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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

CHILE
TRANSPORTATION

A Preliminary Report

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Economic Department
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Map of Chile.
I. Summary and Conclusions

On the whole, the existing Chilean transport system is capable of moving the current amount of freight. Only a slight increase in capacity seems necessary to accommodate a growth in traffic at a rate commensurate with that in the 1938-1948 period. However, if new developments, e.g., in agriculture are contemplated, the development of new transport lines may prove necessary.

The main transport need in Chile is improved efficiency of service which would reduce operating costs and could be passed on to the consumer as reduced freight tariffs. Improved operating efficiency can be achieved by closer economic cooperation between the various forms of transport, by administrative reforms, by better utilization of labor, and by capital investment.

From an investment standpoint, operating efficiency can be achieved for coastal vessels mainly by replacing obsolete high operating cost vessels with modern tonnage. The highest priority in port investment is apparently increased mechanization, so as to reduce cargo handling costs and vessels turnaround time. For the State Railroads, the first necessity appears to be replacement of obsolete rolling stock and increased mechanization at terminal facilities. For road transport the highest investment priority is to improve the seasonal roads to all-weather roads.

While road improvements would largely mean an investment in local currency, the investment for improved facilities for coastal vessels, ports and railroads are predominantly in foreign currency.

Existing transport investment plans appear to suffer from lack of coordination. They are not well enough documented to form a judgment as to their economic soundness and relative priority.
II. Relative Importance of existing Transport Carriers

The railways are the backbone of the Chilean internal transportation system. In 1948 the railroads carried about 69% of the tonnage of internal trade. Truck transport is of growing importance, particularly in regional trade in the Central Valley. It has been estimated that for Chile as a whole the trucks carry a volume equal to about 28% of rail traffic. Cabotage is important to Chilean inter-regional trade, being the only means to reach the Southern Provinces and the Arica District in the far north.

The following table compares the tonnages of internal freight hauled in 1948 by mode of carriers:

<table>
<thead>
<tr>
<th></th>
<th>Million Metric Tons</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railways (State and Private)</td>
<td>11.6</td>
<td>68.6</td>
</tr>
<tr>
<td>Cabotage (Private and State)</td>
<td>2.1</td>
<td>12.4</td>
</tr>
<tr>
<td>Roads (Estimated at 28% of rail traffic)</td>
<td>3.2</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>16.9</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

These figures give the unduplicated cargo traffic, i.e. goods unloaded. A fraction of this internal trade, however, may have been duplicated because of transfers from one transport media to another.

It is generally recognized that the relative performance of the various means of transportation is more accurately judged by taking into account not only the volume of cargo carried, but also the distance hauled. Traffic data for Chile measured in ton kilometers have only been available for the railways. The "Ferro carriles del Estado" (State Railways) are the principal railways, carrying 76-77% of the traffic of principal railroads in 1948. The remainder was carried mostly by privately owned railroads. The "Antofagasta-Bolivia Railways" is the major privately owned railroad.

International railway traffic moves between Chile and Peru on the State-owned Arica-Tacna Line, to Bolivia on the State-owned Arica-La Paz, and the private Antofagasta-Bolivia Railroad. Rail links with Argentina are the
State-owned Antofagasta-Salta Line (opened in 1948) and Valparaíso over Los Andes Line, connecting with Argentine Railroads from Buenos Aires. International railway traffic (1948) carried by the Chilean sections of the international railways was about equal to the traffic carried by the principal railroads outside the "Ferrocarriles del Estado". The level of traffic and the relative importance of principal categories of carriers will appear from the following table:

<table>
<thead>
<tr>
<th>Cargo unloaded on Principal Railways (1948)</th>
<th>Million Metric Tons</th>
<th>Million Tons</th>
<th>% based on Ton KM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferrocarriles del Estado</td>
<td>7.00</td>
<td>1,760</td>
<td>76.7%</td>
</tr>
<tr>
<td>Privately operated railways (internal traffic)</td>
<td>4.6</td>
<td>273</td>
<td>11.9%</td>
</tr>
<tr>
<td>International Railways (Transit Traffic)</td>
<td>1.00</td>
<td>262</td>
<td>11.4%</td>
</tr>
<tr>
<td>Total</td>
<td>12.6</td>
<td>2,295</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Service Traffic included.

Some minor railroads, owned by mining companies and operated for short distances to bring minerals to the mills or to the ports, are not included in the above table.

Of the five railroad lines operated by the State, the Southern System (Red Sur) is the most important. In 1948 Red Sur carried 81.5% of internal cargo unloaded on the State-operated lines.

<table>
<thead>
<tr>
<th>Cargo unloaded on State-Operated Railroads (1948)</th>
<th>Thousand Tons</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.C. Red Sur (Puerto Montt a La Calera)</td>
<td>5,686</td>
<td>81.5</td>
</tr>
<tr>
<td>F.C. Red Norte (La Calera a Pueblo Hundido)</td>
<td>908</td>
<td>13.0</td>
</tr>
<tr>
<td>Red Sur and Red Norte:</td>
<td>6,594</td>
<td>94.5</td>
</tr>
<tr>
<td>F.C. Arica a La Paz</td>
<td>100</td>
<td>1.4</td>
</tr>
<tr>
<td>F.C. Iquique a Pintados</td>
<td>235</td>
<td>3.4</td>
</tr>
<tr>
<td>F.C. Transandino</td>
<td>48</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>6,977</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: The State-owned Longitudinal Line from P. Hundido to Pintados is operated by the Antofagasta-Bolivia Company.
III. Intra-Regional Traffic

The greatest traffic density is found in Central Chile, extending some 690 miles from about Valparaiso in the north to about Puerto Montt in the south. The Central Provinces support nearly 90% of the total population. Traffic centers are the economic and political capital of Santiago, the main port of Valparaiso and the important city of Concepcion. Feeding these population centers is an important task of the transport network.

The most important means of transportation within the Central Valley is the railroad, viz. the broad-gauge Red Sur (Southern System), stretching 2,692 km from Puerto Montt to La Calera. On a weight basis, minerals and agricultural goods were the most important cargoes transported in 1948. The average distance hauled for minerals was 209 km at an average cost of 75 centados per ton km. Agricultural products were hauled an average distance of 320 km at an average cost of 78 centados.

<table>
<thead>
<tr>
<th>Cargo unloaded on Red Sur (1948)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thousand Metric Tons</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Agricultural goods</td>
</tr>
<tr>
<td>Forest Products</td>
</tr>
<tr>
<td>Mineral Products</td>
</tr>
<tr>
<td>Animal Products</td>
</tr>
<tr>
<td>Manufactures</td>
</tr>
<tr>
<td>Other Products</td>
</tr>
<tr>
<td>Miscellaneous</td>
</tr>
<tr>
<td>Revenue Traffic</td>
</tr>
</tbody>
</table>

(Note: Figures are rounded).

No data are available as to the level of truck traffic in the Central Provinces, but it is relatively more important here than in other parts of Chile. In the districts of Santiago and Valparaiso, more than 17,000 trucks were registered in 1948 compared with 27,600 trucks for Chile as a whole.
Some traffic is hauled by animal wagons. In 1948 there were 75,696 animal vehicles registered in Chile.

Cabotage plays an important role in the movement of freight from one coastal community to another within the Central Provinces. Available statistics do not, however, separate traffic originating from and going to points within the Central Provinces from inter-regional traffic, i.e. traffic between Central Chile and Northern and Southern Chile.

The level of regional traffic in Northern and Southern Chile is limited in scope because of the low density of population and the relatively low standard of living.

IV. Inter-regional Trade

A main feature of inter-regional trade is the movement of agricultural products from the Central Valley and to a lesser extent from the Southern Districts to the northern mining districts. Cargo unloaded in coastal trade at the range of ports north of Valparaiso (1948) amounted to 626,000 metric tons, of which Coquimbo and Antofagasta accounted for 261,000 tons. The extreme Northern district of Arica is connected exclusively by cabotage with the rest of Chile. Cabotage is, however, important also for the parts of northern Chile served by rail because the cost of rail transport is increased by the necessity of transfers between the various gauges. Northbound rail cargo originating within the 1.676 meter gauge Red Sur (Southern System of the State Railways), thus must be transferred at La Calera to the one-meter gauge State-owned Red Norte and again at Pintados to the 1.435 meter gauge British-owned railroad to the northern rail terminal at Pisagua. The Red Norte terminus to the north is Pueblo Hundido, where the state-owned (but operated by the private Antofagasta-Bolivia Railroad) "Longitudinal Railway" extends northwards to Pintados, at which point it connects with the
State-owned and operated Pintados-Quique Railroad and the private Pintados-Pisagua Railroad. The Longitudinal Railways has a junction with the Antafagasta-Bolivia Railway at Esquadano.

The Red Norte Railway is an important carrier of inter-regional trade between La Calera in the Central District and as far north as Pueblo Hundido. Minerals and agricultural goods accounted for the bulk of the traffic. In 1948 minerals were moved an average distance of 73 km at an approximate tariff of 82 Centados per ton km, whereas agricultural products were moved an average distance of 237 km at an average cost of 109 Centados per ton km.

### Cargo unloaded by Red Norte (1948)

<table>
<thead>
<tr>
<th>Class of Cargo</th>
<th>Thousand Tons</th>
<th>Thousand Ton km</th>
<th>Average Distance km</th>
<th>Average Tariff Centados</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Products</td>
<td>64</td>
<td>15,231</td>
<td>237</td>
<td>109</td>
</tr>
<tr>
<td>Forest Products</td>
<td>23</td>
<td>3,074</td>
<td>134</td>
<td>111</td>
</tr>
<tr>
<td>Mineral Products</td>
<td>759</td>
<td>55,324</td>
<td>73</td>
<td>82</td>
</tr>
<tr>
<td>Animal Products</td>
<td>9</td>
<td>3,196</td>
<td>341</td>
<td>121</td>
</tr>
<tr>
<td>Manufactures</td>
<td>33</td>
<td>9,187</td>
<td>275</td>
<td>88</td>
</tr>
<tr>
<td>Other Products</td>
<td>1</td>
<td>87</td>
<td>441</td>
<td>158</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>18</td>
<td>3,706</td>
<td>206</td>
<td>111</td>
</tr>
</tbody>
</table>

Total Revenue Traffic 908 89,834 99 92

Road transport is insignificant in inter-regional trade. The road network northwards from the Central Valley to the Peruvian border consists mostly of seasonal roads.

Inter-regional trade to the Southern District (South of Puerto Montt) is carried exclusively in coastal vessels. Traffic in 1948 for all ports in the Southern area amounted to 68,500 tons loaded and 57,600 tons unloaded. There is no statistical breakdown as to the volume of the different categories of goods carried. The coastal rates, as fixed in a Decree of April 21, 1950 make no distinction between northbound and southbound cargo. Sample coastal rates from the southern ports of Natales and Iunta Arenas to Valparaiso and San Antonio are: livestock on the hoof: 732 pesos per metric ton, baled sheepskins: 769 pesos per metric ton, wool and cotton in bales: 935 pesos per metric ton.
V. INTERNATIONAL TRADE

Roughly, the volume of cargo unloaded in coastal traffic in Chilean ports equals the cargo imported. Exports on the other hand, are more than double the level of coastal trade.

**Chilean Port Traffic - 1948**

<table>
<thead>
<tr>
<th></th>
<th>Loaded</th>
<th>Unloaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>5.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Coastal</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Chile's international trade is almost entirely seaborne. The dominant feature is the export of minerals through the ports of the Northern provinces. Of the total export in 1948 of 5.3 million metric tons, 2.6 million tons went through the port of Cruz Grande and 1.3 million tons through the port of Tocopilla. The minerals for exports are transported to the ports mainly by privately owned railways. The largest of these railroads is the Antofagasta-Bolivia Railway.

Valparaiso, serving Santiago and the Central Valley, is the main port of imports. Of total imports in 1948 of 2.1 million metric tons valued at 1.3 billion pesos, 65 million tons valued at 786 million pesos passed through Valparaiso.

On the basis of 1948 import values, the port of Talcahuano, serving the city of Concepcion, was next to Valparaiso in importance. Imports included manufactured goods, raw materials for the Chilean industry and agricultural products, mostly from Peru.

The main countries of destination for oceanborne exports in 1948 were the US, Great Britain and France. The US, Peru, Argentine and Curacao were main sources of imports.

In addition to her own foreign trade, transit trade from Bolivia passes through the ports of Antofagasta and Arica, and from Peru through Arica.
VI. TRAFFIC TRENDS AND THE CAPACITY OF THE TRANSPORT SYSTEM

Rail and coastal traffic displayed a slow but steady increase from 1937 to 1949. On the basis of average 1937/38 traffic = 100, the freight index for the "State Railways" was 132 in 1948 and 126 in 1949 (ton kilometer basis). Coastal traffic, compared with the same base period, stood at 128 in 1948 and 116 in 1949 (based on tonnage of cargo unloaded). Judging from truck registrations in the absence of traffic statistics, truck traffic increased at a fast rate. In 1936/39 the number of trucks registered annually averaged 11,561 as compared with 23,387 trucks in the 1940/46 period. The 1948 truck census stood at 27,580 trucks. With the increased mileage of improved roads, the heavier trucks were possible, so that the increase in capacity of the trucking fleet was greater than the increase in number of trucks. Highways with better grade paving expanded from 118 kilometer in 1930 to 1,021 km. in 1943, while sand and gravel roads increased from 3,000 km. to 14,000 km.

It appears that traffic in Chile is moved with reasonable dispatch. No particular transport bottlenecks are reported. It may therefore be assumed that the capacity of the transport network is on the whole adequate to meet the current demand of traffic.

The freight traffic outlook in Chile is on the whole favorable. Mineral traffic is likely to be at a high level, with the increasing demand for minerals in the world market. Freight traffic as a whole, will probably grow at least as fast during the next decade as in the preceding one. It may be that a further diversion of agricultural products and "less than carload shipments" may cause a greater increase in truck traffic than in rail and coastwise traffic, conditional on the rate of road improvements.

New sources of traffic because of new development schemes, e.g. irrigation schemes or development of the oil fields in the Magellanes, would mean
commensurate development of transport facilities. Apart from such specific expansion of certain transport lines, there is apparently no foreseeable need for large scale expansions of transport facilities. There will probably be a regular growth of capacity commensurate with the growth in traffic.

VII. TRANSPORT COST AND THE OVERALL FINANCIAL POSITION OF THE TRANSPORT SYSTEM

The cost of transportation in Chile is at a relatively high level due to a number of causes, some of which are inherent in geographical, economic, legal and historic factors beyond the control of the management of the various forms of transport. Others are due to a degree of inefficiency in the transport system itself.

Navigation along the coast of Chile is hampered by frequent storms and foggy weather. There are no natural ports. The mountain range along the coast and the high Andes mountains separating Chile from her neighbors pose obstacles of construction, maintenance and operation of both railroad and road transport. Inland transportation is moreover hampered by earthquakes, torrents and landslides.

The pattern of inter-regional and international trade also tend to increase cost of transportation, since traffic in many instances is predominantly "one-way traffic".

Postwar increases in transport operating costs which are notable in Chile as well as in most parts of the world, are the increases in the cost of new equipment, in the cost of labor, in the prices of fuel and stores. In Chile these factors strike particularly hard. Since transport equipment is predominantly imported, the cost of long distance ocean transport must be added to the already high F.O.B. prices.

The postwar inflationary pressures in Chile have been particularly severe and are still strong. Both the railroads and the coastal fleet were granted
overall increases in tariffs, but it is claimed that these increases are insufficient to compensate for the increases in operating costs.

The postwar increases in the cost of labor have a particularly important impact on the transport operating costs in Chile, partly because of the extensive reliance on manual labor, especially at transport terminals, partly because of the social legislation requiring short working days.

It is probable that the coastal vessels and the ports thus operate with unnecessarily large labor crews. As an illustration, railroad pension arrangements permit retirement at the age of 55.

Varying gauges are another high cost factor. The Chilean railroads were built piecemeal by private interests during the middle of the 19th century and onwards. This resulted in the construction of railroads of six different gauges. Although many of the existing railroads are short "mine-to-port" lines not connected with other railroads, the transfer between the broad-gauge Red Sur and the Red Norte adds to the cost of operation.

Main cost factors attributable to inefficiency of the transport system are the poor physical condition of a large part of the mobile and fixed equipment. Overage rolling stock, obsolete coastal vessels, require a high extent of repairs. Light rails limit the economic speed of the trains. Poor roads enhance the cost of wear and tear of trucks as well as the fuel costs.

The impact of the extraordinary increases in the postwar period and the inherent high operational costs have put the State railroads and the coastal fleet in a precarious financial position. The financial difficulties are increased by the fact that the depression of the 1930's had already undermined the financial structure. The State railroads have consistently been running at a loss during the postwar period. State subsidies to the railroads were as high as 1,1 billion pesos in 1950. The coastal fleet is not subsidized but earnings are insufficient to put aside sufficient replacement funds. The private railroads and the trucking company appears to be in better condition,
VIII. Problems of Transport Policy and Existing Transport Improvement Plans

In order to ensure continued transport services, the transport policy in Chile has to devise ways to reduce transport costs and bring about a balance between the cost and the price of transport services. The way to achieve these ends is seemingly to start an all-out efficiency drive aided by programs for replacement, mechanization, rationalization of labor, transport coordination, etc. In addition a review and a reform of transport tariffs may both increase income to the carrier and distribute transport costs more evenly between the groups of commodities transported.

Main features of existing proposals for transport improvement are sketched below. Information available is too meagre to form a true estimate of their economic soundness.

1. Cabotage

Except for seven vessels owned by the State Railways, the Chilean coastal fleet is privately owned. The coastal fleet totals 88 vessels of 104,928 DWT. Of these, 71 vessels of 81,990 DWT (78%) are over 20 years old.

The Chilean Development Corporation (a State undertaking) is seeking a foreign currency loan of $8 million for the construction of coastal vessels of 32,000 DWT, which, because of greater efficiency, would replace 45,000 DWT of coastal vessels currently over 30 years old. A second step planned by the Development Corporation is the replacement of 37,000 DWT currently 20–30 years old.

Foreign capital is sought for the financing of these vessels since the replacement funds of the coastal shipping companies are negligible and since private Chilean capital is unwilling to invest in coastal vessels because of the record of poor earnings.
It is not apparent whether the Development Corporation or another
State agency plans to take over the operation of the new vessels, or
whether they will be chartered or ownership transferred to the private
shipping companies. Cabotage is reserved for Chilean flag vessels.

2. Ports

The largest single item of operating costs of coastal as well as inter-
national shipping is the cost of cargo handling in ports. In view of her
reliance on seaborne trade it is thus of vital importance to the Chilean
economy to reduce the cost of a ship's port expenditures. At the end of
1949 the Government was considering the creation of a Governmental corpora-
tion as a part of the Governmental "Production Development Corporation", to
finance the improvement of port facilities. No reports of the actual es-
 establishment of such a corporation has been received. Press reports (1949)
indicate that 745 million pesos will be spent on port modernizing, 30
million of which will be spent on coal discharging equipment for the port
of San Antonio. The Chilean shipping company "The Compania Sud Americana
de Vapores" has offered to aid the coal companies in financing coal dis-
charging equipment at Valparaiso and San Antonio.

Three State bodies are charged with the various aspects of port invest-
ment:

(1) The port authorities, who are responsible for the investment in
cargo handling equipment, warehouses, etc.

(2) The Public Works Authority, which is in charge of dredging
of the harbor, paving of streets, etc.

(3) The Navy, which is responsible for navigational aids.

No data are available on the port program. The impetus for port mechan-
ization in Chile should be particularly great, since savings by mechaniza-
tion are especially noticeable for bulk cargoes as minerals and grain.
3. **State Railways: Red Sur and Red Norte**

The high degree of obsolete rolling stock (estimated at 60%) on the State Railways makes for high maintenance costs. A prime need for the Chilean State Railways is thus to replace her rolling stock. It has been estimated that 300 freight cars each year would be necessary for efficient service, while only about half that quantity has been replaced in recent years. Similarly increased mechanization of technical facilities and extended storage space are important steps to increase operating efficiency. It is of particular importance further to improve the transfer of goods between the broad and narrow gauges of the Red Sur and Red Norte at La Caldera.

A gradual replacement of the light rails with heavier equipment is also contemplated in order to allow heavier trains and higher speed. A scheme of more spectacular proportions is the proposed electrification of the Southern System between Santiago and Chillan and between Santiago and Cartagena. The main motivation for the electrification scheme is the savings in operating cost, particularly in the cost of fuel. It has been estimated that electricity would cost only 25% of coal-generated steam power. The foreign exchange cost of electrification was estimated by the U.S. Engineering Firm of Gibbs and Hill (1948) at 34 million US Dollars. As against the cost of electrification, including new locomotives, repair shops, etc. Gibbs & Hill calculated that the foreign currency cost necessary to replace old steam locomotives and to bring about "ideal" steam operation, would amount to US $28 million.

4. **Highways**

The Chilean road network includes 1,400 km high type paved highways, 15,000 km macadam, gravel, sand and clay allweather roads, and 30,000 km unimproved earth roads. The aim of the road development program as
set by the Director of Public Works is to have 10,000 km first class, paved roads, and 25,000 km of allweather, secondary roads. One of the main tasks of the road development policy is the completion of the Pan American highway between Concordia on the Peruvian border and Santiago. The section between La Serena and Santiago is now under construction.

The section from Santiago and Buenos Aires is open for traffic all the year round. A branch of the Pan American highway between Santiago and Puerto Montt is being improved. Other major road projects are the construction of tunnels on the road between Valparaiso and Santiago.

The necessary acquisition of additional trucks will apparently be financed by the private companies operating truck haulage. The State Railroads operate some trucks for pickup and delivery service.

The highway construction program is financed by: earmarking of gasoline taxes and copper taxes, by real estate taxes, budget appropriations, and bond issues. Unlike in Central America, when the U.S. pays two thirds and the national Governments one third of the cost of constructing the Pan American Highway, the Chilean section of the Pan American Highway is financed by the Government of Chile exclusively.