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PROBLEMS OF TRANSPORT
AND COMMUNICATIONS
IN THE ANDEAN GROUP

by

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Abstract

This paper examines the problems of transport and communications in the Andean Group customs union recently formed by Colombia, Chile, Peru, Ecuador and Bolivia, and demonstrates that high transport costs and poor communications are likely to limit the expansion of intra-Andean trade. Comparative data are presented for the European Economic Community, and some suggestions are made for reducing Andean transport costs. Some fresh evidence is presented on the hypothesis that ocean freight rates for intra-Andean trade are higher than those for Andean trade with the U.S. and Europe: it suggests that the hypothesis is at best "not proven."

Portions of this research were supported by Harvard's Development Advisory Service through funds provided by the Agency for International Development under contract CSD-1543. The views expressed in this paper do not, however, necessarily reflect the views of either organization. At the time of writing the Andean Group customs union was composed of Colombia, Chile, Peru, Ecuador and Bolivia, and Venezuela was considering applying for membership. Unless otherwise specified all U.S. dollar figures in this paper are in pre-December 1971 dollars, and all E.E.C. data refer to the situation as of 1971 when there were six member countries. I am deeply indebted to Ernesto Negret and Geneese Baumbusch for valiant research assistance.

Problems of Transport and Communications

in the Andean Group

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This paper examines the problems of transport and communications in the Andean Group customs union recently formed by Colombia, Chile, Peru, Ecuador and Bolivia, and demonstrates that high transport costs and poor communications are likely to limit the expansion of intra-Andean trade. Comparative data are presented for the European Economic Community, and some suggestions are made for reducing Andean transport costs. Some fresh evidence is presented on the hypothesis that ocean freight rates for intra-Andean trade are higher than those for Andean trade with the U.S. and Europe: it suggests that the hypothesis is at best "not proven."

Overland transport

The Andean Group countries stretch the full 4,500 mile length of South America and cover almost 2 million square miles, almost one fourth of the area of South America. The high, rugged Andes mountain range is the backbone of the region and the cause of many of its transportation problems. The bulk of the Andean population lives near the coast: the interior regions consist largely of uninhabited mountains, jungle, and desert. Large distances separate most population centres. Inter-country transport facilities are of four types - rail, road, air and sea. These will be discussed in turn.

Because of the ruggedness of the terrain and the large distances between population centres, overland access between the Andean countries is poor. The only international railways are those linking Bolivia with Peru and Chile, and the only international road connection is provided by the Pan-American Highway. The Santiago-Lima section of this road is fully paved but large parts of the sections linking Colombia, Ecuador and Peru are not, and traffic is almost nonexistent during much of the

year. A journey along the Panamerican highway from Pasto in southern Colombia to Quito, Ecuador in the local bus is an exciting experience. The mainly unpaved road winds from near sea level up to eight or ten thousand feet and down again several times. Average speed when in motion is about 15-20 mph, the same as that of the few lorries which are encountered along the way. At one particularly hairy stage of the trip taken by the writer the conductor took up a collection from the passengers and left it with a statue of the Virgin which stands at the roadside; whether or not this was to ensure a safe journey could not be confirmed. The state of transport connections between Andean countries may be appreciated from the fact that Brown(1966, p37) classifies this Colombia-Ecuador link as "relatively good." A second link which is also classified as "relatively good" is the rail link between Bolivia and Peru. Goods for shipment along this route are loaded onto a train in La Paz, transhipped onto a ferry to cross Lake Titicaca, and then transhipped once more, this time onto a train of a different gauge, to be taken to their Peruvian destination. Given that handling costs are a significant part of total rail-transport costs even without unloading and reloading twice during the journey, it can be seen that "relatively good" access is a very relative term indeed. Other Andean intercountry links which Brown classifies as "relatively good" are Chile-Bolivia, Chile - Peru, Colombia-Venezuela and Peru-Ecuador. Pairs of countries with "relatively poor" access are Chile-Colombia, Chile-Ecuador, Bolivia-Colombia, Bolivia-Ecuador, Peru-Colombia, Chile-Venezuela, Peru-Venezuela, Bolivia-Venezuela and Ecuador-Venezuela.

Air transport

International air freight of merchandise cannot be expected to be of great help in solving the inter-country transport problem even if air freight charges are reduced significantly in the "Jumbo-jet age". There are at least two reasons for this. First, air freight tends to be economical mainly for high value-low volume merchandise like electronic components, out-of-season fresh fruit and vegetables etc., and such goods are unlikely to significantly increase their present small share of inter-country trade. For other types of goods air transport is likely to remain more costly than ocean transport. For example, at 1971 rates it still cost 14 to 20 times more to send fiberglass products (roving and mat) from Colombia to Ecuador by air rather than by sea, 10 to 15 times more for Colombia-Peru, and 7 to 9 times more for Colombia-Chile (Table 1). Second, intra-Andean air freight rates appear to be high relative to rates for Andean shipments to the U.S., possibly in part because of the differing volumes of cargo shipped on the different routes. For example, while Bogota-Santiago is only 9 per cent further in air miles than Bogota-New York, air freight charges on the former route are on average more than double those on the latter. Similarly, although the distance Bogota-New York is almost four times as great as Bogota-Caracas, air freight charges on the two routes are on average about the same (Table 2).

Ocean transport

Nine-tenths of the merchandise traded among the Andean countries is carried by sea, as is nine-tenths of Andean trade with the rest of the world. This pattern is typical of almost all Latin American countries (Table 3). Chile, Peru, Ecuador and Colombia all have ports on the Pacific, and Colombia and Venezuela have Atlantic ports (Fig. 1). Bolivia is completely land-locked but has access to the Pacific through Chilean and Peruvian ports.

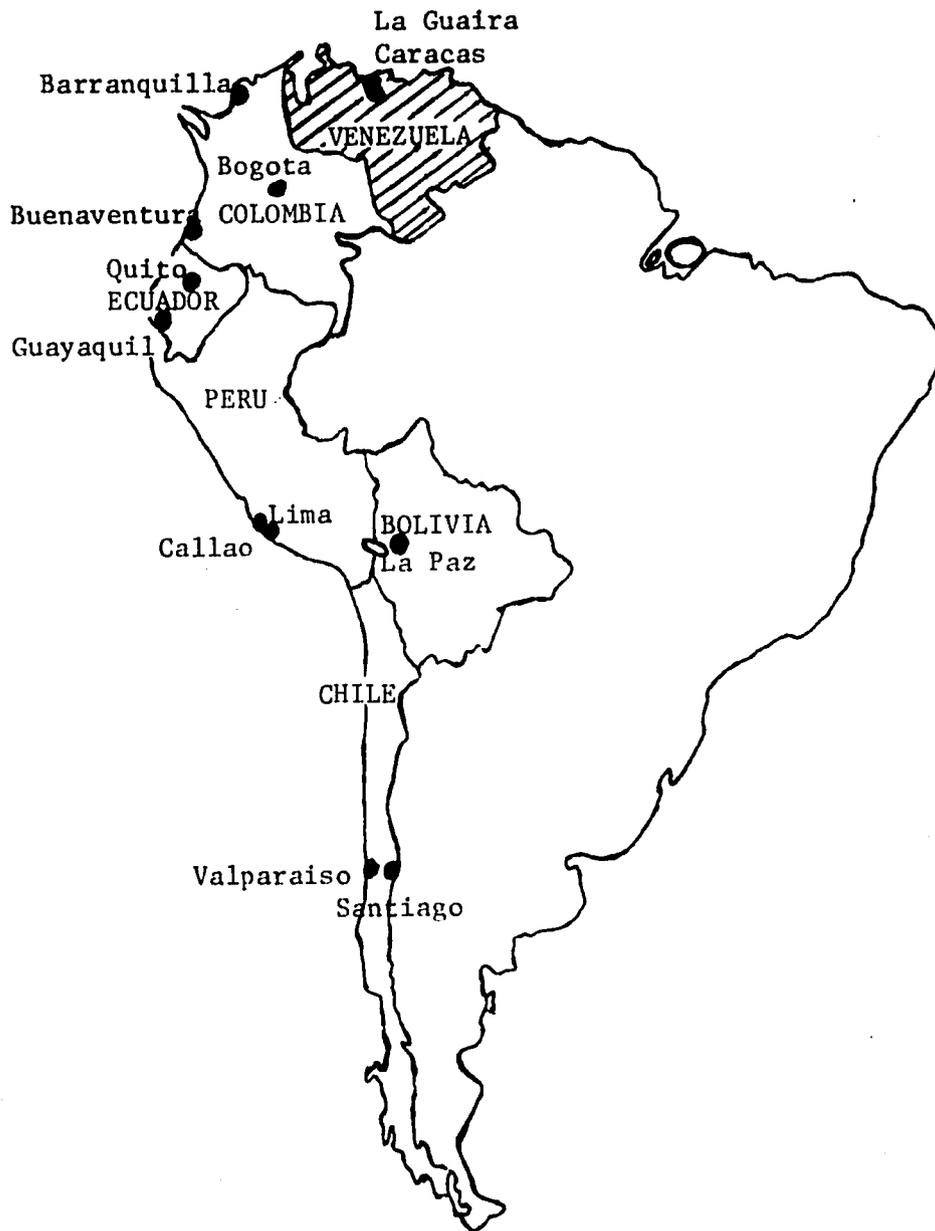


Fig. 1 The Andean Group Countries

Although ocean transport is already considerably less costly than road, rail or air transport for Andean inter-country trade in most cases, there may be ways of cutting costs still further. Ocean transport costs may be divided into intra-country transport costs (costs of transporting merchandise from factory to port and from port to buyer), port charges, and ocean freight costs. These three components will be discussed in turn.¹

The dominant means of Andean intra-country transport varies from country to country depending mainly on population, geographical and topographical features (Tables 4 to 6). Chile, with most people living along the long coastline, relies on coastal shipping for more than half of her internal cargo transport, railways for over a quarter, and roads for only 15 per cent. Colombia, which has several large population centres in the highlands and the Magdalena River navigable from the Atlantic coast almost to Bogota, relies on road transport for more than half of her internal cargo, river transport for over a quarter, railways for 18 per cent and coastal shipping for a negligible proportion. Peru, Ecuador, Bolivia and Venezuela rely mainly on rail and road transport.

Detailed data for Colombia indicate that intra-country transport costs can be almost as great as international ocean freight costs (Tables 7 to 9). For example, it costs 15.75 dollars per ton to truck merchandise from the Pacific port of Buenaventura to the capital Bogota (\$13.75 to send it by rail, \$110.00 by air) which is only 25 to 30 per cent less than it costs to send it from Buenaventura to Guayaquil, Ecuador (port charges and ocean freight costs included - Table 13). To the extent that these high internal transport costs reflect the difficulties presented by the terrain they are inescapable.

However, to some extent they reflect poor planning and/or misplaced priorities. For example, more than half of Colombia's total foreign trade passes through the port of Buenaventura, yet until the mid 1960's more than 80 per cent of the length of the only road out of Buenaventura, the 85 mile road to Cali, was unpaved and in relatively poor condition. In part this was because of the difficult terrain through which it passes, but this cannot be the whole explanation since roads have been successfully completed in more difficult parts of the country.² In the 1960's a second road following a more direct route was opened, but work on it proceeded at a snail's pace: by early 1971 more than fifteen miles of the road still had not been paved and a final bridge was still missing.³ The lack of paving on these fifteen miles alone costs the country over one million dollars each year, far more than it would have cost to pave the road.⁴ Almost two-thirds of this was in scarce foreign exchange since 60 per cent of trucking costs are made up depreciation, interest, and usage of spare parts (Table 11) on imported trucks. Looked at from another viewpoint, paving the last fifteen miles would reduce trucking costs from Cali to Buenaventura by 20 per cent (from U.S. \$4.46 to \$3.56) and would cut total transport costs for an average bundle of goods being shipped from Cali to Guayaquil, Ecuador by about 4 to 5 per cent. Similar and greater savings may be available in other aspects of internal transport within Colombia and in other Andean countries.

Latin American port charges tend to be high by world standards if ship turnaround time is included, and account for from 50 to 70 per cent of total ocean transport costs, inland factory-to-port costs excluded (Brown 1966, Dell 1966). Approximate port costs for Andean and other ports are presented in Table 12. These figures do not take account of ship turnaround time, nor do they

include surcharges on particular ports which change frequently and can be significant. In late 1970, for example, a surcharge of six dollars per ton was in force on goods passing through the Colombian port of Buenaventura, apparently because of its slow handling of merchandise. Surcharges of up to six dollars per ton and three dollars per ton plus 15 per cent of the freight rate were in effect at Callao, Peru and Valparaiso, Chile respectively around 1964 (Brown, 1966, p.250). A study by the Organization of American States (1962) suggests several means of improving port efficiency: modernization and improved maintenance of equipment, improvement of the quality of the labour force, avoidance of labour disputes, and elimination of unnecessary formalities and documentation which lead to congestion of both trucks and vessels in the ports. Given the importance of port charges in total transport costs, the implementation of recommendations such as these could significantly reduce the barriers to increased inter-country trade.

The third component of total ocean transport costs is ocean freight charges. It has often been stated that ocean freight rates are higher for trade within Latin American than for trade between Latin American countries and the rest of the world. For example, Sidney Dell states that "The high cost of transport between Latin American ports has seriously impeded the development of area trade: in many cases it is cheaper to ship goods from Europe or North America than between points within the region." The only direct evidence he presents for this contention is:

For example, the freight rate for lumber shipped from Mexico to Venezuela was \$24 per ton in 1963 as compared to \$11 from Finland to Venezuela, even though the distance is three times greater. From Buenos Aires to Tampico, Mexico, the ocean

freight rate for chemicals was \$54 per ton for direct shipment; but if the goods were trans-shipped in New Orleans the rate was only \$46, while trans-shipment in Southampton brought down the rate further to \$40, despite the tremendous increase in distances involved. (Business International, Latin America's Merging Market, p.29)

Dell then goes on to suggest that there are three reasons for the high cost of maritime transport in Latin America: low volume of traffic which does not permit regular, frequent and stable services on an economic basis; the poor condition of the ports; and discrimination by the shipping conferences which are dominated by foreign companies.

Before analysing the empirical evidence on Latin American freight rates let us examine the rate-setting process. It seems generally agreed that conference freight rates are based not on any single criterion or "formula", but rather that they are derived in an ad hoc fashion using a number of criteria: Brown (1966 p118) lists twenty-eight factors which play some role in rate determination. Mr. K. Trace, an economist at the University of Essex summarizes:

Most authorities agree that conferences [use] a rough and ready system of rate determination in which the volume of cargo coming forward, distance, possibilities of obtaining return cargoes, and the handling characteristics of the cargo are considered in conjunction with shipowners' rule-of-thumb estimates of 'what the traffic can bear'. Since shipowners do not attempt 'scientific' measurement of elasticities, rate-making is an extremely contentious subject, complaints being frequently made that rates are too high and that as a result commodities are priced out of world markets. (Trace 1969 p.130)

An econometric study carried out by the joint E.C.L.A./O.A.S. Transport Program and reported on in U.N. (1970a) uses two single equation models to estimate the determinants of freight rates for 133 export commodities over 193 shipping routes with origin in Latin America and destination in Latin

America, the United States and Canada, Europe and Japan. The chief findings are as follows. First, the structure of freight rates among different commodities on the same route is well explained by two key variables: the value of the commodity and a stowage (cost) factor. The share of the commodity in the total volume of cargo moving on the route and the risk of breakage or theft of the commodity as represented by its insurance premium do not appear to be important. Second, the variation in freight rates for the same commodity over different routes is more difficult to explain. Rates do seem to increase with distance of the voyage and decline with an increase in the number of shipping lines serving a route, but variables representing the age of vessels, relative imbalance of trade flows, and the quantity of the commodity carried have little explanatory power and are often insignificant. Interestingly enough the level of freight rates tends to have an inverse relationship with "port costs", apparently because the most expensive ports are also those which operate most rapidly. Unfortunately, no variable was included for "discrimination against intra-Latin American trade": it would have been interesting to see how a dummy variable for port of destination performs (one for destination within Latin Amer'ca, zero for the rest of the world).

One set of data does exist which throws light on whether freight rates for intra-Latin American trade are higher than those for Latin American trade with the rest of the world. Brown (1966) presents and examines evidence on trade in fourteen carefully selected products on routes between Argentina, Brazil, Colombia, Chile, Ecuador, Peru, Uruguay, Britain, Japan, the Netherlands and the United States. He concludes that intra-Latin

American freight rates do not appear to be higher in general than rates for Latin American trade with the rest of the world. However, freight rates do appear to be high between the northern and southern parts of Latin America (where the problem of low traffic volume is compounded by the structure of the ocean freight conferences) and on short routes (where high port costs, excessive delays in loading and unloading, the importance of port charges in total freight costs, and the tendency for conferences to charge the same rates for directionally similar routes of different distances are the dominant factors).⁵

A second set of evidence, this time concerning only Andean Group countries, is presented in Tables 13 to 24 below. These tables cover observations on trade in some forty-three different commodities among Andean Group countries, and between those countries and the rest of the world. They should be read with the usual strong caveats in mind. First, at times shippers may not in fact pay the published rates, since rebates and surcharges are not uncommon. Second, some figures may be inaccurate since port surcharges may have been included in the rates shown in some instances. Third, if goods are not actually traded on some of the routes, some rates may be arbitrary "paper rates." Fourth, some products may not be completely homogenous.⁶ Bearing these caveats in mind let us examine Tables 13 to 24. In terms of dollar freight rates and freight rates as a percentage of the value of the product, intra-Andean rates do not appear to be in general higher than rates between Andean countries and the U.S. and Europe. Of the 51 cases presented in Tables 13 to 16, dollar freight rates are higher for intra-Andean trade than for Andean trade with the U.S. and Europe in only

2 cases (sodium nitrate from Chile, maize from Ecuador), they are lower in 38 cases, and they are "mixed" (higher on some routes, lower on others) in the remaining 11 cases. Similarly, of the 52 cases presented in Tables 17 to 20, freight rates as a percentage of the value of the product are higher for intra-Andean trade than for Andean trade with the U.S. and Europe in only 5 cases (sisal fibre and nails-and-screws from Colombia, sodium nitrate from Chile, maize from Ecuador and Peru); they are lower in 29 cases, and they are "mixed" in the remaining 18 cases. On the other hand, freight rates per ton mile appear to be consistently higher for intra-Andean trade than for Andean trade with the U.S. and Europe. Of the 51 cases presented in Tables 21 to 24, freight rates per ton mile are higher for intra-Andean trade than for Andean trade with the U.S. and Europe in 44 cases, they are lower in no case, and the remaining 7 cases are mixed. However, since the data in these tables include port charges, which are lower per ton-mile the longer the voyage, it is more meaningful to compare costs per ton-mile for journeys of similar length. Of the 11 cases for which data are available on such journeys, freight rates per ton mile are higher for intra-Andean trade than for Andean trade with the rest of the world in only 3 cases, being lower in the remaining 8 cases.⁷ While this evidence on freight rates is not comprehensive enough to be conclusive, it does seem to suggest that whether freight rates are examined in dollar terms, as a percentage of the value of the merchandise, or in dollars per ton-mile (abstracting from differences in length of voyage), the argument that intra-Andean freight rates are higher than rates for Andean trade with the rest of the world is at best "not proven."⁸

Comparison with the European Economic Community

In order to underline the importance of high Andean transport costs

as a barrier to the expansion of regional trade it may be useful to examine some comparative data on transport costs in the European Economic Community (E.E.C.). Distances which goods have to travel for intra-E.E.C. trade are much shorter than for intra-Andean trade (Tables 25 and 26). One of the longest Andean journeys, Bogota-Santiago (3512 miles) is 3 1/2 times the distance of one of the longest E.E.C. routes, Rome-Amsterdam (1084), and ten times as far as the longest E.E.C. route if Rome is excluded (Paris-Frankfurt 347). One of the shortest Andean routes, Lima-La Paz (891 miles) is eight times the distance of one of the shortest E.E.C. journeys, Amsterdam-Brussels (118). One of the busiest Andean routes, Santiago-Lima (1613 miles) is five times as long as the busy Paris-Frankfurt route (347). Similarly, the costs of transporting goods within the Andean sub-region are significantly greater than those within the E.E.C. (Tables 7, 13, and 27).⁹ The cost of shipping an average bundle of goods on the long Bogota-Santiago route is approximately 60 to 65 dollars per metric ton, 25 to 30 per cent greater than on the long Rome-Amsterdam route (48 dollars) and four times greater than on the Paris-Frankfurt run (15 dollars). Costs on the short Lima-Quito route are about 30 to 35 dollars per metric ton, six or seven times greater than on the short Amsterdam-Brussels run (5 dollars). Costs on the busy Santiago-Lima route are about 30 to 35 dollars per metric ton, more than double those on the busy Paris-Frankfurt run (15 dollars).

A comparison of intra-E.E.C. and intra-Colombian distances and transport costs serves to illustrate the significance of intra-country transport costs in the Andean context. (Tables 7 and 26 to 28). Indeed, intra-Colombian and intra-E.E.C. distances and transport costs are similar in

several respects. One of the longest Colombian routes, Bogota-Barranquilla, covers 727 miles (of mostly unpaved road) compared with 1084 miles for Rome-Amsterdam and 347 miles for Paris-Frankfurt. One of the shortest Colombian routes, Cali-Buenaventura, covers 85 miles compared with 118 miles for Amsterdam-Brussels. One of the busiest Colombian routes, Bogota-Cali (321 miles) covers almost the same distance as the busy Paris-Frankfurt route (347). The cost of trucking goods on the long Bogota-Barranquilla trip is approximately 19 dollars per metric ton compared with 48 dollars for Rome-Amsterdam and 15 dollars for Paris-Frankfurt. Costs on the short Cali-Buenaventura route are 4 1/2 dollars per metric ton, about the same as the 5 dollars for Amsterdam-Brussels. Costs on the busy Bogota-Cali route are 10 dollars per ton compared with 15 dollars for Paris-Frankfurt.

Communications

In addition to high transport costs, poor communications impose an extra barrier to increased trade in the Andean Group. Mail and telephone services are in general inadequate. Delays in postal service hinder business efficiency, and placing an international telephone call (or at times even a call from one city to another within the same country) can be a long, laborious and occasionally unsuccessful process. In addition, telephone calls tend to be relatively expensive (Tables 29 to 31). A three-minute telephone call from Bogota to the other Andean capitals costs from U.S. \$4.08 to \$8.16, which is four to eight times more than similar calls between E.E.C. cities. A call from Bogota to New York, Frankfurt or Madrid costs no more than a call to La Paz. As with transport costs, intra-E.E.C. telephone costs can better be compared with intra-Colombian costs - European costs are on average only about 60 per cent greater and the service is far more efficient.

A second indication of the inadequacy of communications is the expense and amount of detailed preplanning needed for an Andean business trip. Detailed data on costs of flights per week between Andean, E.E.C. and Colombian cities respectively are presented in Tables 32 to 37. The cost of "same-day" business trips includes round-trip jet economy air fare, taxi to and from each airport, and airport departure taxes. In eight of the fifteen cases in the Andean Group (but in no case in the E.E.C. or within Colombia) air travel time is over 3 1/2 hours each way and therefore a return trip on the same day is judged to be impossible; in these cases costs of one night in a hotel with two meals is added. The pattern for costs and convenience of business trips is similar to that for transport costs and the costs of telephone calls. "Same-day" business trips between Andean cities cost from one hundred to 514 dollars and are on average almost three times as expensive as similar trips between E.E.C. cities; these in turn are on average twice as expensive as trips between Colombian cities. In terms of ease of scheduling such trips the Andean businessman has a much more difficult job than his E.E.C. and Colombian counterparts. There are on average only eleven flights per week between Andean cities, and in some cases there are only two, whereas there are on average 49 and 31 flights per week between E.E.C. and Colombian cities respectively. There are more flights from Bogota each week to New York, Paris, Madrid, London and Frankfurt than there are to La Paz.

This paper has demonstrated that Andean transport costs are high in absolute terms (being on average several times higher than those in the E.E.C.) and that Andean communications facilities are inadequate and expensive. While there is some potential for improvement, notably through upgrading port

facilities and cutting intra-country transport costs, these barriers are likely to remain important for the foreseeable future thereby limiting potential intra-Andean trade expansion. It is important to keep this in mind in evaluating the prospects for success of the Andean Group.

Table 1

Costs of transporting fiber-glass products
by air and by sea from Colombia
to Ecuador, Peru and Chile, 1971

(U.S. dollars per metric ton)

From Colombia to	Roving			Mat		
	air	ocean	air/ocean	air	ocean	air/ocean
Ecuador	340	25	14	340	17	20
Peru	250	25	10	250	17	15
Chile	180	27	7	180	19	9
Arithmetic mean	257	26	10	257	18	15

Source: Data kindly supplied by officials of the Owens-Corning Fibre Glass Company, Bogota, Colombia

Note: Ocean rates are per ton or per 40 cubic feet while air rates are per ton only. Air rates are from capital city to capital city while ocean rates are from port to port. Hence ocean rates should be adjusted upwards to include the cost of transport from factory to port and from port to consumer. Trucking rates from the fibre glass factory near Bogota to the ports of Buenaventura and Barranquilla are approximately U.S. \$7.50 and U.S. \$15.50 respectively.

Table 2

Air freight charges for shipment of general merchandise
from Bogota to Andean and other selected cities, 1971

(U.S. dollars per kilogram)

From Bogota to	Distance (air miles)	Minimum weight in kilograms						
		Less than	45	45	100	200	300	400
La Paz	1846	7.5	5.7	5.3	5.0	4.6	4.3	4.0
Santiago	2704	10.2	7.7	7.2	6.7	6.3	5.8	5.4
Quito	450	2.8	2.1	2.0	1.9	1.8	1.7	1.6
Caracas	638	5.0	3.8	3.5	3.3	3.0	2.8	2.6
New York	2487	5.0	4.0	3.7	3.3	3.0	2.6	2.3
Paris	6115	18.4	14.1	10.4	8.9	8.1	7.3	6.6
Arithmetic mean	2373	8.2	6.2	5.4	4.9	4.5	4.1	3.8

Source: Avianca, Bogota

Table 3

Foreign trade carried by water transport
in Andean and other selected Latin American countries, 1965

	Total foreign trade (millions of metric tons)	Trade carried by water transport (millions of metric tons)	Trade carried by water transport as per cent of total trade (per cent)
Colombia	8.7	8.6	99
Chile	16.1	16.0	99
Ecuador	2.0	2.0	99
Peru	13.7	13.6	99
Venezuela	191.3	191.3	100
Argentina	26.7	26.3	98
Brazil	36.3	35.8	99
Arithmetic mean			99

Source: United Nations, Economic Commission for Latin America, Los Fletes Maritimos en el comercio exterior de America Latina, E/CN.12/812,UD/OEA/SER.C.17/2, New York, 1969.

Table 4

Transportation data for Andean and other
selected Latin American countries, 1965

	<u>Roads</u>			<u>Railroads</u> (thousands of miles)	<u>Air</u> <u>transport</u> (millions of tons/mile)	<u>Motor</u> <u>vehicles</u> (thousands)	<u>Merchant</u> <u>fleet</u> (thou- sands of gross tons)
	<u>Paved</u> (thousands of miles)	<u>Gravel</u> ^(a)	<u>Earth</u> ^(a)				
Bolivia	1.0	4.5	10.3	5.6	7.2	44	-
Colombia	9.7	20.0	4.1	5.6	184.7	224	201
Chile	5.4	17.0	14.6	13.3	66.4	188	353
Ecuador	2.4	3.5	7.3	1.9	7.5	40	43
Peru	7.9	3.9	20.1	5.3	39.2	209	222
Venezuela	21.3			0.4	79.0	498	448
Argentina	36.7			70.6	141.7	1,378	1,464
Brazil	30.1			60.3	418.5	1,784	1,684
Mexico	54.3			39.2	185.6	1,082	444
Central America (arithmetic mean of five countries)	1.6			1.2	14.2	31	36

Sources: United Nations, Economic Commission for Latin America, Antecedentes para el estudio de los problemas de desarrollo de la subregion andina, E/CN.12/856, Santiago de Chile, May 1970 and F. Mathis, Economic Integration in Latin America: The Progress and Problems of LAFTA, Austin, Texas, Bureau of Business Research, University of Texas at Austin, 1969, p.14.

(a) Data for 1967

Table 5

Freight traffic by different means of transport

in selected countries, selected years

(percentage composition)

	<u>Year</u>	<u>Railroads</u>	<u>Highway trucking</u>	<u>Coastal and river</u>
Chile	1959	27.6	14.8	57.6
Colombia	1951	21.2	43.6	35.2
	1955	16.6	53.1	30.3
	1960	18.2	53.9	27.9
Argentina	1945	62.2	8.5	29.3
	1950	51.1	27.3	21.6
	1955	44.1	30.7	25.2
	1960	38.0	34.7	27.5
France	1938	57.8	24.0	18.2
	1950	64.7	24.1	11.2
	1955	61.5	26.8	11.7
	1960	57.9	31.1	11.0
U.S.A.	1937	70.7	7.9	21.4
	1950	65.7	16.2	18.1
	1955	60.7	18.4	20.9
	1958	58.0	22.3	19.7

Source: United Nations, Economic Commission for Latin America, El Transporte en America Latina, E/CN.12/703/Rev.1, New York, 1965, p.99.

Table 6

Means of transport of Colombian foreign
trade between major cities and ports, 1967

(metric tons)

	<u>Road</u>	<u>Rail</u>	<u>River</u>	<u>Total</u>
Buenaventura - cities	214,076	185,433		399,509
Cities - Buenaventura	159,722	346,272		505,994
Total	373,798	531,705		905,503
Barranquilla - cities	236,874	-	37,907	274,781
Cities - Barranquilla	54,220	-	1,322	55,542
Total	291,094		39,229	330,323
Santa Marta - Cities	33,552	182,181		215,733
Cities - Santa Marta	7,036	73,553 ^(a)		80,589
Total	40,588	255,734		296,322
Cartagena - Cities	83,070	-	23,544	106,614
Cities - Cartagena	48,357	-	9,817	58,174
Total	131,427		33,361	164,788

Source: Harvard Transport Research Program, An Analysis of the Investment Alternatives in the Colombian Transport System, mimeo, Bogota, 1968, p.455.

(a) Shipments of bananas of 79,459 metric tons are not included.

Table 7

Costs of transporting merchandise by road
between major Colombian cities and ports, 1971
(U.S. dollars per metric ton)

From \ To	B'quilla	Bogota	B'ventura	Cali	Medellin
Barranquilla	-	19.50	22.85	19.50	15.00
Bogota	18.00	-	9.75	8.63	11.25
Buenaventura	22.88	15.75	-	5.63	14.63
Cali	18.00	10.50	3.38	-	9.75
Medellin	9.00	11.25	8.75	6.75	-
Arithmetic mean:	13.04				

Source: Departamento Nacional de Planeacion, El Transporte en el Grupo Andino, DNP-727-UEIA, Bogota, 1971

Note: All costs in this and the following intra-Colombia tables have been converted to U.S. dollars at the official exchange-rate. Therefore, to the extent that the peso is overvalued, cost figures are overstated.

Table 8

Costs of transporting merchandise by rail
between major Colombian cities and ports, 1971
(U.S. dollars per metric ton)

<u>From \ To</u>	<u>B'quilla</u>	<u>Bogota</u>	<u>B'ventura</u>	<u>Cali</u>	<u>Medellin</u>
Barranquilla	-	16.45	23.95	21.35	14.45
Bogota	12.35	-	17.55	13.25	7.75
Buenaventura	23.95	13.75	-	3.20	10.30
Cali	21.35	10.85	3.20	-	7.40
Medellin	14.45	9.00	10.60	7.40	-

Arithmetic mean: 13.13

Source: Ferrocarriles Nacionales de Colombia, Bogota

Table 9

Costs of transporting merchandise by air
between major Colombian cities and ports, 1971
(U.S. dollars per metric ton)

From \ To	B'quilla	Bogota	B'ventura	Cali	Medellin
Barranquilla	-	75.00	250.00	120.00	70.00
Bogota	75.00	-	207.50	70.00	70.00
Buenaventura	250.00	110.00	-	57.50	82.50
Cali	120.00	70.00	120.00	-	70.00
Medellin	70.00	70.00	167.50	70.00	-

Arithmetic mean: 109.75

Source: Avianca, Bogota

Note: The discrepancy between air rates from Buenaventura to other towns and air rates from other towns to Buenaventura is presumably explained by Buenaventura's location: fares to Buenaventura appear to cover the return trip as well.

Table 10

Truck operating costs by type of vehicle, road and speed, 1971

Type of truck	Road surface			Ratio
	Paved	Gravel	Earth	Earth/Paved
	(U.S. cents per metric ton mile)			
Speed (m.p.h.)	35	25	20	
One ton truck	7.6	10.8	15.4	2.0
3 1/2 ton truck	10.1	15.3	24.5	2.4
15 ton tractor semi-trailer (gasoline engine)	14.9	24.8	42.3	2.8
18 ton tractor semi-trailer (diesel engine)	15.0	24.9	44.9	3.0

Source: calculated from J. de Weille, Quantification of Road User Savings, Work Bank Staff Occasional Papers No. 2, Baltimore, Johns Hopkins Press, 1966, pp.28-9. Costs converted to cents per ton mile and 20 per cent added to bring them up to 1971. Data from Iran are similar (Van der Tak and de Weille, 1969 p.55).

Table 11

Detailed operating costs for a 3 1/2 ton truck, by road and speed, 1971

(per cent)

Item	Road surface		
	Paved	Gravel	Earth
Speed	35	25	20
Fuel consumption	19.7	16.0	12.0
Engine oil consumption	0.7	0.6	0.5
Tire wear	7.8	12.6	19.2
Depreciation	27.6	27.2	27.9
Interest	15.2	14.0	11.1
Maintenance (parts)	17.3	18.6	20.2
Maintenance (labor)	1.5	1.6	1.8
Occupants' time	10.2	9.4	7.3
Total	100.0	100.0	100.0

Source: see Table 10

Table 12

Port charges:

approximate costs of loading and unloading cargo

in selected ports, 1964

(U.S. dollars per metric ton)

<u>Country</u>	<u>Port</u>	<u>Loading</u>	<u>Unloading</u>
Colombia	Buenaventura	3.50	3.50
	Barranquilla	3.00	2.50
Chile	Valparaiso	10.00	10.00
Ecuador	Guayaquil	4.00	3.50
Peru	Callao	10.00	12.00
U.S.A.	New York	12.00	13.00
Belgium	Antwerp	9.00	8.00

Source: United Nations, Economic Commission for Latin America, Los fletes maritimos en el comercio exterior de America Latina. E/CN.12/812, UP/OEA/SER. C.17/2, New York, 1969.

Note: The figures for port charges do not take account of the different lengths of time needed to load and unload a ship in different ports, nor do they include surcharges which change frequently. Around 1964 a surcharge of U.S. \$3.50 to U.S. \$6 per ton was in effect at Callao Peru, while a surcharge of one to three dollars per ton plus 15 per cent of the freight rate was in use at Valparaiso, Chile (Brown 1966 p.250). In late 1970 a surcharge of six dollars per ton was in effect at Buenaventura, Colombia.

Table 13

Ocean freight rates from Buenaventura and Barranquilla, Colombia to Andean, U.S. and European ports, 1964

(U.S. dollars per metric ton or 40 cubic feet)

	CHILE		ECUADOR		PERU		USA and CANADA		EUROPE	
	B'tura Valp'o	B'quilla Valp'o	B'tura Guay'l	B'quilla Guay'l	B'tura Callao	B'quilla Callao	B'tura N.Y.(a)	B'quilla N.Y.(b)	B'tura Antw'p	B'quilla Antw'p
Distance (naut. miles)	2609	3181	578	1150	1299	1871	2373	1801	5222	4650
Raw cotton	29.00	31.00	20.00	25.00			40.00		44.10	38.50
Sisal fibre					35.00	22.00	45.00			
Unroasted coffee	29.00	51.00					28.00		48.10	44.80
Sawn logs			23.00				44.00(c)		33.18	36.40
Cellulose acetate			23.00	30.00			38.00		69.30	72.10
Soluble coffee	36.00	51.00					38.00		34.30	46.20
Cigarettes and cigars					35.00	34.00	50.00		36.40	49.70
Nails and screws			23.00	30.00	35.00	34.00			69.30	72.10
Cotton yarn			23.00	25.00			35.00		30.10	28.00
Fruit juices			23.00	30.00					44.10	42.00
Cotton textiles			23.00	32.00	25.00	32.00	35.00		42.00	37.80
Auto parts and pieces			15.00	25.00			33.00			
Processed rubber			40.00	44.00	70.00	60.00	70.00			
Artificial textile fibres			34.00	32.00	34.00	20.00	41.00		30.80	30.80
Books and magazines			34.00	32.00	34.00	32.00	70.00			

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Source: United Nations, Economic Commission for Latin America, Los Fletes Maritimos en el comercio exterior de America Latina. E/CN.12/812, UD/OEA/SER.C.17/2, New York, 1969.

Note: Tables 13 to 16 include all cases from this source in which freight rates appear for products shipped to at least one Andean country and to New York or Antwerp. Port surcharges are not included in freight rates.

- (a) Rates are per 2,000 pounds or 40 cubic feet
- (b) Rates quoted are not comparable
- (c) Per 1,000 square feet

Table 14

Ocean freight rates from Valparaiso, Chile to Andean, U.S. and European ports, 1964

(U.S. dollars per metric ton or 40 cubic feet)

	COLOMBIA		ECUADOR	PERU	US/CANADA	EUROPE
	B'ventura	B'quilla	Guay'l	Callao(a)	N.Y.	Antwerp
Distance (naut. miles)	2609	3181	2031	1306	4633	7458
Apples				60.00	62.50	
Dried prunes				20.00		30.10
Railroad ties				17.00(b)		24.50(b)
Ferroalloys	21.00	22.00		15.00	20.00(c)	
Dried vegetables			21.00	16.00	30.00	22.40
Cut wood "Insignus Pine"				17.00(b)		21.70(b)
Wooden logs				17.00(b)	40.00	29.40
Sodium nitrate	16.00	17.00	14.00	12.00		10.50
Copper wire	26.00	27.00	22.00	16.00	33.00	37.10
Electrolytic and refined copper	18.00	19.00			32.90	19.50
Canned fish and shellfish				19.00	51.00	94.20
Plywood sheets				16.00	25.00	
Plywood sheets for furniture				19.00		24.50
Newsprint	22.00	21.00	20.00	20.30	28.00	
Dry polyvinyl resins				18.00		(d)
Copper tubes	26.00	27.00	22.00	18.00	38.00(c)	37.10
Bottled wine	45.00	46.00	40.00	25.00	38.00	39.30
Agricultural machinery				16.00	80.00	69.30

Source: See Table 13

- (a) Rates are per metric ton or cubic meter
- (b) 500 square feet
- (c) Long ton of 1016 kilograms or 2240 pounds
- (d) Freight rate is 5 per cent ad valorem

Table 15

Ocean freight rates from Guayaquil, Ecuador to Andean, U.S. and European ports, 1964

(U.S. dollars per metric ton or 40 cubic feet)

	<u>CHILE</u>	<u>COLOMBIA</u>		<u>PERU</u>	<u>US/CANADA</u>	<u>EUROPE</u>
	<u>Valparaiso</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>Callao</u>	<u>N.Y.(a)</u>	<u>Antwerp</u>
Distance (naut. miles)	2031	578	1150	721	2647	5661
Maize ("maiz")				35.00	22.00	
Frozen or chilled fish		55.00			105.00	
Raw sugar	12.00				23.00	23.00
Cocoa	20.00	14.50	29.00	29.00	30.00	54.60
Coffee	38.00				33.00	49.00
Wood	35.00	13.00		22.00	37.00	11.80
Canned fish		17.50	43.00		42.00	32.90

Source: See Table 13

(a) Rates are per 2000pounds or 40 cubic feet

Table 16

Ocean freight rates from Callao, Peru to Andean, U.S. and European ports, 1964

(U.S. dollars per metric ton or 40 cubic feet)

	<u>CHILE</u>	<u>ECUADOR</u>	<u>COLOMBIA</u>		<u>US/CANADA</u>	<u>EUROPE</u>
	<u>Valparaiso(a)</u>	<u>Guayaquil</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>N.Y.</u>	<u>Antwerp</u>
Distance (naut. miles)	1306	721	1299	1871	3368	6187
Garlic		20.00			47.00	47.60
Cotton	18.00	17.00	23.00	33.00	46.00	44.10
Maize ("maiz")		20.00			28.00	
Semirefined fish oil			18.00	20.00		22.40
Coffee	25.00				39.00	49.00
Grain flour		20.00			80.00	
Zinc	16.00		21.00	25.00	17.00(b)	20.70
Alcohol (grape aguardiente)		20.00			80.00	45.50
Refined sugar	13.00		15.00	19.00	27.00	18.20
Canned fish and shellfish	21.00	20.00			45.00	32.90
Fishmeal			22.00	27.00	23.00	24.10
Carpets			37.00	49.00	55.00	(c)

Source: See Table 13

- (a) Rates are per metric ton or cubic meter
- (b) Long ton of 1016 kilograms or 2240 pounds
- (c) Freight rate is 5 per cent ad valorem

Table 17

Ocean freight rates from Buenaventura and Barranquilla, Colombia to Andean, U.S. and European ports, 1964

Freight charge as a percentage of the value f.o.b. of the merchandise
(per cent)

	CHILE		ECUADOR		PERU		USA and CANADA		EUROPE	
	B'tura Valp'o	B'quilla Valp'o	B'tura Guay'l	B'quilla Guay'l	B'tura Callao	B'quilla Callao	B'tura N.Y.	B'quilla N.Y.	B'tura Antw'p	B'quilla Antw'p
Distance (naut. miles)	2609	3181	578	1150	1299	1871	2373	1801	5222	4650
Raw cotton			3.9	4.9			8.7	7.7	8.5	6.7
Sisal fibre					10.8		9.7	7.1		
Unroasted coffee	3.2	5.4					3.0	2.8	4.3	4.0
Sawn logs			11.2				87.6	64.2	42.9	42.4
Cellulose acetate			9.3	12.0			6.4	14.2	7.7	14.5
Soluble coffee	7.6	10.8					11.0	7.5	4.5	5.5
Cigarettes and cigars					8.9	8.9	13.9		6.7	8.3
Nails and screws					15.6	15.2			7.7	9.4
Cotton yarn			3.5	1.5			4.4	3.8	3.2	2.8
Fruit juices			2.4	3.3				15.8	29.3	25.1
Cotton textiles			1.9	1.6	2.8	1.5	7.2	3.7	3.7	3.0
Auto parts and pieces			3.4	5.6			3.6			
Processed rubber			1.2	1.3	3.8	3.2	21.2	13.3		
Artificial textile fibres			4.8	4.5	5.9	3.5		6.5	6.4	5.9
Books and magazines	4.4	5.2	0.7	0.6	2.2	2.1	3.2	3.9		

Source: United Nations, Economic Commission for Latin America, Los fletes marítimos en el comercio exterior de America Latina. E/CN.12/812, UD/OEA/SER.C.17/2, New York, 1969

Note: Tables 17 to 20 include all products from this source for which freight rates appear for products shipped to at least one Andean country and to New York or Antwerp.
:Port surcharges are not included in freight rates.

Table 18

Ocean freight rates from Valparaiso, Chile to Andean, U.S. and European ports, 1964

Freight charge as a percentage of the value f.o.b. of the merchandise

(per cent)

	COLOMBIA		ECUADOR	PERU	US/CANADA	EUROPE
	B'ventura	B'quilla	Guayaquil	Callao	N.Y.	Antwerp
Distance (naut. miles)	2609	3181	2031	1306	4633	7458
Apples				49.2	130.3	
Dried prunes				7.6		15.5
Railroad ties				16.1		29.3
Ferroalloys	16.9	17.7		11.7	16.7	
Dried vegetables			6.0	8.8	14.7	12.4
Cut wood						
"Insignus Pine"				58.6		64.7
Wooden logs				16.2	45.9	38.0
Sodium nitrate	49.7	52.8	46.2	37.1		32.7
Copper wire	2.9	3.0	2.6	1.9	3.7	5.1
Electrolitic and refined copper	1.7	1.8			4.3	2.5
Canned fish and shellfish				1.9	3.1	5.9
Plywood sheets				24.0	28.6	
Plywood sheets for furniture				10.0		71.1
Newsprint	17.8	17.0	17.1	16.0	26.7	
Dry polyvinyl resins				3.7		5.1
Copper tubes	6.3	6.3	4.1	3.4	5.1	3.1
Bottled wine	13.6	13.9	15.1	8.0	27.2	21.9
Agricultural machinery				3.7	6.6	9.1

Source: See Table 17

Table 19

Ocean freight rates from Guayaquil, Ecuador to Andean, U.S. and European ports, 1964

Freight charge as a percentage of the value f.o.b. of the merchandise
(per cent)

	<u>CHILE</u>	<u>COLOMBIA</u>		<u>PERU</u>	<u>US/CANADA</u>	<u>EUROPE</u>
	<u>Valparaiso</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>Callao</u>	<u>New York</u>	<u>Antwerp</u>
Distance (naut. miles)	2031	578	1150	721	2647	5661
Maize ("maiz")				107.7	18.9	
Frozen or chilled fish		35.3			37.7	
Raw sugar	12.1				23.4	12.9
Cocoa	4.0	2.9	5.9	6.6	6.7	8.2
Coffee	5.2				4.4	5.3
Wood	34.6	9.9		59.7	25.9	9.7
Canned fish		4.2	10.0		8.0	12.9

Source: See Table 17

Table 20

Ocean freight rates from Callao, Peru to Andean, U.S. and European ports, 1964

Freight charge as a percentage of the value f.o.b. of the merchandise
(per cent)

	<u>CHILE</u>	<u>ECUADOR</u>	<u>COLOMBIA</u>	<u>US/CANADA</u>	<u>EUROPE</u>	
	<u>Valparaiso</u>	<u>Guayaquil</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>New York</u>	<u>Antwerp</u>
Distance (naut. miles)	1306	721	1299	1871	3368	6187
Garlic		24.5			24.1	26.3
Cotton	2.5	2.3	2.4	3.5	5.9	6.0
Maize ("maiz")		36.6			13.4	
Semirefined fish oil			9.6	10.7		13.7
Coffee	3.4				4.6	5.3
Grain flour		16.5			71.2	
Zinc	6.2		7.9	9.5	6.2	7.8
Alcohol (grape aguardiente)		7.3			10.5	4.8
Refined sugar	22.2		8.8	11.2	23.2	34.1
Canned fish and shellfish	3.7	12.1			11.5	6.6
Fishmeal			20.0	24.4	21.7	21.8
Carpets			7.2	9.5	10.1	5.0

Source: See Table 17

Table 21
Ocean freight rates per nautical mile from Buenaventura and
Barranquilla, Colombia to Andean, U.S. and European ports, 1964
 (U.S. cents per metric ton mile or per 40 cubic feet mile)

	CHILE		ECUADOR		PERU		USA and CANADA		EUROPE	
	B'tura Valp'o	B'quilla Valp'o	B'tura Guay'l	B'quilla Guay'l	B'tura Callao	B'quilla Callao	B'tura N.Y.(a)	B'quilla N.Y.(b)	B'tura Antw'p	B'quilla Antw'p
Distance (naut. miles)	2609	3181	578	1150	1299	1871	2373	1801	5222	4650
Raw cotton			3.46	2.17			1.69		0.84	0.83
Sisal fibre					2.69		1.90			
Unroasted coffee	1.11	1.60					0.93		0.92	0.96
Sawn logs			3.98				1.85(c)		0.63	0.78
Cellulose acetate			3.98	2.61			1.60		1.33	1.55
Soluble coffee	1.38	1.60					1.60		0.65	0.99
Cigarettes and cigars					2.69	1.82	2.11		0.70	1.06
Nails and screws					2.69	1.82			1.32	1.55
Cotton yarn			3.98	2.17			1.47		0.57	0.60
Fruit juices			3.98	2.61					0.84	0.90
Cotton textiles			3.98	2.78	1.92	1.71	1.47		0.80	0.81
Auto parts and pieces			2.59	2.17			1.39			
Processed rubber			6.92	3.83	5.38	3.20	2.95			
Artificial textile fibres			5.88	2.78	2.62	1.07	1.73		0.59	0.66
Books and magazines	1.65	1.60	5.88	2.78	2.62	1.71	2.95			

Source: Calculated from Table 13

Note: Port surcharges are not included in freight rates.

(a) Rates are per 2000 pounds mile or 40 cubic feet mile

(b) Rates quoted are not comparable

(c) Per 1000 square feet

Table 22

Ocean freight rates per nautical mile from Valparaiso, Chile to

Andean, U.S. and European ports, 1964

(U.S. cents per metric ton mile or per 40 cubic feet mile)

	COLOMBIA		ECUADOR	PERU	US/CANADA	EUROPE
	B'ventura	B'quilla	Guayaquil	Callao(a)	N.Y.	Antwerp
Distance (naut. miles)	2609	3181	2031	1306	4633	7458
Apples				4.59	1.34	
Dried prunes				1.53		0.40
Railroad ties				1.30(b)		0.33(b)
Ferroalloys	0.80	0.69		1.15	0.43(c)	
Dried vegetables			1.03	1.22	0.65	0.30
Cut wood "Insignus Pine"				1.30(b)		0.29(b)
Wooden logs				1.30(b)	0.86	0.39
Sodium nitrate	0.61	0.53	0.69	0.92		0.14
Copper wire	1.00	0.85	1.08	1.22	0.71	0.50
Electrolitic and refined copper	0.69	0.60			0.71	0.26
Canned fish and shellfish				1.45	1.10	1.26
Plywood sheets				1.22	0.54	
Plywood sheets for furniture				1.45		0.33
Newsprint	0.84	0.66	0.98	1.55	0.60	
Dry polyvinyl resins				1.38		(d)
Copper tubes	1.00	0.85	1.08	1.38	0.82(c)	0.50
Bottled wine	1.72	1.45	1.97	1.91	0.82	0.53
Agricultural machinery				1.22	1.73	0.93

Source: calculated from Table 14

- (a) Rates are per metric ton mile or cubic meter mile
- (b) 500 square feet
- (c) Long ton of 1016 kilograms or 2240 pounds
- (d) Freight rate is 5 per cent ad valorem

Table 23

Ocean freight rates per nautical mile from Guayaquil, Ecuador
to Andean, U.S. and European ports, 1964

(U.S. cents per metric ton mile or per 40 cubic feet mile)

	<u>CHILE</u>	<u>COLOMBIA</u>		<u>PERU</u>	<u>US/CANADA</u>	<u>EUROPE</u>
	<u>Valparaiso</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>Callao</u>	<u>N.Y.(a)</u>	<u>Antwerp</u>
Distance (naut. miles)	2031	578	1150	721	2647	5661
Maize ("maiz")				4.85	0.83	
Frozen or chilled fish		9.51			3.96	
Raw sugar	0.59				0.87	0.40
Cocoa	0.98	2.51	2.52	4.02	1.13	0.96
Coffee	1.87				1.25	0.86
Wood	1.72	2.25		3.05	1.40	0.20
Canned fish		3.03	3.74		1.59	0.58

Source: calculated from Table 15

(a) Rates are per 2000pounds mile or 40 cubic feet mile

Table 24

Ocean freight rates per nautical mile from Callao, Peru
to Andean, U.S., and European ports, 1964

(U.S. cents per metric ton mile or per 40 cubic feet mile)

	<u>CHILE</u>	<u>ECUADOR</u>	<u>COLOMBIA</u>	<u>US/CANADA</u>	<u>EUROPE</u>	
	<u>Valp'o(a)</u>	<u>Guayaquil</u>	<u>B'ventura</u>	<u>B'quilla</u>	<u>New York</u>	<u>Antwerp</u>
Distance (naut. miles)	1306	721	1299	1871	3368	6187
Garlic		2.77			1.39	0.77
Cotton	1.38	2.36	1.77	1.76	1.36	0.71
Maize ("maiz")		2.77			0.83	
Semirefined fish oil			1.38	1.07		0.36
Coffee	1.91				1.15	0.79
Grain flour		2.77			2.37	
Zinc	1.22		1.62	1.34	0.50(b)	0.33
Alcohol (grape aguardiente)		2.77			2.37	0.73
Refined sugar	0.99		1.15	1.02	0.80	0.29
Canned fish and shellfish	1.60	2.77			1.33	0.53
Fishmeal			1.69	1.44	0.68	0.39
Carpets			2.85	2.62	1.63	(c)

Source: calculated from Table 16

- (a) Rates are per metric ton or cubic meter
- (b) Long ton of 1016 kilograms or 2240 pounds
- (c) Freight rate is 5 per cent ad valorem

Table 25

Approximate distances by sea and road-and/or-rail

between Andean capital cities

(statute miles)

FROM \ TO	Port and its distance from capital city						
		La Paz	Bogota	Santiago	Quito	Lima	Caracas
La Paz	(Arica 285)	-					
Bogota	(B'ventura 409)	2786	-				
Santiago	(Valparaiso 103)	1274	3512	-			
Quito	(Guayaquil 288)	2001	1362	2727	-		
Lima	(Callao 8)	891	1911	1613	1125	-	
Caracas	(La Guaira 9)	3654	1029	4358	2230	2779	-

Arithmetic mean: 2217

Sources: National maps, A. Marshall, ed., The 1971 South American Handbook, London, Trade and Travel Publications, 1971, and Tables 13 to 16 above.

Note: 1 nautical mile = 6076.1 feet or 1.15 statute or "ordinary" miles. Therefore distances in nautical miles have been multiplied by 1.15 to convert them to statute miles.

Table 26

Distances by road between selected E.E.C. cities

(miles)

FROM \ TO	Brussels	Paris	Frankfurt	Rome	Amsterdam
Brussels	-				
Paris	164	-			
Frankfurt	227	347	-		
Rome	980	916	748	-	
Amsterdam	118	309	250	1084	-

Arithmetic mean: 514 (excluding Rome: 236)

Sources: Road maps

Table 27

Costs of transporting merchandise by road
between selected E.E.C. cities, 1971
(U.S. dollars per metric ton)

<u>FROM \ TO</u>	<u>Brussels</u>	<u>Paris</u>	<u>Frankfurt</u>	<u>Rome</u>	<u>Amsterdam</u>
<u>Brussels</u>	-				
<u>Paris</u>	7.22	-			
<u>Frankfurt</u>	9.99	15.27	-		
<u>Rome</u>	43.12	40.30	32.91	-	
<u>Amsterdam</u>	5.19	13.60	11.00	47.70	-

Arithmetic mean: 22.63 (excluding Rome: 10.38)

Sources: Costs are estimated by multiplying distances via road between E.E.C. cities (Table 26) by metric ton-mile transport costs for a fifteen to eighteen ton tractor-semi-trailer travelling at 45 m.p.h. on paved roads, updated to 1971 dollars (4.4 cents) (de Weille 1966 pp.28-9).

Table 28

Distances by road
between major Colombian cities and ports
(miles)

FROM \ TO	B'quilla	Bogota	B'ventura	Cali	Medellin
Barranquilla	-				
Bogota	727	-			
Buenaventura	868	409	-		
Cali	781	321	85	-	
Medellin	496	281	373	285	-

Arithmetic mean: 463

Source: Mapa de la Republica de Colombia, Esso Colombiana S.A.

Table 29

Costs of three minute telephone calls from Bogota
to Andean, U.S. and European cities, 1971
(U.S. dollars)

<u>From Bogota to</u>	<u>Cost</u>
La Paz	8.16
Santiago	6.80
Quito	5.44
Lima	6.80
Caracas	4.08
Arithmetic mean	6.26
New York	8.16
Paris	13.59
Frankfurt	8.16
Rome	12.72
London	13.59
Madrid	8.16

Source: Empresa de Telefonos de Bogota

Table 30

Costs of three minute telephone calls

between selected E.E.C. cities, 1971

(U.S. dollars)

FROM \ TO	Brussels	Paris	Frankfurt	Rome	Amsterdam	Arithmetic mean
Brussels	-	0.81	0.72	2.04	0.54	1.03
Paris	0.70	-	1.03	1.51	0.97	1.05
Frankfurt	0.88	1.18	-	1.22	0.98	1.07
Rome	1.77	1.66	1.66	-	1.77	1.72
Amsterdam	0.58	0.71	0.71	1.00	-	0.75

Arithmetic mean: 1.12

Sources: Brussels, Paris, Rome: telephone directories. Frankfurt: Statistisches Bundesamt, Wiesbaden. Amsterdam: Telefoon-district, Amsterdam.

Table 31

Costs of three minute telephone calls
from Bogota to selected Colombian cities, 1971
(U.S. dollars)

<u>From Bogota to</u>	<u>Cost</u>
Barranquilla	0.83
Buenaventura	0.60
Cali	0.60
Cucuta	0.68
Ipiales	0.75
Medellin	0.53
Santa Maria	0.83

Arithmetic mean: 0.69

Source: Bogota telephone directory

Note: Direct dialing is not possible and connections may take half an hour or more to reach.

Table 32

Costs of "same-day" business trips
between Andean capital cities, 1971
 (U.S. dollars)

FROM \ TO	La Paz	Bogota	Santiago	Quito	Lima	Caracas
La Paz	-					
Bogota	352.50(a)	-				
Santiago	160.50	439.00(a)	-			
Quito	283.00(a)	99.50	371.50(a)	-		
Lima	117.50	236.00	226.00(a)	164.50	-	
Caracas	437.00(a)	169.00	514.00(a)	255.00	401.00(a)	-

Arithmetic mean: 281.74

Sources: Round trip air fares: Official Airlines Guide: International Edition, Vol. 15, No. 21, Chicago, R.H. Donnelley, Nov. 1971. Taxi fares and airport departure charges: Panamerican Airways, New Horizons World Guide, New York, Feffer and Simons, 1970.

Note: Basic costs include round trip jet economy air fare, taxi to and from each airport and airport departure taxes. The cost shown is the absolute minimum and assumes the businessman's schedule can be tailored to flight times. If this is not the case he could be forced either to spend up to four days waiting for the next flight (Quito-La Paz) or to return by a roundabout route which would cost more.

(a) One-day round trip is impossible since travel time is over 3 1/2 hours each way. Therefore cost of one night in a hotel with two meals is added.

Table 33

Costs of "same-day" business trips
between selected E.E.C. cities, 1971
(U.S. dollars)

<u>FROM \ TO</u>	<u>Brussels</u>	<u>Paris</u>	<u>Frankfurt</u>	<u>Rome</u>	<u>Amsterdam</u>
Brussels	-				
Paris	77.40	-			
Frankfurt	77.60	97.00	-		
Rome	162.80	158.60	147.60	-	
Amsterdam	46.38	77.98	74.58	74.58	-

Arithmetic mean: 99.42

Sources and notes: See Table 32

Table 34

Costs of "same-day" business trips
between major Colombian cities, 1971

(U.S. dollars)

<u>FROM</u> \ <u>TO</u>	<u>Baranquilla</u>	<u>Bogota</u>	<u>Cali</u>	<u>Medellin</u>
Barranquilla	-			
Bogota	59.00	-		
Cali	77.00	39.00	-	
Medellin	49.00	35.00	33.00	-

Arithmetic mean: 48.67

Source: Avianca, Bogota

Note: Costs include round-trip economy air fare and taxi to and from each airport.

Table 35

Number of flights per week between Andean capital cities
and from Bogota to selected U.S. and European cities, 1971

FROM \ TO	La Paz	Bogota	Santiago	Quito	Lima	Caracas
La Paz	-					
Bogota	3	-				
Santiago	7	9	-			
Quito	2	7	11	-		
Lima	11	20	39	12	-	
Caracas	2	14	9	4	11	-

Arithmetic mean: 11

New York	11
Paris	8
Frankfurt	4
Rome	1
London	4
Madrid	6

Source: Official Airlines Guide: International Edition, vol. 15, No. 21,
 Chicago, R.H. Donnelley, Nov 1971.

Table 36

Number of flights per week
between selected E.E.C. cities, 1971

FROM \ TO	Brussels	Paris	Frankfurt	Rome	Amsterdam
Brussels	-				
Paris	37	-			
Frankfurt	46	63	-		
Rome	23	88	44	-	
Amsterdam	49	69	48	27	-

Arithmetic mean: 49

Source: Official Airline Guide: International Edition, vol. 15,
No. 21, Chicago, R.H. Donnelley, Nov 1971.

Table 37

Number of flights per week
between major Colombian cities, 1971

<u>FROM</u> \ <u>TO</u>	<u>B'quilla</u>	<u>Bogota</u>	<u>Cali</u>	<u>Medellin</u>
Barranquilla	-			
Bogota	36	-		
Cali	15	50	-	
Medellin	16	48	21	

Arithmetic mean: 31

Source: Avianca, Bogota

Footnotes

1. A fourth component, packaging costs, could be added. The extra packaging required for sea transport can be very costly especially for fragile goods. Colombian exports of plate glass to Ecuador are among the few commodities which make the tortuous road journey described above: the saving in packaging glass for truck rather than ocean transport more than offsets the increased cost of trucking over ocean shipping. (Interview with officials of the Colombian plate glass producing enterprise)
2. The "cordillera occidental" (western range) through which the Buenaventura-Cali road passes is the smallest of Colombia's three mountain ranges. It is interesting that the slightly longer road over admittedly easier terrain from Cali to Popayan is one of the best constructed, surfaced, and maintained in the country. Traffic on that road is negligible compared to traffic on the Cali-Buenaventura road since Popayan is a town of only 80,000 people and has almost no industry. However, Popayan is the "aristocratic reserve" of Colombia and is the home town of several former Presidents, whereas Buenaventura, with a population slightly larger than Popayan, is a very poor town, largely populated by mulattos (Marshall 1971, p.387-8).
3. On an automobile trip which the writer took on the new road from Cali to Buenaventura and back in late 1970 a small river which was easily crossed on the downward journey had swollen so much twenty-four hours later that more than four hundred trucks were stranded at the crossing for eight to ten hours until it subsided enough to allow passage. The only other road exit from Buenaventura, the old road to Cali, was blocked at the same time by waterfalls which were spilling onto the road and threatening to wash vehicles over the edge of the mountain. Construction of a small bridge over the river on the new road would quickly solve this problem but building had not yet begun in early 1971.
4. Using Table 7, the total cost of trucking goods the length of the new Cali-Buenaventura road is $(3.38 + 5.53)/2 = 4.46$ dollars per metric ton. Since the road is 85 miles long and the cost of trucking goods on an earth road is 2.4 times costs on a paved road (Table 10) the dollar cost per metric ton mile on the paved section (y) can be estimated:

$$70y + (15 \times 2.4y) = 4.46$$
$$y = 0.04$$

The excess dollar cost per metric ton mile on the unpaved section is therefore $(1.4 \times 0.04) = 0.06$, and the total excess dollar cost of the unpaved section per metric ton (the cost per metric ton of leaving 15 miles unpaved) is $(15 \times 0.06) = 0.90$. Given that 1,230,000 metric tons of exports and imports passed through Buenaventura in 1969 (Colpuertos, 1970) the total cost of leaving 15 miles of the road unpaved was $(1,230,000 \times 0.90) = 1,107,000$ dollars in 1969.

5. The conference that is concerned with shipping between the Pacific coast of the United States and the west coast of South America applies the same rates for the 6,200 mile trip from Vancouver, Canada to Talcahuano, Chile as for the 3000 mile voyage from Los Angeles, California to Buenaventura, Colombia (U.N. 1970a, p274). Similarly, freight rates on the London-New York route (3,300 miles) do not differ systematically from those on the Bremen-Los Angeles run (8,000 miles). "This is probably due to the fact that only a relatively small part of total liner cost is a function of sea distance. The cost of loading and discharge, other port expenses and the cost of the vessel's time spent in port are probably much more important, and differences in these items can easily outweigh the influence of even large differences in sea transport distance." (O.E.C.D. 1968 p13)

6. For example, from Tables 16 and 20 the freight rate for sending "grape aguardiente" from Peru to the U.S. is \$80 per metric ton or 40 cubic feet, exactly four times the rate for "grape aguardiente" shipped from Peru to Ecuador. Yet freight costs are only 10.5 per cent of the f.o.b. value of the "grape aguardiente" shipped to the U.S. compared with 7.3 per cent for shipments to Ecuador. Again, although it costs 40 per cent more to ship corn or maize ("maiz" in Spanish) from Peru to the U.S. than to Ecuador, transport costs only represent 13.4 per cent of the f.o.b. value of the "maiz" shipped to the U.S. compared with 36.6 per cent for that shipped to Ecuador. If these figures are reliable we can deduce that the "grape aguardiente" and "maiz" shipped by Peru to the United States are priced about three times higher than the "grape aguardiente" and "maiz" sent to Ecuador. It seems likely, then, that the "grape aguardientes" and the "maizes" are really quite different products.

7. Routes of comparable length are Barranquilla-Callao (1871 nautical miles) and Barranquilla-New York (1801); Buenaventura-Valparaiso (2609) and Buenaventura-New York (2373); Guayaquil-Valparaiso (2031) and Guayaquil-New York (2647). Even after standardizing for length of journey differences in charges at different ports may still bias the results somewhat.

8. Both intra-Andean trade and Andean trade with the U.S. and Europe travels in a north-south direction. Hence Brown's contention that freight rates for north-south trade in Latin America tend to be greater than those for east-west trade cannot be tested using the present data.

9. Andean cost estimates in this section include ocean freight rates (from Tables 13 to 16 updated to 1971 dollars by multiplying by 1.25) port surcharges, and intra-country transport costs (estimates based on a variety of sources).

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