....	$817,162	.....	$222,307		$788,281	.....	$1,866,030	$562,749	$2,428,779

*Population increase, 12%.
†Based on estimated increase of population.
‡On basis of average increase for the three districts.

Summary of Estimates of Cost of Construction, Woodland to Petaluma, Forestville to Healdsburg and Vallejo Freight Line—on Basis of Extension of Northern Electric Railway.

Plan No. 1.

Items	Woodland to Vacaville (26.0 Miles)	Willota to Soscol (9.29 Miles)	Soscol to Petaluma (20.0 Miles)	*Forestville to Healdsburg (10.0 Miles)	†Vallejo Freight Line (1.00 Miles)
Right of Way	$ 63,200.00	$ 27,600.00	$ 53,600.00	$ 84,000.00	None
Grading	188,100.00	116,600.00	157,200.00	52,500.00	$ 22,500.00
Bridging	84,210.08	14,883.60	185,211.00	50,474.08	5,000.00
Track	171,446.80	59,878.94	131,219.35	69,697.47	14,000.00
Ties	58,956.98	20,561.20	45,016.68	23,909.74	4,100.00
Buildings	55,300.00	25,900.00	49,850.00	25,900.00	15,000.00
Stock Yards	4,250.00	1,700.00	3,400.00	2,550.00	.....
Fencing	39,000.00	13,955.00	30,000.00	15,000.00	.....
Telegraph Line	9,100.00	3,251.50	7,000.00	3,500.00	.....
Ballast	34,200.00	12,000.00	26,400.00	13,800.00	2,400.00
Railroad Crossings	500.00	1,000.00	1,500.00	1,000.00	500.00
Interlocking Plants	20,000.00	30,000.00	45,000.00	30,000.00	15,000.00
Water States	.....	.....	.....	.....	.....
Fuel Stations	.....	.....	.....	.....	.....
Labor—Track	43,470.00	15,180.00	33,270.00	17,610.00	3,450.00
Electric Facilites	117,000.00	41,400.00	90,000.00	54,000.00	9,000.00
	$888,733.86	$383,910.24	$858,667.03	$443,941.29	$ 90,950.00
Engineering and Contingencies, 10 per cent	88,873.39	38,391.02	85,866.70	44,394.13	9,095.00
	$977,607.25	$422,301.26	$944,533.73	$488,335.42	$100,045.00

Woodland to Vacaville	$ 977,607.25
Willota to Soscol	422,301.26
Soscol to Petaluma	944,533.73
Forestville to Healdsburg	488,335.42
Vallejo Freight Line	100,045.00
	$2,932,822.66

*Extension of existing Petaluma & Santa Rosa Railway.
†Improvement of existing San Francisco, Napa & Calistoga Railway.

WOODLAND TO VACAVILLE.

Estimated Cost of Proposed Branch Line.

		Miles		
Main Track		26.0		
Sidings		2.5		
Total		28.5		
RIGHT OF WAY.				
22 Miles of Right of Way	@ $1,600		$ 35,200.00	
4 Miles of Right of Way	@ 7,000		28,000.00	
Total Right of Way				$ 63,200.00
GRADING.				
32,000 Cu. Yds. Solid Rock Excavation	@ $1.00		$ 32,000.00	
17,000 Cu. Yds. Loose Rock Excavation	@ .50		8,500.00	
115,000 Cu. Yds. Earth Excavation	@ .30		34,500.00	
377,000 Cu. Yds. Borrow	@ .30		113,100.00	
Total Grading				$188,100.00
BRIDGING.				
Steel Bridges and Trusses:				
1,058 Cu.Yds. Concrete Bridge Masonry	@ $10.00		$ 10,580.00	
4,536 Lin. Ft. Piling, driven	@ .28		1,270.08	
19 F. B. M. Bridge Timber	@ 30.00		570.00	
286 Tons Bridge Steel				
$100 for steel				
13 Freight				
15 Erecting $128.00			30,208.00	
Total Steel Bridges and Trusses				$ 42,628.08
Pile Trestles:				
12,000 Lin. Ft. Piling, driven	@ $ .28		$ 3,360.00	
260 M. F. B. M. Timber	@ 30.00		7,800.00	
5,600 Lbs. Iron	@ .06		336.00	
Total Pile Trestles				$ 11,496.00
Culverts:				
1,920 Cu. Yds. Concrete Masonry	@ $10.00		$ 19,200.00	
3,000 Cu. Yds. Earth Excavation foundation	@ .50		1,500.00	
520 Lin. Ft. Corrugated Pipe 18"	@ 3.65		1,898.00	
520 Lin. Ft. Corrugated Pipe 24"	@ 4.50		2,340.00	
260 Lin. Ft. Corrugated Pipe 30"	@ 5.55		1,443.00	
570 Lin. Ft. Corrugated Pipe 36"	@ 6.50		3,705.00	
Total Culverts				$ 30,086.00
Total Bridging				84,210.08

ELECTRIC FACILITIES.

26 Miles Third Rail	@	$4,000.	$104,000.00	
26 Miles Track Bonding and Road Crossings	@	†500.	13,000.00	
Total Electric Facilities				117,000.00

TRACK.

28½ Miles, 2687.14 Gross Tons, 60# Rails	@	$55.00	$147,792.70	
10,374 Prs. 60# Angle Bars	@	1.00	10,374.00	
264 Kegs 60# Track Bolts	@	10.00	2,640.00	
834 Kegs Track Spikes	@	88.00	6,672.00	
41,496 Nut Locks	@	10.00	414.90	
530 Joint Tie Plates, for 1½ Miles of Curves	@	.16	84.80	
7,570 Intermediate Tie Plates for 1½ Miles of Curves	@	.12	908.40	
16 Sets #10 Frogs and Switch Irons complete	@	160.00	2,560.00	
Total Track				$171,446.80

TIES.

16 Sets #10 Switch Ties, 62,224' B. M.	@	$20.00	$ 1,244.48	
76,950 Redwood Track Ties	@	.75	57,712.50	
Total Ties				$ 58,956.98

BUILDINGS.

5 Depots	@	$ 3,500.00	$ 17,500.00	
2 Warehouses	@	15,000.00	30,000.00	
4 Section Houses	@	1,200.00	4,800.00	
4 Bunk Houses	@	750.00	3,000.00	
Total Buildings				55,300.00
Stockyards:				
5 4-Pen	@	850.00		4,250.00
Fencing:				
26 Miles	@	1,500.00		39,000.00
Telegraph Line:				
26 Miles	@	350.00		9,100.00
Ballast:				
28½ Miles	@	1,200.00		34,200.00
Railroad Crossing:				
Southern Pacific, at Vacaville				500.00
Interlocking Plants:				
1 at Vacaville				20,000.00
Labor:				
Laying 16 Switches	@	45.00	720.00	
Laying and Surfacing 28½ Miles	@	1,500.00	42,750.00	
Total Labor				43,470.00
				$888,733.86
Engineering and Contingencies, 10%				88,873.39
TOTAL COST				$977,607.25

†$335 per mile for track bonding—$165 per mile for road crossings and miscellaneous.

WILLOTA TO SOSCOL.

*Estimated Cost of Proposed Branch Line.

			Miles		
Main Track			9.29		
Sidings			.71		
Total			10.00		
RIGHT OF WAY.					
9.2 Miles 100′ wide, 12 acres per mile	@	$250.00	$ 3,000.00		$ 27,600.00
GRADING.					
14,000 Cu. Yds. Solid Rock Excavation	@	$ 1.00	$ 14,000.00		
75,000 Cu. Yds. Loose Rock Excavation	@	.50	37,500.00		
165,000 Cu. Yds. Earth	@	.30	49,500.00		
52,000 Cu. Yds. Borrow	@	.30	15,600.00		
Total Grading					116,600.00
BRIDGING.					
Steel Bridges and Trusses:					None
Pile Trestles:					
4,200 Lin. Ft. Piling, driven	@	$ .28	$ 1,176.00		
92 M. F. B. M. Timber	@	30.00	2,760.00		
2,000 Lbs. Iron	@	.06	120.00		
Total Steel Bridges and Trusses				$ 4,056.00	
Culverts:					
700 Cu. Yds. Concrete Masonry	@	$10.00	$ 7,000.00		
1,100 Cu. Yds. Earth Excavation Foundations	@	.50	550.00		
180 Lin. Ft. Corrugated Pipe 18″	@	3.65	657.00		
180 Lin. Ft. Corrugated Pipe 24″	@	4.50	810.00		
92 Lin. Ft. Corrugated Pipe 30″	@	5.55	510.60		
200 Lin. Ft. Corrugated Pipe 36″	@	6.50	1,300.00		
Total Culverts				$ 10,827.60	
Total Bridging					14,883.60
ELECTRIC FACILITIES.					
9.2 Miles of Third Rail	@	$4,000	$ 36,800.00		
9.2 Miles of Track Bonding and Road Crossings	@	†500	4,600.00		
Total Electric Facilities					41,400.00

*West end of Northern Electric Suisun Branch to Napa Valley Electric Line connection.

†$335 per mile for track bonding—$165 per mile for road crossings and miscellaneous.

TRACK.

10.00 Miles, 942.86 Gross Tons, 60# Rail.	@	$55.00....	$ 51,857.30	
3,640 Pairs Angle Bars for 60# Rail...	@	1.00....	3,640.00	
92½ Kegs Track Bolts 3/4" x 4" for 60# Rail . . .	@	10.00....	925.00	
292½ Kegs Track Spikes . . .	@	8.00....	2,340.00	
14,560 Nut Locks (per thousand) . . .	@	10.00....	145.60	
176 Joint Tie Plates for ½ mile curves.	@	.16....	28.66	
2,524 Intermediate Tie Plates for ½ mile curves . . .	@	.12....	302.88	
4 Sets No. 10 Frogs and Switch Irons . . .	@	160.00....	640.00	
Total Track . . .				59,879.44

TIES.

4 Sets No. 10 Switch Ties, 15,556 F. B. M. . . .	@	$20.00....	$ 311.20	
27,000 Redwood Ties . . .	@	.75....	20,250.00	
Total Ties . . .				20,561.20

BUILDINGS.

2 Depots . . .	@	$ 3,500....	$ 7,000.00	
1 Warehouse . . .			15,000.00	
2 Section Houses . . .	@	1,200....	2,400.00	
2 Bunk Houses . . .	@	750....	1,500.00	
Total Buildings . . .				$ 25,900.00
Stockyards:				
2 4-Pen Stockyards . . .	@	$ 850....		1,700.00
Fencing:				
9.29 Miles . . .	@	1,500....		13,935.00
Telegraph Line:				
9.29 Miles . . .	@	350....		3,251.00
Ballast:				
10 Miles . . .	@	1,200....		12,000.00
Railroad Crossings:				
San Franisco, Napa and Calistoga Electric and Southern Pacific R. R. . . .	2 @	500....		1,000.00
Interlocking Plant . . .	2 @	15,000....		30,000.00
Labor on Track:				
Laying 4 Switches . . .	@	45....	$ 180.00	
Laying and Surfacing 10 miles of Track . . .	@	1,500....	15,000.00	15,180.00
				$383,910.24
Engineering and Contingencies, 10% . . .				38,391.02
TOTAL COST . . .				$422,301.26

*SOSCOL TO PETALUMA.

Estimated Cost of Proposed Branch Line.

		Miles		
Main Track		20		
Sidings		2		
Total		22		
RIGHT OF WAY.				
16 Miles of Right of Way	@ $1,600		$ 25,600.00	
4 Miles of Right of Way	@ 7,000		28,000.00	
Total Right of Way				$ 53,600.00
†GRADING.				
23,600 Cu. Yds. Solid Rock Excavation	@ $1.00		$ 23,600.00	
47,000 Cu. Yds. Loose Rock Excavation	@ .50		23,500.00	
142,000 Cu. Yds. Earth Excavation	@ .30		42,600.00	
225,000 Cu. Yds. Borrow	@ .30		67,500.00	
Total Grading				157,200.00
BRIDGING.				
Steel Bridges and Trusses (Napa River and Sonoma Creek)				
2,320 Cu. Yds. Concrete Masonry	@ $10.00		$ 23,200.00	
15,000 Lin. Ft. Piling, driven	@ .28		4,200.00	
44 M. F. B. M. Timber	@ 30.00		1,320.00	
550 Tons Bridge Steel	@ 128.00		70,400.00	
Total Steel Bridges and Trusses				$ 99,120.00
Pile Trestles:				
9,100 Lin. Ft. Piling, driven	@ .28		$ 2,548.00	
2,000 M. F. B. M. Timber	@ 30.00		60,000.00	
5,220 Lbs. Iron	@ .06		313.20	
Total Pile Trestles				62,861.20
Culverts:				
1,480 Cu. Yds. Concrete	@ $10.00		$ 14,800.00	
2,400 Cu. Yds. Earth Excavation foundations	@ .50		1,200.00	
400 Lin. Ft. Corrugated Pipe 18"	@ 3.65		1,460.00	
400 Lin. Ft. Corrugated Pipe 24"	@ 4.50		1,800.00	
200 Lin. Ft. Corrugated Pipe 30"	@ 5.55		1,110.00	
440 Lin. Ft. Corrugated Pipe 36"	@ 6.50		2,860.00	
Total Culverts				23,230.00
Total Bridging				185,211.20

*From Napa Valley Electric connection to Petaluma.
†Estimated on basis of 5 miles of ridge work and 15 miles of valley work.

ELECTRIC FACILITIES.

20 Miles Third Rail	@	$4,000....	$ 80,000.00	
20 Miles Track Bonding and Road Crossings	@	‡500....	10,000.00	
Total Electric Facilities				90,000.00

TRACK.

22 Miles, 2074.29 Gross Tons 60# Rail	@	$55.00....	$114,085.95	
8,088 Pairs 60# Angle Bars	@	1.00....	8,008.00	
203.5 Kegs 60# Track Bolts	@	10.00....	2,035.00	
643.5 Kegs Track Spikes	@	8.00....	5,148.00	
32,032 Nut Locks	@	10.00....	320.32	
352 Joint Tie Plates	@	.16....	56.32	
5,048 Intermediate Tie Plates	@	.12....	605.76	
6 Sets #10 Frogs and Switch Irons	@	160.00....	960.00	
Total Track				131,219.35

TIES.

6 Sets #10 Switch Ties, 23,334' B. M.	@	20.00....	$ 466.68	
59,400 Redwood Track Ties	@	.75....	44,550.00	
Total Ties				45,016.68

BUILDINGS.

4 Depots	@	$ 3,500....	$ 14,000.00	
2 Warehouses	@	15,000....	30,000.00	
3 Section Houses	@	1,200....	3,600.00	
3 Bunk Houses	@	750....	2,250.00	
Total Buildings				49,850.00
Stockyards:				
4 4-Pen	@	$ 850....		3,400.00
Fencing:				
20 Miles	@	1,500....		30,000.00
Telegraph Line:				
20 Miles	@	350....		7,000.00
Ballast:				
22 Miles	@	1,200....		26,400.00
Railroad Crossings:				
2 Southern Pacific Tracks				
1 Northwestern Pacific Track	@	500....		1,500.00
Interlocking Plants:				
3	@	15,000....		45,000.00
Labor:				
Laying 6 Switches	@	45....	$ 270.00	33,270.00
Laying and Surfacing 22 miles track	@	1,500....	33,000.00	$858,667.03
Engineering and Contingencies, 10%				85,866.70
TOTAL COST				$944,533.73

‡$335 per mile for track bonding—$165 for road crossings and miscellaneous.

FORESTVILLE TO HEALDSBURG.

Estimated Cost of Proposed Branch Line.

	Miles
Main Track	10.0
Sidings	1.5
Total	11.5

RIGHT OF WAY.

12 Miles—60′ Wide	@ $ 7,000.00		$ 84,000.00

GRADING.

175,000 Cu. Yds.	@ $ 0.30		52,500.00

BRIDGING.

Steel Bridges and Trusses (One 160′ span):				
700 Cu. Yds. Concrete Bridge Masonry	@ $ 10.00	$ 7,000.00		
4,536 Lin. Ft. Piling, driven	@ .28	1,270.08		
19 M. F. B. M. Bridge Timber	@ 30.00	570.00		
175 Tons Bridge Steel	@ 128.00	22,400.00		
Total Steel Bridges and Trusses			$31,240.08	
Pile Trestle:				
5,500 Lin. Ft. Piling, driven	@ $ 0.28	$ 1,540.00		
120 M F. B. M. Timber	@ 30.00	3,600.00		
2,600 Lbs. Iron	@ .06	156.00		
Total Pile Trestles			5,296.00	
Culverts:				
890 Cu. Yds. Concrete Masonry	@ $ 10.00	$ 8,900.00		
1,400 Cu. Yds. Earth Excavation in foundations	@ 0.50	700.00		
240 Lin. Ft. Corrugated Pipe 18″	@ 3.65	876.00		
240 Lin. Ft. Corrugated Pipe 24″	@ 4.50	1,080.00		
120 Lin. Ft. Corrugated Pipe 30″	@ 5.55	666.00		
264 Lin. Ft. Corrugated Pipe 36″	@ 6.50	1,716.00		
Total Culverts			13,938.00	
Total Bridging				50,474.08

ELECTRIC FACILITIES.

12 Miles Distributing System	@ $ 4,000.00	$48,000.00	
12 Miles Poles, Fixtures, etc.	@ 500.00	6,000.00	
Total Electric Facilities			54,000.00

TRACK.

11½ Miles—1084.29 Gross Tons, 60# Rail	@	$ 55.00	$59,635.95	
4,186 Pairs Angle Bars for 60# Rail	@	1.00	4,186.00	
107 Kegs Track Bolts for 60# Rail	@	10.00	1,070.00	
337 Kegs Track Spikes	@	8.00	2,696.00	
16,744 Nut Locks—per thousand	@	10.00	167.44	
352 Joint Tie Plates for 1 mile of curves	@	.16	56.32	
5,048 Intermediate Tie Plates for 1 mile of curves	@	.12	605.76	
8 Sets No. 10 Frogs and Switch Irons	@	160.50	1,280.00	
Total Track				69,697.47

TIES.

8 Sets No. 10 Switch Ties 31,112 F. B. M.	@	$ 20.00	$ 622.24	
31,050 Redwood Track Ties	@	.75	23,287.50	
Total Ties				23,909.74

BUILDINGS.

2 Depots	@	$ 3,500.00	$ 7,000.00	
1 Warehouse	@	15,000.00	15,000.00	
2 Section Houses	@	1,200.00	2,400.00	
2 Bunk Houses	@	750.00	1,500.00	
Total Buildings				25,900.00
Stock Yards: 3 4-Pen Stock Yards	@	$ 850.00		2,550.00
Fencing: 10 Miles	@	1,500.00		15,000.00
Telegraph Line: 10 Miles	@	350.00		3,500.00
Ballast: 11½ Miles	@	1,200.00		13,800 00
Railroad Crossing: Probably at both terminals 2	@	500.00		1,000.00
Interlocking Plants: Possibly at both terminals 2	@	15,000.00		30,000.00
Labor on Track: Laying 8 Switches	@	45.00	$ 360.00	
Laying and surfacing 11½ miles of track	@	1,500.00	17,250.00	17,610.00
				$443,941.29
Engineering and Contingencies, ten per cent				44,394.13
TOTAL COST				$448,335.42

ESTIMATED COST OF PROPOSED FREIGHT LINE AT VALLEJO.

	Miles
Main track	1
Sidings	1
Total	2

Right of Way.

Lands now owned by San Francisco, Napa & Calistoga and Northern Electric Railways separately, if combined in one holding, are sufficient to construct freight line and necessary yard.

75,000 cu. yds. grading @ 30c	$ 22,500
Bridging	5,000
Electric Facilities	9,000
Track	14,000
Ties	4,100
Warehouse	15,000
Ballast	2,400
Railroad Crossing	500
Interlocker Plant	15,000
Labor—Track	3,450
	$ 90,950
Engineering and Contingencies, ten per cent	9,095
TOTAL COST	$100,045

PETALUMA & SANTA ROSA RAILWAY.

(ANNUAL REPORT.)

Income Account.

	Year Ended December 31, 1916.	Increase over previous year.
Miles of Line	42.35	
Passenger Revenue	$ 78,614.75	**$10,450.47**
Freight Revenue	187,831.53	732.22
Other Transportation Revenue	3,283.44	394.64
Miscellaneous Railway Revenue	2,000.97	**272.13**
Total Operating Revenue	$271,730.69	**$ 9,595.74**
Operating Expenses	$195,302.28	**4,264.46**
Net Operating Revenue	$ 76,428.41	**$ 5,331.28**
Net Revenue from Auxiliary Operations	120.17	82.30
Total Net Revenue	$ 76,548.58	
Taxes	8,998.43	**674.40**
Operating Income	$ 67,550.15	**$ 4,574.58**
Non-Operating Income	113.85	
Gross Income	$ 67,664.00	$ 4,937.64
Interest	52,604.10	86.06
Net Income	$ 15,059.90	$ 4,851.58
Operating Ratio	71.87%	

Note: Bold face figures indicate decrease.

Capitalization.

Common Stock (authorized and issued)		$1,000,000.00
Retired	$ 5,900.00	
Outstanding	994,100.00	
Bonds—		
First Mortgage 5 per cent of March 1, 1904, to mature March 1, 1924		1,000,000.00
Actually issued	750,000.00	
Re-acquired and canceled	95,000.00	
Pledged to cover Demand Notes	80,000.00	
Second Mortgage 6 per cent of April 1, 1905, to mature April 1, 1917		250,000.00
Issued	217,000.00	
Pledged to Bank	33,000.00	
Demand Notes to various banks, no interest specified, to cover construction of branch lines. Secured by Bonds pledged, as above noted		59,600.00
Demand Note to bank for Current Expenses		7,000.00
Due to bank on demands for Sinking Fund		13,000.00

No proceedings before Railroad Commission with reference to Second Mortgage Bonds which matured April 1, 1917.

SAN FRANCISCO, NAPA & CALISTOGA RAILWAY.

(ANNUAL REPORT.)

Income Account.

	Year Ended December 31, 1916.	Increase over previous year.
Miles of Line	41.6	
Passenger Revenue	$188,836.92	**$13,250.33**
Freight Revenue	16,126.72	**1,995.13**
Other Transportation Revenue	6,288.59	566.41
Miscellaneous Railway Revenue	1,190.61	**611.84**
Total Operating Revenue	$212,442.84	**$15,300.89**
Operating Expenses	130,950.11	**16,950.71**
Net Operating Revenue	$ 81,492.73	$ 1,649.82
Taxes	11,391.33	351.33
Operating Income	$ 70,101.40	$ 1,298.49
Gross Income	70,101.40	1,298.49
Interest	67,105.53	**2,478.72**
Net Income	$ 2,995.87	$ 3,777.21
Operating Ratio	61.64%	

Note: Bold face figures indicate decrease.

Capitalization.

Common Stock		$2,000,000.00
Outstanding	$ 731,700.00	
Delinquent for non-payment of 1911 assessment	1,269,300.00	
Bonds—		
First Mortgage 6 per cent of December 1, 1911, to mature December 1, 1936.		
Authorized		1,000,000.00
Actually issued		600,000.00
Re-acquired after actual issue and canceled	20,800.00	
Outstanding	579,200.00	
Nominally but not actually issued—		
Held in Treasury unincumbered	14,000.00	
Pledged as collateral for notes	19,000.00	
Debenture 5 per cent of December 1, 1911, to mature December 1, 1936		610,000.00
Authorized actually issued	599,100.00	
Nominally but not actually issued	10,900.00	
Interest matured and unpaid on Debenture Bonds.		91,461.25
Six per cent Notes payable to Napa Banks		26,000.00

SACRAMENTO VALLEY.

This is the most important agricultural district in Northern California, the total area of agricultural land included within it being 3,449,000 acres, or 5,389 square miles. This area consists of 2,659,000 acres of valley agricultural land, which covers the portion within the main floor of the valley, and 790,000 acres of plains agricultural land, which lies between the valley floor and the foothills of the mountains inclosing the valley.

The present traffic movements to and from this district are very large, but they are small compared with those which are certain to result in the future from the improvements now being made.

A statement of the physical characteristics of the area and their relation to production is necessary to a proper understanding of the rail traffic situation.

Reclamation.

Within the floor of the valley there is a total area of 959,500 acres of land which is subject to temporary and intermittent overflow unless protected by levees. Adding to this the land in the San Joaquin Valley adjoining the lower end of the Sacramento, the total area subject to overflow is 1,291,027 acres.

This latter area may be classified as follows:

	Acres
Low river land reclaimed, or in process of reclamation	595,731
Low lands entirely unreclaimed	160,600
Higher lands, partly protected, over which floods pass in the absence of protection	149,600
Higher lands, over which floods pass, but on which the water does not remain	182,785
Waste land in by-passes and overflow channels	202,311
	1,291,027

It appears from this statement that whenever the rich alluvial lands of this district are protected from overflow there will be added to the producing area 695,296 acres. (Total area below flood plane, less land reclaimed and in process of reclamation). The value of the annual production of this added area will be approximately $30,000,000.

The reclamation of overflowed lands has been undertaken heretofore by private individuals, corporations and reclamation districts acting independently. As all of the reclamation areas are interdependent, many ill effects have resulted from the lack of co-operation between these independent agencies of reclamation. In some districts the levees have been unwisely planned and must be reconstructed in part; in a few instances no reasonable expenditure that is economically possible can adapt the levees to a comprehensive plan applying to the whole territory. At some points levees have been located so that they narrow the river, or overflow channels to such an extent that rupture of the levees is inevitable.

To cure these evils a State Board of Reclamation was appointed some years ago. It has police powers in directing private reclamation so that it may not interfere with flood control or injure the safety of existing reclamations. Plans for new levees or for the reconstruction of old ones must now receive the approval of this Board before the work is undertaken. It has jurisdiction over bridges and other works which might interfere with flood control or endanger reclamation structures. This jurisdiction extends over both the main rivers and their tributaries.

The plan that has been adopted for flood control of the Sacramento River is the result of co-operation between the engineers of the War Department and of the State of California The essential features of the plan are stated in the Report of the Reclamation Board of California for 1916 as follows:

> "The problem of flood control of the Sacramento River involves caring for a maximum flood flow six times as great as the extreme capacity of the river below Sacramento City; and the by-pass system has been declared by the engineers to be the only feasible solution. The plan contemplates retaining within the river channel all the waters that channel can safely carry, by maintaining, on or near the river banks, strong levees or dikes. The excess is to be discharged in flood season, at convenient points, over four weirs, into by-passes, within which it will be conveyed through the basins to a junction with the river, fifteen miles above its mouth. From that point the

river is to be widened and deepened sufficiently to carry the full flood. (The by-passes referred to are simply strips of land within the low basins, the water being confined in its flow over them by levees on each side.)"

The accompanying map with the title, "Flood Control Project, Sacramento River," will make clear the general features of the plan.

The following table shows the progress that has been made in constructing flood control works:

RIVER LEVEES.

		Miles
River levees contemplated by the project..		519.42
Constructed up to approved grade.....	79.59	
Constructed, but not up to standard.....286.35		
In course of construction.....	18.65	
Projected	5.89	
Unprovided for	55.68	
Data lacking	73.26	
		519.42

BY-PASS LEVEES.

By-pass levees contemplated by the project.		193.71
Constructed up to approved grade.....	9.47	
Constructed but not up to standard.....	20.39	
In course of construction.....	40.10	
Projected	25.38	
Unprovided for	74.37	
Not yet located (Butte Basin).....	24.00	
		193.71

It is the largest project of its kind at the present time in the country west of the Missouri River.

It is apparent from this statement that much has been accomplished in flood control, and while much remains to be done the final completion of the project in its entirety with the next few years may be reasonably expected.

*Irrigation.

The Sacramento Valley has a wet and a dry season. The rainfall is greatest in the northern portion of the valley. The average annual precipitation is 24.9 inches at Red Bluff and 14.5 inches at Stockton. It is apparent from this that the area is semi-arid.

*The "Irrigation Map of Northern California," and the map showing the "Irrigation and Reclamation Districts of Sacramento Valley," both of which appear in the book of maps accompanying this report, will be found of interest in connection with this discussion.

The rainy season embraces the period from November to March usually, though at times it extends from September to June. The rainfall is well distributed through these months. Crops which mature in the Summer, such as grain and hay, may be successfully grown; fruit crops which mature in the late Summer and Fall suffer from lack of moisture, as the soil cannot retain a sufficient supply of the Winter precipitation to carry them through the protracted rainless period. Irrigation is therefore essential to intensive cultivation in all parts of the valley, and even for the growing of grain and hay crops in the southern portion of it.

Hardy vegetables are not affected in any part of the valley by freezes during the Winter months. Late Spring freezes are rare and damage to early blooming fruit seldom occurs in areas of good air drainage; such crops as almonds, cherries and apricots are most affected by late Spring freezes.

Although the soil and climate of the valley are suited to the growing of fruits, vegetables and other highly specialized industries, the production of grain by dry farming is the prevailing type of agriculture through lack of irrigation. Barley is the most important grain crop, the annual production being from 6,000,000 to 8,000,000 bushels.

The latest Government survey of the valley shows that in 1913 the areas under irrigation in the valley aggregated 123,500 acres.

The map of the Sacramento Valley accompanying this report shows 9 irrigation projects with a capacity for watering 578,560 acres. It must be remembered that, while these irrigation works are *designed* to serve this large acreage, the amount actually under irrigation is very much less. It is not possible to state with accuracy the area of land now irrigated, although it is undoubtedly larger at this time than is indicated by the Government survey of 1913.

The Irrigation Manager of the United States Department of Agriculture, in summarizing the irrigation needs and re-

sources of the valley, states that, "The irrigable area of the valley probably approximates 2,500,000 acres. It is believed that this area can be considered fit for irrigation and that water for irrigation is now or will be made available to it."

It is idle to speculate on what the production of the Sacramento Valley will be when this immense area is under irrigation, but it is certain to be enormous and will furnish a volume of business for railroad transportation far beyond the capacity of existing railroad facilities. The facts in regard to rice culture in the northern portion of the valley will serve to illustrate the possibilities in the way of production when irrigation shall have been accomplished.

After experimenting for several years, 5,000 acres were planted with rice in 1913. The average yield for that year was 4,000 pounds per acre, which sold for about 2 cents per pound (the present price is much higher owing to the abnormal condition prevailing in all food markets). The area planted with rice during the present year is reported as 78,000 acres

The Agronomist of the United States Department of Agriculture reports that more than 200,000 acres of the land in the valley heretofore considered worthless for any purpose other than pasturage is peculiarly well adapted to rice culture, which requires a level surface, a high lime and humus content of the soil and a heavy, compact subsoil to prevent the water from escaping by percolation during the necessary flooding.

The significance of this fact for a transcontinental railroad is that in the near future there will be from 350,000 to 400,000 tons of rice to move to market, a large part of which will go by rail to points in the central, southern and eastern states.

The extent of the production of fruit, grapes and grain in the Sacramento Valley Counties is shown by the following tabulation. The acreages of fruit and grapes are those reported by the Horticultural and Vitacultural Commissions; of grain those reported by the State Board of Equalization in 1916:

PRODUCTION OF SACRAMENTO VALLEY COUNTIES.

County	Fruit (Acres)	Grapes (Acres)	Wheat (Acres)	Oats (Acres)	Barley (Acres)
Butte	20,000	600	16,200	3,000	15,700
Colusa	10,875	1,100	40,000	1,000	180,000
Glenn	11,553	50	3,500	600	52,475
Placer	19,644	2,500	18,250	7,500	9,500
Sacramento	20,989	20,000	35,000	34,000	43,000
Solano	20,151	3,000	140,000	20,000	200,000
Sutter	12,600	4,500	9,014	2,299	15,872
Tehama	10,145	2,000	58,780	4,750	50,175
Yolo	13,155	5,000	8,045	450	97,500
Yuba	6,720	400	29,000	9,000	75,000
	145,892	39,150	357,789	82,599	739,222

On the basis of three tons per acre for fruit and 0.75 tons per acre for grain, the tonnage of these commodities produced in the above counties annually at this time is practically 1,400,000.

The most important cities and towns in the valley are:

	Population
Sacramento	75,000
Woodland	5,000
Roseville	4,500
Marysville	6,000
Yuba City	1,700
Colusa	2,000
Oroville	3,300
Chico	6,200
Willows	3,000

The principal industries are those connected with the packing, drying and canning of fruit and vegetables, milling grain, and, to a smaller extent, manufacturing wine. Near Sacramento are two large plants manufacturing clay products. At Marysville there is a large plant which manufactures and repairs dredges and other gold-working machinery. At Chico is located a plant of the Diamond Match Company. At Hamilton, near Chico, is a large beet sugar plant which is to be placed in operation this year after having been idle for some time.

The important outbound transcontinental traffic consists of green deciduous fruit, dried fruit, nuts and olives, rice, barley, beans, hops and alfalfa meal. The important outbound traffice to points in California consists of the same commodities,

with grain, hay and live stock added. The inbound traffic consists of coal, oil, lumber and building material, box shooks, and material required for preparing the fruit and vegetables for shipment, automobiles, agricultural implements, grain from Western states for mixing with California wheat, and merchandise.

The mileage of the various railroads moving the traffic of the Sacramento Valley Counties is as follows:

SACRAMENTO VALLEY—EAST SIDE.*

County	Western Pacific (mileage)	Northern Electric (mileage)	Southern Pacific† (mileage)	Miscellaneous (mileage)
Butte	54.74	45.77	90.77	
Placer		1.32	151.80	17.12**
Sacramento	33.68	21.16	138.97	31.97††
Sutter	16.48	44.67	37.14	
Yuba	24.47	14.17	29.35	
	129.37	127.09	448.03	49.09

*East of Sacramento River.
†A very considerable part of the Southern Pacific mileage in Butte and Placer Counties lies in the Sierras.
**Nevada County Narrow Gauge, 3.62; and Lake Tahoe Railway Company, 13.50.
††Central California Traction.

SACRAMENTO VALLEY—WEST SIDE.*

County	Western Pacific (mileage)	Northern Electric (mileage)	Southern Pacific (mileage)	Miscellaneous (mileage)
Colusa		9.34	73.18	
Glenn		4.88†	64.68	
Solano		14.92	117.08	49.66**
Yolo		17.17	94.86	17.89††
	None	46.31	349.80	67.55

*West of Sacramento River.
†Not operative.
**Oakland, Antioch & Eastern, 30.09; San Francisco, Napa & Calistoga, 4.31; Sacramento Valley Electric, 11.70.
††Oakland, Antioch & Eastern, 16.39; Westside Railroad, 1.50.

It will be noted from this statement that the western portion* of the Sacramento Valley, north of Solano County, is served almost wholly by the Southern Pacific, the exception being three branch lines† of the Northern Electric reaching towns located on, or near, the west bank of the Sacramento River.

*The portion west of the Sacramento River.
†The three branch lines are the Woodland Branch; part of the Marysville and Colusa Branch; part of the line from Chico to Hamilton.

The Eastern side of the valley is served by the WESTERN PACIFIC, Northern Electric and Southern Pacific. The WESTERN PACIFIC, is located generally along the eastern boundary of the Sacramento Drainage District—the flood control district—from Sacramento to a point about midway between Marysville and Oroville.

From Sacramento to a point 30 miles north its line lies along the eastern boundary of Reclamation Districts Nos. 1,000 and 1,001, owned by the Natomas Consolidated Company.** The levees for the protection of this district were completed in 1916 and the first crop will be produced in 1917. The area of these two districts is 88,000 acres and their production will add materially to the traffic of the WESTERN PACIFIC and Northern Electric. North of these districts, and extending to Marysville, a distance of 15 miles, is Reclamation District No. 784, with an area of 23,700 acres. The levees for the protection of this district have been completed, or are in course of construction, except for a length of 9 miles along the east bank of the Sacramento River. This latter work will undoubtedly be undertaken immediately in order to obtain the benefit of the large expenditure heretofore made on the levees which have been constructed.

Reclamation District No. 10 lies on the east side of Feather River, between it and the WESTERN PACIFIC, extending from Marysville northward a distance of 10 miles. Its area is 15,000 acres. The levees for the protection of the district are in course of construction. As the eastern boundary of this district is the roadbed of the WESTERN PACIFIC main line, that railroad should obtain all of the traffic from it.

To summarize the preceding paragraph, the territory along the WESTERN PACIFIC main line from Sacramento north for a distance of 55 miles, which has heretofore been barren, will be productive from this time on and will eventually yield a very large tonnage of agricultural products, the movement of

**Shown on Map of Irrigation and Reclamation Districts as (28) and (29).

which will materially increase the traffic of the WESTERN PACIFIC. The producing area that will be added to its territory through reclamation of lands lying below the flood plane will be 126,700 acres, 103,000 of which will begin to produce crops this year and the balance in the immediate future.

The sketch map on the opposite page shows that the Northern Electric practically parallels the WESTERN PACIFIC between Sacramento and Marysville, a distance of 40 miles. The main lines are less than two miles apart at the point of greatest divergence. Between these two cities the lines cross each other at two points; first, just north of Sacramento, and, second, 10 miles north of that city. Within the limits of Marysville the lines cross each other twice.

The Northern Electric crosses the Feather River, which flows between Marysville and Yuba City. Its main line then turns abruptly and runs due north on the west side of the Feather River to Tres Vias, 5.5 miles west of Oroville, which is located on the east bank of the Feather River. The Southern Pacific crosses the Feather River just north of Marysville and runs in a practically straight line northwest to Chico, crossing the Northern Electric at Live Oak, distant 13 miles from Marysville.

It is apparent from this statement that between Sacramento and Marysville the Northern Electric and the WESTERN PACIFIC are parallel and competing lines for the traffic of the territory traversed. At the present time there is very little railroad traffic within the territory except that moving between the cities of Marysville and Sacramento. The Southern Pacific also has a line between Sacramento and Marysville, via Roseville, which terminates in Oroville. The significance of this third line lies in the fact that the consolidation of the Northern Electric with the WESTERN PACIFIC would not deprive the Cities of Sacramento and Marysville of competitive railroad service on interurban traffic.

North of Marysville the Feather River lies between the Northern Electric and the WESTERN PACIFIC main lines. There are no highway bridges over the Feather River between Marysville and Oroville. Between those two cities the Northern Electric and the WESTERN PACIFIC serve two distinct territories divided by the Feather River. The WESTERN PACIFIC cannot serve the territory west of the river unless it acquires the Northern Electric, or constructs a line practically paralleling it. In this territory the Northern Electric and the Southern Pacific compete for the railroad traffic. If the Northern Electric were acquired by the WESTERN PACIFIC there would still be rail competition in the territory west of Feather River and between the Cities of Marysville and Oroville on the east side of that river.

From Tres Vias (5.5 miles west of Oroville) the Northern Electric runs northwest to Durham, a station on the Southern Pacific; thence to Chico it parallels that road. Between Marysville and Chico the two lines are five miles apart at the point of greatest divergence (Tres Vias).

The Northern Electric has four branches, viz., the Oroville Branch, the Hamilton Branch, the Marysville and Colusa Branch, and the Woodland Branch. There is also an isolated line, located in the southwestern corner of the Sacramento Valley, extending from (near) Cordelia through Fairfield to Vacaville, with a line to the water front at Suisun.

The Sacramento Terminal Railroad is a part of the Northern Electric, and provides a freight connection between the main line and the Woodland Branch.

The Hamilton Branch, 11.08 miles long, extending from Chico to Hamilton, was constructed to reach the sugar beet plant at the latter point. This branch crosses the Sacramento River 5.25 miles west of Chico. To avoid the large expenditure required for the construction of a permanent bridge over the river a pontoon bridge was used. The sugar beet plant has not been operated for some time and the pontoon bridge

has been removed so that part of the branch west of the river, 5.83 miles, is at present non-operative property. As the sugar plant is to resume operation this year, the whole of the branch will probably become operative property.

The following is a statement of the mileage of the Northern Electric:

NORTHERN ELECTRIC RAILWAY.

MILEAGE OPERATED.*

	Main Track	Second Track	Other Tracks	Total Tracks
Main Line	91.507	4.202	30.696†	126.405
Oroville Branch	5.531		2.715	8.246
Hamilton Branch	5.248		.584	5.832
Suisun Branch	14.922		2.126	17.048
Sacramento Terminal R. R.	5.725		.300	6.025
Woodland Branch	17.111		2.344	19.455
Colusa Branch	22.203	1.094	3.149	26.446
Total System Mileage	162.247			
Total Double Track Mileage		5.296		
Total Other Track Mileage			41.914	
Total Track Mileage				209.457

NONOPERATIVE MILEAGE.

Hamilton Branch	5.834		0.668	6.502
Total of all Mileage	168.081	5.296	42.582	215.959
Joint Ownership Mileage	2.923	.074	1.804	4.801
Sole Ownership Mileage	165.158	5.222	40.778	211.158

*Tracks of Oakland, Antioch & Eastern Railway and West Side Railroad, which are used, but in which no interest is held, are not included. (This amounts to about 3,000 feet of track south of Reed Orchard.)

†Mileage 1.848 included, lying between Sacramento and Woodland, in Yolo County. (This is line to Reed Orchard Tract near Sacramento and track on Second Street in Woodland.)

If the Northern Electric and its four branches (the isolated Suisun Branch is not included in this statement) were made a part of the WESTERN PACIFIC it would contribute to the tonnage and revenue of that System the following:**

FREIGHT EARNINGS.

30,869 Tons of Interstate Outbound Traffic	$202,457
38,187 Tons of Intrastate Outbound Traffic	278,903
30,685 Tons of Inbound Traffic	164,820
	$646,180

**This is shown in detail in the traffic statement headed, "Sacramento Valley, Northern Electric—Southern Pacific Territory," at the conclusion of this section.

The passenger train and miscellaneous revenue of the Northern Electric in 1916 was $490,243. Deducting the passenger and miscellaneous earnings† of the Suisun Branch (14.92 miles long) on a mileage prorate basis, the earnings of the balance of the system were $445,216.

The total amount which the operation of the Northern Electric system—excepting the Suisun Branch—would add to the gross revenue of the WESTERN PACIFIC, if owned by that system, would be at the present time:

Freight revenue	$646,180
Less present interchange of traffic	127,076
	$519,104
Passenger and Miscellaneous Revenue	445,216
	$964,320

On the basis of an operating ratio of 72 per cent. and taxes 5¼ per cent. of gross revenue, the income account for this feeder system would stand at the present time.

Gross revenue	$964,320
Net revenue 28% of gross	270,010
Taxes 5¼% of Gross Revenue	50,627
Available for fixed charges and surplus	$219,383

In the five-year period 1909-1914* the freight earnings of the Northern Electric increased from $1216 per mile in 1909 to $2118 in 1914, the increase being 74 per cent.; during the same term the passenger and miscellaneous revenue increased from $2673 per mile to $3908 per mile, the increase being 46 per cent. The rate of increase has been quite uniform, especially in freight earnings, during the period. These percentages of increases are a conservative basis for estimating the increase in traffic during the next five-year period following 1917. When applied to the statement of revenue shown

†Earnings of Suisun Branch $\frac{14.9}{162.2}$ of $490,243 total passenger and miscellaneous earnings.

*Earnings for 1915 and 1916 were below normal on account of the Colusa Branch being closed for four months in each of those years. The earlier period is used as showing more nearly the normal ratio of increase.

above, the revenue at the end of the fifth year would be as follows:

Freight Revenue	$997,249†
Passenger Revenue	650,015
	$1,647,264

Applying an operating ratio of 69 per cent. and taxes at 5¼ per cent. of gross revenue, the net revenue would be as follows:

Gross Revenue	$1,647,264
Net Revenue 31% of gross	510,652
Taxes 5¼% of Gross Revenue	86,481
Available for Fixed Charges and Surplus	$424,171

The average annual amount available for interest and surplus which will be added to WESTERN PACIFIC net earnings if it owns the Northern Electric, during the five-year period 1917-1922, will be $327,285.

The investment value of the Northern Electric cannot be properly determined by capitalizing this sum at a rate that may be considered as affording a fair return on the investment, for the reason that a part of the existing property of the WESTERN PACIFIC is employed in earning the sum stated as being added to WESTERN PACIFIC revenue if the Northern Electric were acquired by it.

As stated in the description of its location and as clearly shown on the accompanying map entitled, "Flood Control Project, Sacramento River," the WESTERN PACIFIC main line lies at the extreme eastern limit of the valley lands which are being rapidly reclaimed between Sacramento and Oroville, the latter being the point where it enters the Sacramento Valley.

Betweeen Maryville and Oroville it can draw traffic only from the territory lying between its main line and the Feather River, a comparatively narrow strip. The topography of the country requires a line on thc west side of the Feather River to secure the traffic of the territory lying between that river and the Sacramento River.

†This is 174% of present earnings, less present interchange $127,076.

The Northern Electric serves this territory better as a competitor of the Southern Pacific than any other line can serve it. If the WESTERN PACIFIC is to secure any considerable amount of traffic in this district, it must either buy the Northern Electric or practically parallel it by a newly constructed line of its own. At present prices of material and labor such a parallel line would cost more than $40,000 per mile. There is no doubt that the Northern Electric may be acquired at a lower cost per mile than this.

Its present system consists of 162.247 miles of main line and branches, all of which will serve as beneficial feeder lines for the WESTERN PACIFIC, except 35 miles of its main line extending south from Marysville to a point 10 miles north of Sacramento. This portion of its main line, it will be remembered, is within two miles of the WESTERN PACIFIC main line for this entire distance and will not serve that SYSTEM beneficially. The remaining 127.25 miles would be of value to the WESTERN PACIFIC and is essential to any feeder system designed to serve the Sacramento Valley from its eastern boundary to the Sacramento River.

At $25,000 per mile, the unit cost used in valuing the Suisun Branch, the value of the entire Northern Electric System of 162.247 miles is $4,056,175.

On the basis of 127.25 miles of the electric line, which would serve the WESTERN PACIFIC beneficially, the price per mile, at $4,056,175 for the entire property, would be $31,875. The property may be acquired for less but the WESTERN PACIFIC can better afford to pay that amount than build a parallel line which would cost more and could not earn as much as the Northern Electric System would do as a part of the WESTERN PACIFIC because the business of the territory would be divided between three companies, the Southern Pacific, Northern Electric and WESTERN PACIFIC, instead of two if the second named road is absorbed.

In connection with the question of the acquisition of the electric system by the WESTERN PACIFIC the attitude of the California Railroad Commission must be considered. If it developed upon inquiry that the control of the Northern Electric by the WESTERN PACIFIC deprived the public of competition in the territories served by them, the commission would undoubtedly deny the application of the WESTERN PACIFIC for permission to acquire the property.

As indicated in the preceding discussion, all of the territory in the Sacramento Valley east of the Sacramento River will still have competitive service after its acquisition. In fact, the territory lying west of the Feather River will have actual in lieu of the nominal rail competition which now exists.

Further, upon proper presentation of the matter to the Railroad Commission, it might allow the present 35 miles of the line of the Northern Electric lying between Marysville and 10 miles north of Sacramento to be taken up, as the public would derive no benefit from having two rail lines in identical territory under existing conditons. The rails released by the abandonment of this 35 miles could be well employed in extending the Woodland Branch to the Suisan Branch at Vacaville and extending this latter branch west, as described in a preceding discussion of the Vacaville, Napa and Sonoma County districts. To take up track from a location where it does not serve the public beneficially and place it in a territory which is now served by only one through line (such as the Vacaville district), should certainly appeal to the Commission. If the application for such permission is accompanied by a promise to construct equal mileage serving the State more beneficially, there should be little doubt of obtaining the assent of the Commission to the plan outlined.

None of the interurban electric lines in Central and Northern California, excepting those controlled by the Southern

Pacific, are earning a fair return on the capital invested in them; in fact, none of them are able to meet taxes, fixed charges and the requirements of the amortization clauses of their mortgages. In view of this fact, a comparison of their operation under present conditions with that under conditions existing when they shall have become feeder lines for such a system as the WESTERN PACIFIC is pertinent.

The California Railroad Commission reports the reproduction cost of the Northern Electric System, as of 1915, at $54,422 per mile. It could not be reproduced *exactly* as it now exists for less than that amount, at prices current in 1917. The rail, copper and equipment, if placed on the market to-day, could be readily disposed of at a price exceeding $3,000,000, on the basis of second-hand material.

In spite of the value of its physical property, considered as such, and its cost to those who have constructed it, this system can never become a valuable property if operated as a local railroad. The freight and passenger rates, which, in the main, are fixed by commercial and competitive transportation conditions, preclude it.

The principal markets of the territory which it serves are San Francisco and Oakland, in California, and that territory known as Transcontinental, which extends roughly from a north and south line drawn through Denver to the Atlantic Seaboard. On the greater part of the traffic of its territory the length of its hauls are much less than the hauls of its rail connections. Operated as an independent line, it must accept the division of rates which its stronger connections are willing to allow it. It can have no voice in the matter of such divisions.

The effect of this condition on its earnings is illustrated by a condition existing in the Vacaville District at a small station near the eastern terminus of the Suisun Branch. In 1916, 606 cars of fruit were shipped to eastern markets from Willota, a station on this branch. The Northern Electric

performed practically a switching service in transferring the cars from the packing plant on its line to the Southern Pacific, and that system allowed it a rate averaging $13 per car. If the Suisun Branch had been connected with and belonged to the WESTERN PACIFIC that system would have obtained a revenue of $117.78 per car for its portion of the total haul. The total earnings of the Northern Electric on the shipment of 606 cars was $7,878; the earnings on the shipment had this branch belonged to the WESTERN PACIFIC would have been $71,375.

In practically all of the Sacramento Valley territory the Northern Electric competes with the Southern Pacific for the traffic to transcontinental territory. In competing for this traffic it labors under the serious handicap of all local lines. Why should a shipper give the Northern Electric such business when the Southern Pacific can haul it from the local station well on toward its destination, and give the shipper better service?

The electric line has not the car supply that is available on a large system. It must usually obtain cars from its connections and these connections will usually serve their own shippers first and those of the connecting line afterwards. In case of loss and damage claims, or of delays in transit the shipper prefers dealing with the large system, which performs a large part of the total haul, rather than the local road, which is weak in prosecuting claims against the larger systems with which it connects and in demanding first-class service of them as to time in transit.

In competing for the traffic between the territory it serves and San Francisco and Oakland the Northern Electric is also at a disadvantage. It relies at the present time principally on the Oakland, Antioch & Eastern and the Sacramento River steamers as connections at Sacramento in moving this traffic.

On traffic from Oakland to Chico a shipment over the Southern Pacific leaves Oakland at 10:15 P. M. and arrives at Chico at 2:55 P. M. the following day. A shipment between the same two points by the electric lines leaves Oakland over the Oakland, Antioch & Eastern at 6:30 P. M., reaching Sacramento at 7:30 A. M. It leaves Sacramento over the Northern Electric at 8:30 P. M. and arrives at Chico the following morning at 7:00 , that is, the day following the one on which the Southern Pacific makes delivery.

It is possible, of course, to arrange the schedules of the two electric lines to give better service if there is sufficient traffic to justify it, which is doubtful.

The conditions just recited exist as to practically all of the business between the territory under discussion and Oakland —San Franciso.

Further, the freight stations of its connections at Oakland and San Francisco are not as favorably located as are those of the Southern Pacific.

An analysis of the outbound freight traffic of the Northern Electric for 1915 reflects the conditions here mentioned. The carload traffic for that year consisted of:

	Tonnage	Revenue
*Interline	19.6%	30.9%
Local	80.4%	69.1%

*Tonnage received from or delivered to connecting lines.

This means that 80 per cent. of the present freight traffic of this System is interchange between stations located on the System and only 20 per cent. between the System and connecting lines.

This is the normal condition for a local line independently operated in competitive territory. The respective proportions of local and interline would probably be reversed if the electric system were operated as a feeder for a transcontinental system.

A statement of these conditions justifies beyond reasonabe doubt two conclusions, viz:

The Northern Electric cannot be profitably operated as an independent local system.

The Northern Electric will certainly be a valuable feeder for such a transcontinental system as the WESTERN PACIFIC.

The following is a detailed estimate of the total freight tonnage and revenue of that portion of the Sacramento Valley served by the Northern Electric (except the Suisun Branch) and the portion of such traffic which would be added to the WESTERN PACIFIC if the electric line were owned and operated by it:

SACRAMENTO VALLEY.

NORTHERN ELECTRIC-SOUTHERN PACIFIC COMPANY TERRITORY.

Estimated Revenue.

INTERSTATE OUTBOUND (Eastern.)

					Western Pacific Proportion.	
				Total Revenue.	Tonnage.	Revenue.
Green Deciduous Fruit.	827 Tons	@$	9.06	$ 7,493	802	$ 7,266
Dried Fruit	12,860 Tons	@	7.90	101,594	7,023	55,482
Canned Goods	2,715 Tons	@	5.74	15,584	1,357	7,789
Almonds	1,205 Tons	@	9.06	10,917	772	6,994
Oranges	425 Tons	@	9.06	3,850	425	3,850
Olives	129 Tons	@	7.90	1,019	129	1,019
Rice	22,536 Tons	@	5.06	114,032	9,147	46,283
Hops	1,800 Tons	@	6.96	12,528	1,650	11,484
Beans	6,099 Tons	@	5.94	36,228	5,569	33,080
Barley	1,970 Tons	@	4.60	9,062	1,970	9,062
Wool	35 Tons	@	5.94	208	25	148
Diamond Match Co.	1,000 Cars			Not known		
Add to Western Pacific portion 100 cars outbound as portion of Diamond Match Company business					2,000	20,000
Total Interstate Outbound					30,869	$202,457

INTRASTATE OUTBOUND (California).

					Western Pacific Proportion.	
				Total Revenue.	Tonnage.	Revenue.
Grain	35,020 Tons	@$	2.25	$80,145	16,855	$37,924
Hay	17,200 Tons	@	1.50	25,800	7,410	11,115
Rice	16,061 Tons	@	3.50	56,213	7,768	27,188
Cannery Fruit	4,090 Tons	@	1.50	6,135	640	960
Wine Grapes	1,380 Tons	@	1.00	1,380	645	645
Sugar Beets	2,500 Tons	@	1.00	2,500	2,500	2,500
Pumpkins	80 Tons	@	1.00	80	32	32
Cattle	330 Cars	@	42.00	13,860	183	7,686
Broom Corn	210 Tons	@	5.00	1,050	158	790
Ice	1,500 Tons	@	1.00	1,500	600	600
Scrap Iron	630 Tons	@	1.50	945	240	360
Waste Paper	300 Tons	@	1.00	300	120	120
Wood	50 Tons	@	1.00	50	20	20
Hides	31 Tons	@	2.00	62	31	62
Millstuff	1,390 Tons	@	2.72	3,781	640	1,741
Dried Fruit	533 Tons	@	2.60	1,386	266	692
Machinery	25 Tons	@	2.00	50	20	40
Outfits	15 Tons	@	2.00	30	10	20
Household Goods	15 Tons	@	25.00	375	12	300
Sheep	37*Cars	@	33.50	1,239	37	cars 1,239
Northern Electric Local Outbound						184,869
Total Intrastate Outbound					38,187	$278,903

*425 tons for this item.

INBOUND.

				Total Revenue.	Western Pacific Proportion. Tonnage.	Revenue.
Box Shooks	300 Tons	@	$ 4.15	$ 1,245	150	$ 623
Lumber	5,900 Tons	@	4.20	24,780	3,175	13,335
Iron and Steel	300 Tons	@	4.25	1,275	120	510
Cement	1,525 Tons	@	1.20	1,830	770	924
Plaster	200 Tons	@	1.20	240	100	120
Brick	100 Tons	@	2.00	200	50	100
Rock, Sand and Gravel	34,200 Tons	@	0.30	10,260	14,150	4,245
Automobiles	770 Tons	@	23.40	18,018	338	7,909
Agricultural Implements	470 Tons	@	12.58	5,913	233	2,931
Tractors	99 Tons	@	5.45	540	55	300
Oil	12,960 Tons	@	3.35	43,416	6,070	20,334
Coal	2,320 Tons	@	3.95	9,164	1,175	4,641
Flour	1,680 Tons	@	1.75	2,940	840	1,470
Feed	755 Tons	@	1.75	1,321	386	675
Millstuff	1,800 Tons	@	1.75	3,150	720	1,260
Bags	150 Tons	@	5.50	825	60	330
Grain	1,200 Tons	@	2.25	2,700	675	1,519
Hay	24 Tons	@	1.50	36	18	27
Potatoes	105 Tons	@	3.60	378	79	284
Beer	1,125 Tons	@	5.50	6,187	529	2,910
Ice	1,120 Tons	@	1.00	1,120	790	790
Box Board	1,200 Tons	@	5.50	6,600	480	2,640
Cans	150 Tons	@	7.90	1,185	75	592
Miscellaneous	3,250 Tons	@	6.00	19,500	1,500	9,000
Diamond Match Co.*	1,000 Cars		.....	Not known	2,000	20,000
Livestock	34 Cars	@	42.00	1,428	390	1,071
Population (not included above)	7,000	@	8.00	56,000	†5,730	22,920
Inbound at Northern Electric Stations (not included above)						43,360
Total Inbound					30,685	$164,820
Grand Total Outbound and Inbound					99,741	646,180

*Western Pacific portion 100 cars at $200.00.
†Western Pacific portion of population 2,865 at 2 tons per capita.

WEST SIDE OF SACRAMENTO VALLEY.

The territory west of the Sacramento River between Woodland and Orland is served only by the Southern Pacific, except at Colusa, which is reached by a branch of the Northern Electric. The district is from 15 to 20 miles wide and 90 miles long, and its principal present production is grain, hay and cattle. Generally speaking, it is a dry farming district. The exceptions to this latter statement are the fruit district in and adjacent to Orland, where about 14,000 acres of land are served by the Stoney Creek Irrigation Project; the rice districts of Glenn and Colusa Counties, in which 26,000 acres are being irrigated this year, and about 5,000 acres of fruit and alfalfa near Hamilton, Willows and Maxwell.

While the irrigation project generally known as the Kuhn Project is designed to irrigate 225,000 acres of land, the area actually watered by it this year is 31,000 acres.

As shown in the accompanying traffic estimate, the entire freight revenue of the territory, including Corning, to the north, is $483,069, and the length of the Southern Pacific, which serves it, 106 miles. The freight earnings of the line are therefore $4,557 per mile of railroad.

A railroad newly constructed into this territory could not hope to do better than divide the traffic equally with the Southern Pacific, which has been carrying it for many years. The freight revenue of such a railroad would therefore not exceed $2,278 per mile immediately after its construction. As the population is not dense, the earnings from passenger revenue would be small. With such a slender gross revenue, the new line would certainly operate at a deficit. The total revenue from its transcontinental business, allowing all of the revenue accruing west of Salt Lake, would be $107,689, or at the rate of about $1,000 per mile.

Such a line if it were a part of the WESTERN PACIFIC would be operated at a loss and would not contribute any substantial amount to its tonnage and revenue.

On the other hand, at some time in the future the traffic of this territory, particularly in rice and fruits, will be very large and a large porton of it will be transcontinental business. This condition will exist when water is applied to the land and the large land holdings pass into the hands of farmers cultivating smaller areas. The agricultural conditions are fundamentally sound, but the potential wealth of the soil cannot be realized until the land comes under intensive cultivation. Whenever this condition shall exist a railroad into the territory will be a valuable feeder for the WESTERN PACIFIC and may be operated at a profit.

The following is a detailed estimate of the total freight tonnage and revenue of the west side of the Sacramento Valley between Woodland and Corning, except points on the west bank of the Sacramento River:

SACRAMENTO VALLEY WEST SIDE.

SOUTHERN PACIFIC TERRITORY.

	Miles.
Woodland to Corning	93
Orland to Hamilton	13
Total	106

ESTIMATED REVENUE.

INTERSTATE OUTBOUND (Eastern).

				Total Revenue.
Green Deciduous Fruit	400 Tons	@$	9.06	$ 3,624
Dried Fruit and Raisins	1,400 Tons	@	7.90	11,060
Almonds	262 Tons	@	9.06	2,374
Olives	433 Tons	@	7.90	3,421
Olive Oil	25 Tons	@	7.90	198
Oranges	300 Tons	@	9.06	2,772
Alfalfa Meal	1,800 Tons	@	5.00	9,000
Rice	7,914 Tons	@	5.06	40,045
Barley	31,062 Tons	@	4.60	142,885
Total Interstate Outbound				$215,379

INTRASTATE OUTBOUND (California).

Dried Fruit and Raisins	100 Tons	@$ 4.70	$ 470
Beans	200 Tons	@ 6.70	1,340
Onions	300 Tons	@ 4.20	1,260
Rice	2,638 Tons	@ 3.50	9,233
Barley	20,708 Tons	@ 2.70	55,912
Wheat	3,000 Tons	@ 1.80	5,400
Other Grain	12,940 Tons	@ 2.50	32,350
Hay	14,028 Tons	@ 2.00	28,056
Livestock	395 Cars	@ 42.00	16,590
Cattle	243 Cars	@ 42.00	10,206
Hogs and Sheep	465 Cars	@ 33.50	15,577
Horses	25 Cars	@ 48.00	1,200
Wood	397 Tons	@ 4.20	1,667
Mineral Water	2,231 Tons	@ 3.60	8,031
Wine Grapes	3,200 Tons	@ 1.80	5,760
Total Intrastate, Outbound			$193,052

EXPRESS—OUTBOUND.

Butter	398 Tons	@$18.00	
Railroad earnings 50% of express earnings		9.00	$ 3,582

INBOUND.

Lumber	6,000 Tons	@$ 2.50	$15,000
Coal	350 Tons	@ 3.95	1,382
Oil	6,350 Tons	@ 3.35	21,272
Agricultural Implements	645 Tons	@ 12.58	8,114
Automobiles	100 Tons	@ 23.40	2,340
Millstuff	2,100 Tons	@ 2.72	5,712
Grain Bags	480 Tons	@ 6.10	2,928
Machinery	75 Tons	@ 2.00	150
Ice	1,310 Tons	@ 1.60	2,096
Miscellaneous	1,630 Tons	@ 7.40	12,062
Total Inbound			$ 71,056

*TOTAL FREIGHT EARNINGS $483,069

*Includes extraordinary express earnings, as above.

ORANGEVALE-FAIR OAKS-NEWCASTLE DISTRICT.

This district is located in the Northern Sierra foothills, northeast of Sacramento and west of the American River and its north fork. It has a total area of 133,000 acres, much of which is peculiarly well adapted to horticulture. Of the total area 29,000 acres are located in Sacramento County in what is known as the Orangevale-Fair Oaks District. The remaining 104,000 acres are located in the Placer County fruit district. About 14 per cent. of the total area is under irrigation and intensively cultivated.

At the present time there are 27,869* acres of orchard within the district. A large part of the acreage in the Fair Oaks section is in oranges; the principal fruit products of the Placer County district are cherries, peaches, pears and plums, which produce a large traffic in green deciduous fruit to Eastern markets.

There are no towns within the districts of importance, Auburn, the county seat of Placer County, having a population of 2,500.

The most important outbound transcontinental traffic is 40,700 tons of green deciduous fruit and oranges. There is an outbound movement of 8,250 tons of fruit to local canneries. The inbound traffic consists principally of lumber, box shooks and material required for fruit packing and some fertilizer for the fruit trees.

The rail traffic of the Placer County district is carried by the Ogden Line of the Southern Pacific; that of the Fair Oaks section by the Folsom Branch of the same System. The latter is located on the east side of the American River opposite the fruit district. The sketch map on the opposite page shows existing and proposed railroads.

*From field report of traffic men as to acreage in Fair Oaks, etc., and from Horticultural Commission report as to Placer County acreage.

The Northern Electric Railway now operates a branch from Sacramento carrying passenger traffic to the Sawnston Tract. This line terminates at the west side of the Southern Pacific main line (Ogden Line) a short distance south of Ben Ali, opposite a large canning plant which is located on the east side of the Southern Pacific.

Some years ago the Sacramento & Sierra Railway was projected by a local corporation (with which one C. A. Smith of Oakland was prominently identified), which proposed constructing a line of railroad from Sacramento to large tracts of timber lands located on the western slope of the Sierra Nevada Mountains on, and near, the head waters of the American River. The right of way was obtained and the roadbed graded from the east line of the Rancho del Paso for a distance of 20 miles east to a point about opposite Newcastle, a station on the Ogden Line of the Southern Pacific. The elevation of the point last referred to is several hundred feet lower than that of Newcastle.

The right of way of this Sacramento & Sierra Railway has been sold for delinquent taxes and the title has reverted to the original grantors. Letters in the file of Mr. C. M. Levey, President of the WESTERN PACIFIC, state that practically all of these grantors are willing to deed or quitclaim the title to this right of way to any responsible railroad company which will construct a railroad upon it.

The distance from the end of the Northern Electric line serving the Swanston Tract to the western terminus of the Sacramento & Sierra Railway right of way, is approximately 7 miles. The line of the Sacramento & Sierra Railway passes about 1½ miles north of Fair Oaks and a branch of that length must be constructed if that section is to be served better than it is now served by the Southern Pacific.

Summarizing these statements, an extension of the Swanston Spur of the Northern Electric to the point opposite Newcastle would necessitate the construction of 7 miles of new

roadbed and the laying of 28½ miles of track. To reach Fair Oaks would require the construction of 1½ miles of new railroad. The old roadbed would require resurfacing.

A line so constructed will secure practically all of the traffic of the Orangevale-Fair Oaks section and serve the Placer County fruit district at least equally as well as it is now served by the Southern Pacific. It is entirely practicable to construct a line from the main line of the WESTERN PACIFIC north of the bridge over the American River at Sacramento which will accomplish the same result. This latter line would involve the construction of practically 30 miles of new railroad.

Such a line, either the new line last mentioned or the Northern Electric spur extended, when connected with, and made a part of, the WESTERN PACIFIC SYSTEM will add to its tonnage and revenue the following:

22,214	Tons Interstate Outbound Traffic*	$200,476
2,292	Tons Fruit Outbound—by Express*	22,122
4,795	Tons Intrastate Outbound Traffic	10,122
13,004	Tons Inbound	42,265
42,305	Total Freight and Express	$274,985

No net revenue would be added to the above freight revenue through the operation of passenger trains immediately following construction. Passenger operation should be deferred as long as possible. Such operation as far as the Fair Oaks and Orangevale Colony would probably be demanded soon after completion of the line. · When required the present operation between Sacramento and Sawnston, would be extended to the above stations, an additional distance of about 10 miles. With such operation the passenger train revenue will probably be sufficient to cover the out-of-pocket expense incurred. In any event the effect of the passenger service on the income account is negligible.

The estimate of cost of this line, which is given in detail on following pages, is $771,508.

*Practically all transcontinental traffic.

On the basis of an operating ratio of 52 per cent., taxes 5¼ per cent. of gross and fixed charges at 5 per cent. on cost of construction, the income account at the end of the first year of operation, would be as follows:

Gross Revenue		$274,985
Net Revenue 48% of Gross		131,993
Taxes, 5¼% of Gross		14,437
		117,556
5% on Cost of Construction $771,508		38,575
Surplus		$78,981

The following is a statement of the income account at the end of the fifth year, based on the estimate of increased revenue at that time, as shown in detailed statement following:

Gross Revenue at beginning		$274,985
Increase in 5 years		43,046
Gross Revenue end of fifth year		$318,031
Net Revenue 48% of Gross		152,655
Taxes 5¼% of Gross		16,697
		135,958
5% on Cost of Construction		38,575
Surplus		97,383

The following is a detailed estimate of the total freight tonnage and revenue of this district and the WESTERN PACIFIC proportion thereof, the foregoing statement of freight traffic being a summary of this estimate:

NEWCASTLE BRANCH.

Estimated Revenue.

INTERSTATE OUTBOUND (Eastern).

				Total Revenue.	Western Pacific Proportion. Tonnage.	Revenue.
Oranges	4,614 Tons	@$	9.06	$41,802.84	4,614	$41,803
Almonds	98 Tons	@	9.06	887.88	98	888
Olives	175 Tons	@	7.90	1,382.50	175	1,382
Olive Oil	500 Tons	@	7.90	3,950.00	500	3,950
Deciduous Fruit	31,405 Tons	@	9.06	284,529.30	16,827	152,453
Total Interstate, Outbound				$332,552.52	22,214	$200,476

EXPRESS.

Fruit	4,585 Tons			$44,245.25	2,292	$22,122

INTRASTATE OUTBOUND (California).

Almonds (less-than-carload)	60 Tons	@$	4.10	$ 246.00	60	$ 246
Dried Fruit (carload)	410 Tons	@	2.60	1,066.00	410	1,066
Canning Fruit	8,250 Tons	@	2.00	16,500.00	4,125	8,250
Olives	200 Tons	@	2.80	560.00	200	560
Total Intrastate	8,920 Tons			$18,372.00	4,795	$10,122

INBOUND.

Box Shooks and Lumber	8,100 Tons	@$	2.00	$16,200.00	4,100	$ 8,200
Baskets, Nails and Paper	650 Tons	@	3.40	2,210.00	325	1,105
Cans	42 Tons	@	7.90	331.80	42	332
Manure and Fertilizer	800 Tons	@	1.85	1,480.00	400	740
Sulphur and Spraying Material	125 Tons	@	3.92	490.00	62	243
Hay	600 Tons	@	1.75	1,050.00	300	525
Grain and Feed	750 Tons	@	3.00	2,250.00	375	1,125
Coal or Oil	200 Tons	@	3.95	790.00	100	395

MERCHANDISE AND MISCELLANEOUS.

Population	3,650	@	8.00	$29,200.00	7,300*	14,600
Miles Local Station interchange traffic	30		500.	15,000.00	.....	15,000
				$69,001.80	13,004	$42,265
TOTAL FREIGHT AND EXPRESS EARNINGS				$464,171.57	42,305	$274,985

*On basis of two tons per capita.

ESTIMATED FIVE YEAR INCREASE OF FREIGHT REVENUE.

The nonbearing acreage of the orchards of the districts is at this time 15.2 per cent. of the bearing acreage. All of this nonbearing acreage will be in bearing within five years. Increase in fruit, fruit products, fertilizers and spraying material for fruit, box shooks and other material used in packing fruit, is estimated at 15 per cent.

Merchandise and miscellaneous inbound items such as coal, oil, grain, feed, etc., are estimated to increase directly with the estimated increase in population, viz., 22.2 per cent., the ratio actually employed in the estimate being 22 per cent.

On this basis the increase in five years will be as follows:

INTERSTATE OUTBOUND.

Fruit and fruit products—Freight	$30,071
Fruit and fruit products—Express	3,318
	$33,389

INTRASTATE OUTBOUND.

Fruit and Fruit Products	$ 1,520

INBOUND.

Box Shooks and Packing Material	$ 1,168
Merchandise and Miscellaneous Supplies	6,969
	$8,137
Total Increase in Five Years	$43,046

SWANSTON TO NEWCASTLE.

Estimated Cost of Proposed Branch Line.

	Miles.
Main Track	28.5
Sidings	2.5
Total	31.0

RIGHT OF WAY.

28.5 miles of right-of-way			$15,000.00

GRADING.

188,000 Cubic Yards Grading	@ 30c		56,400.00

BRIDGING.

Steel Bridges and Trusses			None
Pile Trestles—			
1,200 Lineal Feet Pile Trestle	@ $15.00,	$18,000	
Culverts—			
810 Lineal Feet Corrugated Iron Pipe, 18"	@ $ 3.65,	$2,956	
820 Lineal Feet Corrugated Iron Pipe, 24"	@ 4.50,	3,690	
400 Lineal Feet Corrugated Iron Pipe, 30"	@ 5.55,	2,220	
880 Lineal Feet Corrugated Iron Pipe, 36"	@ 6.50,	5,720	
2,000 Cubic Yards Excavation foundations	@ .50,	1,000	
		15,586.00	
Total Bridging			33,586.00

ELECTRIC FACILITIES.

28.5 Miles of Third Rail	@ $4,000,	$114,000	
28.5 Miles of Track Bonding, Road Crossings, Etc.	@ 500,	14,250	
Total Electric Facilities			128,250.00

TRACK.

31	Miles—2,922.86 Gross Tons of 60# Rail	@ $ 55.00,	$160,757.30	
11,284	Pairs 60# Angle Bars	@ 1.00,	11,284.00	
286½	Kegs 60# Track Bolts	@ 10.00,	2,867.50	
906½	Kegs Track Spikes	@ 8.00,	7,254.00	
45,136	Nut Locks	@ 10.00 M	451.36	
528	Joint Tie Plates for 1½ Mile of Track	@ .16	84.48	
7,572	Intermediate Tie Plates for 1½ Mile of Track	@ .12	908.64	
10	Sets #10 Frogs and Switch Irons	@ 160.00	1,600.00	
	Total Track			185,207.28

TIES.

10	Sets #10 Switch Ties, 38,890′ B.M.	@$ 20.00	777.80	
83,700	Redwood Track Ties	@ .75	62,775.00	
	Total Ties			63,552.80

BUILDINGS.

5	Depots	@$ 3,500,	$17,500	
2	Warehouses	@ 15,000,	30,000	
5	Section Houses	@ 1,200,	6,000	
5	Bunk Houses	@ 850,	4,250	
	Total Buildings			$57,750.00
	Stock Yards—			
5	4-Pen	@$ 850,		$ 4,250.00
	Fencing—			
28½	Miles	@ 1,500.		$42,750.00
	Telegraph Line—			
28½	Miles	@ 350,		$ 9,975.00
	Ballast—			
31	Miles	@ 1,200,		$37,200.00
	Railroad Crossings—			
1	(Southern Pacific R. R.)			$ 500.00
	Interlocking Plants—			
1	(Southern Pacific R. R.)			$20,000.00
	Labor—			
	Laying 10 switches	@ 45,	$ 450	
	Laying and surfacing 31 Miles Track	@ 1,500,	46,500	
	Total Labor			$46,950.00
	Total			$701,371.08
	Engineering and Contingencies, 10 per cent			70,137.10
	TOTAL COST			$771,508.18

GRASS VALLEY-NEVADA CITY DISTRICT.

This district is located in the northern Sierra foothills,* nearly due east of Marysville, and lies between the Yuba River and the headwaters of Bear Creek. It has a total area of agricultural land of 117,000 acres, 4,013 of which are under irrigation. The conditions as to soil, climate and surface contour are such as to make it well adapted to horticulture. The Horticulture Commission reports the area in orchards as 4,761 acres.

The most important towns are Nevada City, the county seat of Nevada County, with a population of 2,750, and Grass Valley, with 900.

The traffic consists of 1,850 tons of fruit, wool and dairy products and 90 cars of cattle outbound; 16,326 tons of machinery and lumber and 13,600 tons of merchandise inbound.

The rail traffic of the district is now carried by the Nevada County Narrow Gauge Railroad, 23 miles long, operating between Colfax, on the Southern Pacific, and Grass Valley and Nevada City. Being a narrow gauge line, all of its traffic must be transferred at Colfax. In 1916 it carried 25,000 tons inbound, of which 114 cars were transcontinental traffic, and 2,000 tons outbound. Its operation is very profitable to its owners.

The Chamber of Commerce of Marysville, for the purpose of inducing the WESTERN PACIFIC to build a branch line from that city to the district under discussion, prepared a report, dated April 15, 1916, suggesting a route based on surveys previously made and showing in detail the traffic which could be reached by the proposed branch. The traffic estimate was later verified by a traffic official of the WESTERN PACIFIC, who approved the statement as to estimated tonnage and earnings. This traffic estimate, which is reproduced herewith, shows a total freight earning for the branch of $130,491, and total earnings from all sources of $202,286.

* See map page 58.

The length of the branch is reported as 42 miles and to secure reasonable cost of construction 10 degree curves and 2½ grades must be employed in its location. The cost on this basis is estimated at $1,250,000, which is probably too low for a line located in a country having such rugged topography.

The greater part of the traffic is local and a branch serving it would add little to the traffic of the WESTERN PACIFIC main line at this time. Further the business must be divided with the narrow gauge railroad which now serves the district. After dividing the traffic with this latter road, it is doubtful, in view of the high cost of operating a line of the character of that proposed for the branch line, if there would be sufficient business to produce any net revenue from the operation. The operation would probably result in a deficit.

It is probable that within a few years the production of this district will increase materially, particularly as to green deciduous fruit, which would add a considerable tonnage and revenue to the main line. Whenever this condition exists the branch should be constructed; for the present its construction should be deferred.

GRASS VALLEY BRANCH.

Report on Anticipated Revenue.

REPORT OF MARYSVILLE CHAMBER OF COMMERCE.

DATED APRIL 15, 1916.

(Verified by J. M. Mettler, Traveling Freight Agent of The Western Pacific Railroad, in report of June 12, 1916.)

FOR YEAR 1916.

GOLD DREDGING.			
Marysville to Marigold—East.			
Machinery—repairs, etc.	1,100 tons	@ 1.20	$ 1,320.00
Machinery——new work	2,000 tons	@ 1.20	2,400.00
Marigold to Marysville—West.			
Steel scrap	200 tons	@ 1.00	200.00
Old Machinery	126 tons	@ 1.20	151.00
Marysville to Hammonton—East.			
Machinery—repairs, etc.	2,500 tons	@ 1.20	3,000.00
Lumber	500 tons	@ 1.00	500.00
Machinery—new work.	5,000 tons	@ 1.20	6,000.00
Hammonton to Marysville—West.			
Steel scrap	1,000 tons	@ 1.00	1,000.00
Marysville to Guggenheim Camp—East.			
Machinery—new work	1,700 tons	@ 1.20	2,040.00
QUARTZ MINING.			
Marysville to Grass Valley & Nevada City—East.			
Supplies and new machinery	2,000 tons	@ 4.50	9,000.00
FRUIT.			
Grass Valley to Marysville—West.			
Pears	1,500 tons	@ 4.80	7,200.00
Plums, apples, peaches, cherries and other fruits	100 tons	@ 4.80	480.00
AGRICULTURAL PRODUCTS.			
Hammonton, Smartsville and Penn Valley to Grass Valley—East.			
Hay	2,500 tons	@ 4.00	10,000.00
Hammonton and Smartsville to Marysville—West.			
Hay	500 tons	@ 4.00	2,000.00
LIVE STOCK.			
Grass Valley to Marysville—West.			
Horses, cattle and sheep	1,000 tons	@ 4.80	4,800.00
Wool fleeces, 20,000	50 tons	@ 4.00	200.00
DAIRY PRODUCTS.			
Grass Valley to Marysville—West.			
Milk (less-than-carload)	100 tons	@15.00	1,500.00
Butter	100 tons	@ 9.40	940.00

MERCHANDISE.

Marysville to Hammonton—East.		
Groceries and supplies	1,600 tons @ 1.20	1,920.00
Marysville to Guggenheim Camp—East.		
Groceries and supplies	200 tons @ 1.60	320.00
Marysville to Nevada City and Grass Valley—East.		
Merchandise	10,000 tons @ 6.40	64,000.00
Marysville to Nevada City—East (en route to Downieville and other points.)		
Merchandise	1,800 tons @ 6.40	11,520.00
Total Freight Revenue		$130,491.00

PASSENGER REVENUE.

Estimated revenue based on Nevada County Narrow Gauge for the year 1913	65,000.00

EXPRESS REVENUE.

Estimated revenue to be derived from handling express (an important item being bullion)	5,000.00

MAIL REVENUE.

Revenue paid by Government for handling railroad mail for year, 42 miles @$42.75	1,795.50
TOTAL ANNUAL ESTIMATED REVENUE FOR 1916. . . .	$202,286.50

DELTA—LODI—STOCKTON DISTRICT.

1. Delta Lines.
   (a) Thornton—Isleton.
   (b) Shima—Rindge.
2. Lodi Branch.
   (a) Steam Line.
   (b) Electric Line.
3. Stockton Channel Industrial Line.
4. Combined Electric System.

THE DELTA.

The Delta of the Sacramento and San Joaquin Rivers, according to the report of the Irrigation Division of the United States Deparment of Agriculture, contains 315,000 acres of agricultural land. Much the greater part of the area consists of islands containing from 1,000 to 23,000 acres entirely surrounded by navigable channels, which were formed by dredges in excavating material from the original shallow sloughs for the construction of the levees protecting the islands, which are below the mean level of the rivers and much below their flood plane.

The work of reclamation was started in the early 70's, so that the present agricultural area represents the work of more than 40 years. It has involved a prodigious amount of labor and a very large capital expenditure.

The Delta is by far the greatest producer of vegetables in the state, the total being enormous. For instance, 3,500,000 sacks, or 210,000 tons, of potatoes are raised annually. The principal commodities are potatoes, onions, beans, asparagus, celery, fruit and barley.

As all of the producing areas abut upon navigable channels their entire production has heretofore moved by boat to the docks at Stockton, Sacramento, Walnut Grove, Antioch, Oakland and San Francisco.

The record in the United States Army Engineer's Office, shows that, for the river boats reporting to that office, the shipments on the San Joaquin River alone for 1916, were as follows:

SHIPMENTS ON THE SAN JOAQUIN RIVER.

1916

Articles	Tons	Value
Asparagus	2,252	$ 112,600
Barley	106,720	2,134,400
Beans	21,690	1,735,200
Dairy produce	793	237,900
Eggs	12	2,724
Fish	1,298	155,760
Fruit, dried	13	1,950
Fruit, fresh	1,092	46,410
Melons	4	80
Oats	5,478	164,340
Onions	38,562	694,116
Potatoes	136,269	2,725,380
Poultry	11	3,025
Rice	9	720
Vegetables	29,898	1,494,900
Wine	3	250
	344,104	$9,509,755

In addition, there is a very large commerce on the river carried by the "mosquito fleet," consisting of small craft not owned by river transportation companies operating regularly.

Shipments by the Sacramento River steamers from the Delta cannot be segregated from their total shipments, but a very large tonnage is moved by them from the Delta islands.

Potatoes, beans and onions go to warehouses on the water front and are moved thence to destination either by rail to distant points, or by truck to local dealers. Fresh asparagus and celery move to packing plants and thence by rail to eastern points. After April 1st asparagus moves to the canneries, of which there are seven located in the Delta, and thence by river steamer to points having rail connection, from which it moves by rail to points outside of the state. From the warehouses 75 per cent. of the potatoes and 90 per cent. of the beans move east by rail. An average of 1,350 cars of fresh fruit are shipped annually from Sacramento and San Joaquin River points. Delta barley is light weight and low grade generally as to quality. None of it moves east, being consumed locally for feeding purposes, the rail movement being from water front to interior milling points.

The difficulty in serving this area directly by rail, lies in the fact that it is crossed at short intervals in every direction by navigable channels across which drawbridges must be maintained. The number of these channels is too large to permit the construction of a railroad serving the entire area on account of the cost of constructing so large a number of drawbridges and the constant breaking of the line on account of opening such bridges for passing water craft. The soil within the area enclosed by the levees is peat, and hence unstable and not capable of supporting the track structure and traffic over it, so that the track would settle constantly under traffic and the cost of its maintenance be prohibitive. It would be impracticable in any event to operate steam locomotives over Delta lands, as sparks from the engines would fire the peat soil. The Santa Fe main line crosses the southern part of the Delta, and it has been obliged, at large expense, to cover its embankments with sand to prevent fire damage.

While this is true applied to the Delta as a whole, careful study has developed the fact that by constructing two electric lines, aggregating 32 miles in length, an area of 129,553 acres may be made directly tributary to the WESTERN PACIFIC. This is of great importance to this railroad for the reason that at Stockton and other river ports through which Delta products are handled, it is handicapped by the lack of facilities at the water fronts equal to those of competing railroads. The construction of these two electric lines will improve its traffic position, as it will reach Delta products at the point of production where there is little competition, instead of at competitive points where it is at a disadvantage.

The first of the lines, designated the Thornton-Isleton Line for convenience, would leave the WESTERN PACIFIC main line near Thornton, running thence west alongside of the public road on stable ground, to New Hope Landing, where it would cross the Mokelumne River by a drawbridge; thence along the top of the levee, heretofore constructed, located along the

north fork of that river to a crossing of the Georgiana Slough, at the south edge of Walnut Grove; thence crossing the slough by a drawbridge to Andrus Island; thence on a light embankment built at the foot of the protecting levee on its land side to the southern end of that island, with a two mile spur to a point on Andrus Island opposite Voorman on Tyler Island, and Valentine on Staten Island. The point on the south end of Andrus Island is on the steamer channel of the San Joaquin River. The channels requiring drawbridges across them and the proposed location of the line between them is shown on the sketch map on the opposite page.

This line would be 22 miles long and serve 97,589 acres of Delta islands and tracts better than they are now served—much of it directly, and the balance by furnishing a rail connection much closer to the point of production than any now existing. The following table shows the several tracts in the tributary area with their acreage and production for the year 1916. A map of the Delta on a large scale showing the location of the two proposed branches and the area tributary to them will be found in the book of maps accompanying this report.

DELTA LINE
THORNTON, WALNUT GROVE, ISLETON, ETC.
PRODUCTION OF TERRITORY SERVED
(Annual Production—Year 1916.)

Tract.	Total Acres.	Tons					Acres			Cars	Division of Traffic.
		Potatoes.	Onions.	Beans.	Barley.	Corn.	Hemp.	Asparagus.	Orchard.	Celery.	
District 348	10,000	702	.....	1,000	7,215	500					
Sargent Canal							100	.....	.....	.....	All Western Pacific.
Ranch	3,400	3,802	.....	.....	5,932	.....	.....	.....	.....	.....	All Western Pacific.
Brack Tract	5,000	140	32	300	678	2,250	.....	.....	.....	.....	All Western Pacific.
Terminous	7,500	4,387	1,100	1,200	2,825	150	.....	.....	.....	.....	All Western Pacific.
Staten Island	9,260	11,700	.....	600	5,650	750	.....	196	.....	300	All Western Pacific.
Tyler Island	9,234	4,095	.....	500	1,412	.....	.....	1,450	250	.....	All Western Pacific.
Andrus Island	7,200	2,925	.....	650	1,130	.....	.....	1,200	1,000	.....	All Western Pacific.
Grand Island	17,000	11,700	.....	7,000	.....	.....	.....	.....	.....	.....	Western Pacific portion two-thirds.
Pierson District	8,000	.....	.....	4,250	1,050	.....	.....	1,000	500	.....	Western Pacific portion one-third.
Brannan Island	7,500	3,510	.....	500	3,390	.....	.....	.....	.....	.....	All Western Pacific.
Twitchell Island	2,000	1,412	1,650	510	.....	.....	.....	.....	.....	.....	All Western Pacific.
Bradford Tract	2,120	.....	.....	.....	.....	.....	.....	1,200	.....	100	All Western Pacific.
Webb Tract	5,500	2,263	5,225	3,500	.....	.....	.....	.....	.....	.....	All Western Pacific.
Venice Island	3,875	11,215	2,420	1,795	.....	.....	.....	.....	.....		Production on same basis as Empire Tract, which has practically the same acreage.
	97,589	57,851	10,427	21,805	29,282	3,650	100	5,046	1,750	400	

The operation of this line will add to the tonnage and revenue of the WESTERN PACIFIC the following:

101,496 tons of Outbound Traffic (practically all transcontinental), producing a revenue of	$646,424
5,900 tons of Inbound Traffic, Revenue	31,064
107,396	$677,488

The second of the electric lines, designated the Shima-Rindge Line, for convenience of reference, would leave the WESTERN PACIFIC main line at a point seven miles north of Stockton, running thence west over the main land to the eastern end of a levee; thence west along the levee heretofore constructed, to the channel between the Shima Tract and Rindge Island; thence across the channel by a drawbridge to Rindge Island; thence along the levee heretofore constructed on the north and west side of Rindge Island to a point on the steamer channel of the San Joaquin River. The total length of the line would be 10 miles. Both lines would have warehouses at the river termini and at crossings of channels.

This line would serve 32,064 acres of Delta islands and tracts, the larger part of it directly, and the balance better than it is now served, by furnishing rail connection closer to points of production than any now existing. The following table shows the tracts in the tributary area with acreage and production for 1916.

DELTA LINE
SHIMA-RINDGE TRACTS
PRODUCTION OF TERRITORY SERVED
(ANNUAL PRODUCTION—YEAR 1916)

Tract	Total Acres	Tons						
		Potatoes	Onions	Beans	Barley	Corn	Hemp	
Cohen Grant	3,400	10,179	1,650	300	.....	.....	.....	
George Shima	2,000	12,370	.....	.....	.....	.....	.....	
King Island	3,300	9,366	5,500	595	.....	.....	.....	
Empire Tract	3,800	11,215	2,420	1,795	.....	.....	.....	
Medford Island	1,300	3,738	806	598	.....	.....	.....	No report—Production estimated at one-third of Empire Tract.
Mandeville Island	6,000	40,950	.....	.....	.....	.....	.....	First crop in 1918—To be planted in potatoes.
McDonald Island	3,400	21,307	.....	2,500	4,520	.....	.....	
Rindge Tract	6,800	6,160	2,750	1,840	1,130	110	650	
Chin Lung	2,064	12,074	.....	.....	.....	.....	.....	No report—Estimated on basis of 100 sacks potatoes to acre.
	32,064	127,353	13,126	7,628	5,650	110	650	

The construction of this line will add to the tonnage and revenue of the WESTERN PACIFIC the following:

113,722 Tons of Outbound business (practically all of which is trans-continental), producing a revenue of $763,696

If constructed for operation without reference to the Shima-Rindge Line, the Thornton-Isleton line would cost $889,137. On the basis of an operating ratio of 60 per cent., taxes 5¼ per cent. of gross revenue and fixed charges at 5 per cent. of cost of construction, its income account at the end of the first year would stand as follows:

Gross Revenue	$677,488
Net Revenue 40% of Gross	270,995
Taxes 5¼% of Gross Revenue	35,568
	235,427
5% of Construction Cost, $889,137	44,457
Thornton-Iselton Line—Surplus	$190,970

If constructed for operation as an isolated electric branch, the Shima-Rindge line would cost $424,752. On the same basis as that stated above its income account at the end of the first year would stand as follows:

Gross Revenue	$763,696
Net Revenue 40% of Gross	305,478
Taxes 5¼% of Gross Revenue	40,094
	265,384
5% Construction Cost, $424,752	21,238
Shima-Rindge Line—Surplus	$244,146

The two lines can be operated more economically together than as isolated electric branches connecting with a steam main line. The points at which the two electric lines connect with the WESTERN PACIFIC main line, are 15 miles apart. It would be necessary to electrify the WESTERN PACIFIC main line for 15 miles in order to connect the operation of the two branches. This electrification of the main line would consist of placing a trolley line over the present track and bonding the rails. The cost of the construction will be $61,793. The diagrams of distribution system on the opposite page show the arrangement of trolley and feeder lines.

The total cost of the two branches and the electrification of the main line is as follows:

Thornton-Isleton Line	$889,137
Shima-Rindge Line	424,752
Electrification of Western Pacific Main line	61,793
Total cost	$1,375,682

The total traffic of the two branch lines is:

Thornton-Isleton Line	$677,488
Shima-Rindge Line	763,696
	$1,441,184

When operated together the operating ratio will be less than when operated as isolated electric branches. A ratio of 52 per cent. may be safely assumed.

On this basis the income account for the two branches operated together would stand as follows:

Gross Revenue	$1,441,184
Net Revenue 48% of Gross	691,768
Taxes, 5¼% of Gross Revenue	75,662
5% of Construction Cost, $1,375,682	68,784
Delta Lines Combined—Surplus	$547,322

No estimate for future increase in traffic has been made for the reason that it is not possible to determine in advance the conditions in the Delta during the five-year period following the completion of the line.

The greater portion of the Delta tributary to these electric lines has heretofore been served by slow water transportation only. The crops raised have been those adapted to such transportation. The areas adjacent to the landings of the Sacramento River passenger steamers or lying close to Antioch, on the main line of the Santa Fe, have been very generally planted to fruit, asparagus and celery, the movement of which involves rapid transportation. Undoubtedly a large area lying immediately along these electric lines will be devoted to raising fruit and vegetables which are shipped east in large quantities in the early Spring. Packing houses will certainly be established along these lines to prepare these products for

the market and a large rail traffic will be created which does not exist at this time.

For this reason while it is practically certain that the traffic of the lines will increase greatly in the future, there is no reasonable basis on which it can be estimated even approximately.

The following is a detailed estimate of the WESTERN PACIFIC proportion of the total freight tonnage and revenue of these delta districts, the foregoing statements of freight traffic being a summary of these estimates:

DELTA TRAFFIC.

ESTIMATED REVENUE.

THORNTON—WALNUT GROVE—ISLETON LINE.

(WESTERN PACIFIC PORTION OF REVENUE.)

OUTBOUND.

Potatoes	41,195 tons @ $6.90		$284,245.00
Onions	7,820 tons @ 5.94		46,451.00
Beans	15,498 tons @ 5.94		92,058.00
Barley	4,287 tons @ 1.80		7,717.00
Hemp	100 tons @ 5.94		594.00
Asparagus, Canned	†23,211 tons @ 5.74		133,231.00
Fresh Fruit	6,885 tons @ 9.06		62,378.00
Celery	1,500 tons @ 7.90		11,850.00
Fresh Asparagus	1,000 tons @ 7.90		7,900.00
	101,496		$646,424.00

INBOUND.*

Box Shooks	2,884 tons @ $3.10		$ 8,940.00
Cans	2,500 tons @ 7.90		19,750.00
Sacks (Vegetables)	516 tons @ 4.60		2,374.00
	5,900		31,064.00
	107,396		$677,488.00

SHIMA-RINDGE LINE.

WESTERN PACIFIC PORTION OF REVENUE.

Potatoes	95,515 tons @ $6.90		$659,053.00
Onions	9,845 tons @ 5.94		58,479.00
Beans	6,865 tons @ 5.94		40,778.00
Barley	847 tons @ 1.80		1,525.00
Hemp	650 tons @ 5.94		3,861.00
	113,722		$763,696.00

†Totals from 7 canneries 32,500 tons—5 served by proposed line equals five-sevenths of total, or 23,211 tons.

*Box shooks for canned asparagus on basis of 6½ lbs. per case.
Cans for canned asparagus on basis of 7 lbs. per case.
Packing for fresh fruit on basis of 6 per cent. of total shipping weight.
Sacks for vegetables 0.75 per cent. of weight of shipments.

Basis of Estimate.

The line contemplated for the Thornton—Isleton and the Shima—Rindge Branches is an overhead trolley electric railroad operating with 1,200 volt direct current.

The trolley line is to be catenary construction suspended from bracket arms on a single line of poles. The power is to be purchased from a power company having a transmission line in the vicinity. The substations to be mounted on car bodies set on rails at side of track, the type being that generally termed portable substations.

One substation on each branch will be sufficient to operate a 10 to 12 car freight train to the junction at the main line. No feeder line is provided for the trolley over the Western Pacific main line. The purpose of that electrification is to allow the movement of the electric locomotive from one branch to the other and not for moving a train from one to the other. In order that the last movement be made possible a feeder line costing $25,800 would be required.

The electric locomotive provided for each branch in the estimates is a four-80-H. P. motor (total 320 H. P.) machine mounted on a car body with automatic brakes and all necessary appliances. It will have ample power to haul 12 loaded freight cars over any portion of the branch lines.

A 4/0 copper feeder line is provided to maintain a sufficient voltage at all points to move the freight train specified above. It is not possible to predict in advance the points at which the greatest demand for current will occur. The portable substations may be moved with little expense after actual operation begins to such points as the service requires.

The estimate provides for carrying the transmission line from the line of the power company across country to the pole line of the electric branch on which it will be carried to the portable substations.

The unit prices used are those for 1917 shown in the following tabulated statement:

	1915	1917
Portable Substation:		
2200/1200 volts, 300 K. W. Induction motor, D. C. Generator Set Complete in Stout Box Car.....	$10,200	$11,730
Locomotive:		
1200 volts, 4 motors of 80 H. P. each; K-34 control; box car body; automatic brakes, trucks, etc., complete	9,000	10,800
Catenary Trolley, Overhead Construction:	Per Mile	Per Mile
1200 volts. 8" 35' poles—150-ft. spacing; 4/0 trolley wire, bracket construction	$ 2,100	$ 3,100
Feeder Wire:		
4/0 copper bare, installed on trolley poles.....	920	1,720
Rail Bonds:		
Traffic Rail. Double soldered bonds on each joint. 200,000 c. m. on traffic rail.....	440	645
3-Phase Transmission Line:		
3 #6 wires carried on trolley poles; extra cost per mile	1,000	1,350

THORNTON—ISLETON.

Estimated Cost of Proposed Branch Line (Delta Line)

Main Track	22 Miles
Sidings	3 Miles
Total	25 Miles

RIGHT OF WAY.

Right of Way and damage				$ 20,000.00

GRADING.

175,000 Cu. Yds. grading	@	$ .30		52,500.00

BRIDGING.

Steel Bridges and Trusses:					
4,000 Cu. Yds. Concrete Bridge Masonry	@	$ 10.00	$ 40,000.00		
33,600 Lin. Ft. Piling, driven	@	.28	9,408.00		
80 M. F. B. M. Timber	@	30.00	2,400.00		
1,000 Tons Bridge Steel (Including turning machinery)	@	128.00	128,000.00		
				$179,808.00	
Pile Trestles:				None	
Culverts:					
180 Lin. Ft. Corrugated Iron Pipe, 24"	@	4.50	810.00		
50 Lin. Ft. Corrugated Iron Pipe, 36"	@	6.50	325.00		
				1,135.00	
Total Bridging					180,943.00

ELECTRIC FACILITIES.

Portable Substation—300 K. W.—1200 Volts.			$ 11,730.00	
4/0 Trolley and Pole Line—25 Miles	@	$ 3,100.00	77,500.00	
Bonding Traffic Rail— 25 Miles	@	645.00	16,125.00	
4/0 Feeder—1 strand, 22 Miles	@	1,720.00	37,840.00	
Transmission Line—3 Phase, 4 Miles	@	1,350.00	5,400.00	
Poles across country, 2 Miles	@	500.00	1,000.00	
Locomotive—4 80-H. P. Motors, box car body, automatic brakes, trucks, etc., complete			10,800.00	
Total Electric Facilities				160,395.00

*ELECTRIFICATION OF WESTERN PACIFIC MAIN LINE.

15 Miles Main Line, Trolley and Poles		$ 46,500.00	
15 Miles Main Line, Bonding Traffic Rail		9,675.00	
Total			56,175.00

*To connect the operation of this line with that of the Shima-Rindge Line.

TRACK.

25 Miles—2,357.14 Gross Tons of 60# Rail	@	$ 55.00	$129,642.70	
9,100 Pairs 60# Angle Bars	@	1.00	9,100.00	
231¼ Kegs 60# Track Bolts	@	10.00	2,312.00	
731¼ Kegs Track Spikes	@	8.00	5,850.00	
36,400 Nut Locks	@	10.00	364.00	
528 Joint Tie Plates	@	.16	84.98	
7,572 Intermediate Tie Plates	@	.12	908.64	
8 Sets #10 Frogs and Switch Irons	@	160.00	1,280.00	
Total Track				149,542.32

TIES.

1 Set #10 Switch Ties, 31,112' BM	@	$ 20.00	$ 622.24	
67,500 Redwood Track Ties	@	.75	50,625.00	
Total Ties				51,247.24

BUILDINGS.

4 Depots	@	$ 3,500.00	$ 14,000.00	
4 Warehouses	@	15,000.00	60,000.00	
4 Section Houses	@	1,200.00	4,800.00	
4 Bunk Houses	@	750.00	3,000.00	
Total Buildings				81,800.00
Stock Yards:				
4 4-Pen Standard	@	$ 850.00	$ 3,400.00	3,400.00
Fencing:				
22 Miles	@	1,500.00		33,000.00
Telegraph Line:				
22 Miles	@	350.00		7,700.00
Ballast:				
25 Miles	@	1,200.00		30,000.00
Labor:				
Laying 8 switches	@	35.00	280.00	
Laying and surfacing 25 Miles Track	@	1,500.00	37,500.00	
Total Labor				37,780.00
Total				$804,482.56
Engineering and Contingencies, 10 per cent.				86,448.00
TOTAL COST				$950,930.56

SHIMA-RINDGE.

Estimated Cost of Proposed Branch Line (Delta Line).

(FROM ABOUT HARTE STATION TO SAN JOAQUIN RIVER.)

Main Track			10 Miles		
Sidings			1½ Miles		
Total			11½ Miles		
RIGHT OF WAY.					
Right of Way and expense of recording....					$ 2,700.00
GRADING.					
22,500 Cu. Yds. of grading.....	@	$ .30			6,750.00
BRIDGING.					
Steel Bridges and Trusses:					
2,000 Cu. Yds. Concrete Bridge Masonry..	@	$ 10.00	$ 20,000.00		
16,800 Lin. Ft. Piling, driven.....	@	.28	4,704.00		
40 M. F. B. M. Timber	@	30.00	1,200.00		
500 Tons Bridge Steel	@	128.00	64,000.00		
(Including turning machinery)				$ 89,904.00	
Pile Trestles:					
				None	
Culverts:					
60 Lin. Ft. Corrugated Iron Pipe—24"...	@	4.50	270.00		
Total Bridging					90,174.00
ELECTRIC FACILITIES.					
Portable Substation—300 K. W.—1200 Volts.			$ 11,730.00		
4/0 Trolley and Pole Line—11.5 Miles.....	@	$ 3,100.00	35,650.00		
Bonding Traffic Rail, 11.5 Miles.....	@	645.00	7,417.00		
4/0 Feeder—1 Strand, 10 Miles.....	@	1,720.00	17,200.00		
Transmission—3 Phase, 5 Miles.....	@	1,350.00	6,750.00		
Poles across country, 2 Miles.....	@	500.00	1,000.00		
Locomotives—Four 80-H. P. motors, box car body, automatic brakes, trucks, etc., complete			10,800.00		
Total Electric Facilities.....					90,547.00
TRACK.					
11½ Miles—1,084.29 Gross Tons of 60# Rail	@	$ 55.00	$ 59,635.95		
4,186 Pairs 60# Angle Bars.....	@	1.00	4,186.00		
107 Kegs 60# Track Bolts.....	@	10.00	1,070.00		
337 Kegs Track Spikes	@	8.00	2,696.00		
16,744 Nut Locks	@	10.00	167.44		
352 Joint Tie Plates for 1½ mile curves..	@	.16	56.32		
5,048 Intermediate Tie Plates for 1½ mile curves	@	12	605.76		
8 Sets #10 Frogs and Switch Irons...	@	160.00	1,280.00		
Total Track					69,697.47
TIES.					
8 Sets #10 Switch Ties, 31,112' BM...	@	$ 20.00	$ 622.24		
31,050 Redwood Track Ties	@	.75	23,287.50		
Total Ties					23,909.74

BUILDINGS.

2 Depots . . . @	$ 3,500.00	$ 7,000.00	
3 Warehouses . . . @	15,000.00	45,000.00	
2 Section Houses . . . @	1,200.00	2,400.00	
2 Bunk Houses . . . @	750.00	1,500.00	
Total Buildings . . .			55,900.00
Stock Yards:			
3 4-Pen Standard . . . @	$ 850.00	$ 2,550.00	2,550.00
*Fencing:			
6 Miles . . . @	1,500.00	9,000.00	9,000.00
Telegraph Line:			
10 Miles . . . @	350.00	3,500.00	3,500.00
Ballast:			
11½ Miles . . . @	1,200.00	13,800.00	13,800.00
Labor:			
Laying 8 switches . . . @	45.00	360.00	
Laying and surfacing 11½ Miles Track . . . @	1,500.00	17,250.00	
Total Labor . . .			17,610.00
Total . . .			$386,138.21
Engineering and Contingencies, 10 per cent.			38,614.00
TOTAL COST . . .			$424,752.21

*8 miles fenced on one side only.

LODI—WOODBRIDGE DISTRICT (STEAM LINE).

This district lies 12 miles north of Stockton on the Southern Pacific and the Lodi Branch of the Central California Traction, an interurban electric railway.

This is a vineyard district with a very large area surrounding it devoted to the production of table and wine grapes. It also has a considerable acreage of producing almond orchards.

Lodi is a prosperous town, with a population of 4,200; Woodbridge has a population of 250. The industries of the former are those connected with the packing of table grapes, principally of the Tokay variety, and the manufacture of wine. The total rail shipments from the district of the former commodity are more than 37,000 tons annually—of the latter 6,750 tons, all of which moves to eastern markets.

Owing to the location of the tracks of the Southern Pacific serving the packing plants at Lodi a spur from the WESTERN PACIFIC built into that town could not expect at the beginning of operation to secure more than 25 per cent. of the total shipments of grapes and 50 per cent. of the tonnage of wine; at Woodbridge it could secure one-half of the shipments; at Boyce Corners, near by, it would secure all of the traffic.

A spur may be constructed from the main line of the WESTERN PACIFIC at a point about 13 miles north of Stockton, running thence about east through Woodbridge to Lodi, the total length being practically 6 miles.

Such a spur, if owned by the WESTERN PACIFIC, would add to its freight tonnage and revenue the following:

15,623	Tons Transcontinental Outbound	$132,234
750	Tons Outbound to California Points	750
1,050	Tons Utah Coal Inbound	4,148
3,660	Tons Inbound	11,967
21,083		$149,099

This spur would be operated for freight service only, and there is no passenger revenue to be added to the above freight earnings.

The accompanying estimate of cost has been made by the Chief Engineer of the WESTERN PACIFIC, except as to items of Right-of-Way, Grading and Bridging. The district is flat and the drainage requires only a few pipe culverts. The line for two miles east of the WESTERN PACIFIC lies in grain fields and for the balance of the distance largely through vineyards. The location may follow land lines generally, so that there are no serious questions of separation damages to consider, in estimating the cost of acquiring the real estate needed.

The estimate as submitted is amply sufficient to cover the cost of these items and is made by adding them to the estimates of the Chief Engineer. The total cost of the spur is estimated at $223,652.

On the basis of an operating ratio of 52 per cent., interest charges at 5 per cent. on the cost of construction and taxes at 5¼ per cent. of gross earnings, the income account would be as follows:

Gross Revenue	$149,099
Net Revenue, 48% of Gross	71,568
Taxes, 5¼% of Gross	7,828
	63,740
Interest on $223,652 @ 5 per cent.	11,183
Surplus	$52,557

The following is a detailed estimate of the total freight tonnage and revenue of the Lodi District and the Western Pacific proportion thereof, the foregoing statement of traffic being a summary of this estimate:

LODI-WOODBRIDGE DISTRICT.

Estimated Revenue.

Interstate Outbound (Eastern)

Green Deciduous Fruit	37,323 Tons	@	$9.06	$338,146.38
Almonds	490 Tons	@	9.06	4,439.40
Wine	6,750 Tons	@	5.24	35,370.00

Intrastate Outbound (California)

Grapes	3,000 Tons	@	$1.00	$ 3,000.00

Inbound

Utah Coal	1,050 Tons	@	$3.95	$ 4,147.50
Baskets	420 Tons	@	1.40	588.00
Shooks and Lumber	4,830 Tons	@	2.00	9,660.00
Population, per capita	4,450	@	8.00	35,600.00
Total Outbound and Inbound				$430,951.28

Western Pacific Proportion of Traffic

Green Fruit	13,061 Tons	@	$9.06	$118,332.00
Almonds	125 Tons	@	9.06	1,132.00
Wine	2,437 Tons	@	5.24	12,770.00
Wine Grapes	750 Tons	@	1.00	750.00
Utah Coal	1,050 Tons	@	3.95	4,148.00
Baskets	105 Tons	@	1.40	147.00
Box Shooks and Lumber	1,210 Tons	@	2.00	2,420.00

Merchandise and Miscellaneous

Population	1,175*	@	$8.00	$ 9,400.00
	21,088			$149,099.00

* Estimate 2,350 tons.

LODI—WOODBRIDGE DISTRICT.

Estimated Cost of Proposed Branch Line.

			Miles	
Main track			6	
Sidings			1	
Total			7	
Right-of-Way				
2 miles of right-of-way	@	$1,400.00	$ 2,800.00	
4 miles of right-of-way	@	7,000.00	28,000.00	
City lots at Lodi and Woodbridge			10,000.00	
Total right-of-way				$ 40,800.00
Grading				
87,000 cu. yds. grading @ 30c			$26,100.00	
Work in paved streets and roads			10,000.00	
Total grading				$ 36,100.00
Bridging				
Culverts:				
300 Lin. Ft. corrugated iron pipe—24"	@	$ 4.50		$ 1,350.00
Track				
7 miles—660 Gr. Tons 60# Rail.	@	$ 55.00	$36,300.00	
2,568 pairs angle bars for 60# Rail.	@	1.00	2,568.00	
64⅜ kegs track bolts, ⅞"x4"	@	10.00	647.50	
204⅜ kegs railroad spikes	@	8.00	1,638.00	
10,272 nut locks—per M	@	10.00	102.72	
180 joint tie plates for ½ mile curve	@	.16	28.80	
1,150 intermediate tie plates for ½ mile curve	@	.12	138.00	
6 sets No. 10 frogs and switch irons	@	160.00	960.00	
Total track				$ 42,383.02
Ties:				
6 sets No. 10 switch ties, 23,334' B. M.	@	$ 20.00	$ 466.68	
16,200 Redwood track ties	@	.75	12,150.00	
Total ties				$ 12,616.68
Buildings				
2 depots	@	$3,500.00	$ 7,000.00	
2 warehouses	@	15,000.00	30,000.00	
1 section house			1,200.00	
1 bunk house			750.00	
Total buildings				$ 38,950.00
Stock Yards:				
1 4-pen standard				850.00
Fencing:				
6 miles	@	$1,500.00		9,000.00
Telegraph Line:				
6 miles	@	$ 350.00		2,100.00
Ballast:				
7 miles	@	$1,200.00		8,400.00
Labor:				
Laying 6 switches	@	$ 45.00	$ 270.00	
Laying and surfacing 7 miles of track	@	$1,500.00	10,500.00	
Total labor				$ 10,770.00
				$203,319.70
Engineering and Contingencies, 10 per cent				20,331.97
TOTAL COST				$223,651.67

DELTA LINES—LODI ELECTRIC SYSTEM.

If it is decided to construct both of the electric lines in the Delta, and the branch from the main line to Lodi, the latter branch might well be made an electric line (in lieu of the steam line just described) and operated in connection with the two Delta electric branches. The only expense incurred in connection with such electrification would be the installation of a trolley line over the Lodi Branch and a feeder line over 15 miles of the WESTERN PACIFIC main line and 6 miles of the Lodi Branch. The two substations included in the estimates for the Delta branches may be so disposed that they could serve the three branches. The two electric locomotives provided for the Delta line would serve the three branches. The feeder line over the WESTERN PACIFIC main line would enable the electric locomotives to switch not only over the branches but to move freight trains (of 12 loaded cars) over the main line from one branch to the other.

The cost of electrifying the Lodi Branch and the main line between the junction points of the three branches would be as follows:

6 miles 4/0 trolley wire and pole line	$18,600
21 miles 4/0 copper feed wire	36,120
	$54,720
Engineering and Contingencies, 10%	5,472
TOTAL COST OF ELECTRIFICATION	$60,192

The location of substations and feeder lines shown by the diagram on the opposite page indicates the proper arrangement of the electric facilities.

Operated as a system, the operating ratio should not exceed 52 per cent. The country around Lodi in every direction is well provided with passenger transportation in the form of automobile stages, commonly termed "jitneys" which maintain time schedules practically the same as the steam and interurban lines, and give more frequent service. Under

these circumstances it would be folly to attempt passenger service, nor is it likely that the State Railroad Commission would attempt to enforce it in view of the generally accepted fact that all rail local passenger transportation in the district is conducted at a loss. This applies to the Thornton-Isleton Line as well as to the Lodi Branch. Auto stages run at frequent intervals from all Delta towns in the vicinity of that line to Sacramento, Stockton and Lodi.

The gross earnings and total cost of the three-branch system just outlined would be as follows:

	Earnings	Cost
Thornton-Isleton Line	$ 677,488	$ 889,137
Shima-Rindge Line	763,696	424,752
Lodi Branch	149,099	283,844*
Electrification of Western Pacific Main Line		61,793
Total	$1,590,283	$1,659,526

On the basis of an operating ratio of 52 per cent., taxes 5¼ per cent. of gross and fixed charges at 5 per cent. of the cost of construction, the following is a statement of the income account at the end of the first year of operation:

Gross Revenue		$1,590,283
Net Revenue 48% of Gross		763,336
Taxes, 5¼% of Gross Revenue		83,490
		$ 679,846
5% on Cost of Construction, $1,659,526		82,976
Surplus		$ 596,870

*This is the sum of $223,652 shown on estimate of cost of Lodi Branch (Steam Line) and $60,192 cost of electrification of Lodi Branch shown above.

STOCKTON CHANNEL INDUSTRIAL LINE.

AT STOCKTON.

The water front of the City of Stockton is along the Stockton Channel, a waterway about 300 feet in width which connects the city with the San Joaquin River. Practically all of the traffic between rail and water carriers is interchanged at docks located on the Channel.

The waterway terminates in the heart of the business district of the city.

The principal docks for the interchange of freight between river craft and the railroads are located on the south side of and near the terminus of the channel. The tracks of the electric interurbans and the Southern Pacific occupy all of the street surface alongside of these docks. The tracks of the WESTERN PACIFIC are connected with the channel only through its warehouse located approximately a mile west of the terminus of the waterway.

It is very important that the WESTERN PACIFIC reach the Stockton water front at or near the business center of the city. In order to compete for its share of the business it must have team tracks and other facilities near the produce markets, and a line near the water front serving industries requiring both rail and water transportation.

As the water front on the south side of the Stockton Channel is now fully occupied by other transportation lines, the only territory left for the WESTERN PACIFIC to occupy is that on the north side of the Channel. An inspection of the map of Stockton in the book of maps accompanying this report will show the principal features of interest in this connection.

The following extracts from the report of the local agent of the WESTERN PACIFIC at Stockton indicate the present situation and the needs of the COMPANY:

> "The property north of Stockton Channel is the most valuable industrial property in Stockton, and is desirable

for all kinds of industries, manufacturing plants and team track locations. All industries could locate on both rail and water. There are at present located in this section the Stockton Iron Works, Stephens Brothers Shipbuilding Plant, a similar plant of the Island Transportation Company, and at the east end the San Joaquin Brick Company, a junk yard and other industries, an early onion market where fully 300 cars of onions are loaded each Spring, and public docks. The terminal would be in the heart of the city. We could have a team track at the terminal similar to the one the Southern Pacific now has on the southern bank of the Channel.

"Large plants of various kinds are continually seeking a location in Stockton where they may have rail and water connection, and the only reason the property north of the Channel has not been built up with factories and industrial plants is because there has been no certainty of rail connection. About a year ago the Union Iron Works of San Francisco were negotiating with the Island Transportation Company for a location on Wood Island, and, in my opinion, they would probably have located there had the district been served by a railroad.

"If we get our rails into this section we will, in the near future, have as large an industrial representation in Stockton as either the Southern Pacific or Santa Fe. The line, in my opinion, should be electric.

"We formerly had right-of-way covering this entire route (the line shown on the map) and what is known as 'Old Women's Grade' is still in good shape for more than three-quarters of the distance. I think there would be no difficulty in crossing both Wood and Banner Island with little, if any, cost for right-of-way. There has in the past been considerable demand for a wagon drawbridge across Fremont Channel and we would perhaps be able not only to get permission for the drawbridge, but, in addition, some backing to induce the City to assist in this construction, the property to be used jointly for team and rail traffic."

An examination of the district and an investigation of conditions at Stockton verifies the statements quoted above.

The terminus of the line shown on the accompanying map of Stockton is at El Dorado Street in the center of the business district. It lies in the street alongside of public docks

from El Dorado Street to the Fremont Channel. The crossing of this channel will involve the construction of a drawbridge with a span of probably 400 feet. The line thence crosses Banner Island, over which it may be carried on a trestle to a street running parallel with, and 400 feet distant from, the Channel; thence it runs in streets and across private property in places to the west boundary of the city, distant 1¼ miles from the point of beginning. It turns thence and runs north from the water front for a distance of about 1½ miles, and thence east to a connection with the WESTERN PACIFIC main line north of the point where that line crosses the Southern Pacific. The total length of the line with a spur track in the street alongside of Banner Island, terminating at the steamboat levee, is approximately 5 miles.

The construction of this line will accomplish three very desirable things:

Connect the WESTERN PACIFIC main line with the center of the business district of Stockton and the public docks on the north side of the Stockton Channel.

Provide team tracks near the produce markets and the water front.

Between Fremont Channel and the west limits of the city, a distance of approximately one mile, it will serve an industrial strip having a water frontage about one mile long with a depth varying between 200 and 400 feet. As Stockton is the most important industrial city in the interior of California, there is no doubt that this industrial strip on the water front will be occupied when provided with rail transportation and will provide a very large traffic for the WESTERN PACIFIC.

The business available for such a line probably will not provide a return on the expenditure immediately following construction. It can hardly fail to do so within a short time after it has been placed in operation.

An approximate estimate of the cost of constructing the line follows. It is based upon a personal inspection of local conditions and reports from employes of the COMPANY, as it was not considered desirable to make actual surveys or extensive investigations which would disclose the purpose of the COMPANY too far in advance of an effort to obtain right-of-way, franchises and other concessions from the city. The estimate is to be regarded as a rough approximation of cost based on the best information obtainable without detailed surveys and investigations:

STOCKTON CHANNEL INDUSTRIAL LINE.

ESTIMATE OF COST OF CONSTRUCTION.

		Miles		
Main and Spur Track		5.0		
Sidings		1.0		
Total		6.0		
RIGHT-OF-WAY				$ 25,000
*GRADING				
5 miles of line	@	$ 1,000	$ 5,000	
Work in city streets, 2,000 feet	@	6	12,000	
Total Grading				$ 17,000
BRIDGING				
†Fremont Channel Drawbridge—400′ Span:				
6,150 Cu. Yds. Concrete Masonry	@	$ 10.00	$ 61,500	
40,000 Lin. Ft. Piling	@	.28	11,200	
90 F. B. M. Bridge Timber	@	30.00	2,700	
60 Lin. Ft. Caisson Driven	@	300.00	18,000	
750 Tons of Bridge Steel	@	128.00	96,000	
Turning Machinery			2,000	
600 Lin. Ft. Pile Trestle Approach	@	15.00	9,000	
			$200,400	
Cost equally divided between city and railroad:				
Railroad portion			$100,200	
400 Lin. Ft. Trestle at Smith's Canal	@	$ 15.00	6,000	
5 miles Miscellaneous Small Culverts			5,000	
Total Bridging				$111,200

* Statement shows 75 per cent. of line heretofore graded.
† Estimate is based on cost of drawbridge of same span over Sacramento River, details of which are available.

TRACK

6 Miles 60# track, except switches		$ 35,506	
(Track and Ties on same basis as Western Pacific estimates for similar track.)			
15 Sets No. 10 Frogs and Switch Irons	@ $160	$ 2,400	
Total Track			$ 37,906

TIES

6 Miles of Track Ties		$ 10,414	
15 Sets No. 10 Switch Ties	@ $ 20.00	300	
Total Ties			$ 10,714
Fencing:			
2 miles	@ $ 1,500		$ 3,000
Ballast:			
5 miles	@ $ 1,200		6,000
Labor:			
Laying and surfacing 6 miles	@ $ 1,500	$ 9,000	
Laying 15 switches	@ 45	675	
Total Labor			$ 9,675

*ELECTRIC FACILITIES

Portable Substation—300 K. W.—1,200 Volts.		$ 11,730	
4/0 Trolley and Pole Line, 6 Miles	@ $ 3,100	18,600	
Bonding Traffic Rail, 6 Miles	@ 645	3,870	
Transmission Line—3 phase, 1 Mile	@ 1,350	1,350	
Poles for Transmission, 1 Mile	@ 500	500	
Locomotive		10,800	
Total Electric Facilities			46,850
			$267,345
Engineering and Contingencies, 10 per cent			26,735
TOTAL COST			$294,080

* See article following for the cost of electric facilities if this line is operated as a part of an electric system.

DELTA-LODI-STOCKTON ELECTRIC SYSTEM.

If the Stockton Channel Industrial electric line were operated in connection with the two Delta branches and the branch to Lodi, it would facilitate the operation of all of the four branches.

The cost of the electrification of the four lines would be as follows:

3	Portable Substations	@ $11,730	$ 35,190
69	Miles Trolley and Pole Line	@ 3,100	213,900
62.5	Miles Feeder Line	@ 1,720	107,500
69	Miles of Track Bonding	@ 645	44,505
10	Miles Transmission Line	@ 1,350	13,500
5	Miles of Pole Line	@ 500	2,500
2	Locomotives	@ 10,800	21,600
			$438,695
	Engineering and Contingencies, 10%		43,870
	TOTAL COST		$482,565

The total cost of the four electric lines would be as follows:

Thornton-Isleton Line	$ 712,703
Shima-Rindge Line	325,150
Lodi Branch	223,652
Stockton Channel Industrial	242,545
Electrification as above	482,565
GRAND TOTAL	$1,986,615

The sketch on the opposite page shows the arrangement of electric facilities upon which the estimate is based. The locomotives can haul a train of 12 loaded freight cars over any of the branches or the main line of the WESTERN PACIFIC between their junctions with that line.

CENTRAL CALIFORNIA TRACTION COMPANY.

The Central California Traction Company is a third rail electric interurban railway operating a main line between Sacramento and Stockton, a distance of 53 miles, with a two-mile branch to Lodi. The total mileage of the system owned is stated in the report of the Railroad Commission of California, 1915-1916, as 75.548 miles—operated, 78.508 miles. The Traction Company in 1915 leased certain of its lines in Stockton to the Stockton Electric Railroad. The entire stock issue of the latter company is owned by the Southern Pacific Railroad.

The territory through which it runs is practically all irrigated and intensively cultivated. A large proportion of the tributary area is in vineyards and orchards. The vineyards produce a very large tonnage of table and wine grapes.

The principal eastbound transcontinental traffic consists of fresh deciduous fruit, principally grapes, wine and brandy, almonds and hops. The intrastate outbound traffic consists of grapes, olives, dried fruit, grain and hay. The inbound tonnage is merchandise, miscellaneous and materials used in fruit packing.

The line of the Southern Pacific between Sacramento and Stockton practically parallels the traction line, being about six miles west of it at the point of greatest divergence. The Western Pacific main line lies still further west, practically paralleling the other two lines but lying wholly beyond the area devoted to intensive cultivation. It will be noted in passing that the Southern Pacific lies between the Western Pacific and the Central California Traction for practically the entire distance between Stockton and Sacramento. The sketch map on the opposite page shows the relative positions of the various railroads in the territory under discussion.

The principal traffic center of the territory is Lodi, which is the shipping point for about 2,500 cars of fresh fruit and 3,750 tons of wine annually to eastern markets.

During 1916 the Central California Traction secured only 78 cars of the total of 2,500 cars of fresh fruit shipped from Lodi, although three of the six packing plants are located on its industrial tracks. The superior through service of the Southern Pacific is undoubtedly responsible for the present unequal division of this traffic as the Traction Line as at present operated, performs practically a switching service only in moving such cars as it receives, delivering them to the Santa Fe at Stockton or the WESTERN PACIFIC at Sacramento for movement to eastern territory.

It is the opinion of the traffic officials of the WESTERN PACIFIC that if the Central California Traction Company were owned and operated by that SYSTEM it could secure one-third of the fresh fruit traffic at Lodi and one-half of the wine shipments. This opinion is based on the relative adaptability of the facilities of the two roads in serving the packing plants and the winery.

On the basis of such a division of the traffic at Lodi and the traffic it is now securing at points on its own line, the Central California Traction, if owned by the WESTERN PACIFIC, would contribute to its freight tonnage and revenue the following:

24,833 Tons Interstate Outbound Traffic	$213,409
8,700 Tons Intrastate Outbond Traffic	8,900
Inbound Traffic	59,097
Total	$281,406

The report for the year ended December 31, 1916, shows the passenger earnings of the Traction Company at $176,240.13 and miscellaneous transportation revenue $6,360.82, a total transportation revenue, other than freight, of $182,600.95.

The total revenue which the Traction Company would add to the WESTERN PACIFIC, if owned by it, would be as follows:

Total Freight Revenue	$281,406
Less Revenue now received by Western Pacific Account of Central California Traction Company	22,802
	$258,604
Passenger and Miscellaneous Revenue	182,601
Total Revenue	$441,205

The following statement, compiled from the report of the year ended December 31, 1916, shows that the net operating revenue of the Central California Traction Company was not sufficient to pay its taxes:

Total Operating Revenue	$272,551.72
Operating Expenses	261,526.55
Net Operating Revenue	$ 11,025.17
Taxes	16,916.24
Deficit	$ 5,891.07
Non-operating Income (Leases)	11,277.67
Gross Income	$ 5,386.60

As the fixed charges total $109,460.17, there is a *net deficit* of $104,073.57 resulting from the year's operation.

Under these conditions there is of course no equity in the stock and with an income from all sources of only $5,386.60 available for interest charges there is very little in the First Mortgage Bonds.

The salvage value of its physical property exceeds its value as an operating railroad. As its total operating revenue for 1916 shows a decrease of $17,079.08 from the revenue of 1915, and its operation for several years has resulted in a steadily increasing deficit, there is no reason to anticipate a more favorable showing in the future. The current quotation on its First Mortgage Bonds is 30 bid, 45 asked.

Its statement of capitalization shows the following funded debt and outstanding notes:

First Mortgage Bonds Outstanding	$1,473,000
Mortgage Note of February 16, 1910	19,000
Notes at various banks due at call	446,091
	$1,938,091

The sum of $1,000,000 would discharge the outstanding notes amounting in the aggregate, to $465,091, and net the bondholders 36.23 per cent. of the par value of their bonds, less any expense incurred in the reorganization of the Company or transfer of its property. It seems as though an offer of $1,000,000 for the property free of encumbrance would be accepted by its owners.

If acquired by the WESTERN PACIFIC and operated as a feeder for that SYSTEM its income account on the basis of an operating ratio of 71 per cent., taxes at 5¼ per cent. of gross revenue, and fixed charges at 5 per cent. of cost of acquisition, would stand as follows:

Total Freight Revenue	$281,406
Passenger and Miscellaneous Revenue	182,601
Gross Revenue	$464,007
Net Revenue, 29% of Gross	134,562
Taxes 5¼% of Gross Revenue	24,360
	110,202
5% on Cost of Acquisition, $1,000,000	50,000
Surplus	$ 60,202

The whole of this surplus would not be added to the present net income of the WESTERN PACIFIC, as, on the basis of an operating ratio of 60 per cent., it now earns net $8,642 after taxes on its traffic interchange with the Central California Traction. The net benefit that would be derived by the WESTERN PACIFIC as the result of acquiring the electric road for $1,000,000 would be the difference between the surplus shown above and its net earnings on the present interchange, which are ($60,202 minus $8,642) $51,560.

Comparing this net benefit of $51,560 with the surplus shown from operation of the proposed (steam) branch from the WESTERN PACIFIC main line to Lodi, $52,557, the purchase of the Central California Traction at $1,000,000 will add practically the same amount to WESTERN PACIFIC surplus as the construction of the Lodi Branch (steam) costing $223,652.

The estimates of traffic show that the most important single items at the present time in the territory served by the Central California Traction are products of vineyards. No statistics showing the ratio of non-bearing to bearing vineyards are available. For this reason no reliable estimate can be made of the probable increase in traffic during the next five years. It is certain, however, that there will be a large increase in the rail traffic of this territory.

The Central California Traction line lies in Sacramento and San Joaquin Counties, in the sections devoted to intensive cultivation. The non-bearing acreage of fruit trees of these counties is 40 per cent. of the bearing acreage. The estimated increase of population at the end of five years is 40 per cent. of the present population. Rail traffic in such items as merchandise and miscellaneous will increase in the same ratio as the population. There will be a decided increase in shipments of fruit and nuts, which will afford traffic in addition to the present shipments of table grapes. It is not safe to estimate that there will be an increase in wine shipments owing to the national tendency toward prohibition and the possible decrease in the consumption of wine. The same is true of brewing hops, which now move east in large quantities from the territory; therefore, while there is a practical certainty of a large increase in traffic, it is not possible to estimate its amount, and for this reason the usual income statement, on the basis of the increase of traffic at the end of a five-year period, is omitted.

The WESTERN PACIFIC, Southern Pacific and Central California Traction are practically parallel between Sacramento and Stockton, and the attitude that the Railroad Commission of California may assume towards a proposition looking to the acquisition of the Central California Traction by the WESTERN PACIFIC is important.

The control of the Central California Traction by the WESTERN PACIFIC would not deprive shippers of rail competition with respect to traffic between Sacramento and Stockton, as there would still be two transcontinental roads serving such shippers. It would give shippers east of the Southern Pacific actual competitive rail service instead of the nominal competition that now exists. That it is merely nominal is abundantly proven by the impoverished condition of the Central California Traction.

In the territory south of Stockton, adjoining the one under discussion the Southern Pacific operates two lines between

Stockton and Merced, the Santa Fe being located midway between. The conditions in the two territories are exactly the same, and it is unlikely that a Commission that allows the operation mentioned south of Stockton would forbid a similar operation north of it.

The following is a detailed estimate of the freight tonnage and revenue which the Central California Traction Company would contribute to the WESTERN PACIFIC if owned by that SYSTEM, the foregoing statement of traffic being a summary of this estimate:

CENTRAL CALIFORNIA TRACTION.

ESTIMATE OF TRAFFIC—CENTRAL CALIFORNIA TRACTION PORTION.

INTERSTATE OUTBOUND.

Deciduous Fruits	20,358 Tons	@	$9.06	$184,443
Almonds	600 Tons	@	9.06	5,436
Hops	1,875 Tons	@	6.96	13,050
Wine and Brandy	2,000 Tons	@	5.24	10,480
Total Interstate Outbound	24,833 Tons			$213,409

INTRASTATE OUTBOUND.

Grain	1,000 Tons	@	$2.50	$2,500
Hay	500 Tons	@	1.44	720
Dried Fruit	300 Tons	@	1.15	345
Olives	400 Tons	@	2.40	960
Grapes to San Francisco, etc.,	1,500 Tons	@	1.25	1,875
Grapes to El Pinal	5,000 Tons	@	.50	2,500
Total Intrastate Outbound	8,700 Tons			$8,900

INBOUND.

Merchandise and Miscellaneous to Lodi (1/3 of total)	$11,200
Local interchange between stations:	
55 miles @ 500 (Lodi Branch not included)	27,500
Box Shooks and Baskets for Fruit	16,249
Coal, 1,050 Tons @ $3.95	4,148
Total Inbound	$ 59,097
Total Estimated Freight Revenue	$281,406

CENTRAL CALIFORNIA TRACTION COMPANY.

INCOME ACCOUNT

	Year Ended December 31, 1916.	Increase over previous year.
Miles of Line	78.51	
Passenger Revenue	$176,240.13	**$14,060.26**
Freight Revenue	87,857.31	7,535.82
Miscellaneous Transportation Revenue	6,360.82	763.92
Total Transportation Revenue	$270,458.26	**5,760.52**
Other Railway Revenue	2,093.46	**11,818.56**
Total Operating Revenue	$272,551.72	**17,079.08**
Operating Expenses	261,526.55	24,108.36
Net Operating Revenue	$ 11,025.17	**41,187.44**
Taxes	16,916.24	**229.49**
Operating Income	$ 5,891.07*	**40,957.95**
Non-Operating Income (Leases)	11,277.67	10,608.77
Gross Income	$ 5,386.60	**30,349.18**
Interest on Funded Debt	75,502.50	1,780.08
Interest on Non-Funded Debt	24,977.67	3,403.98
Miscellaneous Deductions	641.08	
Amortization of Discount on Funded Debt	8,338.92	8,338.92
Total Deductions	$109,460.17	14,164.06
Net Deficit	104,073.57	**44,513.24**
Operating Ratio	95.95%	

*Deficit.
Note: Bold face figures indicate decrease.

CAPITALIZATION

	Year ended December 31, 1916
Common Stock Authorized	$3,000,000.00
Retired and Canceled	72,000.00
Outstanding	2,928,000.00
Preferred Stock Authorized and Actually Issued	$1,000,000.00
Retired and Canceled	207,200.00
Outstanding	$ 792,800.00
First Mortgage Five Per Cent. Bonds of September 1, 1906:	
Maturing April 1, 1936	$1,500,000.00
Canceled	27,000.00
Actually Issued	1,473,000.00
Six Per Cent. Mortgage Note of February 16, 1910	19,000.00
Five and Six Per Cent. Notes at Various Banks, Due at Call	446,991.47

CENTRAL CALIFORNIA.

The agricultural areas in Central California which are discussed in this report are divided into two groups:

1. San Joaquin Valley.
2. Central Coastal Valleys.

SAN JOAQUIN VALLEY.

The total area of agricultural land in this valley is 7,576,000, or 11,867 square miles, the largest single arable area in California. The east side of the valley, extending from the Sacramento River to, and including, Fresno County is the portion that is of interest in connection with this report.

The following table shows the classification of the land, which has particular significance on account of the climate of the valley:

SAN JOAQUIN VALLEY (EAST SIDE)

Area	Valley Lands Total Agricultural (Acres)	Valley Lands Area Irrigated (Acres)	Plains Land Total Agricultural (Acres)	Plains Land Area Irrigated (Acres)	Counties
San Joaquin Delta	315,000	177,000	.....	....	Contra Costa and San Joaquin
Stockton	256,000	13,320	73,000	....	San Joaquin
South San Joaquin—Oakdale	129,000	4,000	110,000	....	Stanislaus and San Joaquin
Modesto—Turlock	315,000	135,760	135,000	....	Stanislaus and Merced
Madera	390,000	43,000	112,000	40	Madera
Fresno	947,000	540,200	83,500	2,350	Fresno
Total Areas	2,352,000	913,880 38.85%	513,500	2,390	

The precipitation and temperature for the year 1916 at the northern, central and southern portions of the section were:

	Total Precipitation	Highest Temperature
Stockton	18.85	102
Merced	16.47	105
Fresno	12.50	108

It is apparent from this statement that only grain and other early maturing crops may be grown without irrigation in the valley north of Merced; that grain cannot be grown without irrigation south of it; that irrigation is essential to intensive cultivation in all parts of the valley.

*Disregarding the "Plains Land," which is of no immediate interest in this discussion, it follows from the statement showing the irrigated area of valley land that the sections of present intensive cultivation are the Delta, Modesto-Turlock and Fresno areas, and that the Madera Valley Area is barren of agricultural production at this time as to 89 per cent. of its acreage.

Between the Merced and Chowchilla Rivers, in Merced County, water for irrigation purposes must be obtained from underground sources. Examination of this territory shows that several extensive vineyards in this section are now securing irrigation water by pumping.

An inspection of the sketch map of the San Joaquin Valley on the opposite page shows that a line drawn parallel with, and midway between, the Southern Pacific and the San Joaquin River from the Chowchilla River to a point opposite Madera will lie close to the largest body of irrigated land in the Madera area—a tract of approximately 35,000 acres.†

The Southern Pacific between Merced and the crossing of the San Joaquin River, about seven miles north of Fresno, is located near the eastern line of the valley lands of the San Joaquin Valley, the distance varying from one to seven miles. The Santa Fe, located further east, traverses at several points the plains land, none of which is irrigated.

If the Tidewater Southern were extended south from its present southern terminus to Fresno its location should follow a line drawn midway between the San Joaquin River and the Southern Pacific Railway as far as the point opposite Madera, at which the river turns abruptly east. Such a line produced further south would cross the river at Skaggs Bridge, and intersect the Kearney Boulevard at a point near its western

*The purpose of this and the paragraphs next following is to show the physical characteristics of the country which would be traversed by an extension of the Tidewater Southern Railway to Fresno.

†An "Irrigation Map of Central California" will be found in the book of maps accompanying this report. Existing railroads and the location of the proposed extension are shown on this map.

terminus. Thence the line should turn to the east and parallel the boulevard upon a railroad right-of-way adjacent to it, which right-of-way was platted and reserved for that purpose when the boulevard was planned. The terminus of this line in Fresno must be selected after a careful study of local conditions.

Such a location would pass through, or close by, the largest areas of irrigated land in the district. The area of irrigated land directly tributary to the extension as far south as Skaggs Bridge would be greater than that tributary to the Southern Pacific, and, in consequence, its freight traffic from the territory lying between Turlock and Skaggs Bridge would within a few years after its completion be greater than the present traffic of the Southern Pacific in the same territory.

It is not to be understood from this, however, that the entire area traversed by the extension is susceptible of intensive cultivation. Soil conditions in parts of the Madera area, particularly near the Chowchilla River, preclude this type of cultivation, and while the area may be utilized for other purposes, such as pasture, it will never produce the large tonnage of traffic that will follow intensive cultivation of lands adjacent to other parts of the line. This area of inferior soil extends for an aggregate distance of perhaps 25 miles.

That portion of the district from a point about 15 miles south of Stockton through Modesto, Turlock, Livingston and Merced furnishes a practical demonstration of the wonderful productivity of the San Joaquin Valley lands when provided with water and intensively cultivated. The land is covered with orchards, vineyards and fields of vegetable and melon crops. Its prosperity is more recent than that of the coastal valleys and it lacks, therefore, the air that long sustained prosperity brings, but there is abundant evidence of growing wealth and population.

A state highway of the same class of construction as that in the Santa Clara Valley, described elsewhere in this report, traverses the district from Stockton to Fresno.

The principal towns and cities of the district are:

	Population
Stockton	42,000
Modesto	10,000
Turlock	3,200
Merced	4,000
Madera	3,300
Fresno	48,000

The principal industries of the district are the manufacture of wine, the packing, curing and canning of fruits and the shipment of vegetables and melons. The extent of some of these industries may be judged by the fact that during 1916 upwards of 130,000 tons of raisins were shipped out of California, more than 90 per cent. moving by rail. Fresno is the center of their production and shipment. During 1916 it shipped 81,000 tons of raisins into transcontinental territory and a total of 25,000 tons of wine to transcontinental and California points.

On account of its proximity to the Delta District Stockton is the principal market for such staple vegetables as potatoes, onions and beans. There are several manufacturing plants of considerable magnitude producing tractors and agricultural implements.

At Mantica, 12 miles south of Stockton, a large sugar beet plant is now under construction and it is expected will be in operation this year.

From the territory lying south of Turlock to, and including, Fresno the principal items of outbound transcontinental traffic are dried fruits and raisins, cantaloupes, wines, green deciduous fruits, sweet potatoes, canned goods and watermelons, which are also shipped in large quantities to California points, as are also grain, hay, cattle and lumber. There is an outbound movement from Fresno amounting to 21,400 tons of merchandise and miscellaneous freight.

The principal items of inbound traffic are box shooks and other material used in the fruit packing industry, lumber and other building material, automobiles, agricultural implements and merchandise.

If the Tidewater Southern Railway became a part of the WESTERN PACIFIC and was extended from its present southern terminus near the Merced River to Fresno, it would add to the tonnage and revenue of that SYSTEM the following:*

58,622 Tons of Interstate Outbound Traffic	$541,723
50,364 Tons of Intrastate Outbound Traffic	165,188
38,910 Tons of Inbound Traffic	249,122
147,896	$956,033

No net revenue would be added to the above freight revenue immediately following construction through the operation of passenger trains. If possible, passenger operation should be deferred for a time, or at least confined to the absolute minimum required to develop the country. Upon this basis passenger revenue may be sufficient to pay the out-of-pocket expense incurred in connection therewith, or in any event, the loss would be negligible in arriving at the net revenue resulting from the operation of the extension.

The accompanying estimate of the cost of constructing the extension was prepared jointly by T. J. Wyche and J. C. Lindsay, the Chief Engineers of the WESTERN PACIFIC and the Tidewater Southern respectively, except as to one item. The latter's estimates are confined to the items of Right-of-Way, Grading and Bridging, the balance of the estimate, both as to quantities and prices, being that of the Chief Engineer of the WESTERN PACIFIC. The exception referred to relates to the estimate of the cost of real estate in Fresno. As the conditions as to population and development at Fresno are very similar to those at San Jose, the estimated cost of right-of-way at San Jose was used as the estimate for Fresno in the absence of better information.

* This traffic pertains to the **extension only** and does not include the present or prospective business of that portion of the Tidewater Southern which is now under construction and operation.

The total cost of construction shown by the estimate is $2,324,832. On the basis of an operating ratio of 52 per cent., with taxes at 5¼ per cent. of gross revenue, the operation of the extension from the present terminus of the Tidewater Southern to Fresno would result as follows:

Gross Revenue	$956,033
Net Revenue 48% of Gross	458,896
Less Taxes, 5¼% of Gross	50,192
	$408,704
Interest, 5% on $2,324,832	116,242
Surplus	$292,462

At the end of the five-year period following the beginning of operation the gross revenue would be $1,470,721, as shown on a following page under caption, "Estimated Five-Year Increase."

On the basis of an operating ratio of 52 per cent., taxes 5¼ per cent. of gross revenue and fixed charges at 5 per cent. of the cost of construction, the income account at the end of the fifth year would stand as follows:

Gross Revenue	$1,470,721
Net Revenue, 48% of Gross	705,946
Taxes, 5¼% of Gross	77,213
	$ 628,733
Interest, 5% on $2,324,832	116,242
Surplus	$ 512,491

The average annual surplus for the five-year period would be $402,476.

The following is a detailed estimate of the total freight tonnage and revenue of the district that will be served by the Fresno Extension of the Tidewater Southern and the latter's proportion of it, the foregoing statement of freight traffic being a summary of this estimate:

FRESNO EXTENSION OF TIDEWATER SOUTHERN.

Estimated Revenue.

Interstate Outbound (Eastern)

				Total Revenue	Western Pacific Proportion Tonnage	Revenue
Green Deciduous Fruit	10,600 Tons	@	$9.06	$ 96,036.00	4,400	$ 39,864
Dried Fruit and Raisins	87,025 Tons	@	7.90	687,497.50	24,862	198,410
Canned Goods	2,740 Tons	@	5.74	15,727.60	685	3,932
Watermelons	2,000 Tons	@	8.74	17,480.00	1,000	8,740
Sweet Potatoes	9,000 Tons	@	15.00	135,000.00	4,500	67,500
Wine	14,700 Tons	@	5.24	77,028.00	4,175	21,877
Cantaloupes	19,000 Tons	@	10.60	201,400.00	19,000	201,400
Total Interstate Outbound					58,622	$541,723

Intrastate Outbound (California)

Dried Fruit and Raisins	9,225 Tons	@	$4.50	$ 41,512.50	2,337	$ 10,517
Canned Fruit	410 Tons	@	5.50	2,255.00	102	561
Wine	15,300 Tons	@	4.40	67,320.00	4,575	20,130
Grain (Average)	50,000 Tons	@	2.25	112,500.00	25,000	56,250
Hay (Average)	6,000 Tons	@	2.00	12,000.00	3,000	6,000
Lumber (Western Pacific not interested)	95,000 Tons			.....	....	.....
Cars Cattle	1,539	@	51.50	79,258.50	10,000	39,630
Miscellaneous	*21,400 Tons	@	6.00	128,400.00	5,350	32,100
Total Intrastate Outbound					50,364	$165,188

Inbound

Box Shooks	6,600 Tons	@	$4.00	$ 26,400.00	1,925	$ 7,700
Lumber	30,000 Tons	@	5.00	150,000.00	8,625	43,125
Sand and Gravel	30,000 Tons	@	.30	9,000.00	8,625	2,587
Iron and Steel	3,000 Tons	@	10.04	30,120.00	875	8,785
Paper and Paper Boxes	6,250 Tons	@	6.20	38,750.00	1,875	11,625
Potatoes and Onions	6,000 Tons	@	2.60	15,600.00	1,750	4,550
Grain and Feed	6,000 Tons	@	2.75	16,500.00	1,750	4,813
Wood	4,800 Tons	@	1.00	4,800.00	1,200	1,200
Nails	600 Tons	@	6.20	3,720.00	175	1,085
Coal	1,400 Tons	@	3.95	5,530.00	1,400	5,530
Automobiles	7,200 Tons	@	23.40	168,480.00	2,100	49,140
Agricultural Implements	720 Tons	@	12.58	9,057.00	210	2,642
Miscellaneous	*28,800 Tons	@	7.60	218,880.00	8,400	63,840
Miles Local Station Interchange	85	@	$500	.....	....	42,500
Total Inbound					38,910	$249,122
TOTAL FREIGHT TONNAGE AND EARNINGS					147,896	956,033

* Includes merchandise.

Estimated Five-Year Increase of Freight Revenue.

As heretofore stated, the traffic tributary to the extension of the Tidewater Southern Railway from its present terminus at Hilmar, south as far as Skaggs Bridge, will be greater in a few years after its completion than the present traffic of the Southern Pacific in the same general territory. It would not necessarily consist of the same commodities, as the land is better adapted for such crops as grapes, cantaloupes, watermelons, sweet potatoes and similar crops than for fruit. The revenue of the Tidewater from agricultural products in this territory, at the end of five years, may be safely assumed to be equal to that now handled by the Southern Pacific at its stations located between Turlock and Fresno.

It is estimated that the increase in shipments of dried fruit and raisins between Skaggs Bridge, which is located on the north line of Fresno County, and the City of Fresno, will amount to 70 per cent. during the next five years, that having been the actual rate of increase in interstate shipments of the same commodities during the past five years. No increase in shipments of wine is included. The increase in production of deciduous fruit is estimated on the basis of non-bearing to bearing acreage, 20 per cent.

The increase in inbound traffic for the whole territory during a five-year period is based on the estimated increase of population, viz., 34.4 per cent., 35 per cent. being the factor actually used.

It will be noted that this basis treats the territory north of Fresno County as undeveloped at present, but takes into account the present highly developed area in Fresno County.

Upon these hypotheses the increase in traffic in the five-year period will be:

Interstate Outbound Traffic	$ 305,425
Intrastate Outbound Traffic	128,872
Inbound Traffic	80,391
Total Increase in Five Years	$514,688

Total Revenue at end of Five-Year Period:

Revenue at beginning	$ 956,033
Increase in five years	514,688
	$1,470,721

FRESNO EXTENSION OF TIDEWATER SOUTHERN.

Estimate of Cost of Construction.

Main track	75 miles
Sidings	10 miles
Total	85 miles

Right of Way.

32 miles, 50′ wide, @ $ 200 per mile	$ 6,400	
26 miles, 50′ wide, @ 1,000 per mile	26,000	
18 miles, 50′ wide, @ 3,500 per mile	63,000	
Real estate at Fresno	150,800	
Total right of way		$246,200

Grading.

10 miles 1 foot fill @ $ 600	$ 6,000	
30 miles 2 foot fill @ 1,100	33,000	
36 miles 3 foot fill @ 1,750	63,000	
10 miles spurs and sidings @ $750	7,500	
Total Grading		$109,500

Bridges, Trestles and Culverts.

Steel Bridges:		
Merced River; 250-foot steel bridge, with foundations	$25,000	
Pile Trestles:		
1,850 feet pile trestle approach to Merced River Bridge	27,750	
Bear Creek, Chowchilla River, Ash Creek, Berend Creek, Fresno River, Cottonwood Creek,	20,000	
San Joaquin River Viaduct	300,000	
Culverts:		
Irrigation culverts and structures through 40 miles of irrigated land	16,000	
Total Bridges, Trestles and Culverts		$388,750

Track.

85 miles (8,014.29 gross tons) 60-lb. rail	@	55.00	$440,785.95	
30,940 pairs 60-lb. angle bars	@	1.00	30,940.00	
787 kegs 60-lb. track bolts	@	10.00	7,870.00	
2,487 kegs track spikes	@	8.00	19,896.00	
123,760 nut locks	@	10.00	1,237.60	
352 joint tie plates	@	.16	56.32	
5,048 Intermediate tie plates	@	.12	605.76	
60 sets frogs and switch irons	@	160.00	9,600.00	
Total Track				$510,991.63

TIES.

60 sets switch ties, 233,340' B.M...	@	$ 20.00	$ 4,666.80	
229,500 Redwood track ties.....	@	.75	172,125.00	
Total Ties				$176,791.80

BUILDINGS.

11 depots	@	$ 3,500.00	$ 52,500.00	
10 warehouses	@	15,000.00	150,000.00	
11 section houses	@	1,200.00	13,200.00	
11 bunk houses	@	750.00	8,250.00	
Total Buildings				$223,950.00
Stock Yards:				
11 four-pen standard	@	$ 850.00		9,350.00
Fencing:				
75 miles	@	1,500.00		112,500.00
Telegraph Lines:				
75 miles	@	350.00		26,250.00
Ballast:				
85 miles	@	1,200.00		102,000.00
Railroad Crossings:				
2 possible crossings; Chowchilla Pacific Railway, Chowchilla to Dairyland, and Biola Branch of Southern Pacific, Biola Junction to Biola	@	$ 1,000.00		2,000.00
Interlocking Plants:				
2	@	$20,000.00		40,000.00
Water Stations:				
4	@	$ 5,000.00		20,000.00
Fuel Stations:				
1				15,000.00
Labor:				
Laying 60 switches.....	@	$ 45.00	$ 2,700.00	
Laying and surfacing 85 miles of track	@	1,500.00	127,500.00	
Total Labor				$130,200.00
				$2,113,483.43
Engineering and Contingencies, 10 per cent.....				211,348.00
TOTAL COST				$2,324,831.43

SAN JOSE TO WATSONVILLE AND SALINAS, ETC.

The Central Coastal Valleys which have been investigated, and the area of agricultural and irrigated land within them, are shown in the following tabulation:

Area	Acres of Agricultural Land	Acres of Irrigated Land	County
Santa Clara Valley	148,000	42,550	Santa Clara
Gilroy	46,800	1,220	Santa Clara
Hollister	59,500	3,300	San Benito
Pajaro Valley	32,000	1,370	Santa Cruz
			Monterey
Lower Salinas Valley	250,000	25,000	Monterey
Total	536,300	73,440	

Sixty per cent. of the entire Central Coastal Valley area is included within these valleys. The first three adjoin and the last three are in close proximity to each other. The significance of these conditions lies in the fact that a railroad line constructed to serve these districts will lie almost entirely in traffic producing territory.

All of the land within the area is extremely fertile, peculiarly well adapted to horticulture and under intensive cultivation. It has been more highly developed than any agricultural body of land in Central California of equal area.

The State highway—a paved roadway of the highest type of modern road construction—extends through all the districts, except the Salinas Valley. It is provided with good roads throughout and the residences and other improvements are of the best types.

In the Santa Clara Valley much of the surface water is used in Winter and Spring irrigation. Underground water occurs with lifts up to 100 feet and is extensively used, more than one-third of the irrigated area being supplied from this source. In the Gilroy and Hollister Districts the present use of water is much less than the annual run off, but no storage capacity sufficient for any considerable amount is available. Underground water conditions are favorable, particularly near the

streams and some artesian flow is encountered. Since the maturing of the orchards in the Pajaro Valley, irrigation has ceased, precipitation being ample. The Salinas River is the main source of water supply for the Salinas Valley. This surface supply cannot be extensively used without storage. More than 100 pumping plants draw water from underground sources.

The most important cities and towns in the district are:

San Jose	45,000
Watsonville	6,000
Salinas	5,000
Gilroy	2,900
Hollister	2,500
Spreckels	*

* Industrial town at sugar refinery.

The most important industries of the first four are connected with the packing, curing and canning of fruit. At San Jose there are a few other industries such as the manufacture of clay products. The lumber and jobbing interests are also large and important, especially the former.

Watsonville is the center of the largest apple growing district in the State, comprising more than 59 per cent. of the total acreage devoted to this fruit. The total shipment of apples in 1916 exceeded 3,600 cars.

Hollister is in a fruit growing area, is the shipping point for an immense tonnage of hay, and is the center of the largest district in the country that is devoted to the production of seeds. At San Juan, close by, is located one of the largest cement plants in the State, which will be placed in operation during 1917.

Salinas is the center of a large vegetable and grain growing area and an important cattle shipping point. A sugar beet plant with an annual capacity of 59,800 tons of sugar is located at Spreckels, which is consequently the center of a large area devoted to sugar beet production.

The most important items of outbound transcontinental traffic are sugar, green and dried fruits, canned goods, wine,

vinegar, vegetables and grain. The important outbound traffic to California points consists of the same commodities, together with cement, cattle, hay and beet pulp. The important items of inbound traffic are box shooks, lumber, lime rock for the sugar plant, sugar beets, coal, coke and merchandise.

The rail traffic of the district is served by the Coast Line and Hollister Branch of the Southern Pacific; a six-mile line owned by the Mission Portland Cement Company called the California Central Railroad connecting the cement plant near San Juan with the Southern Pacific main line, and the Pajaro Valley Consolidated Railway, a narrow gauge railroad extending from Watsonville to Spreckels and Salinas, with beet gathering branches extending from Spreckels to Alisal and Buena Vista, in the Salinas Valley.

The line from the WESTERN PACIFIC main line at Niles to San Jose, the construction of which has recently been authorized, may be extended to serve this whole district. It would necessarily parallel the Southern Pacific main line from San Jose to Watsonville. The acquisition and standardization of the narrow gauge line from Watsonville to Spreckels and Salinas would serve to complete the extension to those points. Hollister and the cement plant near San Juan may be reached either by securing operating rights over the California Central Railroad and extending it eight miles into Hollister, or by building an entirely new branch from the extension by way of the cement plant to Hollister. The sketch map on the opposite page shows existing railroads and the lower end of the proposed extension of the San Jose branch.

The Pajaro Valley Consolidated Railroad is owned by the same interest that operates the Spreckels sugar plant. It is used as a gathering line for carrying beets from the fields to the plant and to effect a connection between the plant and Moss Landing, on Monterey Bay, a port of call for Pacific Coast vessels.

As the business of the owners of this road is primarily that of manufacturing sugar, it seems probable that this line can be leased or purchased by a transcontinental line which could inaugurate competitive service. The arrangement must necessarily include an agreement as to the rates charged for rail shipments from the sugar plant to Moss Landing. The narrow guage branches extending from Spreckels to the beet fields might be operated by the sugar interests, as at present, or by the WESTERN PACIFIC, as conditions require.

Such an extension from San Jose through Watsonville to Spreckles and Salinas, with a branch to Hollister via the cement plant, would serve the territory with a varying degree of effectiveness in the several districts. Owing to the fact that the business of the Santa Clara and Gilroy Valleys has grown up largely since the construction of the Southern Pacific, it has become in larger part adapted to the facilities of that line. It would be difficult for a line newly constructed to secure an equal division of the business with the older line immediately following construction. It is the opinion of the general traffic officers, as well as the traffic men soliciting freight in the district, that for stations between San Jose and Gilroy the new line would secure at least one-third of the business.

At Watsonville the main line of the Southern Pacific is on the opposite side of the Pajaro River and the business is served by a branch extending to Santa Cruz, through Watsonville. Much the greater part of the business of this station consists of apples. More than 50 per cent. of the apples are packed in or near the orchards and are hauled to *team tracks* in Watsonville. The line of the WESTERN PACIFIC may be so located that *practically the whole of the team track business would be compelled to cross its rails to reach the Southern Pacific tracks.* The remaining 50 per cent. of the apples go to the fruit packing houses located on or near the Southern Pacific tracks.

The terminal of the Pajaro Valley Consolidated Railroad in Watsonville is well located in relation to its business houses. Under these conditions the assumption that the new line would secure one-half of the Watsonville traffic seems conservative.

It is the general practice of the sugar interests to apportion the whole traffic to the railroads on the basis of the tonnage of sugar beets which the respective railroads haul to the plant. The field reports of the traffic men show that the WESTERN PACIFIC can deliver 40 per cent. of the sugar beet tonnage and in the traffic estimate the division of the business of the sugar plant between the two railroads, is made on that basis.

By constructing the Hollister Branch directly to the cement plant, which is six miles distant from the Southern Pacific, it is considered that the WESTERN PACIFIC would obtain a material advantage over the other road in handling its traffic, which in the estimate is divided 75 per cent. WESTERN PACIFIC, 25 per cent. Southern Pacific.

At Hollister and Salinas an even division of the business is considered a fair estimate, after careful consideration of the location of the two competing lines.

On this basis of division of the traffic of the territory the extension from San Jose, constructed as outlined above, would add to the tonnage and revenue of the WESTERN PACIFIC the following:

68,875	Tons of Outbound Transcontinental Traffic.	$ 414,294
192,853	Tons of Outbound Intrastate Traffic.....	379,424
288,393	Tons of Inbound Traffic	391,372
550,121		$1,185,090
	The estimated total revenue from passenger train operation is.....	113,557
	Total Gross Operating Revenue.....	$1,298,647

An accompanying estimate of Mr. T. J. Wyche, Chief Engineer of the WESTERN PACIFIC, establishes the cost of constructing the line from San Jose to Watsonville, with a branch from it extending by way of the cement plant to Hollister, at

$4,007,451. He estimates the cost of standardizing the Pajaro Valley Consolidated Railway from Watsonville to Spreckels and Salinas, 30.2 miles, at $247,710, making a total expenditure of $4,255,161 to effect a rail connection of this entire district with the San Jose Branch of the WESTERN PACIFIC.

The following is a statement of the income account on the basis of an operating ratio of 61 per cent., taxes 5¼ per cent. of gross revenue, and fixed charges at 5 per cent. on the cost of construction of new line and standardizing the line from Watsonville to Salinas and Spreckels:

Gross Revenue		$1,298,647
Net Revenue—39% of gross		506,472
Less Taxes—5¼% of gross		68,179
		$ 438,293
Interest 5% on cost of construction		212,758
Surplus		$ 225,535

The following is a statement of the income account at the end of the fifth year when the operating ratio will be 57 per cent. based on the estimate of increased revenue at that time, as shown by a following statement:

Gross Revenue at beginning		$1,298,647
Increase in 5 years—Freight	$127,291	
Increase in 5 years—Passenger	19,305	146,596
Gross Revenue, end of fifth year		$1,445,243
Net Revenue 43% of gross		621,454
Taxes 5¼% of gross		75,875
		545,579
Interest 5% on cost of construction		212,758
Surplus		$ 332,821

The following is a detailed estimate of the total freight tonnage and revenue of the districts that will be served by the proposed extension from San Jose to Watsonville and Salinas, etc., and the WESTERN PACIFIC proportion of the traffic, the foregoing statement of freight traffic being a summary of this estimate:

SAN JOSE TO WATSONVILLE AND SALINAS, ETC.

Estimated Revenue.

Interstate Outbound (Eastern)

					Total Revenue	Western Pacific Proportion Tonnage	Revenue
Green Deciduous Fruit..	19,150	Tons	@	$9.06	$173,499	9,575	$ 86,749
Berries	3,400	Tons	@	9.06	30,804	1,408	12,756
Dried Fruit	10,350	Tons	@	7.90	81,765	4,225	33,378
Canned Goods	5,200	Tons	@	5.74	29,848	2,060	11,824
Wine	3,100	Tons	@	5.24	16,244	1,300	6,812
Potatoes	6,600	Tons	@	6.90	45,540	3,300	22,770
Beans	11,250	Tons	@	5.94	66,825	5,625	33,412
Seed	750	Tons	@	8.68	6,510	375	3,255
Barley	31,875	Tons	@	4.60	146,625	15,937	73,310
Vinegar	2,300	Tons	@	7.82	17,986	1,150	8,993
Sugar	59,800	Tons	@	5.06	302,588	23,920	121,035
Total Interstate Outbound						68,875	$414,294

Intrastate Outbound (California)

Green Deciduous Fruit..	47,925	Tons	@	$2.30	$110,227	23,858	$ 54,873
Berries	3,400	Tons	@	2.30	7,820	1,408	3,238
Dried Fruit	7,950	Tons	@	2.45	19,477	3,508	8,595
Wine	2,800	Tons	@	3.40	9,520	1,000	3,400
Potatoes (Watsonville)..	2,150	Tons	@	3.00	6,450	1,075	3,225
Beans (Salinas)	3,750	Tons	@	3.10	11,625	1,875	5,812
Seed (Hollister)	250	Tons	@	3.60	900	125	450
Beets (Sargent)	33,000	Tons	@	.50	16,500	11,000	5,500
Beet Pulp (San Francisco)	6,000	Tons	@	1.00	6,000	2,400	2,400
Beet Pulp (Salinas)	6,000	Tons	@	.50	3,000	2,400	1,200
Beet Pulp (Transcontine'l)	2,000	Tons	@	6.55	13,100	800	5,240
Wheat (Salinas)	6,000	Tons	@	2.50	15,000	3,000	7,500
Barley (Salinas)	10,000	Tons	@	2.50	25,000	5,000	12,500
Hay (Hollister)	25,000	Tons	@	1.75	43,750	12,500	21,875
Cattle (Salinas District)	275	Cars	@	31.50	8,662	137	4,316
Gravel (Coyote)	50,000	Tons	@	.30	15,000	16,667	5,000
Cement (San Juan)	140,000	Tons	@	2.20	308,000	105,000	231,000
Vinegar	2,200	Tons	@	3.00	6,600	1,100	3,300
Total Intrastate Outbound						192,853	$379,424

Inbound

Box Shooks and Lumber (Gilroy District)	3,300	Tons	@	$4.25	$ 14,025	1,100	$ 4,675
Box Shooks and Lumber (Hollister)	1,700	Tons	@	4.25	7,225	850	3,612
Box Shooks and Lumber (Watsonville District).	16,000	Tons	@	4.25	68,000	8,000	34,000
Sulphur	75	Tons	@	4.00	300	75	300
Potash	30	Tons	@	3.20	96	30	96
Lumber from Watsonville	300	Tons	@	2.10	630	300	630
Sacking from San Francisco	225	Tons	@	4.25	956	225	956
Sacking from East	100	Tons	@	9.75	975	100	975
Coal	2,590	Tons	@	3.95	10,230	1,255	4,957
Coke (Chattanooga)	3,500	Tons	@	3.68	12,880	3,500	12,880
Lime Rock	20,000	Tons	@	1.40	28,000	13,333	18,666
Beets	550,000	Tons	@	.55	302,500	225,000	123,750
Miscellaneous at San Juan.	22,500	Tons	@	2.60	58,500	16,875	43,875
Population	37,300		@	8.00	298,400	17,750	142,000
Total Inbound						288,393	$391,372
GRAND TOTAL OUTBOUND AND INBOUND						550,121	1,185,090

Estimated Five Year Increase of Freight Revenue.

The nonbearing acreage of orchards at this time is 12.9 per cent. of the bearing acreage. All of this nonbearing acreage will be in bearing within five years. Increase in fruit and fruit products, including vinegar, is estimated at 13 per cent. No increase in wine traffic is included.

The increase in the interstate shipment of raw vegetables from 1910 to 1916 was 446 per cent. (Official figures from return of railroads to State Commission.) It would be unsafe to estimate a future increase on this basis, market conditions having been abnormal, as indicated by the diagram showing graphically the increase 1910-1916. A line drawn from 78,000 tons in 1910, to 200,000 tons in 1914, seems to better represent the average that might be expected than the line of actual increase. It has the virtue of being conservative. On this basis the increase in 5 years has been 113 per cent. and that figure is used in computing anticipated increase in shipments of raw vegetables, such as potatoes, beans, etc.

No increases have been estimated for sugar and other refinery products, grain, hay or cement. Increases for box shooks and other materials required in packing fruit are estimated at 13 per cent., the same as that used for fruit. Increase in merchandise is estimated at 17 per cent., that being the percentage of estimated increase in population.

On this basis the following statement shows the increase in traffic in a period of five years following the completion of the line:

ESTIMATE OF INCREASE IN FREIGHT REVENUE.

Interstate Outbound.	
Fruit and Fruit Products, including Vinegar	$ 19,981
Raw Vegetables and Seed	63,908
Total	$ 83,889
Intrastate Outbound.	
Fruit and Fruit Products	$ 9,100
Raw Vegetables	1,536
Total	$ 10,636
Inbound.	
Box Shooks and Lumber	$ 5,594
Coal	3,032
Merchandise and Miscellaneous	24,140
Total	$ 32,766
Grand Total	127,291

The following is an estimate of the total passenger traffic of the proposed extension and the WESTERN PACIFIC proportion, the foregoing statement of traffic being a summary of this estimate:

ESTIMATED PASSENGER REVENUE.

Sale of tickets (General Passenger Agent's Estimate)			$ 74,057
Baggage, Mail, Express and Miscellaneous (on basis of Northern Electric Earnings in 1916—101 miles @ $250 per mile)			25,250
Express on Fruit, Berries, Poultry, Eggs and Dressed Meats to San Francisco:			
Rate $10.00 per ton Western Pacific earnings 50%, or $5.00 per ton.			
From Watsonville—Western Pacific portion.	1200 tons		
From San Juan—Western Pacific portion...	650 tons		
From Hollister—Western Pacific portion....	1000 tons		
	2850 tons	@ $5.00	14,250
Total Passenger Train Earnings			$113,557

ESTIMATE OF INCREASE IN PASSENGER REVENUE.

Passenger revenue will increase in the same ratio as the population, or 17% in five years	19,305
Passenger revenue at the end of fifth year	$132,862

SAN JOSE TO WATSONVILLE AND SALINAS, ETC.

Detail of Estimated Passenger Revenue.

Gilroy.

Destination	Total Number Tickets Sold	Western Pacific Proportion	Through Revenue	Western Pacific Total Through Revenue
Oakland and San Francisco	7,500	1,000	$ 2.20	$2,200
Sacramento Valley Points	1,000	500	4.00	2,000
San Joaquin Points	1,000	500	6.50	3,250
Eastern Points	250	75	20.00	1,500
Miscellaneous	8,000	2,000		1,200
Resort tickets (15 a year)			14.00	210

Hollister.

Oakland and San Francisco	8,000	1,800	$ 2.70	$ 4,860
San Jose	3,000	1,000		1,400
Sacramento Valley Points	1,000	500	4.45	2,225
San Joaquin Points	1,000	500	6.95	3,475
Eastern Points	225	60	20.00	1,200
Miscellaneous	9,000	3,000		2,700
Resort tickets (15 a year)			75.00	225

San Juan.

Oakland and San Francisco	1,800	1,500	$ 2.50	$ 3,750
San Jose	500	450		562
Sacramento Valley Points	225	200	4.30	860
San Joaquin Points	225	200	6.80	1,360
Eastern Points	60	30	20.00	600
Miscellaneous	2,000			1,500

Salinas (including Spreckels).

Oakland and San Francisco	10,000	1,500	$ 3.25	$ 4,875
San Jose	3,000	750		1,500
Sacramento Valley Points	1,000	500	5.05	2,525
San Joaquin Points	1,000	500	7.55	3,775
Eastern Points	250	100	20.00	2,000
Miscellaneous	9,000	3,000		2,700
Resort tickets (20 a year)			16.75	335

Watsonville.

Oakland and San Francisco	15,000	2,400	$ 2.80	$ 6,720
San Jose	4,000	1,000		1,550
Sacramento Valley Points	1,200	600	4.60	2,760
San Joaquin Points	1,200	600	7.10	4,260
Eastern Points	300	125	20.00	2,500
Miscellaneous	12,000	4,000		3,000
Resort tickets (30 a year)			16.00	480
TOTAL				$74,057

In addition to the regular express business that might be based upon tributary population of various towns shown, the express business of Watsonville, Hollister and San Juan would be as follows, consisting of fresh fruits and berries from Watsonville and San Juan, and poultry, eggs and dressed meats from Hollister. Practically all of this is consigned to San Francisco Bay Points:

Tons		Tons
Watsonville, 3,000	—Western Pacific Proportion,	1,200
San Juan, 650	—Western Pacific Proportion,	650
Hollister, 2,500	—Western Pacific Proportion,	1,000
Total		2,850

SAN JOSE TO WATSONVILLE, AND BRANCH TO HOLLISTER.

Estimated Cost of 71 Miles of Branch Lines.

	Miles
Main track	71
Sidings	17
Total	88

RIGHT OF WAY.

71 miles—70 feet wide 8.5 acres per mile: 603.5 acres @ $1,250 per acre			$ 754,375.00

GRADING AND BRIDGING.

60 miles Main Track.....658,000 cubic yards
- 20 Miles 2.5 feet fill
- 30 Miles 3.0 feet fill
- 10 Miles 4.0 feet fill

17 Miles Sidings.....187,000 cubic yards
- 15 Passing Tracks 4000′ each
- 15 House Tracks 2000′ each

845,000 cubic yards

845,000 Cubic Yards Grading @	$ .30	$253,500.00	
Bridging and Culverts 60 miles		220,000.00	
Grading and Bridging 11 miles @	$75,000.00	825,000.00	
Total Grading and Bridging			1,298,500.00

TRACK.

30 Sets #10 Frogs and Switch Irons @	$ 170.00	$ 5,100.00	
10,377 Gross Tons New 75# Rail @	55.00	570,735.00	
30,976 Pairs 75# Angle Bars @	1.25	38,720.00	
1,506 Kegs 75# Track Bolts @	10.00	15,060.00	
2,510 Kegs Track Spikes @	8.00	20,080.00	
186,000 Nut Locks (per thousand) @	10.00	1,860.00	
3,100 Joint Tie Plates @	.16	496.00	
44,400 Intermediate Tie Plates @	.12	5,328.00	
Total Track			657,379.00

TIES.

30 Sets #10 Switch Ties, 116,620 feet BM @	$ 20.00	$ 2,333.40	
237,600 Redwood Ties @	.75	178,200.00	
Total Ties			180,533.40

BUILDINGS.

15 Depots @	$ 3,500.00	$ 52,500.00	
10 Warehouses @	15,000.00	150,000.00	
8 Section Houses @	1,200.00	9,600.00	
8 Bunk Houses @	750.00	6,000.00	
Total Buildings			218,100.00
6 Railroad Crossings @	$ 500.00		3,000.00
6 Interlocking Plants @	20,000.00		120,000.00
7 4-Pen Standard Stock Yards @	850.00		5,950.00
1 Oil Station @			15,000.00
71 Miles Telegraph Line @	350.00		24,850.00
71 Track Miles Fencing @	1,500.00		106,500.00
4 Water Tanks and Piping @	5,000.00		20,000.00
88 Miles Ballast @	1,200.00		105,600.00
Labor:			
Laying 30 Switches @	45.00	1,350.00	
Laying and Surfacing 88 miles Track @	1,500.00	132,000.00	
Total Labor			133,350.00
			$3,643,137.40
Engineering and Contingencies, ten per cent			364,313.70
TOTAL COST			$4,007,451.10

PAJARO VALLEY CONSOLIDATED RAILROAD.

Estimate of Cost of Standardizing.

Watsonville to Salinas and Spreckels.

	Mileage
Watsonville to Spreckels	27.2
Branch to Salinas	3.0
Total	30.2

Cost of Standardizing Gauge.

	Per Mile
2,000 New ties in place	$ 2,000
Widening gauge	300
Widening roadbed (train work)	3,000
Bridges and Culverts	500
Telegraph Line	250
Total Cost Per Mile	$ 6,050
30.2 Miles @ $6,050	$182,710
Rearranging terminal yards	15,000
Shops, turntable, oil supply, strengthening bridges, etc.	50,000
Total Cost	$247,710

NILES TO SAN JOSE.

The cost of constructing the line from Niles to San Jose, heretofore authorized, will exceed the estimates submitted by the Engineering Department of the WESTERN PACIFIC. These increases relate almost entirely to estimated cost of real estate. It is manifestly impossible to make an accurate estimate of the cost of this item in advance of actual acquirement. The estimate shown on following pages is submitted after the larger part of the required real estate has been acquired so that the probable cost is more definitely known than heretofore.

The total cost of constructing this branch is $1,396,477, from which $40,000 should be deducted for real estate salvage. Some parcels of real estate must first be acquired as a whole and those portions not required for railroad purposes will be disposed of later. The item of salvage shown at the foot of the estimate is included to cover these transactions.

An estimate of the increased traffic anticipated from the operation of this branch has heretofore been made by the Traffic Department of the WESTERN PACIFIC. The work of this department has been verified and the estimate in detail is shown on a following page.

The operating ratio for this branch, estimated on the same basis as that used for other proposed feeder lines, will be as follows:

Passenger Revenue	$ 50,000	—Operating Expenses 100 %	$ 50,000
Freight Revenue	326,890	—Operating Expenses 52.2%	170,637
Total Revenues	$376,890	Total Expenses	$220,637

Operating Ratio, 58.5%

On the basis of an operating ratio of 59 per cent., taxes 5¼ per cent. of gross revenue and fixed charges 5 per cent. of estimated cost of construction, the income account will stand as follows:

Gross Revenue	$376,890
Net Revenue, 41% of Gross	154,525
Taxes, 5¼% of Gross Revenue	19,787
	$134,738
5% of construction cost, $1,356,477	67,824
Surplus	$ 66,914

NILES TO SAN JOSE.

Estimated Revenue.

SAN JOSE

WESTERN PACIFIC PORTION OF REVENUE.

Interstate Outbound (To East).

Tonnage			Revenue
11,760	Tons Dried Fruit ..... @	$ 8.00	$ 94,080
4,800	Tons Canned Goods	5.80	27,840
2,600	Tons Deciduous Fruit	9.06	23,556
1,275	Tons Wine	6.00	7,650
450	Tons Brandy	6.72	3,024
20,885			$156,150

Interstate Inbound (From East).

4,000	Tons Tinplate	$5.46	$ 21,840
4,000	Tons Coal	3.95	15,800
4,000	Tons Miscellaneous carload	7.00	28,000
1,500	Tons Miscellaneous less-than-carload		21,400
13,500			$ 87,040

Intrastate.

2,000	Tons Lumber and Box Material Inbound	$ 3.50	$ 7,000
1,500	Tons Green Fruit, Inbound.....	1.80	2,700
50	Cars Livestock, Inbound.....	80.00	4,000
3,500			

Local Between San Francisco, Oakland and San Jose:	
Inbound	$ 20,000
Outbound	50,000
	$83,700

Total Freight Earnings.....	$326,890
Estimated Passenger Earnings.....	50,000
Total Earnings All Sources.....	$376,890

NILES TO SAN JOSE.

Estimated Cost of Proposed Line.

	Miles
Main Line	19.0
Sidings	3.4
Industry Spurs	1.0
Total	23.4

Right of Way.	Main Line	Sidings and Spurs	Total
Niles to McKee Road	$ 147,300		
McKee Road to S. P. 4th St. Crossing	210,850		$ 358,150
Grading	80,000	$ 10,228	90,228
Track (75# Rail)	145,822	25,861	171,683
Ballast and Ballasting	43,700	7,820	51,520
Interlocking Plants	18,000		18,000
Fencing	13,600		13,600
Telegraph Line	5,700		5,700
Road Crossings, Signs and Whistling Posts	2,731		2,731
Paving on 12 Street Crossings	1,200		1,200
Bridging	32,050		32,050
Buildings	43,090		43,090
Industry Spurs		15,000	15,000
	$ 744,043	$ 58,909	$ 802,952
Engineering and Contingencies, 10 per cent	74,404	5,891	80,295
	$ 818,447	$ 64,800	$ 883,247

Switching Line, Sidings and Spurs.

	Miles
Main Line	4.0
Sidings	0.6
Total	4.6

Right of Way.			
Phelan Tract to the Alameda	$ 255,090		$ 255,090
Grading	12,033	$ 1,805	13,838
Track (75# Rail)	55,590	4,903	60,493
Ballast and Ballasting	7,848	960	8,808
Interlocking Plants	36,000		36,000
Telegraph Line	1,200		1,200
Road Crossings, Signs, Etc.	1,768		1,768
Paving on 10 street crossings	1,000		1,000
Bridging	29,900		29,900
Buildings	8,930		8,930
Industry Spurs		25,000	25,000
	$ 409,359	$ 32,668	$ 442,027
Engineering and Contingencies, 10 per cent	40,936	3,267	44,203
	$ 450,295	$ 35,935	$ 486,230

Freight.

	Main Line and Sidings	Switch Line and Sidings	Total
Track material	$ 10,000	$ 2,500	$ 12,500
Bridge material	4,500	3,000	7,500
Building material	1,500	500	2,000
Men and other material	4,500	500	5,000
	$ 20,500	$ 6,500	$ 27,000

Summary.

	Main Line	Sidings and Spurs	Total
Main Line, Sidings and Spurs	$ 818,447	$ 64,800	$ 883,247
Switching Line	450,295	35,935	486,230
Freight	20,500	6,500	27,000
Total Cost	$1,289,242	$107,235	$1,396,477
Less salvage of real estate	40,000	.....	40,000
Net Cost	$1,249,242	$107,235	$1,356,477

SURPRISE VALLEY.

The proposed Surprise Valley Line is to be built from a point near Reynard, about 415 miles east of San Francisco, to the southern end of Surprise Valley, a distance of approximately 56 miles, being located wholly within the State of Nevada. Surprise Valley contains 110,000 acres of arable land, of which 30,000 acres are under irrigation.

The freight tonnage and revenue of the Surprise Valley line, as estimated by the traffic department of the WESTERN PACIFIC, is shown on following pages. The revenue to be derived from the anticipated tonnage will vary with the basis of rates applied to it. Estimate No. 1 has been made on the assumption that no through rates are to be made; that is, the traffic is to move on the sum of the local rates applying on the branch and the local rates applying on the WESTERN PACIFIC main line. The local rates used on the branch are the same as those now applying to points on the Nevada-California-Oregon opposite the branch stations.

In view of the fact that through rates are in effect to points on the Nevada-California-Oregon and that the proposed branch line must compete with that road for a portion of the business, it is probable that through rates must be put in effect on the proposed branch line on the same basis as those now applying on the existing road. Estimate No. 2 has been made on the assumption that through rates will be in effect on the proposed branch road.

The Eureka Nevada Railway is a narrow gauge line with operating conditions similar to those which will obtain on the proposed branch to Surprise Valley. It obtains local rates on its traffic. Its operating ratio is practically 50 per cent. and its taxes 5 per cent. of gross earnings.

Using this basis of estimating and allowing 6 per cent. interest on the cost of constructing the road, the income account of the Surprise Valley Branch would stand, on the basis of Traffic Estimate No. 1, as follows:

Freight Earnings	$116,818
Passenger Earnings*	33,500
Gross Revenue	$150,318
Net Revenue 50% of Gross	75,159
Taxes 5% of Gross Revenue*	7,516
	$ 67,643
6% on cost of construction, $550,650	33,039
Surplus	$ 34,604

*Estimate of J. E. Sexton, General Manager Eureka Nevada Railway.

The gross freight earnings of the WESTERN PACIFIC on the traffic to be moved to and from the territory served by the branch line, will be $168,280. This traffic can be moved at an operating expense of 52.2 per cent. of the added gross earnings. With taxes at 5¼ per cent. of gross earnings, the net benefit to be received by the WESTERN PACIFIC from this branch traffic, will be:

Gross Revenue	$168,280
Net Revenue 47.8% of Gross	80,438
Taxes, 5¼% of Gross Revenue	8,835
Surplus	$ 71,603

On the basis of the same operating expense as that used in the above statement, the income account of the Surprise Valley Branch would be, for the total freight revenue shown in Traffic Estimate No. 2, as follows:

Freight Earnings	$108,551
Passenger Earnings	33,500
Gross Revenue	$142,051
Operating Expenses, as per Estimate No. 1	75,159
Net Revenue	$ 66,892
Taxes, 5 per cent. of Gross Revenue	7,102
	$ 59,790
Six per cent. on cost of construction, $550,650	33,039
Surplus	$ 26,751

The gross freight earnings of the WESTERN PACIFIC on the traffic to be moved, estimated on the basis of Traffic Estimate No. 2, will be $119,921. The operating expense will be the same whatever basis of rates is applied. In the foregoing statement the assumption was made that operating expense will be 52.2 per cent. of $168,280. This would amount to $87,842. With taxes at 5¼ per cent. of gross earnings the income account would stand under Traffic Estimate No. 2 as follows:

Gross Revenue	$119,920
Operating Expense	87,842
Net Revenue	$ 32,078
Taxes, 5¼ per cent. of Gross Revenue	6,296
Surplus	$ 25,782

The surplus from these earnings, according to Estimate No. 1, are, for the branch, $34,604, and for THE WESTERN PACIFIC RAILROAD, $71,603. If the WESTERN PACIFIC owns all of the stock of the Surprise Valley Line its total surplus would be the sum of these two amounts, or $106,207.

Estimate No. 2 is based upon the assumption that it will be necessary to put in effect through rates, and in this case the surplus of the Surprise Valley Branch will be $26,751, and of the main line, $25,782, a total of $52,533, which would accrue to the WESTERN PACIFIC if it was the sole holder of stock in the branch line company.

It is proposed, however, to make an arrangement similar to that adopted in the construction of the Deep Creek and Indian Valley Line, and to make a contract for the construction and subsequent operation of the line by a third party.

It is believed that the item of grading 56 miles of road, which amounted to $70,000 in the estimate originally submitted, is inadequate, and that this cost should be doubled. It would then amount to only $2,500 per mile, and on the basis of an average cost of 40 cents per yard the grading required would amount to only 6,250 cubic yards per mile. Considering

the canyon work to be done on certain portions of the line, it is believed that this revised estimate is not excessive.

According to the arrangement now being discussed, rail splices, spikes, ties, frogs and switches to the value of $233,500 would be furnished by the WESTERN PACIFIC and it would take stock of the company at par in payment therefor. The party who desires to contract to build and operate the line and furnish narrow gauge equipment to the value of $59,000 would receive stock at par in that amount. This would leave the sum of $258,150, or say $260,000, to be raised by sale of bonds, and of this amount the party contracting for the supervision of construction and subsequent operation of the road is expected to sell $75,000 par value, thus leaving $185,000 cash to be provided by THE WESTERN PACIFIC RAILROAD.

In order to make the estimate of cost and the income account uniform with those of the other lines that have been included it has been assumed that the branch will be built in the usual way and not in accordance with the terms of the proposed contract, which may or may not be consummated.

*ESTIMATE NO. 1.

SURPRISE VALLEY.

Estimated Tonnage and Revenue.

INBOUND.

Commodities—	Cars.	Tons.	Rates per ton to Reynard from points of origin shown.	Points of Origin.	Western Pacific Earnings.	Rates per ton Reynard to Cedarville. Basis Nevada-California-Oregon Railway Rates, Hackstaff to Alturas.	Branch Line Earnings.
Agricultural Implements and Vehicles.	...	25	$11.50	Sacramento	$ 287.50	$ 7.20	$ 180.00
	...	25	13.00	San Francisco	325.00	7.20	180.00
	...	36	12.58	Chicago	452.88	7.20	259.20
Automobiles, Passenger	...	25	25.40	San Francisco	635.00	14.20	355.00
	...	25	23.53	Chicago	588.25	14.20	355.00
Bags and Bagging	...	100	10.20	San Francisco	1,020.00	9.20	920.00
Brick	...	200	5.20	Reno	1,040.00	4.25	850.00
Canned Goods	...	75	11.50	Sacramento	862.50	7.80	585.00
	...	75	13.00	San Francisco	975.00	7.80	585.00
Cereals	...	45	13.00	San Francisco	585.00	7.20	324.00
Cement	...	200	5.00	San Francisco	1,000.00	5.00	1,000.00
Corn	...	250	5.06	Omaha	1,265.00	4.30	1,075.00
Cotton Seed Cakes	...	150	5.52	Fort Worth, Tex.	828.00	5.40	810.44
Coal, Bituminous	...	300	3.80	Castle Gate	1,140.00	2.25	675.00
Coal, Blacksmith	...	60	10.71	St. Louis	642.60	2.25	135.00
Door Screens	...	300	4.30	Feather River Dist. Basis Swain, Cal.	1,290.00	2.15	645.00
Frames and Lumber / Engines and Machinery	...	150	11.00	San Francisco	1,650.00	7.20	1,080.00
High Explosives	...	10	22.20	Hercules	222.00	14.20	142.00
Furniture	...	60	15.16	Chicago	909.60	10.80	648.00
Gasoline	...	78	11.60	Richmond	904.80	7.80	608.40
Iron and Steel Pipe / Valves, Fittings, etc.	...	150	11.51	Minnequa, Colo.	1,726.50	7.80	1,170.00
Lime	...	150	5.00	San Francisco	750.00	7.20	1,080.00
Plaster	...	100	6.36	Nephi, Utah	636.00	7.20	720.00
Powder	...	10	22.20	Hercules	220.00	14.20	142.00
Salt	...	180	3.00	Salduro, Utah	540.00	5.20	936.00
Soap	...	36	8.28	Kansas City	298.08	7.80	280.80
Sugar	...	180	12.00	San Francisco	2,160.00	7.80	1,404.00
Sulphur	...	30	2.60	Sulphur, Nevada	78.00	5.50	165.00
Syrup	..	36	11.00	San Francisco	396.00	7.80	280.80
Stoves	...	30	13.99	Chicago	419.70	7.80	234.00
Wire and Nails	...	120	10.75	Minnequa, Colo.	1,290.00	7.80	936.00
Oil, Refined	...	40	13.00	Richmond	520.00	7.80	312.00
Oil, Distillate	...	40	10.40	Richmond	416.00	7.80	312.00
Miscellaneous, Class A Rates	...	60	9.20	Reno	552.00	7.20	432.00
	...	60	11.50	Sacramento	690.00	7.20	432.00
	...	60	13.00	San Francisco	780.00	7.20	432.00
Feeder Cattle, 36′ car	100	...	37.50	Elko as Basis	3,750.00	7.20	
Feeder Cattle, 30′ car	150	...				17.50	2,625.00
Feeder Sheep, 36′ car	100	...	37.50	Elko as Basis	3,750.00		
Feeder Sheep, 30′ car	300	...				15.00	4,500.00
Miscellaneous Merchandise at Third-Class Rate	...	400	12.60	Reno	5,040.00	10.80	4,320.00
	...	600	17.20	Sacramento	10,320.00	10.80	6,448.00
	...	800	19.00	San Francisco	15,200.00	10.80	8,640.00
	...	250	18.13	Chicago	4,532.50	10.80	2,700.00
Except Stock, Tons		5,521		Total:	$70,687.91		$49,913.20

* Rates on this sheet are local rates on the same basis as apply on the Nevada-California-Oregon Railway.

*ESTIMATE NO. 1.

SURPRISE VALLEY.

ESTIMATED TONNAGE AND REVENUE.

OUTBOUND.

Commodities—	Cars.	Tons.	Rates per ton, Reynard to destination shown.	Destination.	Western Pacific Earnings.	Rates per ton, Cedarville to Reynard. Nevada-Colorado-Oregon Rate, Alturas to Doyle used.	Branch Line Earnings.
Less-than-carload traffic, based on Third-class Rates	...	50	$13.60	Reno	$ 680.00	$10.80	$ 540.00
	...	25	17.20	Sacramento	430.00	10.80	270.00
	...	50	19.00	San Francisco	950.00	10.80	540.00
Alfalfa Seed	...	120	13.00	San Francisco	1,560.00	7.80	936.00
Alfalfa Seed	...	120	9.84	Chicago	1,120.80	7.80	936.00
Butter, less-than-carload	...	120	21.20	San Francisco	2,544.00	12.00	1,440.00
Cereals and Flour	...	600	11.00	San Francisco	6,600.00	3.60	960.00
Cereals and Grain	...	1,500	6.75	San Francisco	10,125.00	3.60	5,400.00
Cheese, less-than-carload	...	20	21.20	San Francisco	424.00	12.00	240.00
Fruit—Apples	...	120	9.00	San Francisco	1,080.00	5.00	600.00
Hay and Straw	...	1,000	3.50	San Francisco	3,500.00	3.40	3,400.00
Hides and Pelts—Dry	...	100	21.20	San Francisco	2,120.00	12.00	1,200.00
Junk	...	48	3.65	San Francisco	175.20	5.00	240.00
Potatoes	...	1,500	5.00	San Francisco	7,500.00	4.00	6,000.00
Potatoes and Vegetables	...	450	7.50	San Francisco	3,375.00	6.00	2,700.00
Wool, Sacked	...	180	26.34	Boston	3,375.00	9.20	1,656.00
Cattle, 30′ car	225	...		Reno	.....	35.00	7,875.00
Cattle, 36′ car	150	...	56.50	Reno	8,475.00	....	.....
Cattle, †N. G. car	113	...		Sacramento	.....	....	3,955.00
Cattle, 36′ car	75	...	80.00	Sacramento	6,000.00	....	.....
Cattle, †N. G. car	225	...		San Francisco	.....	....	7,875.00
Cattle, 36′ car	150	...	85.00	San Francisco	12,750.00	....	.....
Sheep, †N. G. car	150	...		Reno	.....	26.00	3,900.00
Sheep, ⊕DD 36′ car	50	...	89.50	Reno	4,475.00	....	.....
Sheep, †N. G. car	75	...		Sacramento	.....	....	1,950.00
Sheep, ⊕DD 36′ car	25	...	85.85	Sacramento	2,146.25	....	.....
Sheep, †N. G. car	225	...		San Francisco	.....	....	5,850.00
Sheep, ⊕DD 36′ car	75	...	90.10	San Francisco	6,757.50	....	.....
Hogs, †N. G. car	75	...		Reno	.....	26.00	1,950.00
Hogs, 36′ car	50	...	48.50	Reno	2,425.00	....	.....
Hogs, †N. G. car	38	...		San Francisco	.....	....	988.00
Hogs, 36′ car	25	...	53.00	San Francisco	1,325.00	....	.....
Horses, †N. G. car	38	...		Reno	.....	44.00	1,672.00
Horses, 36′ car	25	...	76.00	Reno	1,900.00	....	.....
Horses, †N. G. car	38	...		San Francisco	.....	....	.....
Horses, 36′ car	25	...	97.00	San Francisco	2,425.00	44.00	1,672.00
Miscellaneous—Class A	...	120	9.20	Reno	1,104.00	7.20	864.00
Miscellaneous—Class A	...	60	11.50	Sacramento	690.00	7.20	432.00
Miscellaneous—Class A	...	120	13.00	San Francisco	1,560.00	7.20	864.00
					$ 97,591.75	....	$ 66,905.00

SUMMARY

Outbound	$ 97,591.75	....	$ 66,905.00
Inbound	70,687.91	....	49,913.20
Total	$168,279.66	....	$116,818.20
	116,818.20	....	.....
TOTAL BOTH LINES	$285,097.86	....	.....

*Rates on this sheet are local rates on the same basis as apply on the Nevada-California-Oregon Railway.
†Narrow Gauge.
⊕Double Deck.

*ESTIMATE NO 2.

SURPRISE VALLEY.

Estimated Tonnage and Revenue.

OUTBOUND.

Commodities—	Cars	Tons	Western Pacific Railroad Proportion Alturas Rates to Points Shown	Destinations	Western Pacific Earnings	Branch Line Proportion Alturas Rates to Points Shown	Branch Line Earnings
Alfalfa Seed	...	120	$10.28	San Francisco	$ 1,233.60	$ 7.72	$ 926.40
Alfalfa Seed	...	120	9.08	Chicago	1,089.60	9.48	1,137.60
Butter, Less-than-carload	...	120	13.14	San Francisco	1,576.80	9.86	1,183.20
Cereals and Flour	...	600	6.85	San Francisco	4,110.00	5.15	3,090.00
Cereals and Grain	...	1,500	3.19	San Francisco	4,785.00	3.81	5,715.00
Cheese, Less-than-carload	...	20	13.14	San Francisco	262.80	9.86	197.20
Fruit, Apples	...	120	4.85	San Francisco	582.00	3.65	438.00
Hay and Straw	...	1,000	13.51	San Francisco	3,510.00	2.64	2,640.00
Hides and Pelts, Dry	...	100	14.39	San Francisco	1,439.00	10.81	1,081.00
Junk	...	48	4.71	San Francisco	226.08	3.54	169.92
Potatoes	...	1,500	4.00	San Francisco	6,000.00	3.00	4,500.00
Potatoes and Vegetables	...	450	3.71	San Francisco	1,069.50	2.79	1,255.50
Wool (Sacked)	...	180	19.34	Boston	3,481.20	13.00	2,340.00
Miscellaneous							
Carload Class A Rates	...	120	4.08	Reno	489.60	6.12	734.40
Carload Class A Rates	...	60	7.97	Sacramento	478.20	9.53	571.80
Carload Class A Rates	...	120	10.85	San Francisco	1,302.00	8.15	978.00
Miscellanous	...	50	6.08	Reno	304.00	9.12	456.00
Less-than-carload Freight—Third	...	25	10.56	Sacramento	264.00	12.64	316.00
Class Rates as Basis	...	50	14.28	San Francisco	714.00	10.22	511.00
Live Stock—							
Cattle, 36′ car	150	...	$25.50	Reno	$ 3,825.00	$38.25	$ 5,737.50
Cattle, 36′ car	75	...	50.12	Sacramento	3,759.00	59.88	4,491.00
Cattle, 36′ car	150	...	65.75	San Francisco	9,862.50	44.25	6,637.50
Sheep, ⊕DD 36′ car	50	...	37.20	Reno	1,860.00	55.80	2,790.00
Sheep, ⊕DD 36′ car	25	...	62.42	Sacramento	1,560.50	74.58	1,864.50
Sheep, ⊕DD 36′ car	75	...	82.81	San Francisco	6,210.75	62.19	4,664.25
Horses, ⊕DD 36′ car	25	...	30.50	Reno	762.50	45.75	1,243.75
Horses, ⊕DD 36′ car	25	...	74.24	San Francisco	1,856.00	55.76	1,394.00
Hogs, ⊕DD 36′ car	50	...	18.60	Reno	930.00	27.90	1,395.00
Hogs, ⊕DD 36′ car	25	...	36.22	San Francisco	905.59	43.28	1,082.00
				TOTALS	$ 65,049.13	....	$ 59,540.52

Explanation of Live Stock Rates:

It requires one and one-half Nevada-California-Oregon 30 foot single deck cars to handle the same number of cattle, horses and hogs as one 36 foot Western Pacific single deck car, and three 30 foot Nevada-California-Oregon cars to each Western Pacific 36 foot double deck car. Branch line earnings based on 36 foot cars. If narrow gauge line was built, the rates per car would be reduced proportionately. Reno live stock rates on basis of 40 per cent. to Western Pacific and 60 per cent. to branch line of current Nevada-California-Oregon rates per 36 foot car basis.

*Rates used in this estimate are joint rates on the same basis as that applying to and from Alturas on the Nevada-California-Oregon. The branch is allowed the same division of the rate as that now allowed the Nevada-California-Oregon.

⊕Double deck.

*ESTIMATE NO. 2.

SURPRISE VALLEY.

Estimated Tonnage and Revenue.

INBOUND.

Commodities—	Cars	Tons	Western Pacific Railroad Proportion Alturas Rates from Points Shown	Points of Origin	Western Pacific Earnings	Branch Line Proportion Alturas Rates from Points Shown	Branch Line Earnings
Agricultural Implements and Vehicles	...	25	$ 7.98	Sacramento	$ 199.50	$ 9.52	$ 238.00
	...	25	10.86	San Francisco	271.50	8.14	203.50
	...	36	11.96	Chicago	430.56	8.02	288.72
Automobiles, Passenger	...	25	17.94	San Francisco	448.50	13.46	336.50
Automobiles, Passenger	...	25	27.68	Chicago	692.00	15.42	385.50
Bags and Bagging	...	100	9.71	San Francisco	971.00	7.29	729.00
Brick	...	200	1.70	Reno	340.00	2.55	510.00
Canned Goods	...	75	11.43	Sacramento	857.25	9.57	717.75
Canned Goods	...	75	12.00	San Francisco	900.00	9.00	675.00
Cereals	...	45	4.91	San Francisco	220.95	3.69	166.05
Cement	...	200	5.43	San Francisco	1,086.00	4.07	814.00
Corn	...	250	4.66	Omaha District	1,165.00	3.86	965.00
Cotton Seed Cake	...	150	5.08	Fort Worth. Tex.	762.00	3.94	591.00
Coal, Bituminous	...	300	3.15	Castle Gate	945.00	2.90	870.00
Coal, Blacksmith	...	60	4.24	St. Louis	254.40	3.70	222.00
Doors, Screens	...	...	....	Swain, Cal.	.....	....	.....
Frames and Lumber	...	300	3.40	Average Rates	1.020.00	2.15	645.00
Engines and Machinery	...	150	9.71	San Francisco	1,456.50	7.29	1,093.50
High Explosives	...	10	16.96	Hercules, Cal.	169.60	14.78	147.80
Furniture	...	60	17.56	Chicago	1,053.60	11.86	711.60
Gasoline	...	78	9.45	Richmond	737.10	8.15	635.70
Iron and Steel Pipe Valves and Fittings	...	150	7.78	Minnequa, Colo.	1,167.00	7.68	1,152.00
Lime	...	150	5.43	San Francisco	814.50	4.07	610.50
Plaster	...	100	5.43	Nephi, Utah	543.00	4.07	407.00
Powder	...	10	16.96	Hercules, Cal.	169.60	14.78	147.80
Salt	...	180	3.00	Salduro, Utah	540.00	5.20	936.60
Soap	...	36	7.62	Kansas City	274.32	7.62	274.32
Sugar	...	180	10.28	San Francisco	1,850.40	7.72	1,389.60
Sulphur	...	30	2.60	Sulphur, Nev.	78.00	5.00	150.00
Syrup	...	36	6.28	Chicago	226.08	7.40	266.40
Stoves	...	30	11.14	Chicago	334.20	8.24	247.20
Wire and Nails and Fencing	...	120	8.94	Minnequa, Colo.	1,072.80	7.80	936.00
Oil, refined	...	40	9.45	Richmond, Cal.	378.00	9.55	382.00
Oil, distillate	...	40	7.29	Richmond, Cal.	291.60	6.51	260.40
Miscellaneous							
Carload Rating Class A	...	60	4.08	Reno	244.80	6.12	367.20
Carload Rating Class A	...	60	7.97	Sacramento	478.20	9.53	571.80
Carload Rating Class A	...	60	10.85	San Francisco	651.00	8.15	489.00
Miscellaneous less-than-carload Merchandise, third-class average	...	400	6.08	Reno	2,432.00	9.12	3.648.00
	...	600	10.56	Sacramento	6,336.00	12.64	7,584.00
	...	800	14.28	San Francisco	11,434.00	10.22	8,176.00
	...	250	16.30	Chicago	4,075.00	11.78	2,945.00
Feeder Cattle, single deck 36′ car	100	...	37.50	Elko, Nevada, average distance rate 15 cents per mile on Western Pacific; 17½ cents per mile on branch line.	3,750.00	26.25	2,625.00
Feeder Sheep, double deck 36′ car	100	...	37.50		3,750.00	45.00	4,500.00
				250 Mile Haul, Western Pacific			
				86 Mile Haul, Branch			
Except Stock, Tons	5,521			Total	$ 54,870.96	....	$ 49,010.84

SUMMARY

Inbound	$ 54,870.96	....	$ 49,010.84
Outbound	65,049.13	....	59,540.52
Total	$119,920.09	....	$108,551.36
	108,551.36	....	.....
TOTAL BOTH LINES	$228,471.45	....	.....

* Rates used in this estimate are joint rates on the same basis as that applying to and from Alturas on the Nevada-California-Oregon. This branch is allowed the same division of the rates as that now allowed the Nevada-California-Oregon.

REYNARD TO SURPRISE VALLEY.

Estimated Cost of Constructing Proposed Branch Line.

Grading	$140,000
Tracklaying and Ballasting	42,500
Bridges and Culverts	14,000
Buildings and Water Tanks	12,000
Add 10 per cent. for Contingencies and Engineering	20,850
Interest during construction	20,000
Rails	153,000
Splices	7,000
Spikes	15,000
Ties	57,000
Frogs and Switches	1,500
Equipment	59,000
Organization Expenses	6,000
Surveys	5,800
TOTAL COST	$550,650

OAKLAND, ANTIOCH AND EASTERN RAILWAY.

The Oakland, Antioch & Eastern Railway is an overhead trolley electric interurban railroad, incorporated March 27, 1911, operating a main line connecting Oakland and Sacramento, having four branch lines. The sketch map on the opposite page shows its location.

The distance from the Oakland Mole to Sacramento by its main line and the Key System (San Francisco-Oakland Terminal Railways) in Oakland, is 90 miles.* The Danville Branch, 8.7 miles long, extends through the San Ramon Valley from Saranap to Diablo; the Walwood Branch, 2.9 miles long, from Meinert to Walwood; the Pittsburg Branch, 2.2 miles long, from West Pittsburg to Pittsburg; the Dixon Branch, 12.32 miles long, from Dixon Junction to Dixon. The report of the Railroad Commission of California, 1915-1916, gives its operated mileage as 110.99; mileage owned 60.71.

It controls, through stock ownership, the Oakland and Antioch, incorporated in March, 1909, which had built 34 miles between Bay Point and Oakland, and the San Ramon Valley Railroad—the Danville Branch referred to above. It operates the Dixon Branch through lease from the Sacramento Valley Electric Railroad.

Between Oakland and the crossing of Suisun Bay near West Pittsburgh, this railroad traverses the Contra Costa Hills and the intervening valleys. The area of agricultural land on this section of the line is shown in the following statement:

	Agricultural Land (Acres)	Irrigated Land (Acres)
San Ramon Valley	6,000	10
Lafayette	1,250	..
Pachecco-Concord-Martinez	17,500	20
Ygnacio Valley	11,800	..
	36,550	30

*The Oakland, Antioch & Eastern operates on the Key Route, a distance of 5 miles betwen the mole and its terminal on 40th Street, in Oakland.

All of this area is also served by the Southern Pacific. As the distance from the Oakland terminal of the line to the crossing of Suisun Bay is 37 miles, the total agricultural area served by it south of that bay, is less than 1,000 acres per mile of line. As the business is divided between the two lines and only a small portion of the area is under intensive cultivation, the rail traffic in products of agriculture is small per mile of line for each of the two railroads serving the territory.

The main line and the Pittsburg Branch of the Oakland, Antioch & Eastern are located along, or near, the south shore of Suisun Bay from Bay Point to Pittsburg, a distance of 7.8 miles. In the Pittsburg District there are four industries of considerable extent which may be reached by short extensions of existing facilities. These are a very large lumber yard, the storage tanks of the Shell Oil Company, a chemical industry, and a rubber manufacturing plant. These industries are served now by industrial tracks of the Santa Fe; in fact, the whole district from Martinez to Pittsburg and Antioch, is served by the main lines of the Southern Pacific and Santa Fe, so that the traffic of this industrial district is highly competitive.

From the crossing of Suisun Bay to Lisbon, a distance of 37.8 miles, only a small part of the area is cultivated agricultural land. The soil is a compact adobe clay in places and is generally devoted to pasturage and the raising of grain by dry farming. Under irrigation the whole area from Suisun Bay to Lisbon will become productive agricultural land of the same general character as that of the west side of the Sacramento Valley further north. The soil between Lisbon and Sacramento, a distance of 9 miles, is the Columbia silt, which is appraised by the Agronomist of the United States Department of Agriculture as the most valuable in the Sacramento Valley. At the present time there is practically no rail traffic to and from the district extending from Suisun Bay to

Lisbon, except that coming from the Dixon Branch. The business of this branch is so small that the Oakland, Antioch & Eastern contemplates the abandonment of its operation.

The report of operation for the year ended December 31, 1916, shows the following results:

Net Operating Revenue	$183,018
Taxes	30,364
	$152,654
Non Operating Income	823
	$153,477
Deductions for rentals, interest, amortization, discount	363,708
Net deficit	$210,371

The net operating revenue was $8,606 *less* than that of the preceding year.

If the Oakland Antioch & Eastern was owned by the WESTERN PACIFIC, its contribution to the freight tonnage and revenue of that SYSTEM on carload shipments, according to estimates of tonnage of traffic furnished by the Traffic Manager of the interurban road, would be as follows:

OAKLAND, ANTIOCH & EASTERN.

ESTIMATED REVENUE (OUTSIDE OF OAKLAND AND SACRAMENTO).

INTERSTATE OUTBOUND—EASTERN.

				Revenue
Green Deciduous Fruits	3,290	tons @	$ 9.06	$ 29,807
Wine	450	tons @	5.24	2,358
Fish	5,250	tons @	4.90	25,725
Beans	6,000	tons @	5.94	35,640
Barley	4,000	tons @	4.60	18,400
Sheep	75	cars @	103.96	7,797
				$119,727

INTRASTATE INBOUND AND OUTBOUND.

Cement	25,000	tons @	$ 1.20	$ 30,000
Hay	11,875	tons @	1.50	17,812
Grain	6,400	tons @	2.50	16,000
Miscellaneous	12,000	tons @	3.00	36,000
Sheep	225	cars @	37.40	8,415
				$108,227

It is to be noted that the foregoing estimate includes carload shipments only to and from all points on the ROAD, except Sacramento and Oakland. Less than carload shipments, which probably aggregate a much larger amount than the carload tonnage shown above, are not available and hence are not included. For this reason the above statement *is not* to be taken as a statement of the total freight earnings of the Oakland, Antioch & Eastern; it is given for the purpose of showing its value as a feeder line if acquired by the WESTERN PACIFIC.

TERMINALS.

The terminals of the Oakland, Antioch & Eastern at Oakland are very small and are situated at 40th Street, a considerable distance from the business and industrial sections of the city. They would be of no value to the WESTERN PACIFIC. At Sacramento the freight terminal of this ROAD and the Central California Traction Company are located on M Street near the point where it crosses the wharves and the Sacramento River; this terminal is also very small and would be of no benefit to the WESTERN PACIFIC.

The sketch map herewith shows the general location of the ROAD as described, and also shows the line of the Kennedy Survey from the vicinity of Bay Point to Oakland, which the late Mr. V. G. Bogue, formerly Chief Engineer of the WESTERN PACIFIC, at one time intended to adopt as a route to Oakland. The maximum grades upon this line where it crosses the Contra Costa Hills are 1 per cent., or about 53 feet to the mile. The WESTERN PACIFIC, having committed itself to the circuitous route via Stockton,* it will be uneconom-

* While the saving of 46 miles of distance was important, and will be more so in future, it is a question whether the business obtained at Stockton, the fact that the line as built extends through Niles at the entrance to the Santa Clara Valley, and the collateral traffic advantages incident to the occupation of territory between Niles and Oakland, are not of greater value than the practicable saving in distance; in fact, there is no uncertainty involved. The traffic obtained by the longer in excess of that obtainable by the shorter line is more valuable than the saving in operation that could be realized by a line 46 miles shorter, and this will be the case for years to come, i. e., until train mileage increases many fold.

ical to construct another line for the purpose of saving about forty-six miles of distance between Sacramento and Oakland. It will probably be years before a plan of this kind can be considered. The Oakland, Antioch & Eastern can be of no possible use to the WESTERN PACIFIC.

Its officers state that the Santa Fe at one time stood ready to provide the necessary money to build from a point on their line north of Suisun Bay to Vacaville, which, of course, would depreciate the value of the Northern Electric Railway. It has already been stated in another section of the report that if the Santa Fe and WESTERN PACIFIC enter this territory separately and compete for this business the region will not make satisfactory returns to either of them.

A statement was recently published by the President of the Oakland, Antioch & Eastern to the effect that the earnings of the Road during the year ended June 30, 1917, were about $1,700 in excess of those of the preceding year. This Road was primarily built to handle passenger business, which is not remunerative. Its owners, in common with those of other electric lines in this section of the country, are very anxious to dispose of the property and it could probably be had upon almost any terms that might be named, but, as previously stated, it seems to be without value as far as the WESTERN PACIFIC is concerned.

MILEAGE AND DESCRIPTION OF WESTERN PACIFIC.

1. Mileage Statement.
   Description and Traffic.

2. Western Pacific Main Line.

   (a) Branch Lines—Operated and Under Construction.

   (b) Connections.

   (c) Division of Through Rates and Switching Charges.

MILEAGE STATEMENT.

THE WESTERN PACIFIC RAILROAD was completed from Salt Lake City to San Francisco in the latter part of 1909, and shortly afterwards commenced to handle through freight and passenger business. It was turned over to the Operating Department for operation on July 1, 1911.

The actual mileage of the SYSTEM, as of August, 1917, is as follows:

	Miles	Miles
MAIN LINE:		
Freight Depot (Eighth and Brannan Streets) to Freight Slip (Twenty-fifth and Massachusetts Streets), San Francisco	2.24	
Oakland to Salt Lake City	923.74	
Total Main line		925.98*
BRANCH LINES:		
Carbona (Milepost 72) to Walden	11.36	
Bradford Winery Spur (Milepost 119)	1.61	
Loyalton to Boca and Loyalton Junction (Junction point 324.1 miles east of San Francisco)	16.27	
Grizzly Creek Spur to Ice House (Branch of Boca and Loyalton)	2.40	
Salt Lake Union Depot	.33	
Total Branch Lines		31.97
GRAND TOTAL		957.95

* Note: San Francisco Bay (Ferry) mileage of 3.48 not included.

In addition to the mileage already constructed, new lines have been authorized to date—August, 1917,—as follows:

MILEAGE UNDER CONSTRUCTION
AUGUST, 1917.

	Main Track (Miles)	Sidings (Miles)
BRANCH LINES:		
Niles (Milepost 30) to San Jose	23.00	5.00
Reno Junction (Milepost 341) to Reno	33.00*	3.00
Grants (Milepost 891) to Tooele	15.50	1.75
INDUSTRIAL SPUR:		
Timpie (Milepost 880) to Ellerbeck Quarries	4.78	0.75
	76.28	10.50

*A portion of this is reconstruction of the Nevada-California-Oregon Railway roadbed and another portion is new line to be constructed at points where the old roadbed of that railway cannot be used. The following statement shows the mileage of new and reconstructed line:

	Miles	Miles
Line to be Reconstructed:		
Between Plumas Junction and Purdy	7.7	
Between Summit and Reno	7.0	
Total to be Reconstructed		14.7
New Line to be Constructed:		
Between Reno Junction and Plumas Junction	2.5	
Between Purdy and Summit	15.8	
Total to be Constructed		18.3
Total Length of Reno Branch		33.0

Mileage of Track to be Abandoned.

The Western Pacific has heretofore purchased that portion of the Nevada-California-Oregon Railway located south of Hackstaff (Milepost 371), the station at which the two lines cross. As the latter road is a narrow gauge line all of its *track* south of Hackstaff will be abandoned. The mileage of narrow gauge track to be abandoned is shown in the following statement:

	Miles
Hackstaff to Reno—Main Line	64.8
Plumas Junction to Davies Mill—Branch	39.4
Total Miles of abandoned *track*	104.2

When these branches are constructed the total road mileage of the System will be 1,034.23, and of this mileage 923.74 may be considered as main line (from Oakland to Salt Lake City), and 110.49 as branch lines.

Connections Controlled by The Western Pacific Railroad.

Certain connecting lines, or branches, which are controlled by the Western Pacific may be considered as pertaining to that System for the purpose of stating the length of main and branch lines. These are as follows:

	Miles
Tidewater Southern Railway	49.2
Indian Valley Railroad	22.0
Deep Creek Railroad	46.0
	117.2

The Indian Valley Railroad is not controlled by the Western Pacific, but as it connects with no other line it may be included with the branch line mileage of that System.

A description of these lines will be found under the caption, "Connections of the Western Pacific".

The length of the main line and branches (owned and controlled) of the System may therefore be stated as follows:

	Miles
Main Line	923.74
Branch Lines now operated	31.97*
Branch Lines under construction	76.28
Connecting Lines controlled	117.20
Total Mileage	1,149.19

*Does not include 2.24 miles in San Francisco from the Ferry Slip to the freight terminals at Brannan Street.

DESCRIPTION AND TRAFFIC.

Western Pacific Main Line Traffic.

The business of the Western Pacific is concentrated at the ends of its main line to a marked extent. The revenue from all freight received at and forwarded from San Francisco in 1916 constituted 51.3 per cent. of the total freight revenue of the Road. The revenue from five station, viz., San Francisco, Oakland, Stockton, Sacramento and Salt Lake, including local freight forwarded, constituted 86.7 per cent. of the entire freight revenue. Ninety per cent. of the entire freight revenue is received from traffic handled at Salt Lake and six stations located on 200 miles at the west end of the main line. These six stations are located in the coastal area of San Francisco Bay and in the two greater interior valleys of California, the San Joaquin and Sacramento.

More than 700 miles of the main line lies on the slopes of the Sierra Nevada Mountains and in the deserts and interior mountain country extending from the Sacramento Valley to Salt Lake City. While this portion of the line lies in territory almost barren of agricultural possibilities, excepting comparatively small areas of mountain valleys, it is not devoid of potential traffic by any means, as the territory traversed is rich in forest and mineral resources, the development of which will furnish a tremendous tonnage and a very large revenue for the road. Such development, of necessity, requires time and large capital expenditure. This territory in the future will be of very great importance to the Western Pacific, but its development will be much slower than that of the fertile interior and coastal valleys and plains west of the foothills of the Sierras.

The station earnings* of the Western Pacific at San Francisco, were $3,459,090, including local freight forwarded, in the

* All station earnings shown in this article are those of the Western Pacific in 1916, and include local freight received and forwarded, interline received and forwarded and intermediate traffic forwarded.

calendar year 1916. It is a city of more than 500,000 population with a much smaller manufacturing interest than is usual in cities of the same size in the Central and Eastern States. San Francisco is by far the most important port on the Pacific Coast. An important part of WESTERN PACIFIC earnings at San Francisco is derived from export and import business through that port.

The most important items of import carried from it by the ROAD are raw sugar from Hawaii, cocoanut and other oils, crude rubber, pepper, coffee from Central America, tea, China cotton, hemp and sisal, copra, mahogany lumber, gums, rice, tapioca, zinc concentrates, nitre, wool, hides and Japanese merchandise. The most important items of export traffic carried by the ROAD to this port are iron and steel articles, tin plate, cigarettes (carload shipments), tobacco, automobiles, soda ash, rosin, cotton to Japan, coffee to Russia, leather, staves and headings.

The station earnings at Oakland in 1916 were $624,403. This city is situated across the bay from San Francisco and had a population of 185,000 in 1915. It has at the present time many important manufacturing industries and is rapidly developing into an industrial center of the first rank. It is an important jobbing center and a distributing point for rail shipments of coastwise lumber.

Stockton, 94 miles east of San Francisco, had station earnings of $894,108 in 1916. It is an important city in the northern end of the San Joaquin Valley, having a population of 42,000 at the present time. It has several important industries which relate principally to the manufacture of tractors, dredges and heavy machinery. It it an important jobbing center as well. Its chief importance from a railroad traffic standpoint, however, is due to the fact that it is the market for the immense production of staple vegetables of the Delta of the Sacramento and San Joaquin Rivers, upon the eastern margin of which it is located. The Delta produces 85 per cent. of the

total interstate shipments of potatoes from California. It will be noted that its importance to the WESTERN PACIFIC as a traffic center is second only to that of San Francisco.

Sacramento, the capital of California, 139 miles east of San Francisco, has a population of 75,000. It is the center of the fresh deciduous fruit industry of the State, both for State distribution and concentration for transcontinental shipment. Its shipments of canned fruits and vegetables and dried fruits are also very large. It is an important market for hops, barley and rice. Its station earnings in 1916 were $399,848, the fourth in importance on the SYSTEM.

Marysville, population 6,000, in the Sacramento Valley, 179 miles east of San Francisco, had station earnings of $81,322 in 1916. Its principal traffic is in canned goods and dried fruit. It is a distributing point for merchandise and miscellaneous commodities for the large territory in the foothills of the Sierra Nevada Mountains lying above it. Much of the Sacramento Valley land lying around and west of it which is below the flood plane of the Sacramento River, has been, and is being, reclaimed. As soon as this area comes under cultivation, which it will in the immediate future, this station will become one of first importance. It now ranks eighth as to total stations earnings.

Oroville, 203 miles east of San Francisco, population 3,300, is the last valley station of importance, being located at the western entrance of the Feather River Canyon. Its station earnings in 1916 were $137,674, ranking sixth as to amount. Its principal traffic consists of transcontinental shipments of oranges, almonds, olives and olive oil, some ore and a large tonnage of crushed gravel.

In the Feather River Canyon, which extends 119 miles east from Oroville to Portola, are located some 15 mills manufacturing lumber from the forests covering the western slopes of the Sierra Nevada Mountains. The most important shipping point of the district is Quincy Junction, where a logging road

four miles long connects with the main line. The station earnings during 1916 were $72,479.

The principal traffic from the State of Nevada consists of live stock, wool and ore. There are two important stations on this section of the line: Winnemucca, 532 miles east of San Francisco, with station earnings of $90,256, and Elko, 663 miles east of San Francisco, with earnings of $80,957. Both are distributing centers for large range areas and mineralized sections.

Salduro is a station on the main line of THE WESTERN PACIFIC, 815 miles east of San Francisco and 112 miles west of Salt Lake City. Here is found a deposit of solid salt varying in thickness from one to fifteen feet, eight miles in breadth and sixty miles in length. The salt contains about 98 per cent. of various chlorides and is being differentiated into potash and other by-products.

The Solvay Process Company of New York is now building a large plant for treating the salt. They have one unit established and when the plant is entirely completed with full units the expenditure will amount to about $1,000,000. They are now shipping one car of potash a week and three cars of salt per day. These shipments route east via THE WESTERN PACIFIC. The supply is inexhaustible, as the amount used is replenished each year by the drainage waters.

Grants is a station on the main line of the WESTERN PACIFIC, 897 miles east of San Francisco and 30 miles west of Salt Lake City.

A plant has been established here for making salt, potash and by-products of magnesia chloride. The salt water is obtained by pumping from the Great Salt Lake into ponds where evaporation and mechanical treatment is given. The present shipment is one car of salt per day, one car of potash every two weeks and two cars of chloride and magnesia per month. The development at the present time represents an investment of $100,000, and an equal amount will be expended in enlarging the plant.

Both salt plants consume about one and one-half cars of coal per day and employ about two hundred men. Their output and shipments will be materially increased in future.

The station earnings of Salt Lake City, 927 miles east of San Francisco, were $264,059 in 1916, ranking fifth in importance on the system. The principal traffic contributing to these earnings is that to and from the Murray and Midvale Smelters, this station being the interchange point.

During and prior to the period of the Receivership, the WESTERN PACIFIC had no general agent of its own at Salt Lake City, its interests being represented by officials of the Denver & Rio Grande. Since the appointment of its own General Agent in 1916 the station earnings have increased rapidly and from present indications will probably continue to do so.

The classification of WESTERN PACIFIC freight traffic and the revenue derived from it is shown in the following statement which was compiled from the report of the Auditor for the year 1916:

	Revenue	Per Cent.
Products of Agriculture	$1,157,054.76	17.17
Products of Animals	433,631.97	6.43
Products of Mines	1,255,798.40	18.63
Products of Forests	368,245.65	5.46
Manufactures	2,648,164.28	39.28
Merchandise, less-than-carload	747,810.64	11.10
Other Commodities, carloads	130,272.62	1.93
	$6,740,978.32	100.00

The principal commodities included in the above classification are as follows:

	Percentage of Total Tonnage	Percentage of Total Revenue
Barley, rice, wheat and other grain	3.32	2.16
Fruit, vegetables and derivatives therefrom	7.98	9.52
Live stock	1.99	2.01
Bituminous coal	19.92	12.60
Ore,—manganese, precious and other	4.47	9.66
Crushed rock, sand, stone, etc.	4.47	0.70
Lumber, shooks, logs and ties	6.36	4.78
Oil,—fuel, lubricating, etc.	6.58	5.93
Sugar, glucose and molasses	4.68	5.04
Iron, castings, pipes, structural	3.56	4.39
Bar and sheet metal	2.70	2.62
Wines, liquors and beer	1.43	1.96
Curios, powder, dynamite and other manufactures	10.67	13.47

DESCRIPTION OF BRANCH LINES OPERATED AND UNDER CONSTRUCTION.

It is desirable to make a brief statement concerning the traffic that is now, or will be, served by the several spurs and branches shown in the preceding mileage statement.

1. Niles to San Jose, 23 miles, with sidings and industry tracks, 5 miles. An estimate of traffic and earnings of this line is given under another head.

2. The Carbona Branch extends at present from Carbona to Walden, distance 11.36 miles. It is the south end of the old Alameda & San Joaquin Valley Railway, acquired by the WESTERN PACIFIC during the construction days. At that time it extended from Stockton to Tesla. The present traffic from this branch consists of sand and gravel, distributed to various centers, principally Stockton, from a large deposit at River Rock Spur, amounting at times to as much as ten cars per day; some live stock in season to San Francisco, and from time to time some manganese ore from Carnegie for eastern destinations. Recently the dismantling of a large brick plant furnished about 200 carloads of broken brick (grog) which moved to other brick manufacturing plants. This latter commodity will continue to move for some time, but is not traffic of a permanent character. The inbound traffic is inconsiderable, consisting of merchandise and miscellaneous commodities. There is no town on the branch.

3. The Bradford Winery Spur, 1.61 miles long, extends from Glannvale, Cal., 119.1 miles east of San Francisco, to the Bradford Winery. It was constructed in the Fall of 1913, the winery paying for the cost of construction and providing the right-of-way, the WESTERN PACIFIC furnishing the rails. The commodities handled on this spur are principally wine grapes and cooperage inbound and wine outbound. An arbitrary charge over the line-haul rate is assessed, which amounts

to 25 cents per ton on grapes and 30 cents per ton on other commodities. Some less-than-carload shipments of fruit are loaded on this spur, and move to Sacramento for consolidation into cars there. This traffic is subject to the arbitrary rates mentioned which are applied to the minimum carload weight. Some sand and gravel has been unloaded on this spur, as it affords convenient delivery for road making purposes, but such business is not permanent. Earnings on traffic to and from this spur for the year ended June 30, 1917, were $14,376.59, the tonnage handled being 12,220.

4. The Boca & Loyalton Branch extends from Boca & Loyalton Junction, at Mile Post 324.1, which is east of Portola, to a point 3 miles south of Loyalton, a distance of 16.27 miles. At this junction the branch turns to the north and lies north of, and practically parallel with, the WESTERN PACIFIC main line for a distance of 4 miles. The Grizzly Creek Spur, described in a following paragraph, leaves the branch line in this section.

The branch crosses the WESTERN PACIFIC main line at Hawley, 4 miles east of its junction with it and extends south through Loyalton to a point about 3 miles south thereof.

It originally extended from Boca, on the Southern Pacific, to Portola, crossing the WESTERN PACIFIC at Hawley and joining the main line near Portola. It was purchased by the WESTERN PACIFIC in October, 1916, and that portion of the track from Boca to the point 3 miles south of Loyalton was removed.

The principal town on the branch is Loyalton, a place of about 500 people. Two saw mills are in operation there. Logging operations are in contemplation to serve one of these mills. The outbound traffic is practically all lumber; the inbound generally merchandise.

The total freight earnings of the branch for the calendar year 1916 were practically $29,000, about one-half of which was earned by the Grizzly Creek Spur before referred to.

The potential traffic in the territory that may be reached by extensions of this branch is very large. At the present time an extension about 18 miles in length from near Loyalton through Sierraville to large timber tracts is under investigation. This extension would serve an area which it is estimated will yield 800,000,000 feet of lumber. The output of mills sawing this lumber would be more than 1,600 cars per year for a period of 15 years. In addition there would be an inbound business for the territory served comprised of merchandise and miscellaneous commodities.

5. The Grizzly Creek Spur is a part of the Boca & Loyalton Branch. It is 2.4 miles in length and extends from Grizzly Junction, to Gulling, at which point there is a large ice house shipping natural ice to various points in California, and to Reno, Nev. Ore from mines in the interior is also loaded on this spur and moves to Salt Lake Valley smelters. WESTERN PACIFIC earnings from this spur for the year ended June 30, 1917, were $13,793.22, the tonnage handled being 3,645.

A 25-mile extension of this spur is under investigation at the present time which would reach the timber in the Clover Valley District. It is estimated that this district will produce 311,000,000 feet of lumber, much of it being pine of high grade. The product of mills sawing it would amount to approximately 700 cars per year for a period of 15 years.

6. The Reno Branch is under construction from Reno Junction, mile post 341, to Reno, population 14,000. Reno is the largest city in Nevada and is the distributing center for a total population of perhaps 40,000 people, living upon the eastern slope of the Sierra Nevada Mountains. The estimated revenue from traffic over this branch inbound and outbound and on account of the elimination of the existing Nevada-California-Oregon narrow-gauge railway, is $281,000 per year. More than half of this, or $156,000, consists of merchandise and miscellaneous commodities inbound.

7. The spur tracks to be constructed in Utah from mile post 891 to Ellerbeck Quarries Nos. 1 and 2, will have a mileage of 4.78, with sidings at the quarries of 0.75 mile. Those interested in the lime rock quarries which these spurs will reach estimate their shipments at about 1,000 tons of lime rock per day to smelters, sugar refineries and steel plants. They also propose to establish a plant, costing about $100,000, for the manufacture of lime and other products that will be marketed wherever possible, and expect to ship a considerable part of the 50,000 tons of hydrated lime used on the Pacific Coast each year.

The International Smelter Company has contracted for 200 tons of lime rock per day and other smelters are negotiating similar contracts.

8. The Grants-Tooele Branch, now under construction, will connect the WESTERN PACIFIC directly with the Tooele Valley Railway at Tooele, Utah. The Tooele Valley Railway serves the International Smelter. This new branch line will afford a facility for the direct delivery of ore handled by the WESTERN PACIFIC which has heretofore moved from Garfield on the WESTERN PACIFIC main line, to Tooele, via the Los Angeles & Salt Lake Railroad. It will eliminate the proportion of the rate now allowed that line. This proportion varies between 30 and 62½ cents per ton, less 10 cents per ton allowed the Tooele Valley Railway. It is estimated that the additional earnings on this traffic will be about $26,000 per annum. It also affords the WESTERN PACIFIC direct access to the smelter for delivery of coal and coke inbound, and participation in the traffic of bullion outbound. It is estimated that total additional freight earnings of about $129,000 per annum will accrue from the operation of this line. There will be a movement of 200 tons of lime rock per day over this branch from the Ellerbeck Quarries mentioned above. The revenue from this traffic would not be less than $50 per day, or $18,250 per annum.

9. The Salt Lake City Union Depot Branch is a connection 0.33 mile long between the main line of the WESTERN PACIFIC and certain facilities which it uses in connection with the Denver & Rio Grande in Salt Lake City.

A smelter is investigating a location at Timpie, a station on the main line of the WESTERN PACIFIC at the east end of Skull Valley, and it is probable that the site offered will be accepted. The large tonnage of ore required by the smelter will be quarried in the Tintic District on the Los Angeles & Salt Lake Railroad and delivered at Tooele, at which point the branch line of the WESTERN PACIFIC connects and will handle the ore from that point to the smelter site.

If the smelter is located, an expenditure of from $2,000,000 to $3,000,000 will be made and a branch line seven miles in length will be constructed from Timpie to serve the smelter.

CONNECTIONS OF THE WESTERN PACIFIC.

UTAH.

At Salt Lake City the WESTERN PACIFIC has rail connection with the Denver & Rio Grande Railroad for freight interchange. Its interchange with other railroads entering the city is effected through that ROAD. The importance of this connection is indicated by the following statement showing, for the calendar year 1916, the general classification of WESTERN PACIFIC freight revenue:

1.	Local Business	$ 819,483
2.	Forwarded to and received from California and Nevada Connections	416,327
3.	Forwarded to and received from Utah and Colorado Connections and points East of Colorado	5,505,168
	Total Freight Revenue	$6,740,978

Item 3 includes interchange at Garfield and Salt Lake City. As the total interchange at Garfield amounts to $114,438 the interchange at Salt Lake City through the Denver & Rio Grande amounts to $5,390,730.

At Garfield*—14 miles west of Salt Lake City—the rail connections are the Los Angeles & Salt Lake Railroad and the Bingham & Garfield Railway, the latter being a local line, 34.1 miles long, extending from Salt Lake City through Garfield Junction to Bingham, Utah. The principal freight interchanged with these lines consists of ore and fuel for the smelters located on these connections. For the calendar year 1916 the revenue derived from this interchange was:

Los Angeles and Salt Lake	$ 17,095
Bingham & Garfield	97,343
Total Interchange at Garfield	$114,438

DEEP CREEK RAILROAD.

The Deep Creek Railroad, a standard-gauge line, extends from Wendover, Utah, a station on the WESTERN PACIFIC 121

*Includes Garfield Junction 0.8 miles from Garfield.

miles west of Salt Lake City, southward within the State of Utah, a distance of 46 miles to Gold Hill. This line was completed for operation in March of this year. The traffic originating on it consists principally of ore produced in the Gold Hill and Clifton districts, some live stock and wool. The inbound shipments consist principally of merchandise, mining machinery and fuel. Joint rates are in effect on ore to Salt Lake Valley smelters and on live stock only. Other traffic is handled on the basis of local rates to and from Wendover.

The cost of constructing this line was financed by the sale of capital stock. The investment of the WESTERN PACIFIC in this stock is $400,000, which represents about 90% ownership in the property.

The total revenue derived by the WESTERN PACIFIC through its interchange with this railroad for the five months, March to June 30, 1917, was $30,717.

NEVADA.

NEVADA NORTHERN RAILWAY.

The Nevada Northern Railway is a standard-gauge line which crosses the WESTERN PACIFIC at Shafter, Nevada, 162 miles west of Salt Lake City, and extends southward to Ely, Nevada, and northward to a connection with the Southern Pacific at Cobre, Nev., a total distance of 140 miles. It operates also about 11 miles of mountain lines south of Ely into the copper mines of the Kimberly District. At McGill, on this line, is located the large smelting works of the Steptoe Smelting Company, treating the ores of the Nevada Consolidated Mining Company. The traffic interchanged at Shafter consists principally of coal and coke, mining machinery and supplies and merchandise of all kinds, Ely being a town of possibly 10,000 population. The outbound business consists of smelter products, live stock, wool and ore. The WESTERN PACIFIC handles about one-half of the total business inter-

changed. Joint rates are in effect on practically all traffic. The property is owned and operated by the Guggenheims, who control the Nevada Consolidated Company.

The total revenue derived by the WESTERN PACIFIC through its interchange with this railroad for the year ended June 30, 1917, was $520,505.

EUREKA NEVADA RAILWAY.

The Eureka Nevada Railway is a narrow-gauge line operating from Palisade, Nevada, a point on the WESTERN PACIFIC 291 miles west of Salt Lake City, to Eureka, Nevada, a distance of 84 miles. Eureka is a small mining town. The products of this line are principally ore for treatment at Salt Lake Valley smelters and some wool. It connects also with the Southern Pacific at Palisade. The WESTERN PACIFIC enjoys more than half the business, possibly 60%. There are no joint rates in effect. The line is owned by the J. Ogden Mills Estate.

The total revenue derived by the WESTERN PACIFIC through its interchange with this railroad for the year ended June 30, 1917, was $39,329.

NEVADA-CALIFORNIA-OREGON RAILWAY.

The Nevada-California-Oregon Railway is a narrow-gauge line 236 miles long, extending from Reno, Nevada, to Lakeview, Oregon. It is controlled by Moran Brothers, of New York. It crosses the WESTERN PACIFIC at Hackstaff, California, 555 miles west of Salt Lake City, and the Fernley Branch of the Southern Pacific at Wendel, California. It also operates a branch 40 miles long, extending from Plumas Junction to Davies Mill, the latter point being opposite Blairsden, California, on the main line of the WESTERN PACIFIC.

The traffic interchanged with the WESTERN PACIFIC from north of Hackstaff consists principally of live stock, wool,

hay, potatoes and grain; from south of Hackstaff, lumber. The line south of Hackstaff forms the present connection of the WESTERN PACIFIC with Reno, Nevada, and considerable miscellaneous business is interchanged at Hackstaff. Joint rates are in effect on practically all traffic.

The line south of Hackstaff, including the branch line, has been purchased by the WESTERN PACIFIC during the present year for $700,000. The present narrow gauge line from Hackstaff to Reno, 65 miles, and the 40-mile branch, will be removed after the new standard gauge line of the WESTERN PACIFIC has been placed in operation.

During the year ended June 30, 1917, the total revenue derived by the WESTERN PACIFIC from its interchange with the Nevada-California-Oregon was $100,162.

CALIFORNIA.

INDIAN VALLEY RAILROAD.

The Indian Valley Railroad is a standard-gauge line extending north from Paxton, Cal., a station on the WESTERN PACIFIC 649 miles west of Salt Lake City, to Engels, Cal., a distance of 22 miles. The principal traffic interchanged with this line inbound is merchandise, mining machinery and lumber; outbound, concentrates and ore. As it serves the Indian Valley, a productive agricultural section, it is expected that in time it may develop some traffic in products of agriculture. It is possible to extend it into the large timber tracts of that section. Joint rates are in effect with this line on merchandise and commodities between San Francisco Bay points and points on that line, and on ore and concentrates from their stations to Salt Lake Valley smelters; other traffic is handled on the basis of sum of locals on Paxton. No other lines connect with this railroad. The line is controlled by the Engels Copper Company, whose mining property and mill are at the end of the line. They are the principal shippers.

During the six months of operation, January to June 30, 1917, the total revenue derived by the WESTERN PACIFIC from its interchange with this line, was $47,593.

This property was financed by the sale of stock at par. There is a total issue of stock of $325,000 of which the Engels Copper Mining Company own $250,000 and the WESTERN PACIFIC, through its subsidiary, the Standard Realty & Development Company, $75,000.

NORTHERN ELECTRIC RAILWAY.

The WESTERN PACIFIC has physical connection and interchanges traffic with the Northern Electric Railway at Oroville, Marysville and Sacramento, situated 205, 179 and 139 miles respectively, east of San Francisco. The operative mileage of this electric system so connected is 147.3 miles, the Suisun Branch 14.9 miles, being isolated from the balance of the line.

The WESTERN PACIFIC has joint rates with this line on practically all traffic. Fruit, hops, rice, grain, hay, livestock, merchandise and a wide range of commodities are comprised in this interchange. Maps and description in detail of this system will be found elsewhere in this report.

During the year ended June 30, 1917, the WESTERN PACIFIC derived a total revenue of $127,076 from its freight interchange with this SYSTEM.

CENTRAL CALIFORNIA TRACTION COMPANY.

The WESTERN PACIFIC has physical connection and interchanges traffic with this electric line at Sacramento, 139 miles, and Stockton, 94 miles, east of San Francisco. It serves a fruit and vineyard territory lying east of the Southern Pacific between those two points. Under present conditions its freight traffic is small for a line serving an area of intensive cultivation. The WESTERN PACIFIC has joint rates with this line on practically all traffic. A description and map of it will be found elsewhere in this report.

Its freight interchange with the WESTERN PACIFIC during the calendar year 1916 amounted to $22,802.

Tidewater Southern.

The Tidewater Southern Railway is a standard-gauge line, extending from Stockton, through Modesto, to Turlock, a distance of 49.2 miles. It is electrified for passenger service from Stockton to Modesto, a distance of 33 miles. All freight trains are hauled by steam locomotives over the entire line. There is no passenger service beyond Modesto.

The traffic interchanged with other lines is of a very general character, the principal commodities being cantaloupes, watermelons, beans and grain, with some deciduous fruit and vegetables.

A branch, six miles in length, extending from Small to Manteca to serve a sugar plant at the latter point, is under construction. An extension of the main line from Hatch, the present terminus, to Hilmar, a distance of eight miles, is also under construction. This extension will serve a territory devoted to melon and vegetable crops.

The Western Pacific has joint rates with this line on practically all traffic; the Southern Pacific on transcontinental traffic only. Joint rates with the Santa Fe have not yet been established, but probably will be, on transcontinental traffic, in the near future.

Freight is interchanged with all lines at Stockton. As the Western Pacific has the only direct connection with the Tidewater Southern, it performs the switching service on traffic between that road and all other lines.

During the year ended June 30, 1917, the Western Pacific derived a revenue of $118,814 on freight interchanged with the Tidewater Southern.

By authority of the Railroad Commission of California, the Western Pacific has purchased a stock interest in the Tidewater Southern to the extent of two-thirds of its outstanding capital stock. This is represented by 1,109,642 shares of stock which have cost the Western Pacific $666,314.85.

Oakland, Antioch and Eastern.

The Western Pacific has a physical connection through Northern Electric facilities and interchanges traffic with the Oakland, Antioch & Eastern at Sacramento. There is no direct physical connection between the two lines at Oakland.

The interchange between them is unimportant, amounting to only $548 during the calendar year 1916.

A description and map of this line will be found on other pages of this report.

Atchison, Topeka and Santa Fe.

The Western Pacific has direct physical connection with the Santa Fe at Stockton and San Francisco. It has indirect connection with it at Oakland through switching service performed by the Southern Pacific. The subject of a direct connection at this point is discussed elsewhere in this report.

Joint rates on transcontinental traffic are in effect between the Western Pacific and points on the Santa Fe as far south as Bakersfield. No through rates on transcontinental traffic are in effect to stations in California south of Bakersfield.

Joint rates are in effect between stations on the Santa Fe south of Bakersfield and Western Pacific stations in California and Nevada.

The Western Pacific during the calendar year 1916 derived a total revenue of $415,132 on freight traffic interchanged with the Coast Lines of the Santa Fe.

Southern Pacific.

The Western Pacific has physical connections and interchanges traffic with the Southern Pacific in California at Marysville, Sacramento, Stockton, Oakland and San Francisco.

Joint rates are in effect between all points in California from Bakersfield and Santa Margarita, on the south, to the Oregon State line on the north.

The WESTERN PACIFIC during the calendar year 1916 derived a revenue of $433,795 from its interchange with the Southern Pacific. The revenue it derived from freight received nearly equalled that for freight forwarded, the actual amounts being as follows:

Revenue from freight forwarded by Western Pacific to Southern Pacific.$221,607
Revenue from freight received by Western Pacific from Southern Pacific. 212,188

PETALUMA AND SANTA ROSA.

The WESTERN PACIFIC interchanges freight with the Petaluma & Santa Rosa by steamer transfer to and from Petaluma across San Pablo and San Francisco Bay. The latter is an electric interurban line 42.35 miles long, situated in Sonoma County operating between Santa Rosa, Forestville, Sebastopol and Petaluma.

The revenue derived from this interchange by the WESTERN PACIFIC during the calendar year 1916, was $44,235.

The statements on the following pages show in tabulated form the freight interchange of the WESTERN PACIFIC with its connections:

WESTERN PACIFIC FREIGHT INTERCHANGE
CALENDAR YEAR 1916.

Connection:—	Total Received by Western Pacific From Connection Named.	Total Forwarded to Connection Named by Western Pacific.	Total Interchange.
Atchison., Topeka & Santa Fe—			
Coast Lines	$ 275,157.67	$ 139,974.46	$ 415,132.13
Boca & Loyalton	13,648.14	10,182.81	23,830.95
Nevada-California-Oregon	17,385.93	62,583.96	79,969.89
Nevada Northern	62,411.00	321,824.36	384,235.36
Northern Electric	77,907.23	44,179.77	122,087.00
Tidewater Southern	97,000.48	7,761.99	104,762.47
Petaluma & Santa Rosa	23,958.64	20,276.84	44,235.48
Southern Pacific	212,188.27	221,607.07	433,795.34
Central California Traction	20,004.75	2,797.30	22,802.05
Oakland, Antioch & Eastern	24.72	523.12	547.84
Denver & Rio Grande	2,362,648.17	1,856,700.61	4,219,348.78
Bingham and Garfield	7,810.55	49,485.02	57,295.57
Los Angeles & Salt Lake	113,05	13,339.29	13,452.34
Total Interchange	$3,170,258.60	$2,751,236.60	$5,921,495.20
Local Business			819,483.12
TOTAL FREIGHT REVENUE			$6,740,978.32

CLASSIFICATION OF WESTERN PACIFIC FREIGHT REVENUE.
CALENDAR YEAR 1916.

Connections:—	Western Pacific Received From	Western Pacific Forwarded To	Western Pacific Total Revenue
Local Business			$ 819,483.12
WESTERN PACIFIC ORIGINATING AND DELIVERING CARRIER.			
CALIFORNIA AND NEVADA CONNECTIONS.			
Atchison, Topeka & Santa Fe—Coast Lines	$ 68,467.71	$ 20,196.76	
Boca & Loyalton	13,648.14	10,182.81	
Nevada-California-Oregon	12,158.35	45,197.99	
Nevada Northern	2,614.27	80,704.79	
Northern Electric	13,746.21	14,394.52	
Tidewater Southern	14,488.35	7,291.99	
Petaluma & Santa Rosa	2,292.97	576.10	
Southern Pacific	56,431.31	53,525.01	
Central California Traction	.....	385.39	
Oakland, Antioch & Eastern	24.72	.....	
Total California and Nevada Connections	$ 183,872.03	$ 232,455.36	$ 416,327.39
UTAH AND COLORADO CONNECTIONS.			
Salt Lake & Utah	$ 4.27	$ 1,708.23	
Bingham & Garfield	7,810.55	49,485.02	
Oregon Short Line	6,950.12	7,819.28	
Los Angeles & Salt Lake	113.05	13,399.29	
Denver & Rio Grande—Utah	503,890.84	188,143.20	
Denver & Rio Grande—Colorado	26,221.28	103,882.18	
Colorado Midland	359.71	3,332.28	
Colorado & Southern	2,856.47	6,990.75	
Colorado & Wyoming	48,235.76	320.66	
Total Utah and Colorado Connections	$ 596,442.05	$ 375,086.89	$ 971,528.94
EAST OF COLORADO.			
Atchison, Topeka & Santa Fe	$ 34,634.15	81,140.97	
Atchison, Topeka & Santa Fe via Coast Lines	8,456.83	3,819.38	
Chicago, Rock Island & Pacific	232,411.08	146,811.18	
Chicago, Burlington & Quincy	247,287.74	204,601.12	
Colorado & Southern	22,381.73	53,632.96	
Missouri Pacific	991,502.07	871,039.39	
Union Pacific	35,784.09	40,605.23	
Union Pacific—via Ogden	201,672.03	142,787.80	
Total East of Colorado Connections	$1,774,129.72	$1,544,438.03	$3,318,567.75
WESTERN PACIFIC INTERMEDIATE CARRIER.			
Southern Pacific	$ 155,756.96	$ 168,082.06	
Atchison, Topeka & Santa Fe	206,689.96	119,777.70	
Petaluma & Santa Rosa	21,065.67	19,700.74	
Nevada Northern	59,796.73	241,119.57	
Central California Traction Co.	20,004.75	2,411.91	
Nevada-California-Oregon	5,227.58	17,385.97	
Northern Electric	64,161.02	29,785.25	
Oakland, Antioch & Eastern	.....	523.12	
Tidewater Southern	82,512.13	470.00	
Total Traffic as Intermediate Carrier	$615,814.80	$599,256.32	$1,215,071.12
TOTAL FREIGHT REVENUE			$6,740,978.32

DIVISION OF THROUGH RATES AND SWITCHING CHARGES.

GENERAL BASIS OF DIVISIONS OF RATES ON TRANSCONTINENTAL TRAFFIC (SHORN OF EXCEPTIONS, MINOR DETAILS AND ABSORPTIONS), ALSO SUBDIVISIONS ALLOWED SOUTHERN PACIFIC AND SANTA FE.

New York Territory.
Lines east of Chicago 25%
Lines east of East St. Louis 29%

Pittsburgh-Buffalo Territory.
Lines east of Chicago 15%
Lines east of East St. Louis 18½%

Cincinnati-Detroit Territory.
Lines east of Chicago 12%
Lines east of East St. Louis 15½%

Lines east of Chicago or East St. Louis are allowed above per cents of a minimum rate of 75c per 100 pounds.

To or from territory west of Cincinnati-Detroit (generally known as the Evansville-Vincennes territory), allowances east of Chicago, or Mississippi River Crossings, vary considerably, but the general basis is 10% with local rate as maximum.

On Chicago traffic, lines east of Missouri River receive 15% after deducting 5c per 100 pounds.

On East St. Louis traffic, lines east of Missouri River receive 11%, first deducting 2c bridge toll.

On St. Louis traffic, lines east of Missouri River receive straight 11%.

On traffic to or from California points, the lines east of the Missouri River are allowed the above outlined percentages of the rates applicable to or from California points. In subdividing the proportion west thereof, the lines west of Salt Lake or Ogden receive, using for example the following representative points:

Oakland, San Jose, New Castle 46%
Santa Rosa, Vacaville, South Vallejo 49%
Chico 50%
Lindsay, Fresno 53%
Watsonville 54.6%

The Southern Pacific and Santa Fe on traffic to or from the above-named points and contiguous territory are allowed 23% of the proportion accruing to lines west of the west bank of the Missouri River, which proportion is deducted from the west of Salt Lake proportion, remainder accruing to WESTERN PACIFIC.

EXAMPLES OF DIVISION OF TRANSCONTINENTAL RATES.

EXAMPLE No. 1.

Rate of $1.00 from New York, via Chicago, to San Francisco:

	Cents
Through rate	100.00
Lines East of Chicago 25%	25.00
Amount to divide West of Chicago	75.00
Deduct Mississippi River Bridge Toll	5.00
Amount to which percentage is applied	70.00
Chicago to Missouri River 15% of above	10.50
Amount to divide West of Missouri River	64.50
Less 5-cent Bay Transfer at San Francisco	59.50
Portion West of Salt Lake 46% of 59.5 cents	27.37
Add Bay Transfer Charge	5.00
Total portion, Salt Lake to San Francisco	32.37

When the traffic moves through East St. Louis (instead of via Chicago as above), the total portion west of Salt Lake is slightly less, amounting generally to less than $3.00 per car of 13 tons.

When the portion of the rate west of Salt Lake must be divided between the WESTERN PACIFIC and the Southern Pacific or Santa Fe, the latter lines receive 23 per cent. of the amount to divide west of Missouri River.

EXAMPLE No. 2.

Rate of $1.00 from New York, via Chicago to Fresno:

	Cents
Same divisions as in Example No. 1 to Missouri River.	
Amount to divide West of Missouri River	64.50
Portion West of Salt Lake 53% of above	34.18
Allow Southern Pacific or Santa Fe 23% of 64.5 cents	14.83
Western Pacific West of Salt Lake	19.35

Absorption of 23% Divisions Allowed California Lines.

As stated in the foregoing examples, the Western Pacific must pay the Southern Pacific and Santa Fe 23% of the portion of the rate accruing west of the Missouri River when either of these two Roads participate in the haul west of Salt Lake. As this division for a comparatively short haul takes a very large part of the total revenue accruing west of Salt Lake (between 40 and 50%), and leaves the Western Pacific a disproportionately small amount for its much longer haul, the eastern connections of the latter road absorb a portion of this 23% west of Missouri River which it pays the Southern Pacific and Santa Fe. The absorption is divided as follows:

Lines East of Colorado Junctions	4.968%
Colorado Junctions to Utah Junctions	7.452%
West of Utah Junctions (Western Pacific portion)	10.580%
Total to be absorbed	23.000%

The Western Pacific pays the California Electric Lines which participate in hauls west of Salt Lake, 12½ per cent. of the portion of the through rate accruing west of the Missouri River. This division is absorbed as follows:

East of Colorado Junctions	2.70%
Colorado Junction to Utah Junctions	4.05%
West of Utah Junctions	5.75
Total to be absorbed	12.50%

Premium Switching.

On transcontinental traffic the Southern Pacific and the Santa Fe charge the Western Pacific (and each other) for all switching performed on their facilities, 50 cents per ton, with a minimum charge of $7.50 per car.

Straight Switching.

The normal charge on non-competitive traffic for switching cars from the track of one company to an industry located on another, is $2.50 per car.

Interyard Movement.

Each road charges consignee 25 cents per ton, minimum $5.00 per car.

PHYSICAL CHARACTERISTICS OF WESTERN PACIFIC MAIN LINE.

Someone has referred to the WESTERN PACIFIC as an unsurpassed instrumentality for economical transportation, meaning, doubtless, by comparison with other transcontinental lines, or, more properly, with such lines west of the Salt Lake Meridian. The fact is that the WESTERN PACIFIC, as constructed, is a remarkable line, especially when it is considered that it was the last of the railroads to be built across the western deserts and the Sierra Nevadas to the Pacific coast.

The accompanying profile shows in detail the location of the various maximum grades, which are one per cent. (fifty-three feet per mile). The one per cent's maximum was used quite freely upon the section between Oakland and Stockton. The grade from Stockton to Mile 217 is very light, generally from ten to fifteen feet, with a maximum of twenty-one feet per mile. From Mile 217 a one per cent. maximum is used to Portola, Mile 321. The use of this grade has been criticised by various engineers, but when it is considered that the Central Pacific has gone to enormous expense for the construction of an eastbound track from the foot of the Sierra Nevadas to the summit, and in view of the fact that the WESTERN PACIFIC already has a dense traffic east of Sacramento and over the Sierras, the advantage incident to the construction of the original line upon a one per cent. maximum grade is evident.

If the alternative had been pursued, and a grade of say one hundred and sixteen feet per mile had been located from the summit westward to such a point near the surface of Feather River as would permit of the use of a one per cent. grade thence to Oroville at the foot of the mountains, it would soon have been necessary to consider the construction of a lighter

grade line, and as one per cent. is the lowest practicable maximum grade that can be secured on the west slope of the Sierras, the original investment, even though it was larger than would have been required if a heavier grade line had been used for the upper portion of the incline, was, after all, insignificant as compared with the expenditure that would have been necessary for the subsequent substitution of a one per cent. for a heavier grade.

At Mile 393, Sand Pass, there is a short false summit, involving a grade of one per cent., which can be removed at any time by an expenditure of about $70,000.

Antelope Summit, located at Mile 488, involves the use of a one per cent. grade on the east and an eight-tenths per cent. grade on the west slope. This country is very rugged, but the grades can be reduced to four-tenths per cent. at a cost of about $750,000, according to present prices. A helper engine is employed upon this summit and it will be many years before it will be economical to change the gradient of this line for the purpose of saving the expense of operating this engine.

Between Miles 747 and 806, a one per cent. grade has been used freely, and cannot be avoided at any reasonable expense. Flower Lake Tunnel is located at Mile 752. Between Miles 774 and 806 occurs "Arnold's Loop," a very fine piece of engineering work by which the ROAD is closely fitted to the ground so as to afford a maximum grade of one per cent., with a minimum expense for construction, although the topography of this stretch is such that the line was necessarily very expensive.

Between Miles 854 and 878 are two short stretches of eight-tenths per cent. grade which can be removed whenever it is necessary to do so.

With the exceptions noted, the maximum grade on the entire line from Oakland to Salt Lake is four-tenths per cent., or a little over twenty-one feet to the mile.

The lighter grade line was not unskilfully and wantonly broken, but deliberately, and in the interests of economy, and the existing heavier grades that may hereafter be removed can be more economically maintained for some time to come, helper engines being used on these minor summits, as at present.

The WESTERN PACIFIC is, therefore, entitled to be described as a wonderful instrument, or medium, for economical transportation.

Attention is invited to the profiles of seven roads extending across the Rocky Mountains to the Pacific Coast, namely, the Canadian Pacific; Great Northern; Northern Pacific; Chicago, Milwaukee & St. Paul; Atchison, Topeka & Santa Fe; Central Pacific, and the WESTERN PACIFIC. It is probable that comparisons can more properly be made between the WESTERN PACIFIC, the Central Pacific and the Santa Fe than with the other, and more northern, lines, and a mere visual inspection of the profiles of these two Roads and the WESTERN PACIFIC shows the points of superiority of the last named over the other two.

There is nothing upon the WESTERN PACIFIC to compare with Riordan, the summit on the Santa Fe, near Flagstaff, from which the line falls from an elevation of about 7,400 feet to Needles, about 500 feet above sea level, or approximately 6,900 feet. It then crosses a considerable summit, at an elevation of approximately 2,500 feet, west of Needles, and falls again at Barstow to an elevation of about 750 feet, from which it rises to the summit of a spur of the Sierras, Cajon Pass, at an elevation of about 3,700 feet, and then falls abruptly to the foot of the mountains at San Bernardino.

Its line to San Francisco climbs from Barstow to the summit of a spur of the Sierras, Tehachapi Pass, at an elevation of about 4,300 feet, descends abruptly to Bakersfield, at the foot of the mountains, an elevation of about 500 feet, and thence traverses the San Joaquin Valley and the coastal areas, to Richmond and Oakland.

The Santa Fe furnishes an example of an extreme saw-tooth profile, abounding in heavy grades, and, is consequently, costly to operate.

Turning now to the Central Pacific, it will be found that the grade is nearly level from Salt Lake for some distance west and escapes the false summit that is surmounted by the WESTERN PACIFIC, that is, the Grass Mountain Summit, thence ascends abruptly to Spring Pass, about 6,200 feet above sea level, and descends about 500 feet to the valley of the Humboldt River. It also escapes Antelope Summit, which is crossed by the WESTERN PACIFIC, just west of Winnemucca, at an elevation of 4,500 feet. The grades of the Central Pacific are not as favorable as those of the WESTERN PACIFIC, as it has a long and severe ascent of the Sierras, beginning at a point near Reno, reaching the summit at an elevation of over 7,000 feet, from which the grade falls abruptly to the Valley of the Sacramento, at an elevation of about 200 feet above sea level.

If the grade line of the Central Pacific, just described, be compared with the red line representing the grade of the WESTERN PACIFIC, and if particular note be taken of the difference in the summit elevation, 5,018 feet, at Beckwith Tunnel and that of the summit elevation of the Central Pacific, over 7,000 feet, the superiority of the WESTERN PACIFIC line is apparent. It must be remembered, moreover, that the maximum grade on the WESTERN PACIFIC is one per cent., while that of the Central Pacific is much higher—in fact, the crossing of the Sierras was originally effected by a grade of two and two-tenths per cent., or one hundred and sixteen feet per mile. The Central Pacific has been put to enormous expense in connection with the construction of a lighter grade line over the Sierras, which the WESTERN PACIFIC will avoid because of the forethought of the engineer who originally located and constructed its line.

It is customary, in comparing the profiles of transcontinental roads, to make statements concerning their maximum grades, which are misleading, and practically meaningless, because such grades are usually concentrated upon comparatively short stretches of the line, whereas the usual statements would indicate that they exist generally and extend over considerable mileage. Where heavier grades are concentrated and comparatively short, operation can be performed economically by concentration of heavy power at such points—that is, by the use of helper engines; and, similarly, a road having light grades, generally speaking, and having one division, or say two operating districts, amounting, in the aggregate, for example, to 250 miles, upon which the grade is one per cent., can, and should, adapt its power to this grade so as to prevent the necessity for reducing the tonnage of trains passing over it.

This statement is made because the Northern Pacific and the Great Northern, although the profiles represents them to be sawtooth lines, abound in light grades extending over the principal part of their mileage, with occasional helper summits. The Northern Pacific has been consistently operated for years for about 60 per cent., the ratio in 1916 being 53.15 per cent., in spite of decreased revenue per ton mile and increased expenses that were common to all roads. (See statement on page 26.)

This reference to the Northern Pacific is made because the gradients of the WESTERN PACIFIC are, upon the whole, more favorable, and this fact affords justification for the statement that it can be operated in future as at present (barring unusual disturbances, due to reduction of rates or further increases in the cost of material and labor) for 60 per cent., or less, of the gross revenue.

INDEX OF TRAFFIC ESTIMATES, ESTIMATES OF COST, INCOME ACCOUNTS, VALUATIONS, FINANCIAL STATEMENTS.

* Cost of proposed extension, Forestville to Healdsburg.
† Cost of freight line at Vallejo.
‡ Cost in detail (1) Woodland to Vacaville; (2) Willota to Soscol; (3) Soscol to Petaluma; (4) Extension of Petaluma & Santa Rosa; (5) Vallejo Freight Line.

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