Economic Bulletin for Latin America

The *Economic Bulletin for Latin America,* published by the secretariat of the Economic Commission for Latin America, appears twice yearly, in January and September. The essential purpose of this periodical is to provide a résumé of the economic situation of the region designed to supplement and bring up to date the information published in the Commission's annual economic surveys. Apart from this summary, which is to appear in every issue, special articles on different subjects related to the economy of Latin America are also included.

The ECLA secretariat assumes entire responsibility for the *Bulletin.* Its content—intended for the information both of public officials and of the general reader—was not submitted to the Commission's member governments before publication.

EXPLANATION OF SYMBOLS

Two dots (..) indicate that data are not available or are not separately reported.

A dash (—) indicates that the amount is nil or negligible.

A minus sign (—300) indicates a deficit or a decrease.

A slash (/) indicates a crop year or a fiscal year, e.g., 1954/55.

"Tons" and "dollars" are metric tons and United States dollars, respectively, unless otherwise stated.

Minor discrepancies in totals and percentages are due to rounding.

REVIEW OF THE ECONOMIC SITUATION IN LATIN AMERICA DURING THE EARLY MONTHS OF 1956

INTRODUCTION

The over-all economic situation of Latin America remained at much the same level during the first half of 1956 as in the last six months of the preceding year. The stimulus provided by the satisfactory evolution of the region's sales abroad enabled economic activities linked to the export sectors to continue developing at the relatively high levels registered in 1955; and thanks to the repercussions of these external incentives on the rest of the internal economy, total demand remained active enough to encourage the maintenance of production. Only agricultural production seems to have declined in relation to 1954/55, owing to the adverse weather conditions which affected various countries. On the other hand, industrial and mining output pursued a general upward trend, which was particularly sharp in the former sector. This seems to indicate that total production of goods and services must have been slightly higher than in the first half of the previous year. Perhaps, however, the fact that during this period exports exceeded imports may partly have offset the possible effects of this expansion on total domestic availabilities of the goods and services in question.

These general characteristics of economic growth in the early months of 1956 were accompanied by other favourable symptoms, such as the relative stability of the balance of payments in Latin America as a whole and the efforts made by certain countries to check the inflationary processes by which they have long been handicapped. Nevertheless, in some republics further balance-of-payments disequilibria were recorded, and in others inflation has not yet been brought to a halt.

All these developments will be discussed in the following pages in as much detail as the limited data available permit. The first section of the article contains an analysis of the behaviour of exports and of domestic demand, together with the incentives to economic activity thus provided, while the second reviews the response of the various sectors of production. Attention has first been concentrated on Latin America as a whole, and the salient events in selected countries have then been indicated. To give the reader an approximate idea of the evolution of available goods and services, this second section closes with a brief examination of imports during the first half of 1956. Finally, in the third section the balance-of-payments situation is studied, as well as the course followed by inflation in certain countries and the measures adopted to combat it in that period of the year to which the present notes are confined.

I. EXPORTS AND THEIR INFLUENCE ON ECONOMIC ACTIVITY

Although the early months of 1956 witnessed certain variations in the incentives to economic activity, these can safely be said to have continued to operate in the larger Latin American countries as intensively as in 1955. The fact that external demand displayed the same relatively favourable characteristics as twelve months before, combines with the behaviour of domestic demand to justify the inference that, if Latin America's over-all economic development did not greatly surpass the level already attained, there were at least no signs of a recession. The evolution of the economy in recent months has still, in fact, been closely bound up with that of the foreign sector, more on account of the volume of exports than because of price fluctuations on the world market, as was also the case in 1955. In this latter year, it was the steadiness of external demand that gave an impetus to the most important of the economic sectors linked to the export trade; and the maintenance of production and income in these sectors had favourable repercussions on the rest of the internal economy. Since in 1956 likewise the chief dynamic element has so far been the larger volume of exports, there has been a persistence of last year's reaction from the decline in the export coefficient noted in recent years. Both in 1955 and 1956, the Latin American countries have shown an almost universal anxiety to promote an expansion of their export trade. As in some republics the incentive provided by the external sector has been weaker than last year, and in others has been partially offset by depressive factors in the internal economy, both these phenomena must be examined in detail.

1. THE EXTERNAL SECTOR

During the first three months of 1956, the quantum of Latin America's total exports (assessed in dollars at 1950

prices) was approximately the same as in the last and almost 19 per cent larger than in the first quarter of 1955. The average price of these exports was slightly lower than for the preceding year as a whole, but rather better than in its last quarter. As a result of this evolution of volumes and prices, the current value of exports was maintained at a high level throughout the first three months of 1956. (See table 1.)

Table 1

LATIN AMERICA: QUANTUM, CURRENT VALUE AND PRICES OF EXPORTS[a]

(1950 = 100)

	1955				1956
	I	II	III	IV	I
Quantum	104.6	110.2	113.3	128.2	125.2
Current value	116.2	120.9	120.4	135.0	134.7
Prices	111.1	109.7	106.2	105.3	107.5

Source: ECLA, on the basis of official statistics.
[a] Provisional.

NOTE: The roman numerals in this and subsequent tables indicate the corresponding quarter of the year.

The incidence of the resulting stimuli to the internal economies differed from one country to another, for in some cases, as has already been pointed out, the foreign sector exerted a negative influence. In *Argentina,* the failure of the most important crops occasioned a sharp fall in the volume of cereals and linseed exported, which was ultimately offset, at least in the first three months of the year, by an increase in meat exports. Thus the volume of total exports was still 8 per cent higher than in the first quarter of 1955. The average price of Argentina's exports in 1956 was 6 per cent higher than in January, February and March of 1955, not because the unit value of the staple export items rose, but owing to a change in the composition of exports. In any event, the final result of these movements in price and volume was that the current value of exports was greater than in the first three months of 1955.

The quantum of *Brazil's* aggregate exports during the first quarter of 1956 exceeded that recorded for the corresponding period in the previous year by the exceptional figure of 35 per cent. It should be noted that for coffee exports, which were the principal determinants of this increase, the good 1954/55 crop was drawn upon, and that a smaller output will be registered for the 1955/56 season. In contrast, another important export product—cotton—showed a marked decline. Simultaneously with this expansion of total exports, the unit value of sales abroad fell 14 per cent below the figure for the first three months of 1955, a development mainly attributable to the prices of coffee—which were lower than in 1955 for the type of bean exported by Brazil—and of cotton. Even so, the current value of exports in the first quarter of 1956 still represented a 17-per-cent improvement. (See table 2.)

The situation of *Colombia* is similar to that of Brazil. The 24-per-cent increment in the volume of exports was partly neutralized by a decrease of 6 per cent in their unit value, but the current value of exports was nevertheless 16 per cent higher.

In *Chile,* exceptional circumstances connected with the

Table 2

LATIN AMERICA: COMPARISON OF CURRENT VALUE AND QUANTUM OF EXPORTS WITH THEIR UNIT VALUE IN THE FIRST QUARTERS OF 1955 AND 1956[a]

(Percentages)

Country	Current value	Index of quantum	Index of unit value
Argentina	+14	+8	+6
Brazil	+17	+35	—14
Chile	—10	—34	+20
Colombia	+16	+24	—6
Mexico[b]	+24	+19	+3
Peru	+31	+30	+1
Venezuela	+9	+11	—2

Source: ECLA, on the basis of official statistics.
[a] Provisional.
[b] Figures for the first half of 1955 and 1956.

exporting of copper in the first quarter of 1956, and the unusually large amount of copper sold abroad in the same period of 1955, accounted for a 35-per-cent decline in volume. However, the reduction in foreign exchange income from exports was smaller, as even so their price improved by 20 per cent. (See again table 2.)

Mexico was one of the countries that continued to receive a vigorous stimulus from the external sector during the first six months of 1956. The considerable increase in the volume of exports recorded in 1955 was succeeded in the period under review by another, which amounted to 19 per cent in relation to the corresponding half of the preceding year. Prices of exports also remained high, so that the current value of sales abroad rose by 24 per cent. It should, however, be taken into account that in view of the new cotton sales policy adopted by the United States, Mexican exporters hastened to make all possible sales abroad during the early months of 1956, in anticipation of further price decreases and a weakening of demand in the near future. Thus, in the first half of 1956 cotton exports totalled some 60 million dollars more than in the same period of the previous year.

Lastly, in both *Peru* and *Venezuela* the volume and current value of exports continued to rise during the first three months of 1956. In contrast, the corresponding unit values tended to remain stationary. (See again table 2.)

Within this over-all picture, it should now be noted that the increment in foreign exchange income accruing from exports—whether on account of larger volumes or of higher prices—did not in its entirety represent a net profit or an equivalent incentive for the development of the internal economy. A major share of the product of the region's export trade is used to pay for its imports; and a satisfactory trend in sales abroad may be offset by a rise in import prices. Thus, in order to assess at their net value the favourable effects of the undoubted expansion of exports in the first quarter of 1956, the terms of trade must be taken into consideration. During the period in question, a general upward movement in the prices of goods imported by Latin America partly absorbed the stimuli deriving from the advantageous exports situation.

The most striking deteriorations in the terms of trade between the first quarters of 1955 and of 1956 were recorded for Brazil (—22 per cent), Uruguay (—13 per

cent) and Colombia (—11 per cent). The decline was much less marked in the cases of Venezuela and Peru, where it amounted to only 2 and 4 per cent, respectively. In Argentina the terms of trade remained almost stationary. An improvement was recorded only for Chile. At all events, for Latin America as a whole the deterioration was in the region of 6 per cent. (See table 3.) A reminder of the sharp increase in the volume of exports (20 per cent) will serve to show that despite this evolution of the terms of trade, the favourable influence of the external sector was in the aggregate stronger than in the first three months of 1955, by a figure approaching 11 per cent.

Table 3

LATIN AMERICA: TERMS OF TRADE[a]

(1950 = 100)

Country	1955				1956
	I	II	III	IV	I
Argentina	91.8	86.5	91.8	...	91.9
Brazil	114.8	103.8	100.5	109.8	96.7
Chile	110.4	123.8	132.7	143.0	139.6
Colombia	115.6	106.1	99.7	102.0	102.3
Mexico	105.0	98.9	101.0	101.2	108.3
Peru	100.8	101.8	92.1	87.0	96.5
Uruguay	97.8	82.1	78.5	87.3	85.6
Venezuela	98.1	108.5	96.5	100.8	95.9
Total for Latin America	105.0	101.2	97.7	107.5	98.3

Source: ECLA, on the basis of official statistics.
[a] Provisional.

2. DOMESTIC DEMAND

Although complete data on the evolution of domestic demand during the early months of 1956 are not available, from partial information some idea of its behaviour can be formed. In the case of *Argentina*, for example, there are clear indications that apparent demand—in monetary terms—expanded fairly considerably. This was due mainly to the income increment deriving from the higher prices established for staple agricultural products at the end of the preceding year,[1] and to the general wage increases granted in February 1956. But, as at the same time there was a gradual over-all rise in prices, real demand seems to have grown at a slower rate. These price increases resulted in the first place from the devaluation of the currency—the ultimate impact of which is estimated at not more than 10 per cent—and the heavier cost of fuel, and afterwards, to some extent, from the higher wages themselves, in so far as they were not

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[1] Even though harvests were on the whole smaller than in 1954/55, the evolution of relative prices, by favouring agriculture, more than offset this decline in production from the standpoint of the agricultural sector, where the consequent rise in income had positive repercussions on demand. In contrast, the higher prices for agricultural products—in so far as they were not subsidized or maintained under the control system—tended to reduce demand in the remaining sectors in real terms.

absorbed by entrepreneurs' profits or by the improvement of productivity. In any event, the reaction to be noted in trade sales (12 per cent), and the persistence of the upward trend in industrial production, confirmed the assumption of an increase in real demand.

In *Brazil* and *Colombia,* the incentives to domestic demand provided by the favourable evolution of the external sector continued to operate in combination with the dynamic influence of economic development itself, as manifested in increases in gross product and income. At the same time, the early months of 1956 witnessed the maintenance of a high level of government expenditure, the incidence of which, in the case of Brazil, aggravated the inflationary pressure on the economy, because of the deficit financing methods adopted. Measures for restricting imports, which in the preceding year had already determined a sharp contraction in Brazil's purchases abroad, deflected towards domestic production a part of demand previously met with imports. Nevertheless, the rise in internal prices led to a slower growth of real than of apparent demand.

Chile was one of the countries where the evolution of domestic demand was negative during the first half of 1956. A certain weakening of internal demand had already been observable in the preceding year, but had ultimately been partly offset by the favourable behaviour of the external sector. A more serious decline in domestic demand seems to have brought about a fall in total demand in 1956, as witness the contraction in building activities, industrial production and trade sales, the partial closing-down of establishments, the reduction of work shifts and even the dismissal of workers. During previous years the Chilean economy had been in the throes of a rapid inflationary process, some attempt to check which has been made in 1956. Various stabilizing measures have been adopted,[2] which have affected the income of a large sector of the population, as well as bank credit and investment. The difficulty of halting a firmly established inflationary process—which has sufficient intrinsic dynamic force to generate its own momentum—accentuates the problem involved in restoring economic, monetary and price stability without at the same time provoking an initial deflationary impact. Everything seems to suggest that Chile's economy is at present going through a phase of this kind, and its clearest manifestation is undoubtedly the decline in total demand just described.

In *Mexico,* the expansion of demand seems to have pursued last year's upward trend with no major variations in 1956 to date. The boom in exports was still one of the most active elements in this expansion. The incentives provided by the external sector made themselves felt throughout the Mexican economy in two principal ways. First, the income of sectors directly connected with the export trade increased, and secondly private investment was further stimulated. At the same time, the maintenance of the agricultural sector's income also helped to keep domestic demand at a high level.

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[2] See section III for a more detailed examination of these measures.

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An analysis of the various sectors contributing to the total supply of goods in Latin America reveals that broadly speaking the trends registered during 1955 continued in the early months of 1956. Each sector reacted appropriately to the maintenance of last year's high volumes of external and internal demand. Except as a result of variations in agricultural production occasioned by weather conditions and, in some cases, in consequence of the tightening of import restrictions because of the prolonged tension in the balance-of-payments situation of specific countries, there do not seem to have been any very considerable changes in the compostion of supply.

Again, the same factors that had been determining some degree of inelasticity in supply over the short term continued, broadly speaking, to operate as intensively as in the preceding year. These were the decline in the investment coefficient as from 1950 and the lower absolute level of gross investment in 1955, together with the relative constancy of the product-capital ratio during the last few years. The balance-of-payments tension mentioned above likewise affected purchases not only of consumer goods but also of raw materials and capital goods, thus hindering the expansion of production. Nevertheless, in certain countries, such as Mexico and Venezuela, both domestic production and import availabilities increased substantially in 1956. Heavier imports were also registered in Chile, Ecuador, Peru and some other countries, although in certain cases the balance-of-payments situation was aggravated thereby.

1. THE AGRICULTURAL SECTOR

Agricultural production in 1955/56 seems to have deteriorated in relation to the preceding year. In 1954/55 it was 4.5 per cent higher than in 1953/54. On the other hand, through the preliminary statistics on fourteen important products which it has been possible to collect,[3] the divergent behaviour of agricultural and livestock production has already become apparent. The former has declined fairly considerably, especially with respect to certain products such as wheat, coffee and linseed. In contrast, the number of cattle slaughtered rose substantially in Argentina and elsewhere, and this must have partially offset the contraction in agricultural production. However, as it has not yet been possible to gather data on the evolution of cattle stocks, it would be premature to assert that as a result of this increase in slaughtering, herd figures have or have not remained stationary.

Broadly speaking, the decline in agricultural production was the outcome of the unfavourable weather conditions recorded in some countries during 1955/56, especially in Argentina, Brazil and Uruguay. The area under cultivation seems to have increased, but apparently the bad weather prevented this increment from resulting in an expansion of production.

In the case of *wheat*, the harvest was estimated to be over 20 per cent smaller, a circumstance which will affect Latin America's exportable surpluses and will undoubtedly mean that they fail to equal last year's. (See table 4.) Production of *maize* was estimated as between 5 and 8 per cent higher than in the 1954/55 season. Since con-

siderable expansion of this latter crop was achieved in those countries which sell most of their production abroad, export availabilities were larger than in the previous season. As regards *edible oil seeds*, there seems to have been only a partial improvement on the last two poor harvests, in consequence of which these commodities were in short supply in the region. Sunflowerseed production in 1955/56 will exceed that of 1954/55 by 110 per cent. Peanuts will perhaps reach a figure about 10 per cent higher than last year. In the production of cotton seed, which has registered a rapid expansion during the last few years, there will probably be a decrease of almost 5 per cent in 1955/56; that of linseed again declined, and it seems that there will be a considerable reduction in the exportable balance.

Table 4

LATIN AMERICA: PRODUCTION OF SOME STAPLE AGRICULTURAL COMMODITIES, 1954/55 AND 1955/56

(Thousands of tons)

Commodities	1954/55[a]	1955/56[b]	Percentage variations
Wheat	11,866	9,350 to 9,500	—21 to 22
Barley	1,752	1,570 to 1,630	—7 to 10
Oats	1,101	930 to 940	—15 to 16
Rice	5,602	4,600 to 5,300	—5 to 18
Maize	17,530	18,500 to 19,000	+5 to 8
Rye	877	680 to 690	—21 to 23
Coffee	2,232	1,600 to 1,950	—23 to 28
Linseed	517	335 to 350	—32 to 35
Sunflower	419	860 to 880	+105 to 110
Peanuts	461	465 to 510	+1 to 10
Sugar	10,358	10,850 to 10,950	+4 to 6
Cotton fibre	1,222	1,120 to 1,190	—3 to 8
Wool	315	315 to 320	+2

Source: ECLA, on the basis of official statistics.
[a] Subject to revision.
[b] Preliminary.

Although, according to estimates, the output of *coffee* will be from 23 to 28 per cent lower in 1955/56 than in the preceding season, export availabilities during the first half of the current year were larger than in the corresponding period of 1955. It should be recalled that the 1955/56 crop has been exported only as from June, and consequently the decline in production corresponding to this last cycle will affect exports in 1956/57. The falling-off was partly due to the Brazilian crop, which was smaller than in former years.

After the successive decreases recorded in *sugar* production during the last few years, the output for 1955/56 seems to indicate a 4 to 6 per cent recovery. The greater part of this expansion is accounted for by the exporter countries, although increments were also registered in the production of those whose sugar is mainly used for domestic consumption. *Rice, barley, oats* and *rye* apparently declined, substantially in some cases. As for *wool*, it seems that at best the 1955/56 clip will attain a maximum increase estimated at only 2 per cent.

As was noted in reviewing the staple articles, important changes took place in agricultural production, and these are equally evident when the analysis is carried out by

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[3] These products represent from 50 to 60 per cent of Latin America's total agricultural production.

countries. The unsatisfactory weather conditions prevailing in 1955/56 reduced harvests in *Argentina*, except as far as summer sowings were concerned. It should be remembered that during recent years agricultural production had been adversely affected by the fixing of low prices for export commodities. (Such prices really depended on the marked over-valuation to which external peso quotations were subject.) These low prices deprived traditional production lines of incentives, causing them to lose importance in comparison with other crops and livestock production. In 1955, the devaluation of the currency enabled farmers to improve their prices. The relative profitability of the various agricultural sectors was thus restored approximately to the levels recorded in former periods when crops and exports had been substantial. The stimulating influence of the new prices will not be fully felt until the next agricultural season, as when the measure was introduced (October 1955), the most important sowings had already been made. Later sowings, however, did receive a stimulus from its adoption. In maize, an increase of 1.3 million tons, or 51 per cent, was registered. This accounted for the recovery of an exportable surplus, which had been virtually non-existent in 1955. Considerable progress was also made in the case of peanuts and sunflower (70 and 160 per cent, respectively). Downward movements, on the other hand, took place in wheat and linseed, the former dropping from 7.7 to 5.3 million tons, and the latter recording one of its lowest figures (40 per cent below the already small crop of 1954/55). There was a substantial increase in the number of cattle slaughtered. Thanks to this and to the increment in the production of maize, exports were successfully brought up to more or less the same total in the first half of the year as in the preceding period.

In *Brazil*, the year 1955/56, to judge from available preliminary estimates for the staple products, seems to have been less favourable than 1954/55, probably mainly on account of weather conditions. Coffee production declined considerably, owing to the ravages of frost in 1955 in the State of Paraná. But during the first six months of 1956 it was the 1954/55 harvest that was drawn upon for exports, and the same high level as in the second half of 1955—8.5 million sacks—was maintained, while the figure for the first six months of this latter year was exceeded by more than 20 per cent. Consequently, last season's smaller production will affect sales abroad in the second half of 1956. Sugar production also decreased, mainly owing to frosts in the States of Paraná and São Paulo. The excessive rainfall recorded in the cotton-growing areas caused a falling-off in this crop too. Here, however, the decline was only slight, and according to preliminary estimates will not exceed 5 per cent, since the area under seed was much larger in 1955/56 than in 1954/55. Even so, export availabilities of cotton were heavily reduced in the first half of the current year, and export registers were closed for over a month and a half. Production of rice and maize also seems to have been less than in 1954/55, on account of the adverse weather conditions already described.

Central America records divergent trends for the three principal items of agricultural production for export, namely, coffee, bananas and cotton. As regards the first of these, considerable increases were registered in all five countries, as a result of the excellent weather conditions which prevailed throughout this farm year. The ex-

pansion amounted to 9 per cent in Guatemala, 16 per cent in El Salvador, 5 per cent in Honduras, 35 per cent in Nicaragua and 46 per cent in Costa Rica. Nicaragua's production of bananas seems to have reacted from the previous year's downturn. That of Costa Rica probably decreased. Broadly speaking, the cotton situation was unfavourable, as in El Salvador, Guatemala and Nicaragua production would seem to have declined. In production for domestic consumption, likewise, differing trends are registered. The maize crop is likely to be smaller in Guatemala; rice production expanded in Nicaragua, but contracted sharply in Guatemala and Honduras. Increases will be recorded for sugar in El Salvador and Guatemala, and possibly in Costa Rica, as against a downward movement in Nicaragua.

The production of commodities for domestic consumption in *Cuba* improved in 1956 in relation to the preceding year. The current rice crop has been estimated at 182,000 tons, or 5 per cent above that of 1955. Production of maize rose in 1956 to 185,000 tons as against 178,000 in 1955.

Available statistics for export products suggest that the outlook is better than last year. As regards sugar, a larger volume was processed in 1956 than in 1955; by 23 June the output had already attained 4,738,800 tons, whereas it had been only 4,537,600 tons on the same date in the preceding year. Effective production in the current year covered almost the whole of the authorized quota—which had been established at 4,739,800 tons—and was 4.7 per cent higher than in 1955. The position of Cuba's sugar industry has improved in the present year, since stocks have fallen by 310,000 tons. (See table 5.)

Table 5

CUBA: POSITION OF THE SUGAR INDUSTRY ON 23 JUNE
(Tons)

	1956	*1955*
Surpluses from the preceding crop	1,682,034	1,945,772
Production to date	4,738,809	4,527,577
	6,420,843	6,473,349
Exports to date	2,576,000	2,318,400
Stocks in whole island to date	3,844,843	4,154,949

Source: Weekly Statistical Sugar Trade Journal.

This progress was to a considerable extent due to the aggregate purchases, totalling 548,700 tons, of Czechoslovakia, the People's Republic of China, the German Democratic Republic, Hungary, Romania, the Soviet Union and Yugoslavia. Moreover, under the United States Sugar Act Cuba will be able to export 2,620,200 tons to this country's market during 1956, plus 96 per cent of 45 per cent of any surplus over and above the total United States requirements originally estimated at 7,741,200 tons. Furthermore, Cuba's quota for sales on the world market was established at 2,020,000 tons in 1956, and in August was raised by 290,400 tons because several countries will not be using their full quota. Thus, Cuba's guaranteed sales for the current year total almost 5 million tons, excluding those effected outside the Sugar Agreement and the quota fixed by the United States legislation mentioned above.

Estimated coffee production decreased in 1956 by 15 per cent in relation to the 1955 crop, which amounted to

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46,500 tons. The output of tobacco rose by about 6 per cent, reaching 51,000 tons.

Chile seems to have maintained its total agricultural production at the same level as last year, which may be regarded as a favourable circumstance, since the previous season's production had been highly satisfactory. Among the few negative developments must be mentioned the 11-per-cent decline in the wheat crop caused by excessive summer rainfall in the south. In contrast, production of barley rose by 12 per cent and that of maize and sunflower by 4 per cent. In 1956 agricultural development programmes have so far progressed at the same rate as in previous years, and have even received fresh stimuli. The International Bank for Reconstruction and Development approved in principle the loan requested for the Plan de Desarrollo Agrícola y Transporte; and in addition, moreover, the product of domestic sales of United States agricultural surpluses (34.6 million dollars) will be earmarked as a contribution towards the financing of this programme. Furthermore, thanks to the larger foreign exchange availabilities accruing from the high price of copper and the increased import facilities accorded in certain lines, it is proving possible to purchase agricultural machinery, insecticides, and so forth.

In *Mexico's* production during the current agricultural year, divergent trends are apparently being followed by commodities for domestic consumption and by export lines. Among the former there has been a considerable expansion in foodstuffs, the most outstanding increases having been obtained in wheat (42 per cent), beans (11 per cent) and maize (6 per cent). At the beginning of June the stocks of beans held by the Compañía Exportadora-Importadora, México, S.A. (CEIMSA) amounted to 140,000 tons, which in combination with the current year's crop will leave a fairly large exportable surplus. On the other hand, a 6-per-cent decrease was recorded in the production of sugar. This smaller output is attributable to action taken by the industry itself lest problems should arise from sales difficulties on the United States and world markets. Total estimated demand for 1956 is not enough to absorb the accumulated sugar surpluses. As regards crops for industrial use, mainly for the domestic market, increases were recorded for copra (6 per cent), coquito oil, tobacco and castor oil.

Within the staple exports group a substantial modification took place in the trend of cotton fibre production, the crop being estimated at 23 per cent less than in 1955. This reduction is approximately equal to that of the area under seed,[4] so that yields tended to remain stable. During the present agricultural cycle they will probably reach 450 kilogrammes per hectare, a figure which compares very favourably with the yields obtained in 1955. The smaller volume produced is attributable to the uneasiness created by the United States surplus policy, which has already found expression in a price decrease and a contraction of the areas under seed (those where conditions were least favourable, that is, those with the highest production costs), with a view to securing a more advantageous competitive footing on the world market. In Mexico, a system for controlling water for irrigation purposes was applied, and advance credits to planters in the marginal areas were restricted, so as to promote the replacement of cotton-planting by wheat-growing, a measure which partly

accounts for the boom in the production of the latter cereal.

The production of coffee, another of Mexico's most important agricultural export lines, will, according to estimates, amount to 105,000 tons (1,750,000 60-kilogramme sacks), or 30.6 per cent and 14 per cent more than in 1955 and 1954 respectively. There has been no equally serious recurrence of last year's unfavourable weather conditions, and the present coffee cycle has been satisfactory. After deduction of domestic consumer requirements, the export availabilities will be 93,000 tons (1,550,000 sacks) that is, 9,500 tons (158,000 sacks) above their 1955 level.

Peru's agricultural production during 1955/56 does not seem to have belied the pessimistic forecasts based on the drought at the beginning of the year. According to preliminary estimates, there was a decline in the production of wheat, oats, rice and maize. On the other hand, the output of cotton fibre (110,000 tons) was larger than in 1954/55, and only 1 per cent below the peak figure attained in 1953/54. Sugar production will also be satisfactory, as it is estimated that a 5-per-cent improvement over the previous agricultural year will be registered.

Finally, in *Uruguay*, after the good harvests recorded for the 1954/55 season, 1955/56 seems to have witnessed a falling-off in production. Rather poor weather conditions, and possibly a want of incentives, since for the third time the price paid to the producer decreased, led to a 5-per-cent reduction in the output of wheat. The above measure represented an attempt to prevent any expanson in wheat-growing, in view of the difficulties attending sales abroad. However, the 1955/56 surpluses have already been successfully marketed, and an agreement for the sale of 320,000 tons to Brazil has been concluded. The maize harvest was similar to that of the preceding year; the rice crop, on the other hand, like that of linseed, decreased by 9 per cent. As regards edible oil seeds, a small increase was recorded in the output of peanuts and a slight deterioration in sunflower production. During the first six months of 1956 the number of cattle slaughtered does not seem to have risen much higher than the already low level registered for 1955.

2. THE INDUSTRIAL SECTOR

Industrial production in Latin America seems to have remained at more or less the same level in the early months of 1956 as in the last quarter of 1955, though it was considerably higher than in the first three months of the latter year. The ultimate outcome of a vigorous reaction which set in as from the third quarter of 1955 was an industrial output 4.5 per cent above the high 1954 level. Thus, although the production achieved in 1956 does not so far show any significant advance on the last quarter of the year before, it does indicate a fairly satisfactory evolution of industrial activity, especially when the magnitude of the initial impetus which preceded it is taken in consideration.

The development of the region's industry as a whole, however, masks a variety of situations in the different countries. In Argentina, industrial production maintained the trend towards recovery displayed in the preceding year, when it had expanded by 7 per cent in relation to 1954. Despite this fact, the *per capita* industrial output

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[4] In 1955 there were 1,091,000 hectares under cultivation, as against only 861,000 in the current year.

was not as high as in 1950 and 1951. In Brazil there seems to have been a reversal of the downward trend which in the second half of 1955 had so strikingly contrasted with the upward movement registered in 1954. In some countries—Mexico and Venezuela, for instance—industrial activity continued to grow at a considerably accelerated rate. Specific problems relating to supply and above all to demand hindered satisfactory progress in another group of republics which included Chile and Uruguay. However, while demand remained stationary in Uruguay, in Chile it underwent a more pronounced contraction, so that the decline in production already registered in 1955 became more marked.

Thanks to the improvement in the demand and supply situation with respect to raw materials observable in 1955 and in 1956 to date, there has been a recovery in industrial activity in *Argentina*. In fact, the existence of a certain amount of idle productive capacity and of some disemployment[5] has imparted considerable elasticity to the supply of industrial products over the short term. Nevertheless, this elasticity has not been sufficient to raise *per capita* supplies to much higher levels than were previously attained, in 1950 and 1951, for example. It seems that if industry is to be more fully and extensively developed, longer-term problems must first be solved, such as those now arising from the need to renew industrial equipment, the shortage of energy and imported raw materials, and the defects of the transport system.

In the course of the first half of the year, the linseed oil factories had to stop production for want of raw materials. The 1955/56 harvest provided 231,000 tons of seed, of which only about 140,000 will be used for this industry. Such a tonnage—not yet distributed—would only be enough for one quarter of the year. The sunflower and peanut-oil factories began to work in April and May; during the first quarter raw material was in such short supply that 70,000 tons of United States cotton oil had to be bought to meet consumer needs. However, it is hoped that the output in the second and third quarters will provide an exportable surplus of some 80,000 tons of sunflower and peanut oil.

With respect to the sugar industry, it is believed that, in consequence of the price increase, the mills will be able to undertake the partial renewal of their equipment, which at present is in large measure worn out or obsolescent. Prospects for the current year are good in all the producer areas.

Paper mills worked at full capacity, with a normal working day and week of twenty-four hours and seven days respectively. During the second quarter two new paper machines were installed, and another will enter production in the second half of the year. This means that a substantial increase over the 1955 output can be expected.

The metallurgical industry continued to be handicapped by the inadequate supply of raw materials. This sector was one of those most seriously affected by the modifications in exchange rates, as the raw material used comes largely from abroad. However, output was slightly larger in the first half of 1956 than in the corresponding period in 1955. This increment was due to the expansion programmes under way, especially where semi-finished prod-

ucts were concerned. As a result of the application of the automatic foreign exchange licence system, it is hoped that the volume of production in this branch of industry will recover during the second half of the year.

Foreign investment in the manufacture of chemical and pharmaceutical products, high- and low-tension electric insulators, abrasive stones, carders and acrylic resins, etc., has been authorized during the current year. Another outstanding event was the granting of a 60-million-dollar foreign credit to accelerate the work of installing the San Nicolás steel mills.

In *Brazil*, everything seems to suggest that manufacturing industry is regaining its 1954 impetus, after the slackening registered in the second half of 1955. This weakness was mainly reflected in the consumer goods sector, and was largely due to the reduction of credit and the difficulties attendant upon the importing of raw materials and equipment, which arose in their turn from the high values reached in the auctioning of foreign exchange.[6] But the early months of 1956 must not be judged only by the output of existing industry. The first half of the year has in fact been prolific in industrial programmes and projects, some of which are already under way, and which constitute important undertakings in the field of basic industries, so that they will undoubtedly help to accelerate the country's industrial development over the next few years. Most of these projects are being or about to be put into effect in the region lying within Brazil's dynamic triangle, formed by São Paulo, Belo Horizonte and Rio de Janeiro.

In the iron and steel industry, an increase in the output of rolled products is envisaged which will bring it up to 2.3 million tons by 1960. To achieve this end, ten projects are already being carried out which will raise current production by 721,000 tons. The majority of these comprise extensions of existing plants, but plans for new mills also exist. One of the most important is that of the Companhia Siderúrgica Paulista, which was preparing halfway through the year to begin the construction of an integrated plant with a capacity of 250,000 tons.[7]

An expansion of aluminium production is also apparently contemplated. Consumption in the last few years has been in the region of 12,000 tons, despite the fact that demand has been severely limited by the inadequacy of domestic production and by the restrictions imposed on imports. This fact, together with the natural tendency of consumption to turn increasingly towards activities of greater economic importance than the manufacture of domestic utensils—civil, automobile, aeronautical and naval construction, manufacture of conductors for the transmission of energy, etc.—has made it desirable that current production capacity, which amounts to 12,500 tons yearly, should be raised by 21,500 tons during the next four years.

One of the projects for the mechanical industry is the installation by a French enterprise of a subsidiary in Brazil, to which private Brazilian capital and the Banco do Desenvolvimento Econômico will contribute. It will

[5] See "The Situation in Argentina and the new economic policy", in the *Economic Bulletin for Latin America*, Vol. I, No. 1, pp. 26 et seq.

[6] Brazilian industry obtained 22 per cent less imported equipment and 56 per cent less raw materials from abroad in 1955 than in 1954.

[7] Approximately 200,000 tons of broad sheet and some 30,000 tons of tinplate.

manufacture equipment for the heavy mechanical industry (hydroelectric power stations, drills for petroleum prospecting, motors for the iron and steel industry, port installations, etc.).

After careful study, the Brazilian Government adopted a concrete policy with relation to the domestic manufacture of motor vehicles. April saw the creation of the Grupo de Estudos para a Indústria Automobilística, which was affiliated to the Conselho do Desenvolvimento, and which in June, by virtue of a decree of the supreme court, became the Grupo Executivo da Indústria Automobilística (GEIA). This organization is responsible for the control, direction and supervision of the manufacture of motor vehicles during its initial phase, which according to estimates will last five years. The organization includes representatives of all those bodies on whom the execution of plans for the production of motor vehicles depends, namely, the Ministério de Viaçao e Obras Públicas, the Banco Nacional do Desenvolvimento Econômico, the Superintendencia de Moeda e do Crédito, the Carteira de Cambio and the Carteira de Comércio Exterior do Banco do Brasil. This means that when the GEIA approves a specific manufacturing programme, consideration will have been given to all the correlative aspects, such as technical feasibility, allocation of foreign exchange, financing in local currency, etc. Manufacturers of vehicles will have to secure the GEIA's approval of their projects before they can obtain the foreign exchange privileges granted for the importing of such parts as are not at present produced in the country. Specific standards have been established for each type of vehicle and must be observed by manufacturers. In July approval was given to the Planes Nacionales Automobilísticos relating to lorries and jeeps, and it is expected that those for other types of motor vehicles will shortly be issued. As a rule, enterprises will be under an obligation to produce vehicles with an increasing percentage of domestically-manufactured parts. By mid-1960 this proportion will have to be 90 or 95 per cent of the total weight of the vehicle.

In addition, tractors will be produced within the very near future (1957). By the end of 1956 itself, domestically-manufactured trolley-buses and motor-scooters will be making their appearance.[8] Electric motor plants will also be expanded in the direction of increasing both the number of units and the horsepower of the motors produced.[9]

In the cement industry projected expansions should raise capacity to 5 million tons by 1960, through the enlargement of eleven existing factories and the installation of nine new ones. It is hoped that in this way a balance between production and consumption will be achieved during the five-year period 1956-60.

Rapid development has also been recorded in Brazil in plastic resins (where an output of about 25,000 tons is forecast for 1956), and in nitrogenous fertilizers (where production capacity will amount to 28,000 tons of nitrogen by the close of the present year). As regards alkalis, work has proceeded on the installation of the Cabo Frio

plant, which will have an annual capacity of 100,000 tons of sodium carbonate, but difficulties are being encountered in the expansion of caustic soda production.[10] In the paper industry, there is now a tendency towards setting up integrated paper mills producing their own pulp.[11]

Despite the accelerated growth of Brazil's domestic market, in some manufacturing sectors—the textile industry, for example—there is a tendency for supply to exceed demand. Industry is therefore seeking foreign markets. In 1955, exports of manufactured goods totalled 24 million dollars, that is, 300 per cent more than in 1954. In this connexion, foreign exchange policy has been channelled towards the promotion of exports of this type.

Throughout the first part of the year, a downward trend was registered for industrial production in *Chile*. Sales of manufactured goods—expressed in constant values—decreased by almost 20 per cent between December 1955 and April 1956. Despite this falling-off in sales activities, during the first quarter of the year industrialists managed to maintain production at its 1955 levels. With the approach of the second quarter, however, unmistakable symptoms of a decline in production became apparent in several of the various industrial sectors. The most seriously affected was the mechanical and metallurgical group, whose monthly sales were more than 50 per cent lower than in December last. So striking a drop was due to the crisis through which the building industry is passing. This activity, which provides the principal stimulus to the metallurgical industry, seems to have declined by more than 40 per cent in relation to the 1955 average and by almost 10 per cent in comparison with the lowest average in the last decade. To relieve this critical situation, an issue of bonds to the value of 4,850 million pesos has just been authorized; these will be placed at the disposal of the public organizations and of those private co-operatives which have housing programmes. With respect to the contraction in sales, next in order to the mechanical and metallurgical sector come the wood and furniture industries, the rubber and plastic moulding sector, the chemical and textile industries and the processing of foodstuffs. In all these sectors there was some degree of disemployment or curtailment of working days, as the case might be.

The recovery in *Mexico*'s industrial economy, which had been gathering momentum throughout the year 1955, continued uninterruptedly during the first half of 1956. The demand for industrial products—especially for capital goods—went on rising, and exceeded the already substantial volume attained in 1955. Some branches of manufacturing—the iron and steel, artificial rayon fibre and cement industries—registered very high production figures. The output of cement occasionally fell short of requirements, since production, despite the expansion effected, was unable to satisfy consumer needs, which

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[8] The production of low-power explosion motors has already begun.

[9] The annual output of electric motors from eight of the largest factories in Brazil is at present 200,000 motors for industrial and 500,000 for household purposes. As regards power, most factories are producing motors of up to 150 hp.

[10] Demand for sodium carbonate and for caustic soda is increasing in Brazil at cumulative annual rates of 10 per cent and 15 per cent respectively. While it is hoped that the entry into operation of the Cabo Frio plant will enable a large proportion of sodium carbonate imports to be replaced by domestic production, the same cannot be said of caustic soda, the output of which (36,000 tons annually at present) increases slowly because of the practical difficulty of solving the problems involved in the chlorine-energy-salt trinomial.

[11] Current annual consumption of pulp in Brazil amounts to some 200,000 tons. The country's fifteen mills supply 30 per cent of this total, 58 per cent is imported as raw material, and the remainder represents the pulp contained in imported paper.

were also growing. As on previous occasions, consumer goods industries did not show such marked production increments as those manufacturing capital goods.

As regards the iron and steel industry, the output of pig-iron and steel ingots increased by 30.6 and 19.5 per cent respectively between the first half of 1955 and the first six months of 1956. Production of cement expanded by 11.4 per cent, that of ammonium sulphate by 18.7 per cent and that of caustic soda by 12.7 per cent; for artificial rayon fibre a substantial increment of 24.9 per cent was registered, while the output of sulphuric acid declined by about 4 per cent. (See table 6.)

Table 6

MEXICO: INDUSTRIAL PRODUCTION, 1955-56

Manufactured products	Units	1955 First half-year	1955 Second half-year	1956 First half-year	Half-yearly or quarterly percentages of increase or decrease
Pig-iron ....Tons		155,004	176,513	202,390	30.6
Steel ingot ....Tons		343,000	382,000	410,000	19.5
Cement ....Tons		1,034,370	1,051,282	1,152,154	11.4
Sulphuric acid[a] ....Tons		53,916	49,347	51,810	—3.9
Caustic soda[a] ....Tons		10,482	11,335	12,811	22.2
Ammonium sulphate[a] ...Tons		35,894	32,741	42,598	+18.7
Artificial rayon fibre ...Tons		7,648	9,312	9,554	24.9
Beer ....Thousands of litres		337,487	345,209	370,499	9.8
		First quarter		First quarter	
Tires ....Units		220,007		228,837	4.0
Soap ....Tons		24,486		24,231	—1.0

Sources: For pig-iron and steel ingot: Altos Hornos de México and other producer enterprises; for cement: Cámara Nacional de Cemento; for sulphuric acid, caustic soda, ammonium sulphate and artificial rayon fibre: producer enterprises; for beer: Asociación Nacional de Fabricantes de Cerveza; for tires and soap: Dirección General de Estadística.

[a] Including the two largest enterprises engaged in the production of ammonium sulphate, caustic soda and sulphuric acid, whose output in 1955 constituted 77.8, 89.8 and 97.7 per cent respectively of Mexico's total production of these articles.

Furthermore, in the first half of 1956, a clear indication of the favourable evolution of this sector was provided by several important projects, some of which were completed and others under way. In March, Mexico's fifth blast furnace entered production at the Piedras Negras steel mill with a daily capacity of 200 tons, raising the country's total annual capacity for the production of pig-iron to 805,000 tons. In the early months of the year the largest iron and steel plant, at Monterrey, inaugurated its new combined semi-continuous rolling-mill, with an annual capacity of 120,000 tons, which will ultimately entirely replace the old commercial 55,000-ton rolling-mills; it also obtained a loan of 26 million dollars from the United States Export-Import Bank as a contribution towards the financing of an extensive programme for the expansion of its production capacity. Among other projects, it will undertake the manufacture of flat products.

The same period also witnessed the installation of a new cement factory with a daily capacity of 450 tons. This meant that total capacity increased by 135,000 tons yearly, reaching 2,787,000 tons. Utilization of cement production capacity thus rose in the first half of 1956 to 82.6 per cent—one of Mexico's peak figures—as against 78.6 per cent in 1955 and 71.6 per cent in 1954.

The biggest of the enterprises producing artificial fibres inaugurated a plant with an annual capacity of 170 tons to produce 15- and 30-denier nylon for the first time in Mexico. In view of the great demand for this type of fibre the firm is already planning to double its exsting capacity. In 1955 it had begun production of strong cord for tires, and in the course of 1956 it is implementing an expansion programme which will involve the investment of 8 millon dollars, and will mean that production capacity will be increased by 150, 40 and 38 per cent for strong cord, short viscous fibre and acetate fiilament respectively.

Lastly, another event which will undoubtedly have very favourable repercussions on the cotton textile industry, since it will enable enterprises urgently needing to renew their equipment to do so on more advantageous terms, was the entry into operation, halfway through the year, of the new plant for the manufacture of textile machinery that has been set up in the industrial town of Sahagún (Hidalgo State). This plant, which is financed with Mexican and Japanese capital and will produce machinery and accessories for the textile industry, as well as sewing-machines, has an annual production capacity for 3,600 automatic looms and 120,000 spindles. It is apparently already utilizing 60 per cent of this capacity.

Given the trends noted in Mexico's industrial growth, and the preliminary estimates based on the production programmes of the principal enterprises in some of the most important branches of industry, it is calculated that the total output of steel ingots in 1956 will be in the region of 850,000 tons, which will represent an increment of 17 per cent in relation to 1955. The output of cement will amount to approximately 2.4 million tons, or about 15 per cent more than in 1955. Similarly, it is hoped that

in the heavy chemicals and artificial rayon fibre industries the rate of activity will be maintained at the high levels recorded for the first six months.

While in *Peru* important events took place during the first half of the year in the field of industry, difficulties also arose in relationships between entrepreneurs and workers which created a delicate situation in one of the most important branches of manufacturing, i.e., the textile industry. The most outstanding achievements were recorded for cement, nitrogenous fertilizers and detergent fats. Another salient fact was the inauguration of the Chimbote rolling-mill, as a first stage in the entry into production of this integrated iron and steel works. For the time being imported billet is being used, until the installation of the Chimbote steel mill and the Cañón del Pato hydroelectric power station are completed.

Some degree of stagnation is observable in *Uruguay*. Obstacles still hamper the further development of manufacturing activity, which as it is exceeds the absorption capacity of the limited domestic market.

Industrial expansion persisted in *Venezuela*. In the textile industry, however, there was a patent reduction of activity attributable to severe competition from Japanese textiles. In most of the other sectors the volume of production continued to increase.

3. Mining

During the first quarter of 1956 Latin America's output of crude petroleum rose by 10.6 per cent and that of iron ore by 25.3 per cent, while declines were registered for tin and for the smelting of certain ores. To grasp the full significance of these changes, the sharpness of the 1955 upswing in the branches of production concerned must be borne in mind. (See table 7.) The development of Latin American mining in the early months of 1956 must thus be regarded as, up to a point, satisfactory, with some exceptions that will be indicated in the course of these notes.

Table 7

LATIN AMERICA: PRODUCTION AND SMELTING
OF SELECTED MINERALS[a]

(Percentage variations)

	1955	I-1956		I-1956
	1954	Average	1955	I-1955
Crude petroleum	11.5	7.3		10.6
Iron ore	22.9	15.3		25.3
Tin ore	—2.2	—28.8[b]		—21.8[b]
Smelting of ores (total)	13.2	—1.2		—7.5
Copper	17.4	1.3		—5.7
Lead	—0.5	—6.7		—8.5
Zinc	16.8	—13.6		—25.9

Source: ECLA, on the basis of official statistics.
[a] Preliminary.
[b] Change in exports from Bolivia.

As regards petroleum, the output of all the Latin American producer countries can be said to have expanded, by 3 per cent in the case of Argentina, more than 10 per cent in Colombia, almost 20 per cent in Bolivia, 8 per cent in Venezuela and by smaller percentages in Peru and other countries. The situation was much the same for iron ore. Outstanding increments of more than 25 and 40 per cent were obtained in Venezuela and Chile, respectively. The volume of copper smelted, though 5.7 per cent lower in the first three months of 1956 than in the corresponding period of 1955, was still 1.3 per cent higher than the quarterly average for the preceding year. Circumstantial factors in Chilean mining activity during the three months in question were responsible for the decline. The fall in the production of tin is attributable to the evolution of tin-mining in Bolivia, where the downward trend that had begun as early as 1953 was prolonged.

4. Imports

Latin America's purchases abroad are vital to the region's economy, on the one hand because imports constitute from 15 to 20 per cent of the total supply of goods and services, and, on the other, because imported capital goods represent on an average more than 30 per cent of total gross investment. Similarly, many of the raw materials essential for the normal development of internal economic activity come from abroad. All these imports, mainly on account of the relative inadequacy of the capacity to import, compete both among themselves and with consumer goods for a larger share in the region's total foreign purchases. This is even truer when a contraction in the volume of exports, or a fall in their prices, affects their capacity to pay for imports. In any case, the general rule in Latin America is for domestic demand to maintain a steady pressure on imports.

Broadly speaking, during the first quarter of 1956 a rise in the price of Latin America's imports led in some cases to the deflection of larger amounts of foreign exchange and in others to the adoption of restrictive measures designed to safeguard balance-of-payments equilibrium.

In Argentina, the current value of imports in the three months under review was 34.9 million dollars lower than in the corresponding period of 1955. But the reduction in their quantum amounted to 51.2 million dollars, the discrepancy of 16.3 million dollars between these two figures being due to the price increase. (See table 8.)

Much the same thing happened in Brazil, except that the losses occasioned by the rise in the unit value of imports (6.4 million dollars) corresponded to a decrease of 70.8 million dollars in the volume imported, which was thus more marked than in the case of Argentina. Colombia's situation was similar, though the figures involved were lower. In other countries where heavier imports were registered—among which were Mexico, Peru and Venezuela—higher prices determined the utilization of more foreign exchange than the mere increase in the quantum would have required. (See again table 8.)

In 1955, when there was a considerable increment in the volume of imports, accompanied by substantial balance-of-payments disequilibria in some countries, capital goods had lost some of their relative significance, giving way to raw materials and fuels. During the first three months of 1956, when imports were 3.3 per cent lower than in the last quarter of 1955, the share of capital goods in aggregate purchases rose from 36.8 to 39.9 per cent. Fuels gained still more in importance, coming to represent 13.5 per cent of total imports. In contrast, raw materials and consumer goods lost ground.

Table 8

LATIN AMERICA: EFFECTS OF PRICE AND VOLUME VARIATIONS ON IMPORTS[a]

(Millions of dollars)

Country	1955 I	1956 I	Gross variation between 1956 and 1955	Variation arising from difference in:	
				Price	Volume
Argentina	299.3	264.4	—34.9	+16.3	—51.2
Brazil	350.4	286.0	—64.4	+6.4	—70.8
Chile	93.7	106.5	12.8	—4.5	+17.3
Colombia	179.5	173.1	—6.4	+9.0	—15.4
Mexico	210.5	238.3	27.8	+10.1	+17.7
Peru	63.0	81.6	18.6	+4.6	+14.0
Venezuela	230.7	255.8	25.1	+0.2	+24.9

Source: ECLA, on the basis of official statistics.
[a] Provisional.

Objectively considered, the balance for Latin America as a whole would seem to indicate that gross investment—in so far as it was dependent upon imported capital goods—failed to rise above the low level registered in 1955, when the gross investment coefficient amounted to only 15.9 per cent of available goods and services. A more thorough country-by-country analysis gives a clearer insight into the evolution of imports of capital goods in the first quarter of 1956. (See table 9.)

Table 9

LATIN AMERICA: COMPOSITION OF IMPORTS IN SELECTED COUNTRIES[a]

(Percentages of total in current values)

Country	Year	Quarter	Consumer goods	Raw materials	Fuels	Capital goods
Argentina	1955	I	14.6	52.0	9.9	23.5
		IV	6.1	55.6	12.8	25.5
	1956	I	6.7	37.3	19.8	36.2
Brazil	1955	I	12.9	28.3	21.2	37.6
		IV	11.2	43.0	18.0	27.8
	1956	I	13.0	34.2	26.8	26.0
Chile	1955	I	16.8	44.2	10.3	28.7
		IV	15.5	38.9	13.4	32.2
	1956	I	18.0	40.1	13.6	28.3
Colombia[b]	1955	I	23.0	21.2	4.3	51.5
		IV	23.0	21.2	4.3	51.5
	1956	I	23.0	21.2	4.3	51.5
Peru	1955	I	27.8	28.9	3.2	40.0
		IV	27.0	28.5	3.4	41.1
	1956	I	26.6	27.5	3.7	42.2
Venezuela	1955	I	28.4	21.8	1.5	48.3
		IV	29.1	24.6	1.2	45.1
	1956	I	21.0	22.0	1.5	55.5
Latin America	1955	I	18.8	33.1	10.4	37.7
		IV	18.2	35.6	9.4	36.8
	1956	I	16.2	30.4	13.5	39.9

Source: ECLA, on the basis of official statistics.
[a] Preliminary.
[b] As the proportion of Colombia's total imports represented by these groups has not been determined, the figures shown correspond to the sample taken in 1954.

Among the countries where the proportion represented by capital goods increased were Argentina, Peru and Venezuela. In the first of these, the share of such goods rose from 25.5 per cent in the fourth quarter of 1955 to 36.2 per cent in the first three months of 1956, though at the same time the quantum of total imports underwent an appreciable decline of nearly 15 per cent. It must also be recalled that Argentina's imports in the period concerned included orders placed at the end of 1955, and that some part of them represented foreign capital contributions. It seems that during the remainder of 1956 the share of capital goods in total imports will decrease. In Peru the corresponding proportion rose from 41.1 to 42.2 per cent, while total imports also increased. In a similar position was Venezuela, where the share of capital goods in total purchases abroad reached the exceptional figure of 55.5 per cent, whereas in Brazil and Chile it declined. While in Brazil, however, the aggre-

gate volume of such purchases contracted by almost 20 per cent during the first quarter, in Chile it expanded by over 15 per cent. The greater import facilities ac-corded in Chile in 1956 to date have apparently led to a fairly substantial ' increase in purchases of consumer goods and raw materials.

III. THE BALANCE OF PAYMENTS AND INFLATION

During the early months of 1956, the improvement in Latin America's aggregate balance of payments seems to have continued. This was probably partly due to the favourable over-all evolution of exports already described, and partly to the severe restrictions imposed on imports in some of the larger countries. The position is confirmed by the development of the region's trade balance, which in the first quarter of 1956 showed a surplus of 293 million dollars. This balance is far higher than the figure recorded in the first three quarters of 1955 and only 31 million dollars lower than in the last quarter of that year, when an exceptionally large surplus was registered. (See table 10.) Similarly, up to March monetary reserves remained at the same high level of 3,475 million dollars at which they had stood in December 1955, and which had represented an increase of 125 million dollars in relation to the beginning of the year. It should be noted, however, that although total figures for outstanding foreign debts are not available, there is evidence that in certain countries further trade arrears accumulated during the period under review.

Table 10

LATIN AMERICA: TRADE BALANCE[a]

(Millions of dollars)

Country	1955					1956
	I	II	III	IV	Total	I
Argentina	—73.3	—57.3	—103.8	104.3	—130.1	2.6
Brazil	—52.8	5.2	67.1	98.2	117.7	61.0
Chile	8.8	16.3	25.1	48.3	98.6	—13.8
Colombia	—53.6	—44.4	3.3	7.4	—87.4	—27.4
Mexico	—27.8	—41.0	—16.2	—6.9	—91.9	+7.6
Peru	—11.1	—14.0	—10.6	—4.3	—40.0	—13.5
Venezuela	239.2	250.6	223.5	209.3	922.7	254.3
Others	37.1	30.4	—30.1	—87.2	—49.7	61.3[b]
TOTAL	66.6	145.7	158.4	369.3	740.0	332.3[b]

Source: ECLA, on the basis of official statistics.

[a] Provisional.

[b] Excluding Guatemala and Nicaragua.

Within this general picture, and despite the relatively favourable evolution to be noted in the region as a whole, in some countries the same pressure was maintained on the balance of payments as before, while in others the disequilibrium in their foreign accounts was aggravated. Most of these imbalances are still apparently due to tensions generated in the domestic economy, mainly by the inflationary process which is affecting certain of the Latin American countries. They thus constitute a reflection of these countries' own internal disequilibrium. To judge by the evolution of the balance of payments of each individual republic, and the course followed in 1956 by the money supply and by prices, inflation continued to gather momentum in certain countries, although in others fairly severe restrictive measures were simultaneously adopted in an attempt to check the process. The aim of these measures is of course not only to slow down the rise in prices, but also to stabilize the balance of payments.

The inflation which for years has been affecting *Argentina* is attributable to three main factors. Two of these—the fiscal deficit and the repeated over-all salary and wage increases—influenced monetary demand and found their corresponding expression in the expansion of the money supply. The Government's purchase of crops at prices that exceeded world market quotations on account of the exchange rates fixed for exports, and the management of the transport system, were outstanding among the causes of the deficit, which was principally financed through the banking system. The general salary and wage increases constituted an inflationary factor, inasmuch as the entrepreneurs financed these too with bank credit, or in so far as they implied higher costs which the enterprises transferred to the prices of the products. The third factor, which was the inelasticity of production, affected supplies. Among the decisive determinants of a certain lack of flexibility in domestic production were agricultural production policy and progressive disinvestment in certain basic sectors—energy and transport—to which may be added the failure to expand and renew productive equipment. Closley linked to all this were the balance-of-payments difficulties which likewise led to shortages of imported basic raw materials.

As from October 1955, a definite policy was adopted with the aim of solving the Argentine economy's most urgent short-term problems. This policy, which has already been analysed,[12] has been further pursued in 1956 to date. In outline, its objective is to tackle the problems

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[12] See the article cited above, in footnote 5.

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concerned from two different angles. One approach seeks to restore balance-of-payments equilibrium and the capacity to import by means of greater incentives to production for export, so that in the future it will be possible to increase imports and, up to a point, grapple with present shortcomings in the expansion and renewal of productive equipment and in the availability of raw materials and fuels from foreign sources. The aim pursued from the other angle is to relieve the monetary pressure caused by the fiscal deficit and wage increases, through heavier taxation and caution in public expenditure, while at the same time an attempt is made to prevent wages from rising higher than the growth of productivity or their absorption by the profits of the enterprises can justify.

In view of the short time during which this policy has been in effect, and of the Argentine economy's general situation, as well as the damage to crops occasioned by adverse weather conditions, its results cannot yet be evaluated. Nevertheless, some significant symptoms are already to be observed. The money supply, which had grown by almost 12 per cent between 30 September and 31 December 1955, increased by 10 per cent between the latter date and 31 July 1956. This second expansion is confined within limits which can be regarded as controllable, if it is taken into account that according to realistic estimates the gross product is increasing in 1956 at an approximate rate of 7 to 8 per cent. In view of the rise in prices registered in the current year, the increment in the product in monetary terms has been considerably greater. As the expansion of the money supply has not been out of proportion to the growth of the gross product, there is no reason why it should have exerted an inflationary influence. In other words, the relative monetary expansion has adapted itself to the requirements of an expanding gross product, and its effects have been apparently absorbed by the latter's larger volume and the consequent increase in transactions. Between September 1955 and June 1956 the rise in the cost of living was in the region of 18 per cent, of which up to 10 per cent approximately could be considered as reflecting the effects of monetary devaluation, and the remaining 8 per cent as the result of the rise in salaries and wages decreed in February. Hence the importance of the present wage and salary negotiations for the evolution of the currency and the cost of living in the immediate future. To prevent a further rise in the cost of living, the Government has repeatedly declared that wage increases must be kept within the bounds prescribed by the profits of the enterprises and by productivity, so that they may not be transferred to prices.

The balance-of-payments situation, after deteriorating towards the close of 1955, seems to have experienced a relative improvement despite the reduction in the exportable balance of certain commodities. Monetary reserves, which in December 1955 were 61 million dollars lower than in September, recovered at a later date. In July 1956 their volume exceeded the December figure by slightly more than 50 million dollars.

Argentina has signed a multilateral payments agreement with several European countries and has succeeded in consolidating for a ten-year term a high proportion of its trade debts with the countries in question. Furthermore, an Argentine mission is at present negotiating long-term loans in the United States.[13] All this is tending to relieve the existing tension in the country's foreign accounts.

The relative equilibrium shown by *Brazil's* balance of payments during 1955 was maintained in the early months of 1956, and, to judge from the movements of gold and foreign exchange reserves, a surplus seems to have been achieved in the first quarter. The reserves in question increased by 50 million dollars between December 1955 and March 1956, thus registering a peak level for recent times (533 million dollars). This improvement in the balance of payments was mainly brought about by a reduction in imports achieved through severe restrictions, as well as by the higher prices deriving from the system of auctioning foreign exchange. In exports too some progress was made in the early months of 1956. Shipments of coffee remained at a high level, and the same was true of other marginal export products. The authorities have recently established higher rates of exchange for these exports with a view to giving them still further encouragement. Over against these favourable aspects of the future evolution of Brazil's balance of payments, its liabilities were aggravated by medium-term payments on trade debts and foreign loans contracted in previous years.

As regards the domestic monetary situation, inflation has pursued its course, and constitutes the most vital of the short-term problems confronting Brazil's economy. During the first three months of 1956 the cost of living rose by 12 per cent. Complete statistics on the money supply are not available, but it is estimated to have continued expanding during the first quarter of 1956 at much the same rate as in the later quarters of the preceding year (5 per cent). The rise in domestic prices seems to have been partly due to the higher prices of imports, but mainly to the deficit financing of public expenditure. According to estimates, the fiscal deficit in 1956 will amount to 25 billion cruzeiros. Besides the Government's current expenditure and public investment, the foreign exchange subsidies accorded to certain imports affect this figure. However, it seems that the increased credit granted to the private sector contributed to the progress of inflation. All this accounts for the Government's present aim of reducing public expenditure and tightening credit controls.[14]

Colombia has not yet succeeded in overcoming to any appreciable extent the difficulties which affected its foreign current accounts in 1955. During the early months of 1956, the volume of exports and imports varied little from the preceding year's figures. The further deficit thus originated in the trade balance is preventing the normal repayment of trade debts and arrears, which amounted to some 200 million dollars in December 1955, when gold and foreign exchange reserves totalled only 140 million dollars. To accelerate the liquidation of these commitments, the Government adopted several measures in May. One of these consisted in offering importers enough foreign exchange at the official rate of 2.5 Colom-

[13] Another official financial mission is at present undertaking various negotiations in European countries. At the end of August a private consortium of British banks in London offered it credit for 20 million pounds sterling.

[14] A still stronger motive for the pursuit of this objective is provided by the very fact that in mid-July a rise in the minimum Rio de Janeiro wage from 2,400 to 3,800 cruzeiros (58 per cent) was announced; in the other States this increase will vary according to local conditions, but will be based on the level fixed for Rio de Janeiro.

bian pesos to the dollar to cover 50 per cent of their foreign trade arrears, provided that they first purchased the other 50 per cent at the free market rate of about 4.50 Colombian pesos to the dollar. The other steps taken were aimed at promoting trade-balance equilibrium by enforcing a reduction of imports. It was decided to apply the free exchange rate to a large number of commodities which had previously been imported through the official market, and the prior deposit was made compulsory for several more import categories. Moreover, the Government is making efforts to obtain long-term loans in the United States in order to finance imports of capital goods, and thus relieve, over the short term, the pressure on the balance of payments exerted by purchases of goods of this kind. There is nothing new in the devaluation of the exchange rate implied in the application of the free market rate to a number of imports. As early as 1955 a similar readjustment had been decreed, but had not imposed a sufficient check on the propensity to make more and more purchases abroad.

In recent months a certain tendency towards domestic monetary disequilibrium has become apparent. This is reflected in the rise in the cost of living (3.5 per cent in the first quarter of 1956) and the expansion of the money supply by 4 per cent. To halt this process the authorities have raised bank cash reserves, have frozen rents and are projecting taxation on non-recurrent and excess profits.

The rate of growth of *Chile's* long-drawn-out inflationary process, which had become more pronounced in 1955, slackened to a marked degree during the first half of 1956. The money supply increased by more than 20 per cent and the cost of living by about 14 per cent. These increments contrast with those of 45 and 35 per cent respectively registered in the first half of 1955. Within an integrated programme, various measures were adopted during the first six months of the year to tackle the inflationary process from different angles, though most of them are designed mainly to affect the population's monetary demand.

The credit restrictions introduced in the second half of the preceding year were tightened in 1956 and helped to curb the expansion of the money supply. One of the sources of sustenance which had fostered the process in earlier years was thus eliminated. At the beginning of the year it was decided to restrict wage increases to 50 per cent of the rise in the cost of living during 1955 (85 per cent), and this tended to limit the monetary demand of a large sector of the population, constituting a decisive factor in retarding the progress of inflation.

Under the previous legal system, it has been established that at the beginning of each year wages should be automatically adjusted by a percentage equal to the preceding year's rise in the cost of living. Thus, through the increment in nominal wages designed to offset the effects of price increases further similar increases were brought about, as always happens in the familiar process of the inflationary spiral. This did not permit any improvement in real wages. The procedure now adopted by the Government allows wages to be raised by a proportion equivalent to only half the rise in the cost of living. Hence the successive price increases will progressively diminish until inflation has been eradicated, but of course only in so far as the inflationary process depends on this factor, since other expansionist forces exist. On these too endeavours are being made to exert a controlling influence.

Alongside the two measures already described—restrictions on credit and on wage adjustments—severer price controls were established, and up to June an attempt was also made to keep prices stabilized by means of subsidies. Nevertheless, in the course of the first half of 1956 it became necessary to authorize heavy price increases for a series of articles of mass consumption.

One of the factors which has exerted most influence on the development of inflation is the fiscal deficit, which has been incurred chiefly through subsidies and the social security services, as well as through current public expenditure. Hitherto no important steps have been taken to reduce public outlays, but by recourse to fiscal measures some effect has been produced on the size of the deficit itself, and as it is no longer financed through the banking system its inflationary impact has been weakened. In August 1956 a tax reform was decreed which, besides enforcing stricter tax inspection, raised the rates for several direct and indirect taxes. It is estimated that the higher tax yields which will result from this legislation, in addition to the larger resources provided by the rise in the price of copper, should considerably reduce the fiscal deficit, which, at the close of the first half of 1956, was smaller than in the corresponding period of the preceding year.

Alongside all these measures and provisions for limiting the rise in prices, the devaluation of the unit of currency from 300 to 500 pesos to the dollar has tended to raise price levels. However, within the conditions described, its effects of this nature do not seem to have been very great in comparison with the acceleration of inflation brought about by foreign exchange adjustments in previous years.

In the experience of other Latin American countries it has been noted that after an acute inflationary process monetary stability is achieved at the cost of certain sacrifices, such as those deriving from some temporary slackening of economic activity. Although it would be premature to draw final conclusions in this connexion, the evolution of the Chilean economy during the first half of the year seems to confirm such experience. Credit restrictions and the abrupt slowing-down of the expansion of apparent demand among a large sector of the population have had, as already pointed out, a depressive influence on production.

The exchange reform adopted at the end of April accorded legal recognition to the devaluation which the currency unit had in practice been undergoing, and which was reflected in a pronounced disparity between external and internal prices, the former being assessed through the official exchange rates.

By means of the reform in question the exchange rate was standardized and a free bank market was instituted. The Chilean authorities hope to ensure the external stability of the peso and its adaptation to the real monetary conditions prevailing within the country, as well as equilibrium in the balance of payments. Neither of these objectives had it been possible to achieve through exchange controls and the establishment of multiple rates. However, in view of certain persistent inflationary pressures and of the requirements of economic development, demand for foreign exchange on the free bank market is still restricted and guided into specific channels. In fact, a number of non-essential imports have been prohibited; moreover, a prior deposit in local currency before effecting purchases abroad is now compulsory, and sometimes amounts to

double the value of the product imported. From the standpoint of sales abroad, devaluation favoured those export products which under the old exchange system had been subject to the official market rate, but it seems that the exchange rate at present in force, and the higher costs resulting from inflation, have made it difficult for specific products which formerly had the benefit of preferential exchange rates to compete on the world market.

Again, with a view to ultimately regularizing the supply of foreign exchange and counteracting speculation, Chile has requested and obtained from the International Monetary Fund and from several United States institutions stabilization credits amounting to a sum of 75 million dollars, which can be utilized if necessary.

It should be added that in order to introduce the exchange reform, advantage was taken of the increase in the supply of foreign exchange which has been noted in the country since 1955. This increment was mainly due to copper prices and to the steady foreign demand for copper existing at present. Presumably, too, factors connected with the attraction of foreign capital, whose co-operation was thought to be invaluable in a programme such as that undertaken by Chile, encouraged the adoption of the new measures of economic policy.

To date, however, it seems that the inflow of foreign capital in 1956 has not been very large. It must be remembered that the capacity to import has been lagging behind gross product and income, and in relative terms, does not suffice to meet the country's substantial import requirements. This is still more patently true in view of the additional domestic investment that will have to be undertaken, without inflationary financing, to offset the decline in total demand occasioned by the stabilization measures recently adopted.

The case of *Mexico* constitutes an extremely interesting experience within Latin America. In April 1954, balance-of-payments difficulties led to the adoption of an energetic policy aimed at safeguarding equilibrium. A sharp devaluation of the currency unit was simultaneously accompanied by several complementary measures designed to serve the same end and to ensure that the repercussions of this devaluation on the domestic economy should be as mild as possible. Once the period of adaptation consequent upon the new exchange rate was over, these measures, together with the sustained external demand by which Mexico benefited in the second half of 1954 and during 1955 and 1956, gradually led to a remarkable expansion of production and gross income, as well as to a marked degree of internal stability despite the surplus in the balance of payments. In 1956 to date, a further rise in total demand has been accompanied by an increase in production and imports. This has permitted the maintenance of more or less constant over-all levels for wholesale prices, and there was even a slight fall in prices during the months of May and June (from 121 in April to 120 and 119 in the two last-named months). At the same time, the moderate expansion in the money supply recorded during the course of 1955 was checked in the early months of 1956. Its total volume remained stabilized at a little over 10 billion pesos, a slight downward trend setting in as from February. The relative stability of the domestic

economy was reflected in the favourable balance-of-payments situation, which at the same time benefited by a considerable inflow of foreign exchange, thanks to the increase in exports, the tourist trade and foreign investment.

In *Peru*, the first half of 1956 saw no important modification in the previous year's monetary and balance-of-payments situation. Thus prices and the exchange rate remained relatively stable. The moderate increase in the money supply (3 per cent quarterly) brought about by a credit expansion designed to cover the budgetary deficit and to encourage investment and foreign trade, was not reflected in any considerable rise in the cost of living. Neither have the over-all wage increases granted in 1956 —on an average, rather more than 20 per cent—resulted as yet in substantially higher prices. These increments in the money supply and wages[15] were accompanied by an increase in available goods and services, since production and imports were maintained at high levels. Thus the expansion of supply offset the danger of a rise in prices that might have resulted from the growth of apparent demand.

Nevertheless, some anxiety is felt for the immediate future, lest the fiscal deficit incurred in the first part of the current year should create financing difficulties and exert a pressure likely to cause currency and price disequilibria. This uneasiness is confirmed by the fact that the expansion of the money supply during July seems to have exceeded the cumulative increase in the means of payment recorded for the whole of the first half of the year. The trade balance registered a larger deficit than in the corresponding period of 1955, but it did not cause disequilibrium in the balance of payments or a major reduction of the monetary reserves, because a share of imports corresponded to foreign investment in the form of capital goods.

Insufficient information is available as yet on the position of other countries. However, from the partial data to hand, it can apparently be inferred that in some of them —*Cuba* and *Venezuela*, for example—the relative stability of prices and the satisfactory balance-of-payments situation which prevailed in 1955 were maintained during the early months of the current year. In others, by contrast—and here the outstanding case in point is *Bolivia* —the inflationary process continued at its former rapid rate. In *Ecuador* no internal pressure on prices was recorded, but this is principally attributable to the deflationary action of the balance-of-payments deficit, which resulted from an increase in imports over against the stagnation of exports, and was reflected in a reduction of the gold and foreign exchange reserves.

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[15] In the case of Peru, it seems that the wage increase granted in the current year was accorded subsequently to the achievement of those increments in productivity which are to be observed in its economy. Hence, up to a point, the increase constituted a recognition of this expansion, and for the moment has had no serious inflationary effects. Furthermore, wage adjustments were made by direct negotiation in each branch of activity instead of simultaneously in all branches. Broadly speaking, they have to some degree remained proportionate to the enterprises' capacity for absorbing the increases in their profits.

THE INPUT-OUTPUT MODEL

GENERAL CHARACTERISTICS AND APPLICABILITY TO THE CASE
OF A LATIN AMERICAN COUNTRY*

In recent years a growing interest in current research on inter-industrial relationships has become apparent among economists in Latin America, and has been accompanied by a natural anxiety to investigate how far an input-output model might be of use in the analysis of the economic problems of the Latin American countries.

As has justly been pointed out,[1] two centuries have gone by since François Quesnay, in his work entitled *Tableau Economique*, stressed the importance of taking into consideration the interdependence of the various sectors of economic activity. Subsequent studies by Walras, of which the main objective was to examine the requisites for general equilibrium, once more drew attention to problems of this kind. Nevertheless, it was only a relatively short time ago that as a result of the research carried out by Professor Wassily Leontief such broad concepts took concrete shape in what is nowadays known as the input-output method or inter-industry relations analysis. It was, indeed, Professor Leontief who "had the insight to recognize in these ideas, not simply a tool for the theoretician, but a practical instrument for attacking some of the most complex and perplexing real problems of our modern industrial economic environment."[2]

Since the time when the earliest tables relating to the economy of the United States were constructed for 1919 and 1929, remarkable progress has been made, not only as regards methods of tackling the practical difficulties involved in the construction of the model, but, above all, in its application to an increasingly wide variety of problems. The ways in which it was originally turned to account were closely connected with the questions raised by the mobilization of the economy for military purposes during the Second World War, and, later, with the potential incidence on employment levels of the suspension of activities designed to meet requirements of certain war materials. Attempts were subsequently made to use the model as an instrument of analysis where the main objects of study were economic development problems of a more general character, the quantification and allocation of investment needs and priorities, regional analyses, etc.[3] Alongside this extension of the field of application, work has also proceeded on the construction of new tables for

an increasing number of countries. These tables are proving very valuable in the study of many matters which vitally concern the economists of Latin America.

The aim of the present article is precisely to discuss some aspects of the application of an input-output model to the case of a Latin American country, with reference to the preliminary experience acquired in this field by the Economic Commission for Latin America. As will later be seen, in such instances the construction and utilization of the model seem to involve certain special difficulties, mainly deriving from the consideration of the external sector. But the conclusion may also be reached that this drawback is fully offset by the possibilities—and in some cases the necessity—of utilizing the model in the analysis of several of the basic problems of the Latin American economies, including the structural changes that accompany the growth of *per capita* income, the questions that arise in connexion with import replacement, and so on.

Since this whole topic is the outcome of research whose findings are not as yet widely known in Latin America, largely because there is virtually no literature on the subject in the Spanish language, it was thought desirable to preface the discussion of the specific problems mentioned with as cursory as possible a sketch of the general characteristics of an input-output model. This is the object of the opening section of the following notes, which clears the way for the concrete discussion of the practical application of the model contained in the second part of the article.

First, however—even at the risk of subsequent repetition—the problem may usefully be defined in brief outline, so as to provide a general background for the analysis that follows.

The ultimate purpose of the model is to illustrate the nature of the interdependence of the various sectors of the economy, within which it is hardly conceivable that modifications can take place in any one activity without directly or indirectly affecting others. Supposing, for example, that production of a given manufactured article has to be expanded in order to meet an increase in demand. The mere achievement of the necessary increment in the output in question is not all that is required, for the industry concerned will also have to make heavier purchases of the raw materials and intermediate products needed for this additional production. Such an increase in the activity's "input" would therefore involve an expansion of production in those industries which supply the appropriate raw materials. As will shortly be demonstrated, it may reasonably be assumed that the greater demand for raw materials thus created will be in direct proportion to the increment in the output of the industry concerned; in other words, it will be dependent upon the expansion of production designed to meet higher consumer demand, and upon certain coefficients which are

[1] W. Duane Evans and Marvin Hoffenberg, *The Interindustry Relations Study for 1947*, U.S. Department of Labor, Bureau of Labor Statistics.

[2] *Op. cit.*

[3] See, for example, *The Structure and Growth of the Italian Economy* (U.S.A. Mutual Security Agency, Special Mission to Italy for Economic Co-operation), Rome, 1953.

assumed to be constant. These so-called "technical input coefficients" are thus simply a reflection of each industry's costs structure; that is, they represent an assessment of the raw materials that must be purchased to produce one unit of a given commodity.

Hence, if it is desired to satisfy an increased demand for any product, the input coefficients will provide a means of determining the expansion of production required not only in the industry immediately concerned, but also in all those other sectors of the economy which supply this latter with the goods or services it needs for the purposes of its productive activity. The whole body of modifications thus brought about might therefore be regarded as a direct consequence of the growth of the demand in question.

Nor is this all. The larger output of the other sectors, aimed at providing the raw materials and services needed by the industry originally concerned, in turn calls for supplies of a wide range of raw materials and intermediate products making up the input of these sectors, and this will have further repercussions on production requirements. Thus the interdependence of the various economic activities sets up a series of reactions which may extend to an ever-increasing number of sectors, though their actual impact will become progressively weaker. Herein lies the crux of the problem: how to quantify not only the *direct* but also all the *indirect* effects that may be produced by an increment in the activity of any given sector. Or, to state the problem in different terms, to what extent would production have to increase in each and every sector of the economy for a specific industry to achieve a particular degree of expansion?

The model provides an answer to this question by means of what will be referred to as "coefficients of direct and indirect requirements per unit of final demand". Just as the larger volumes of raw materials and intermediate products directly necessitated by the expansion of any industry can be quantified by virtue of the input coefficients, so the coefficients of direct and indirect requirements make it possible to determine all the repercussions on each sector's production needs that are likely to result from expansion in any individual industry to meet greater consumer demand. In this last instance, not only will the direct effects of such an increment in demand be taken into account, but also the whole chain of reactions to which allusion was previously made.

Obviously, an instrument of this kind can be applied to the consideration of a large number of practical problems. For illustrative purposes, let it be supposed that the promotion of a housing programme has become desirable. It would be relatively easy to consider what amounts of cement, steel and other building materials would be required for the implementation of the programme; but it would also have to be borne in mind that the increment in availabilities of steel would mean an increase in the production of iron ore, which in turn would call for larger quantities of explosives, further transport facilities, more fuel for these, and so forth.

As a rule, market prospects for any product not directly designed to supply consumer needs, and therefore not lending itself to the use of such criteria as the income-elasticity of demand, cannot be properly analysed without the help of an instrument whereby the commodity can be related to the final goods in whose production it plays a part. The table of coefficients of direct and indirect requirements would provide a particularly suitable basis for such an appraisal, the validity of which would be further reinforced by a method that did not overlook the complexity of the relationships between the various sectors.

In the specific case of the Latin American countries, the input-output model may be turned to very good account in the study of certain basic problems, like that of the heavier import requirements to which development itself gives rise. With the growth of *per capita* income, not only must more final goods be imported, but the expansion of domestic industries also calls for increased supplies of raw materials and intermediate products, a fair proportion of which are imported as well. Were a model of the kind to be described available, it would constitute a valuable instrument for a satisfactory analysis of the problem, as by its means the derived import needs consequent upon an increase in the country's productive activity could also be quantified. This is an aspect which does not always receive the attention it deserves. For example, alternative possibilities for the replacement of imports by domestic production are often appraised on the basis of the resultant direct saving of foreign exchange; but due consideration must also be given to the requirements of imported raw materials and intermediate products which may derive from such a process, as will be the case whenever the input of the substitution industries, or of others which supply them with given raw materials, is to some extent composed of imported items.

I. General background data on the input-output model

1. The model and the concept of national accounts

The input-output method is in essence complimentary to the national accounts. In the case of these latter, the point of interest is the *final result* of economic activity, and, in order to avoid duplications in calculating the national income, transactions *between* the various productive sectors are disregarded. In contrast, it is the analysis of such transactions, and consequently of the interdependence of the different sectors of production, that is the chief purpose of an input-output model.

For example, an examination may be made, by means of a very simple formula, of the way in which the gross (geographic) product at market prices would be computed. In such a case, the root of the problem would lie in the calculation of value added by branches of economic activity, taking the gross value of production as the starting-point and deducting the payments made to other sectors for purchases of raw materials and intermediate products or for other services. If it is assumed that total production of goods and services could be classified under only three sectors—agriculture, industry and services—a simplified illustration of the computation of value added might take the following form:

Agriculture
Gross value of production 100
Minus: Seed 5
       Fertilizers 10
       Services 10   25

Value added 75

Industry
Gross value of production 150
Minus: Agricultural raw materials 30
       Intermediate manufactured products 40
       Services 10   80

Value added 70

Services
Gross value of production 140
Minus: Intermediate manufactured products   10

Value added 130

The total value and the sectorial composition of the gross product would then be as follows:

Agriculture 75
Industry 70
Services 130

TOTAL GROSS PRODUCT 275

It can clearly be seen how by this method of calculation all duplication has been avoided. For example, the value of raw materials derived from agriculture is excluded from industrial production, since they have already been taken into account in the gross value of the production of the agricultural sector. In other words, the gross product represents a measure of the value of *final goods*, that is, of goods not subject to any further transforming processes. This can easily be demonstrated by breaking down the gross production of each sector into the part sold to other sectors—sales to meet intermediate demand—and the part disposed of outside the productive sectors in the form of consumer goods or investment, i.e., sales to meet final demand.

Agriculture
Gross value of production 100
Intermediate sales: To   agriculture   itself
              (seed) 5
            To industry 30   35

Final sales 65

Industry
Gross value of production 150
Intermediate sales: To agriculture (fertil-
              izers) 10
            To industry itself 40
            To services 10   60

Final sales 90

Services
Gross value of production 140
Intermediate sales: To agriculture 10
            To industry 10   20

Final sales 120

Final sales total: Agriculture 65
               Industry 90
               Services 120

               TOTAL   275

It should be noted in passing that the gross product and the value of final goods are effectively equal only in an aggregative sense, and not at the sectorial level. In point of fact, a sector's relative contribution to the gross product may be very large, even when it accounts for only a very small proportion of the availability of final goods, as in the case of an activity engaged mainly in the production of intermediate goods which are finished by other sectors.

In contrast, the purpose of an input-output model would be to make an explicit examination of those inter-sectorial transactions which were left out of count in the foregoing calculation. Thus, on the basis of the same illustrative example an *input-output* matrix could be constructed, comprising a complete register of such transactions.

INPUT-OUTPUT TABLE

Distribution of production	Composition of input			Total sales to productive sectors	Final demand	Gross production
	Agriculture	Industry	Services			
Agriculture	5	30	—	35	65	100
Industry	10	40	10	60	90	150
Services	10	10	—	20	120	140
TOTAL INPUT	25	80	10	115		
Value added (gross product)	75	70	130		275	
GROSS PRODUCTION	100	150	140			390

For the sake of simplification, it has been assumed so far that a closed economy with no foreign trade is under consideration.

2. PRINCIPAL CHARACTERISTICS OF AN INPUT-OUTPUT TABLE

As can be seen, in the final issue an input-output table constitutes simply a register of all the transactions conducted in the economy over a given period of time, including both those negotiated between the productive sectors and sales to final demand sectors.

The register itself is drawn up in the form of a double-entry table; along the horizontal rows the distribution of the production—that is, the sales—of each sector is shown, while, conversely, the vertical columns indicate the input—or purchases—of each sector. Of course,

the totals in both directions should coincide, since the sales of one specific sector represents purchases by another. If to input are added the payments made to the factors of production (that is, the value added or gross product) and final sales are taken into account, the sums of the column and row corresponding to each sector will also necessarily be equal, and in both cases the figure will be the same as for gross production. Finally, by definition of the gross product, the sum of the values added will coincide with the total registered for final sales.

To express the above example in general terms, an input-output table could be shown as follows:

Dis-tribu-tion of production	Composition of input Inter-industrial transactions					Final demand	Gross production
	A	B	C	D	$...$		
A	x_{11}	x_{12}	x_{13}	x_{14}	$...$	Y_1	X_1
B	x_{21}	x_{22}	x_{23}	x_{24}	$...$	Y_2	X_2
C	x_{31}	x_{32}	x_{33}	x_{34}	$...$	Y_3	X_3
D	x_{41}	x_{42}	x_{43}	x_{44}	$...$	Y_4	X_4
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

In still more general terms, x_{ij} would represent the sales of any industry i to any industry j; or, from the point of view of input, the purchases of any industry j from any industry i. Y_i would represent final demand for products from any industry i; and, lastly, X_i would symbolize the gross value of the production of any of the sectors included in the model.

3. THE USEFULNESS OF THE MODEL

A table of this kind would obviously have considerable intrinsic interest on account of the descriptive data which show in summarized form the availability of the different types of products, classified by industries of origin; the distribution of gross production among final and intermediate goods; the costs structure and the interdependence of the various sectors, and so on. But this descriptive purpose is not the most important. The model is chiefly useful in that it supplies a quantification of the inter-relationships of the various sectors of the economy, in the light of which an examination can be made of the repercussions of any change in final demand on each of these sectors.

This will be more readily understood if some thought is given to the nature of what have been described as intermediate demand, i.e., transactions between the productive sectors, and final demand, involving goods that will not be subjected to any further transforming process. Within the latter, a distinction should be drawn between consumer goods, capital goods and export products. Demand for consumer goods may be modified by changes in *per capita* income or in its distribution, by fluctuations in relative prices, and so forth. In any event, if a specific hypothesis is postulated for the variations in these factors, their probable incidence on the demand for a given product can be forecast by the application of income-elasticity or price-elasticity coefficients of such demand, or by other similar means. Much the same is true of final goods to be used for investment purposes, future requirements of which can be estimated on the basis of plans for the mechanization of agriculture, specific projects for the creation or expansion of particular industries, capital-output ratios for the different sectors, and so on. Finally, variations in final demand for exports can be assessed by reference to the conditions prevailing on foreign markets and the country's available resources for expanding the branch of production concerned.

This is in essence the procedure adopted in applying ECLA's technique for analyses and projections of eco-nomic development. On the basis of hypotheses as to the possible future rate of growth of *per capita* income, the modifications which such an increase might occasion in final demand for consumer goods and the development prospects of industries manufacturing capital goods are subjected to analysis, and projections are formulated for exports and the capacity to import. In brief, production requirements for the various types of goods coming under the head of final demand, as determined by a given rise in *per capita* income, are calculated in the light of objective criteria.

It is consistent with these criteria to regard the demand for final goods, up to a point, as an autonomous demand. In contrast, the same cannot be said of intermediate demand, which is essentially derivative, and dependent upon the levels of demand for final goods. In fact, unless technological changes take place—to which reference will be made at a later stage—no modification of inter-industrial transactions is conceivable except as the result of changes in final demand. The input-output model is designed precisely to meet the need for quantifying the effects of such changes on intermediate demand. As the sum of intermediate and final demand equals gross production, this is merely another way of saying that the purpose of the model is to permit an assessment of the gross production that each sector would have to attain in order to satisfy a given volume of final demand. Or, in other words, the input-output model aims at illustrating the way in which the whole flow of inter-industrial transactions—and therefore the levels of gross production—must be modified in order to cope with a given change in the level or composition of final demand; and, further, at providing the instruments of computation whereby such modifications can be quantified.

From this point of view, certain basic assumptions are essential. The most important is the hypothesis that a given output requires input in specific proportions; in other words, it is assumed that no technological changes will take place to affect the productive structure of the various sectors, as, for instance, the replacement of certain input items by others.[4] Furthermore, for the sake of simplification, it is also assumed that the functional relationship between input and gross production is of a lineal character; that is, all the items of input correspond-

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[4] It should be noted that the technological changes referred to are confined to those which affect the composition of input in the various sectors, but not necessarily the equipment or techniques used in the production process.

ing to each of the sectors will have to vary in exact proportion to the modification in the gross production of that sector. This last condition might be expressed as follows:

$$x_{ij} = a_{ij} X_j$$

i.e., the purchases of intermediate products which any industry *j* has to make from any sector *i* are equal to the gross production of industry *j* multiplied by a given coefficient which is assumed to be constant. Such coefficients are called "technical" or "input" coefficients; and there will, of course, be as many of these as there are cells in the inter-industrial relationships section of the original table.[5]

In accordance with the foregoing definition, the technical coefficients are obtained as the quotients of each input item and the gross value of the production of the consumer sector concerned. In other words, a technical coefficient represents the amount of intermediate goods that one particular sector must purchase from another in order to produce one unit. Using the same symbols as before, this condition can be summed up as follows:

$$a_{ij} = \frac{x_{ij}}{X_j}$$

Lastly, the technical input coefficients thus reflect the costs structure of each industry, and, in consequence, are dependent upon each sector's input and gross production, without being directly related to final demand for its products. Such demand, as an autonomous element, will be examined at a later stage in order to determine gross production requirements and the resultant input needs.

The following table comprises the input coefficients which would be given by the numerical example presented earlier.

MATRIX OF TECHNICAL OR INPUT COEFFICIENTS

Source of input items	Input requirements per unit of gross production		
	Agriculture	Industry	Services
Agriculture	0.050,000	0.200,000	—
Industry	0.100,000	0.266,667	0.071,429
Services	0.100,000	0.066,667	—

An examination will now be made of the way in which the matrix of input-output coefficients could be utilized to quantify the effects of a change in final demand on the gross production levels of the various sectors. For this

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[5] In general terms, a matrix of technical coefficients could be exemplified thus:

Sales of intermediate goods	Purchases of intermediate goods				
	A	B	C	D	...
A	a_{11}	a_{12}	a_{13}	a_{14}	...
B	a_{21}	a_{22}	a_{23}	a_{24}	...
C	a_{31}	a_{32}	a_{33}	a_{34}	...
D	a_{41}	a_{42}	a_{43}	a_{44}	...
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	

purpose, let it be assumed that the only modification is an increase of 20 units in final demand for agricultural products. Of course, the immediate effect will be that agriculture's gross production will have to expand to an extent equal to the increment in final demand. But this will not be all, since to produce these 20 additional units agriculture will require input from its own sector equivalent to 1 unit (20—final demand—multiplied by 0.05 —corresponding technical coefficient), as well as 2 units of manufactured products and 2 units of services. In its turn, the new unit of agricultural production will call for additional input from agriculture itself as well as from industry and services; again, the production of all three sectors will have to increase in order to meet the input needs arising from the 2 new units of production in industry and services; and so on successively.

The following figures constitute a representative specimen of the first stages in the calculation of the increments required in each sector's gross production to meet the 20-unit increase in final demand for agricultural products.

NECESSARY INCREMENTS IN GROSS PRODUCTION

	Immediate effect	Derived effects		
		First round	Second round	Third round
Agriculture	20	1	0.05 + 0.40 = 0.45	...
Industry	—	2	0.10 + 0.53 + 0.14 = 0.77	...
Services	—	2	0.10 + 0.13 = 0.23	...

The further increments obtained at each of the subsequent stages will be progressively smaller, so that the calculation will have to be taken only to the point at which the increases are still of significant proportions.

4. THE GENERAL SOLUTION: MATRIX OF COEFFICIENTS OF DIRECT AND INDIRECT REQUIREMENTS PER UNIT OF FINAL DEMAND

The complexity of the problem can at once be inferred from the foregoing numerical example, especially if it is recalled that the matrix in use may contain a relatively large number of sectors, in each of which changes in final demand are assumed. It is therefore absolutely essential for work to be based on a more general formula.

In accordance with the preceding definition, the gross production of any sector could be expressed as a function of the final demand of this sector and of the technical input coefficients and gross production of all the remaining sectors. In other words, the gross production of any sector is equal to its sales against final demand plus its sales to other productive sectors, which in turn depend on the gross production of these latter and the corresponding technical coefficients. For any sector *k*, this could be expressed algebraically as follows:

$$X_k = a_{kj} X_j + Y_k$$

If the technical input coefficients are assumed to be known, and a hypothesis of final demand in each sector is adopted, a system of equations can be set up, the solution of which will give the values of the gross production needed in each sector to meet both the final demand in

question and the corresponding input requirements.[6]

Theoretically, the basic problem would thus be solved: once a variation in final demand had been defined, its repercussions on the gross production of each sector could be quantified, and, when these had been computed, the matrix of technical coefficients could be used to determine all the inter-industrial transactions that would be necessary. But in practice this would not be feasible, since any change in the assumption as to final demand would mean that a new system of equations would have to be solved, a task not only exhausting but actually impossible to carry out in a reasonable space of time with ordinary calculating-machines, even for a relatively limited number of sectors.

As it is final demand that is autonomously determined, what is required in practice is to relate a sector's gross production, not—as has been the procedure hitherto—with its own final demand and the gross production of the other sectors, but with final demand in all sectors. This can be done by means of the mathematical operation of inverting the matrix of technical coefficients,[7] which would ultimately give the following set of equations:

$$X_1 = A_{11} Y_1 + A_{21} Y_2 + A_{31} Y_3 + \dots + A_{n1} Y_n$$
$$X_2 = A_{12} Y_1 + A_{22} Y_2 + A_{32} Y_3 + \dots + A_{n2} Y_n$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$
$$X_n = A_{1n} Y_1 + A_{2n} Y_2 + A_{3n} Y_3 + \dots + A_{nn} Y_n$$

It will be seen that this time the gross value of each sector's production is expressed as a function of final demand in all sectors and of certain coefficients—which may be symbolized by the term A_{ji}—obtainable by inverting the matrix as already mentioned. Once these coefficients have been ascertained, a hypothesis of final demand can be formulated, and it will be a very simple matter to calculate the gross production in each sector whereby such demand could be met. This implies that the coefficients take into account not only the output required to satisfy final demand, but also the whole ensuing chain of reactions in the shape of inter-sectorial transactions; hence they are called "coefficients of direct and indirect requirements per unit of final demand".

To sum up, the practical operations involved in the application of the model may now be usefully examined. The first stage would have to comprise the various phases of the preparation and elaboration of background data. These would include: (a) the construction of the initial table of inter-industrial relationships, over a period for which the necessary statistical data were available; (b)

the computation of the technical input coefficients; and (c) the inversion of the matrix which gives the table of coefficients of direct and indirect requirements per unit of final demand. The second stage would consist in the actual application of the model, and the calculations which would have to be made would of course depend on the specific objectives of the analysis. Assuming for purely illustrative purposes that the aim—as in the case of the technique of programming—is to examine all the repercussions of a substantial change in the level and composition of final demand occasioned by a rise in *per capita* income, it would be necessary (a) to establish the new figures for final demand in each sector, utilizing the appropriate objective criteria (income-elasticity coefficients, capital-output ratios, etc.); (b) to apply these new values for final demand and the table of coefficients of direct and indirect requirements per unit of final demand in order to determine the gross value of production in each sector; and (c) to use the new gross values of production by sectors, together with the table of technical input coefficients, for quantifying each and all of the intersectorial transactions whereby the necessary compatibility with the new levels and composition of gross production and final demand could be achieved.

5. A SIMPLIFIED METHOD OF INVERTING THE MATRIX

Hitherto only passing mention has been made of the fact that the table of coefficients of direct and indirect requirements per unit of final demand is to be obtained by inverting the matrix of technical coefficients. Theoretically, this is a very simple operation, but the complexity of the arithmetical calculations involved increases at so remarkable a speed with every additional sector included, that the use of electronic calculators becomes necessary even for a relatively limited number of sectors.

As this is one of the practical difficulties that might seriously hamper the development of such work in Latin America, it would seem appropriate here to make brief parenthetical reference to a method which, by avoiding direct calculation, enables the problem to be relatively quickly and easily tackled.[8]

The procedure in question is fundamentally based on the significance of the coefficients of direct and indirect requirements. The ultimate aim of these coefficients is to define the gross production needed in each sector in order to meet one unit of final demand. Thus the repercussions of any change in the figure for final demand could be calculated by merely multiplying this new demand by the appropriate coefficients. The inversion of the matrix mentioned above would constitute a simultaneous and accurate way of solving the problem; but here, in view of the difficulties noted, a method will be proposed whereby an approximation to the same results can be reached by successive stages, at each of which final demand in every individual sector will be assumed to be equal to unity.

In this case the method of computation will consist in a series of successive approximations, similar in form to the example cited earlier, with reference to the effects of a

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[6] In terms of final demand, the system of equations would be as follows:

$$X_1 - a_{11} X_1 - a_{12} X_2 - a_{13} X_3 - \dots - a_{1n} X_n = Y_1$$
$$X_2 - a_{21} X_1 - a_{22} X_2 - a_{23} X_3 - \dots - a_{2n} X_n = Y_2$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$
$$X_n - a_{n1} X_1 - a_{n2} X_2 - a_{n3} X_3 - \dots - a_{nn} X_n = Y_n$$

In this system all the coefficients a_{ij} would be known, and hypotheses would be adopted for final demand Y_1, Y_2, ..., Y_n. The n equations of the system would then provide the means of discovering the value of the n unknown quantities, i.e., the gross values of production X_1, X_2 ..., X_n.

[7] In conformity with the symbols used, the elements of the matrix which would have to be inverted are as follows:

$$(1 - a_{11}) \quad - a_{12} - a_{13} \quad - \dots - a_{1n}$$
$$- a_{21} + (1 - a_{22}) - \quad a_{23} - \dots - a_{2n}$$
$$- a_{31} - a_{32} + (1 - a_{33}) \quad - \dots - a_{3n}$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$
$$- a_{n1} - a_{n2} - a_{n3} - \dots + (1 - a_{nn})$$

[8] The method to be described was worked out by Victor Ochsenius, and was originally applied to the matrix contained in the chapter on industry in the study on *The Economic Development of Colombia* (E/CN.12/365), which will form volume III of the series *Analyses and Projections of Economic Development* in course of preparation by the Economic Commission for Latin America.

20-unit increment in final demand for agricultural products. The argument will be as follows:

(a) If final demand in one sector is equal to unity, the production immediately required of this sector will be 1;

(b) To produce 1, the sector concerned will need input items deriving from its own activities and from those of other sectors, the value of such input being equal to the figure for the corresponding technical input coefficients;

(c) This means that gross production in all sectors must increase, which in turn calls for additional input, and so on in succession.

The process goes on in this way until the new increments in gross production are negligible as compared with the sums accumulated. This happens very quickly, for the various terms which are gradually added can be compared to the terms of diminishing geometrical progressions, since the technical input coefficients are all much lower than unity. The calculation can, however, be confined to three or four rounds, the residuum being estimated as in the case of a diminishing geometrical progression.

Up to now, the calculations will have determined the output required from every sector to satisfy one unit of final demand in the sector originally considered; that is, a whole column of coefficients of direct and indirect requirements will have been computed.

Production requirements, however, are the outcome of final demand not only in the first but in all the other sectors. Next, therefore, the same calculations will have to be repeated with respect to one unit of final demand in the second sector, and again in exactly the same way for each of the remaining sectors, until the whole table of coefficients of direct and indirect requirements per unit of final demand has thus been completed.

The foregoing points must now be examined more closely.

It will be recalled that in the last set of equations mentioned, the gross production of any sector was expressed as a function of final demand in all sectors and the coefficients of direct and indirect requirements per unit of final demand. For any sector i, therefore, the following equation could be set up:

$$X_i = A_{1i} Y_1 + A_{2i} Y_2 + A_{3i} Y_3 + \ldots + A_{ni} Y_n .$$

If the work is carried out in rounds, and the aim of the first of these is to quantify for one sector only (for example, any sector k) the effects of supplying one unit of final demand, production requirements will be given by:

$$X_i = A_{ki} ,$$

since it was assumed that $Y_k = 1$, and no value has as yet been postulated for the other final demands.

Since $i = 1,2,3,\ldots n$, this will affect a whole column of coefficients, i.e., n simultaneous equations will be

recorded as follows:

$$X_1 = A_{k1}$$
$$X_2 = A_{k2}$$
$$\ldots\ldots\ldots$$
$$X_n = A_{kn}$$

In other words, any coefficient of direct and indirect requirements can be said to be equal to the gross production of the sector concerned when the corresponding final demand is equal to unity and final demand in each of the other sectors is nil, this being the conclusion on which, in the last analysis, the whole procedure is based.

It only remains to consider how—once the calculations described have been carried out for three or four rounds—the whole of the residuum can be estimated without direct calculation, as in the case of a diminishing geometrical progression. For convenience' sake, the increments in gross production resulting at each of the stages described may be expressed in the terms

$$\Delta^1, \Delta^2, \Delta^3, \ldots\ldots \Delta^{n-1}, \Delta^n,$$

and it will be assumed that the calculations have been made up to the nth stage. In virtue of the supposition that the successive increases correspond to a diminishing geometrical progression, the sum of the infinite number of terms not computed—to be designated R—could be estimated by means of the following expression:[9]

$$R = \frac{(\Delta^n)^2}{\Delta^{n-1} - \Delta^n}$$

The application of the method to the numerical example used above will now be considered. To begin with, the first column of coefficients of direct and indirect requirements will be calculated, for which purpose a final demand of 1 for agriculture and of 0 for industry and services will be assumed. The process is shown here up to the third round, together with an estimate of the residuum expressed for convenience' sake in terms of millionths:

[9] This expression is based on the general formula for the sum of the infinite terms of a diminishing geometrical progression, i.e.:

$$a \frac{1}{1 - q} ,$$

a being the first term and q the ratio. In the present case, the first term will be Δ^{n+1}, and the ratio will be given by the quotient

$$\frac{\Delta^n}{\Delta^{n-1}}$$

Since each term is equal to the product of the foregoing multiplied by the ratio:

$$\Delta^{n+1} = \Delta^n \frac{\Delta^n}{\Delta^{n-1}} .$$

If substitution is now effected in the general expression, and the residuum (sum of all the terms as form Δ^{n+1}) is symbolized by R, the result will be:

$$R = \frac{(\Delta^n)^2}{\Delta^{n-1}} \text{ o } \frac{1}{1 - \frac{\Delta^n}{\Delta^{n-1}}}$$

that is:

$$R = \frac{(\Delta^n)^2}{\Delta^{n-1} - \Delta^n}$$

| | Final demand | First Round: Δ^1 Agriculture 1,000,000 | Second Round: Δ^2 | | | |
			Agriculture 50,000	Industry 100,000	Services 100,000	Total
Agriculture	1,000,000	50,000	2,500	20,000	—	22,500
Industry	—	100,000	5,000	26,667	7,143	38,810
Services	—	100,000	5,000	6,667	—	11,667

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| | Third round: Δ³ | | | | $\Delta^2 - \Delta^3$ | Residuum $\dfrac{(\Delta^3)^2}{\Delta^2-\Delta^3}$ | Grand Total |
	Agriculture 22,500	Industry 38,810	Services 11,667	Total			
Agriculture	1,122	7,762	—	8,884	13,616	5,797	1,087,181
Industry	2,250	10,349	833	13,432	25,378	7,109	159,351
Services	2,250	2,587	—	4,837	6,830	3,426	119,930

A similar procedure will have to be followed in order to compute the second column of coefficients, final demand in industry being this time assumed equal to unity, and final demand in the agricultural and services sectors nil.

| | Final demand | First round: Δ¹ Industry 1,000,000 | Second round: Δ² | | | |
			Agriculture 200,000	Industry 266,667	Services 66,667	Total
Agriculture		200,000	10,000	53,333	—	63,333
Industry	1,000,000	266,667	20,000	71,111	4,762	95,873
Services		66,667	20,000	17,778	—	37,778

| | Third round: Δ³ | | | | $\Delta^2 - \Delta^3$ | Residuum $\dfrac{(\Delta^3)^2}{\Delta^2-\Delta^3}$ | Grand total |
	Agriculture 63,333	Industry 95,873	Services 37,778	Total			
Agriculture	3,167	19,175	—	22,342	40,991	12,177	297,852
Industry	6,333	25,566	2,698	34,597	61,276	19,534	1,416,671
Services	6,333	6,392	—	12,725	25,053	6,463	123,633

Lastly, if it is assumed that final demand is equal to unity in the case of services and nil in the agricultural and industrial sectors, the third column of coefficients will be obtained.

| | Final demand | First round: Δ¹ Services 1,000,000 | Second round: Δ² | | | |
			Agriculture —	Industry 71,429	Services —	Total
Agriculture		—	—	14,286	—	14,286
Industry		71,429	—	19,048	—	19,048
Services	1,000,000	—	—	4,762	—	4,762

| | Third round: Δ³ | | | | $\Delta^2 - \Delta^3$ | Residuum $\dfrac{(\Delta^3)^2}{\Delta^2-\Delta^3}$ | Grand total |
	Agriculture 14,286	Industry 19,048	Services 4,762	Total			
Agriculture	714	3,810	—	4,524	9,762	2,097	20,907
Industry	1,429	5,079	340	6,848	12,200	3,844	101,169
Services	1,429	1,270	—	2,699	2,063	3,531	1,010,992

It will then be possible to sum up the results obtained in the following matrix of coefficients of direct and indirect requirements per unit of final demand:

	Agriculture	Industry	Services
Agriculture	1,087,181	0,297,852	0,020,907
Industry	0,159,351	1,416,671	0,101,169
Services	0,119,930	0,123,633	1,010,992

As has already been pointed out, the method described results in an approximate estimate of the size of the coefficients. It is therefore useful to attempt to assess the possible degree of error which might be incurred through working on the basis of these approximate results. Since each sector's gross production can be computed by means of the coefficients of direct and indirect requirements, given any hypothesis of final demand, the calculations can be reconstituted for the numerical example worked out above, and the resulting gross production values can be compared with those previously established. In other words, the procedure will be to utilize the same set of final demands as in the original table, to determine the values for gross production by using the matrix of coefficients of direct and indirect requirements per unit of final demand, and to compare the results thus obtained with the effective gross production statistics available beforehand. Details of these operations are shown in the following calculations:

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	Agriculture	Industry	Services	Estimated gross production	Effective gross production
Final demand	65	90	120		
	—	—	—		
Estimate of gross production:[a]					
Agriculture	70,667	26,807	2,509	99,983	100
Industry	10,358	127,500	12,140	149,998	150
Services	7,795	11,127	121,319	140,241	140
TOTAL				390,222	390

[a] Product of final demand and coefficients of direct and indirect requirements.

As can be seen, the margin of error involved in adopting the assumption that the successive increments in gross production correspond to a diminishing geometrical progression is very small indeed. Consequently, the procedure described seems a satisfactory way of evading the complex problem of the inversion of the matrix, and permits the construction of a table of coefficients of direct and indirect requirements per unit of final demand whose approximate accuracy is sufficient for them to be subsequently utilized in quantifying the effects of any modification that final demand may undergo.

II. APPLICABILITY OF THE MODEL TO A LATIN AMERICAN COUNTRY

In the foregoing paragraphs a brief outline was given of the principal background data of a general kind relating to the interpretation and utilization of an input-output table. It may now be useful to sum up certain aspects of the experience acquired by ECLA in the course of one of the first attempts to apply the model as an instrument for the analysis of the economy of a Latin American country, namely, the study on the economic development of Colombia.[10]

1. METHOD OF DEALING WITH IMPORTS

One of the first problems that had to be tackled when the construction of an input-output table for the Colombian economy was attempted was that of how to integrate the external sector with the intermediate transactions and final demand corresponding to domestic products. The adoption of a satisfactory method was particularly important because, in the year under consideration in the study (1953), imports represented in Colombia's case a considerable proportion of the availability of both intermediate products and final goods.

In the original research on input-output—applied to the United States economy[11]—and in other later studies, such as the model constructed for the Italian economy, the method usually chosen was that of classifying imports by industries of origin and adding them to the domestic production of the industries concerned. In this way, the horizontal rows in the table show the distribution of the availability of each type of product, rather than production; similarly, any sector's input may be made up of domestic or imported products, or of both, in varying proportions. It is, then, on the basis of these figures, which represent the sum of production and imports, that the matrix of technical input coefficients is calculated, as well as that of coefficients of direct and indirect requirements per unit of final demand.

How far is a solution of this kind satisfactory in the case of one of the Latin American countries, characterized as they generally are by the relatively large share of imports in total availabilities of the various types of products? This question can be justified on the following grounds:

"By utilizing coefficients of direct and indirect requirements per unit of final demand it is assumed that there is a necessary interdependence between intermediate and final demand, modifications of the one being considered impossible without variations of the other; but such interdependence would appear necessary only in an economy where imports represented a very low percentage of domestic production (or even, for some purposes, an economy in which the relative importance of imports was high, but in which there were few possibilities of substitution). On the other hand, in a case like that of Colombia, it is perfectly conceivable that there should be some appreciable change in the final demand which, supplied by means of imports, would have practically no effect on intermediate demand (except on the demand for certain services); it is also conceivable that there should be an import substitution policy for intermediate goods, which might completely change the complexion of all intermediate demands, although the final demand would not vary at all (at least not in the short term)."[12]

These reflections led to a more explicit consideration of imports than they seem to have been given in other models, and, in the horizontal rows of the table corresponding to each of the sectors, transactions—both intermediate and final—in domestic products and imported goods, as well as the relevant totals, were registered separately.

In order to give an outline illustration of this way of dealing with imports, it seems useful to continue working on the basis of a hypothetical example like that used above, where in practice a closed economy was assumed.

[12] See op. cit., part two, chap. III: "Analysis of the industrial sector".
[11] See, for example, W. W. Leontief, The Structure of the American Economy, New York, 1951.

[12] See the "Note on sources and methods utilized in the construction of the input-output matrix", op. cit.

Composition of input Distribution of production and imports	Intermediate demand			Total sales to producer sectors	Final demand		Gross production plus imports
	Agriculture	Industry	Services		Internal demand	Exports	
Agriculture:							
Total	6	30	—	36	50	20	106
Domestic	5	30	—	35	45	20	100
Imported	1	—	—	1	5	—	6
Industry:							
Total	12	50	10	72	90	20	182
Domestic	10	40	10	60	70	20	150
Imported	2	10	—	12	20	—	32
Services:							
Total	12	10	—	22	120	—	142
Domestic	10	10	—	20	120	—	140
Imported	2	—	—	2	—	—	2
Total input:							
Total	30	90	10				
Domestic	25	80	10				
Imported	5	10	—				
Value added	70	60	130		260		
Gross production	100	150	140				390
Production + imports				130	260	40	430
Production				115	235	40	390
Imports				15	25	—	40

It should be noted that for the sake of simplification equilibrium between exports and imports has been assumed here. Similarly, it is only for greater convenience that in the following calculations domestic input has been retained, while at the same time new imported input items have been added; as the gross production values were not modified at the same time, the percentages of value added—and consequently the figures for the gross product—in the agricultural and industrial sectors are lower here than in the previous example.

But this mainly formal alteration in the presentation of the input-output table is not the only outcome of the reflections to which allusion has been made. If it is assumed that final demand can be modified without any change in inter-industrial relationships, and that gross production therefore remains at the same level—as would be the case if the increment in final demand were met with imports—the coefficients of direct and indirect requirements per unit of final demand will cease to be of use. Indeed, in such an instance, the object of all inter-sectional transactions has been to satisfy not the whole of final demand, but only that part thereof which is covered by domestic production. Hence can be inferred the first important conclusion. In utilizing the model it is not enough to establish as a starting-point a certain level and composition of total final demand; the volume and structure of that part of demand which it is expected will be met with domestic production must also be defined. Next, in order to deduce the gross production needs determined by such final demand, use must be made of coefficients of direct and indirect requirements per unit of *final demand for domestic products*.

Nor is this all. If, in order to meet a given final demand for domestic products, the sector concerned requires input items all of which are supplied through imports, the increment in the intermediate demand for this input will have no indirect effect, and there is no reason why the increase in that particular sector's gross production should occasion variations in the gross production of the other

sectors. Thus a second conclusion may be reached, to the effect that work must be conducted on the basis of coefficients of direct and indirect requirements of *domestic products* per unit of final demand for *domestic products*.

All this is naturally bound to increase the complexity of the process. In the first place, it will not be enough to determine a matrix of technical input coefficients, taking total input into account; it will also be necessary to calculate a similar matrix for the input of domestic products and another for that of imports.[13] It is by inverting the second of these that the table of coefficients of direct and indirect requirements can be obtained, as described in the preceding paragraph. To the last great interest attaches, as by its means, once the new levels of gross production have been determined, the consequent increase in requirements of imported intermediate goods can be quantified.

Imported input requirements per unit of gross production Source of input items	Agriculture	Industry	Services
Agriculture	0.010,000	—	—
Industry	0.020,000	0.066,667	—
Services	0.020,000	—	—

It is because the input-output model can be used both as an instrument of analysis and as a means of assessing the probable effects of a given increment in domestic production on import requirements, that the attempt to apply it to a Latin American country is of special interest.

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[13] Since the last hypothetical input-output table maintains the same figures for inter-industrial transactions involving domestic products and for final demand for domestic products, it is possible in this case to use the same matrices of technical input coefficients and of coefficients of direct and indirect requirements per unit of final demand (relating in this instance only to domestic products). So it will only remain to add the following matrix of coefficients of *imported* input items per unit of gross production.

In point of fact, such questions as balance-of-payments difficulties, the prospects for the capacity to import and for import requirements and the consequent need for import replacement, take up a good deal of the effort and attention expended on the analysis of the economy of these countries. For this reason, it is worth while to make a more careful examination of such aspects.

In the last example it was assumed that imports contribute 5 units to the final demand for agricultural products and 20 units to the final demand for manufactured goods. If it is assumed that resources and technological possibilities exist for the replacement of 2 units of the former and 15 units of the latter, two questions arise.

(a) If the gross production of agriculture increases by 2 units and that of industry by 15 units, with a view to the replacement of equal quantities in final demand, this will have repercussions, through imported input items, in the shape of larger import requirements; what, then, will be the *net* saving in foreign exchange? and

(b) With this consideration in mind, by how much will the gross production of each sector have to expand so that the net reduction in imports may amount to 17 units?

It would not be difficult to answer such questions provided that the necessary data were available; that is, the basic input-output table, the three matrices of technical input coefficients (for total, domestic and imported input) and the table of coefficients of direct and indirect requirements of domestic products per unit of final demand for domestic products. In such a case, the proposed substitution would in effect signify increments in final demand for domestically-produced goods, and the consequent gross production needs could therefore be determined by utilizing the table of coefficients of direct and indirect requirements; lastly, on the basis of the gross production values calculated in this way, together with the matrix of coefficients of imported input items, it would be possible to assess the increment in requirements of imported intermediate products deriving from the substitution of domestic for imported final goods.

The pertinent calculations for the illustrative example in use are given below.

	Proposed substitution S_1	Increment in gross production $\Delta^1 x$			Derived import requirements S_2		
		Agriculture 2	Industry 15	Total	Agriculture 6,642	Industry 21,569	Total
Agriculture	2	2.174	4,468	6,642	0.066	—	0.066
Industry	15	0.319	21,250	21,569	0.133	1,438	1.571
Services	—	0.240	1,854	2,094	0.133	—	0.133
TOTAL	17			30,305			1.770

As can be seen, the substitution of domestic for imported final goods to the extent of 17 units would call for an increment of more than 30 units in domestic gross production, whence would be derived new import requirements amounting to about 2 units, so that the net substitution achieved would be a little over 15. If it were now desired, as in the case of the second question raised, to attain a net substitution of 17, the process would have to be continued, the further derived demand for imports being regarded as a subsequent expansion of final demand,[14] and so on successively, until the new increments were negligible in comparison with the sums accumulated, or until it were considered satisfactory to estimate the later rounds by convergence.

The problem would assume a similar form if the substitution process involved intermediate products instead of end goods, as, for purposes of the calculation, such replacements could also be taken as increments in the final demand for domestically-produced goods.[15] It must, however, be recognized that in both cases the assumption is that the goods concerned are also being produced to a greater or smaller extent by domestic industry (or, in other words, that competitive imports are in question); but similar criteria would not be applicable when it was a case of replacing goods of which domestic production would mean the establishment of a new industry and, therefore, the augmentation of the national matrix in one sector.

A last remark which seems of some importance in relation to this treatment of imports bears upon the constancy of the coefficients of direct and indirect requirements. When the general characteristics of the model were described, it was pointed out that these were deduced from the technical input coefficients, which in turn were assumed to be invariable, insofar as no technological changes took place that would affect the composition of input in any sector. But if these coefficients are defined in terms of direct and indirect requirements of domestic products per unit of final demand for domestically-produced goods, their constancy is dependent not only upon technological

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[14] It should be noted that the adoption of this criterion does not necessarily presuppose that those intermediate products of which imports requirements have increased are the same as those sold by the industry concerned to the sectors of final demand. Since the aim is a net volume of substitutions, it could be attained by intensifying the replacement of end products, whereby enough foreign exchange would be released to finance the increase in imports of intermediate goods.

[15] In general terms, if any sector's important input items are designated C_{ij}, these will be a function of the gross production of all sectors (X_j) and of the coefficients of input of imported products per unit of gross production (c_{ij}), i.e.,

$$C_{ij} = X_j \, c_{ij}$$

Total requirements of imports of intermediate products from any industry i will therefore be given by:

$$C_i = \Sigma \, C_{ij} = \Sigma X_j \cdot c_{ij}$$

If complete replacement of these imported intermediate goods were the objective, the first endeavour of the sector i would have to take the form of an increase in its gross production equivalent to C_i. If this amount is taken as an increment in final demand, the new levels of gross production can be established, and these in turn will determine heavier requirements of imported input, this time equal to

$$\Delta^1 C_i = \Sigma \, \Delta^1 X_j \cdot c_{ij}$$

At a subsequent stage it will be possible to calculate further derived needs, given by:

$$\Delta^2 C_i = \Sigma \, \Delta^2 X_j \cdot c_{ij}$$

and so on successively.

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changes, but also upon any variation in the shares contributed by domestic production and imports to the supply of raw materials and intermediate products.

However, this does not invalidate the usefulness of the model, and merely adds to the difficulty of calculation whenever an attempt is made to utilize the coefficients of direct and indirect requirements in order to deduce the levels of gross production in successive periods, during each of which certain substitutions of domestic for imported intermediate products may have been effected. Here a more detailed explanation seems to be called for. Let it be assumed that the original input-output model was constructed for a particular base period and the tables of derived coefficients were computed as suggested above; and, further, that certain projections have been formulated with respect to an early future period, covering, *inter alia*, the substitution of domestic products for some of the intermediate goods imported during the base period. By means of the model, all the inter-sectorial transactions necessitated by these projections could be determined, and the derived coefficients could therefore be computed afresh. The global input coefficients would of course be the same as in the base period, since it was assumed that no pertinent technological changes would take place; but this would not be equally true of the coefficients of input of domestic and imported products, which would necessarily reflect the substitution processes concerned. If in such circumstances it were desired to extend the projections over a further future period, a new problem would arise; the coefficients of direct and indirect requirements of domestic products per unit of final demand for products calculated for the base period would no longer be applicable. The processes involved in inverting the matrix of coefficients of input of domestic products would therefore have to be repeated, this time on the basis of the new coefficients obtained for the first period covered by the projections.

The problem may nevertheless be satisfactorily solved if in each case these new substitutions are considered not in relation to the immediate past, but with reference to the situation existing during the period for which the model was constructed. In any case, aggregate domestic and imported input will have to correspond to the figures given by the matrix of technical input coefficients (calculated with total input), and in this sense, therefore, no further new assumption will in fact have been made, apart from the general postulate of the constancy of the technical coefficients.

2. VALUATION PROBLEMS

Although its importance is not so great, mention may also be made of another of the difficulties encountered in the work under review, relating to the most satisfactory way of valuing imports. From this point of view, indeed, the problem is more complex than that of deciding between "prices received by the producer" and "prices paid by the consumer", as when dealing with domestic production.

The price at which imports ultimately reach the hands of the consumer—whether he be an end consumer or a producer who purchases them as input—is made up of at least four components. These are the value at factory prices in the country or origin, expenditure abroad (on insurance, freight, etc.), customs duties and costs of distribution within the buyer country. In these circumstances,

the problem arises as to which of these components should be taken into account when computing any sector's imported input, of agricultural raw materials, for example. It would not seem logical to regard the total amount paid by the sector in question as corresponding to imported input from agriculture, since values would thus be laid to this charge which in reality—as in the case of expenditure abroad or customs duties—represented payments to other sectors; especially as such surcharges may reach a substantial total.

The solution adopted in the ECLA study consisted in classifying by industries of origin only those values corresponding to the estimated factory price valuation in the country of origin, on the basis of which, therefore, the tables of derived coefficients were computed. The other surcharges were considered separately, in one case with the object of determining the value added by sectors, and in the other with that of calculating total expenditure on final goods.

Such a solution seems the most satisfactory as a means of assessing the incidence of imports by sectors of origin, and therefore of quantifying possibilities for the substitution of domestically-produced goods. It must, however, be borne in mind that utilization of the data thus elaborated to appraise the effects of a substitution will imply the assumption that domestic production costs will be similar to those prevailing in the country currently supplying the goods in question.

3. PRACTICAL POSSIBILITIES FOR THE CONSTRUCTION AND UTILIZATION OF THE MODEL

Not only have the foregoing notes underlined the complexity of the problem; they would also appear to indicate that final solutions have not yet been reached in many of its important methodological aspects, which must rather be regarded as still in the experimental stage. For this reason, it seems of interest to close these remarks with a few references to what is perhaps most important at such a stage, namely, the feasibility—especially from the standpoint of statistical data—of constructing models of this kind in the Latin American countries, and, finally, the extent to which the possible utility of such a model justifies the effort involved in its preparation.

Once again it proves useful to refer to the ECLA study on Colombia that has repeatedly been cited. It is true that in this instance a typical input-output table was not elaborated; all that was done was to undertake a specific examination of the manufacturing sector, making complementary use of the basic statistics relating to the other sectors only in so far as was strictly essential. But the study was not carried out at the most opportune moment from the point of view of certain basic statistical data. The Industrial Census for 1953 effected by the Departamento Administrativo Nacional de Estadística was just at the tabulation stage, so that for the construction of the model only a few over-all statistics were available, together with data for sample enterprises by branches of industry. Thus such information had to be supplemented with certain estimates reached by bringing up to date the figures obtained in a previous census (1945). Moreover, the resources earmarked for this work—in terms of personnel and time—were themselves somewhat limited, with the result that many data which could have been collected were not elaborated, though at the cost of a

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moderate additional effort they might have meant a sub-stantial improvement in the findings of the study.

Hence, the conclusion to be drawn from experience in Colombia seems to be that the task of constructing input-output models for certain Latin American countries is not entirely outside the realm of practical possibilities as far as basic statistical data are concerned. Moreover, it is precisely the experiments which are made in this field that will gradually bring to light the worst shortcomings of such basic data, and will therefore serve as a guide for future statistical research. A greater store of experi-ence in this sphere, for example, might ultimately mean that the questionnaires utilized in industrial, agricultural and other censuses were better adapted to supply the in-formation needed for the construction of an input-output table.

Lastly, some consideration may be given to the poten-tial value of a study of this kind. It is difficult to sum up in a few paragraphs the use made of the input-output table in the ECLA study on Colombia and the general conclusions it was possible to reach. Let it suffice, there-fore, to cite a single aspect, relative to the approximate quantification of possible future requirements of imports of raw materials and intermediate products, though for this purpose a skeleton outline of part of the content of the study must be given.[16]

On the basis of a historical analysis and an examination of the current features and problems of the Colombian economy, certain alternative hypotheses were formulated as to the possible future rate of growth of *per capita* income. Present consumption statistics, together with coefficients of income-elasticity of demand by types of product deduced from various sources, were utilized for

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[16] In its *methodological aspects, the content of the study on Colombia follows the lines laid down in an earlier ECLA docu-ment, Analyses and Projections of Economic Development, I: Introduction to the Technique of Programming* (E/CN.12/363), United Nations publication, Sales No.: 1955.II.G.2.

estimating the possible level and composition of future consumption under each of the over-all hypotheses of the growth of income. By the addition of forecasts as to domestic production of capital goods and the outlook for exports—based on an examination of world demand for Colombian export products—hypotheses of total final demand for domestically-produced goods were completed. At this stage one aspect of the usefulness of the model became apparent, as it permitted the calculation of each sector's gross production requirements consistent with these hypotheses of final demand. On the basis of these requirements could also be determined the intermediate goods that would have to be imported for the given levels of gross production to be attained.

It is this last aspect that is of the greatest interest as an illustration of the type of analysis which could be effected by means of the input-output table. It was, in fact, estab-lished that whether the working hypothesis postulated rapid or moderate growth of income, requirements of imports of intermediate products would increase to such an extent that they would prove incompatible with the foreseeable growth of the country's capacity to import. In other words, even if a very moderate rate of develop-ment were assumed, within a few years the Colombian economy would be faced with a serious shortage of the raw materials and intermediate products required for industry, unless the policy of replacing imports of this type by domestically-produced goods were strengthened. The calculations made even permitted an approximate quantification of the substitutions that would be necessary under each of the several hypotheses of the growth of *per capita* income.

Such a situation is not likely to be exceptional in Latin America, and it is difficult to conceive of a satisfactory method of grappling with problems of this nature that would not depend on the availability—even if only in a highly simplified form—of an input-output matrix and the corresponding tables of derived coefficients.

SPECIAL NOTE ON THE CONCEPTS AND METHODS USED BY ECLA IN ITS ANALYSES OF ECONOMIC DEVELOPMENT

1. INTRODUCTION

In the systematic analysis of the principal problems and characteristics of economic development in the countries of the region, the Economic Commission for Latin America makes use of certain methods and concepts which differ in some respects from the usual approaches to research in this field. This is the case in the annual *Economic Survey*, in the special country studies and in articles on specific problems published by the Commission, where great importance is attached to such macro-economic concepts as gross product, gross income, available goods and services, stock of capital, product-capital ratio, etc. The purpose of the present article is to present a more detailed explanation of these concepts and of their background, significance and rationale, as well as to describe the nature of the underlying data and methodology.

In view of the abundant bibliography existent and the ever-increasing attention devoted in Latin America in recent years to income concepts and, in general, to national accounts, a mere repetition of the most widely-known methods and concepts can be avoided. Attention will be focused rather on the way in which the peculiar characteristics of the economic development of Latin American countries have made it necessary for ECLA to elaborate on certain traditional methods, and even, in some cases, to devise new concepts in which these special features would seem to be more adequately reflected. In fact, the study of economic development in the countries of the region requires not only that consideration be given to income levels and to the measurement, by reference to the gross product, of the over-all rate of economic growth, but also that a more careful examination be made of the rapid structural changes which accompany such growth, and which are characterized principally by very marked modifications in the relative contribution of the various sectors of economic activity to the gross product. There can be no doubt that this last aspect of economic development merits special attention, since it is reflected in significant transfers of production factors from one sector to another, and in changes in their respective productivity.

On the other hand, both the over-all rate of development and the structural modifications to which allusion has been made, are strongly influenced by the volume and nature of the transactions effected with the rest of the world. A special analysis of the incidence of the foreign sector on the national economy is therefore indispensable.

It is in relation to these basic characteristics of the analysis that the main concepts and the methodology used in their statistical measurement are discussed in the following pages.

2. SOURCES OF INFORMATION

It is in order here to review very briefly the sources of information used by ECLA. The basic statistical data

required have, as a rule, been obtained directly from official and semi-official sources in each country. Owing, however, to the ever-growing need for specific figures and the inevitable gaps in available national statistics, special efforts have been required on the part of ECLA to build up the complete background of national accounts data needed for its studies.

Although every advantage has been taken of national statistical sources, and no endeavour has been spared to encourage their development, the Commission has found it necessary to fill up major lacunae on its own responsibility. Thus, for example, by making use of more or less current statistical series relating to production, prices and foreign trade, ECLA has calculated the gross product of given countries over periods not covered by official statistics, or has prepared estimates for the main components of the gross product by sectors of activity and type of expenditure, when the specialized department in the country concerned was unable to provide the pertinent data.

It should be mentioned that much has already been done by the Statistical Office of the United Nations—in close collaboration with ECLA—to improve the quality, coverage and timing of statistics in the whole field of national accounts. The Statistical Office has, for example, worked out guiding principles which it has embodied in handbooks and special reports, and has rendered direct assistance to countries in statistical matters.[1] As a result of these and other efforts, a substantial improvement in the quality of the estimates now being prepared by the Latin American countries has already been noted, although it must be recognized that much remains to be done to standardize and perfect them. It is to be hoped, therefore, that progress in this field will be maintained, for, clearly, without a sound and up-to-date factual basis, no realistic analysis of economic development can be undertaken.

3. THE MAIN CONCEPTS AND THEIR STATISTICAL MEASUREMENT

An attempt will now be made to explain the basic concepts mentioned above against the background of the principal problems presented in an analysis of economic development. In the first place, concepts relating to the assessment and rate of growth of income will be examined; the measurement of the structural changes that accompany such growth will next be dealt with; this will be followed by an analysis of the concepts used in quantifying the expansion of productive capacity and its degree of utilization; and finally, consideration will be given to those connected with the appraisal of the inci-

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[1] See especially the following reports issued by the United Nations Statistical Office: *A System of National Accounts and Supporting Tables*, Studies in Methods, Series F, No. 2, 1953; *Concepts and Definitions of Capital Formation*, Series F, No. 3, 1953; *Methods of National Income Estimation*, Series F, No. 8, 1955.

dence of the foreign sector. Complementary reference will also be made to the problem of converting the monetary units of the different countries into a single common unit, namely, the United States dollar.

(a) Measurement of the level and rate of growth of income

In its various studies ECLA has made use of three basic concepts in analysing the rate of growth of the Latin American countries. These are gross product, gross income and available goods and services.

The term *gross product* is an abbreviated way of expressing the concept of the gross domestic product at market prices; that is, it constitutes a measure of the market value of the product attributable to the factors of production located within a country or in Latin America as a whole. This definition implies that the gross product is essentially a reflection of the success of the productive effort in the region under consideration; ECLA has therefore regarded the changes in the *per capita* gross product, expressed in a specific year's constant prices, as the most satisfactory and practical means of assessing the rate of economic growth.

For many purposes, however, a quantification of changes in the gross product does not suffice. If the economies in question exchange part of their production with other countries, the results of their domestic effort, as reflected in the gross product, may be greater or less in proportion to any modification in the terms of trade. Thus, for example, when export prices rise faster than import prices, the total income accruing to the production factors will in effect increase, even though no change will take place in the gross product. Similarly, an opposite movement in the terms of trade will in practice mean that part of the benefits obtained from domestic production of goods and services will be transferred abroad.

These considerations have led to the adoption of a further concept designed precisely to reflect not only fluctuations in the gross product, but also the sum of the gross product and the terms-of-trade effect. Hence arose the definition and utilization of the concept of *gross income.*

The term gross income, then, is equivalent to the gross product at prices of a base year (usually 1950) plus or minus the net gain or loss resulting from changes in the terms of trade.

In the economic analyses effected outside Latin America, stress has not so far been laid—at any rate explicitly—on the gross income concept as employed by ECLA.[2] This is probably because in the case of such extensive areas as the United States and Europe the terms-of-trade effect is rather small in comparison with the magnitude of the gross product. In Latin America, however, not only is a relatively large proportion of the gross product exported (about one-fifth), but such exports consist mainly of raw materials and foodstuffs, which exhibit a volatile price behaviour. As a case in point may be cited the fact that from 1945 to 1950, the terms of trade for Latin America as a whole improved by about two-thirds, the improvement being still more pronounced in the case of the coffee- and cacao-exporting countries. On the

other hand, during the depression years (1930-33) Latin America's terms of trade deteriorated by about 25 per cent in relation to their 1925-29 level.

Another factor to be considered in the analysis of economic development is the possible existence of an export or import surplus. Hence it became necessary to introduce the concept of *available goods and services* (more often referred to in other studies as "total available means"). An export surplus means in fact a reduction of the quantum of goods and services available within the country, whereas an import surplus represents an addition to the gross product. Available goods and services may therefore be defined as the sum of the gross product plus imports minus exports of goods and services. From a different standpoint—and with due regard to the uses to which these available goods and services are put—the concept can also be expressed in terms of the sum of *consumption* plus *gross domestic investment.*

In this connexion the incidence of movements of foreign capital and of variations in gold and foreign exchange holdings makes itself felt. These factors, expressed in constant prices through the index of the unit value of imports, together with the terms-of-trade effect, account for the difference between the values at constant prices of imports and exports of goods and services.

The relationship of the three concepts reviewed will perhaps be made clearer by reference to table 1.

Table 1

RELATIONSHIP OF MAIN CONCEPTS

	Consumer expenditure
plus	*Gross investment*
equals	AVAILABLE GOODS AND SERVICES
plus	Exports of goods and services
minus	*Imports of goods and services*
equals	GROSS PRODUCT
plus	*Terms-of-trade effect*
equals	GROSS INCOME

An examination may now be made of some of the *main practical problems* involved in the use of these concepts, as well as of certain specific aspects of the latter to which importance attaches.

(1) In the first place, it should be noted that the income and gross product statistics supplied by the different countries are ordinarily expressed in units of national currency at each year's current prices. As regards the gross product, an official or semi-official estimate[3] of the figures for each of the Latin American countries is now available for 1950, since in that year a large number of countries carried out population and economic censuses which provided the bases for the estimates concerned.[4] As the price level is perpetually changing in almost all the Latin American countries estimates at current prices are not sufficient; if they are to constitute a proper measure of economic growth, statistics of the gross product must first be expressed

[2] However, this concept has also been used by the Organization for European Economic Co-operation in its most recent studies. See, for example, "Statistics for National Product and Expenditure, 1938, 1947 to 1952", OEEC, *Statistical Bulletin*, 1954.

[3] See list of sources and publications in the Appendix.

[4] For this reason, 1950 was chosen as the base year for all calculations in recent ECLA studies. This does not of course preclude the adoption of different periods as more suitable points of reference for the appraisal of other factors. In the case of the terms of trade, for instance, it might be much more satisfactory to relate relevant comparisons to the year 1945, which marked a turning-point in the downward trend previously recorded.

in *constant prices*, that is, in terms of the prices prevailing in a particular year. Many countries, especially within the last two or three years, have been able to provide estimates of the aggregate gross product, and even of its components, expressed in constant prices, and these data have in many ways proved invaluable for the Commission's studies. In other instances, the ECLA secretariat has had to grapple directly with the problem of estimating the gross product at constant prices. The method generally followed has been that of extrapolating the 1950 gross product as a function of indices of the quantum of production in the base year (1950). In other words, the point of departure has been the statistical data for the gross product by sectors of activity in 1950, these figures having been multiplied by the quantum indices for each of the activities in question, in order to estimate each sector's gross product at 1950 prices for the other years under review. When suitable production indices were not available, estimates of the gross product at current prices were deflated by means of price indices, usually the cost-of-living index. Results, however, have not always been satisfactory, and are generally subject to revision, because these indices are not sufficiently representative of the over-all price level and their weighting system is often defective.

(2) The *terms-of-trade effect* mentioned above refers to the gain or loss resulting from changes in the terms of trade relative to the base year (1950). It has been calculated as the product of exports of goods and services expressed in constant prices multiplied by the changes in the index of the terms of trade (i.e., the ratio of the unit value index of exports to that of imports).

The formula used is thus $E_0 Q_e \frac{(P_e - 1)}{P_I}$, where E_0

represents the value of exports of goods and services during the base year, Q_e the export quantum index, and P_e and P_I the unit value indices of exports and imports, respectively.[5] Table 2 (columns A to D) exemplifies this calculation.

Table 2

LATIN AMERICA: GROSS PRODUCT, TERMS-OF-TRADE EFFECT AND GROSS INCOME, 1945, 1950 and 1954

Year	Value of exports (Billions of dollars at 1950 prices) (A)	Terms of trade index (1950 = 100) (B)	Change in terms of trade index (with respect to 1950) (C)	Terms of trade effect (D)=$\frac{(A)\times(C)}{100}$	Gross product (E)	Net factor income to abroad (F)	Gross income (G)=(D)+(E) −(F)
				(Billions of dollars at 1950 prices)			
1945	6.5	62	−38	−2.5	29.8	0.5	26.8
1950	7.3	100	—	—	39.0	0.8	38.2
1954	7.6	106	6	0.5	45.9	0.8	45.6

The above method for measuring the terms-of-trade effect is not, it may be noted, the only one possible. As a matter of fact, such a procedure takes into account only the actual export value, and disregards the possibility that, for instance, part of the current export proceeds may have to be applied towards liquidating a previous import surplus; or, *vice versa*, that imports in the year under consideration may exceed exports, thus leaving a deficit in the balance of payments which may be financed by net capital inflow. The effect of the terms of trade in this last case will be difficult to measure, since only exports have been taken into account, without regard to the possibility that they may differ from actual imports. Unless the deficit is financed by long-term foreign investment, or through the use of international monetary reserves, the current import surplus will have to be offset by a future export surplus.

A typical example of this kind of situation is afforded by the exchange reserves that some Latin American countries were obliged to accumulate during the war years, but that could be utilized only at a later date, by which time import prices had risen considerably. In this case, if the terms-of-trade effect is computed on the assumption that the *total value* of goods and services exported was immediately utilized to finance an equal quantity of imports, its real magnitude will have been under-estimated to some extent.

(3) Since the terms of trade can only be computed in relation to a given benchmark year, the loss or gain attributable to their effect will by definition be nil in the base year itself, when the figures for gross product and gross income will be exactly the same. Attention must also be drawn to the fact that these two concepts are identical aggregates for any period when expressed in current prices, as in that case the terms-of-trade effect will be already incorporated in the basic figures.

(4) Since the gross product of most Latin American countries is not estimated by type of final expenditure, *consumption* was obtained as a residual item by deducting from the available goods and services the estimated value of gross investment. Furthermore, for lack of consistent data on current government expenditures (central, provincial and municipal) it was not always possible to split total consumption into private and government consumption.

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[5] For practical reasons, ECLA's calculations are based on the Laspeyres formula—with fixed weights—for the quantum indices; and on the Paasche formula—with moving current weights for each year—for the unit value indices. With respect to the terms of trade, both formulae should lead to equally valid conclusions if the two price indices which determine these terms are used for the calculation. It may be noted in passing that this way of defining the terms-of-trade effect is equivalent to saying that it equals the difference between exports as deflated first by import and then by export prices. For,

$$E_0 Q_e \frac{(P_e - 1)}{P_I} = E \frac{(P_e - 1)}{P_I} = \frac{E}{P_I} - \frac{E}{P_e},$$

where the same symbols have been used as above and where E represents the current value of exports of goods and services.

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Statistical information on gross investment is as a rule fairly complete, although the scope and quality of the individual estimates supplied by the various countries is unequal. This is not the case, however, with depreciation figures, for which only rough estimates are available. For this reason, net investment series have not been presented.[6]

When the countries have been able to provide the data required, gross investment has included *changes in inventories*. The corresponding estimates, however, are on the whole very incomplete, and subject to a considerable margin of error. Gross investment in fixed assets and changes in inventories have therefore been shown separately. It is important to stress the inadequacy of basic statistics on changes in inventories which may be substantial in certain periods when they include additions to or withdrawals from the stock of primary materials available for export (coffee, cotton, etc.)

(5) Although the three basic concepts mentioned have met most of the needs of the analyses made by the Commission, it may, of course, be advisable to resort to other supplementary concepts in dealing with certain specific problems. Thus, for example, it might be useful to consider the gross product not only in the *geographical* or *domestic* connotation defined here, but also in terms of the gross *national* product. The latter excludes net factor income payable abroad (i.e., remittances of interest, dividends and profits of foreign enterprises or their subsidiaries). In other words, this concept refers to the income accruing to the actual residents of a country rather than to the income attributable to factors of production within the country, irrespective of ownership. The distinction between the "national" and the "domestic" concepts may be particularly important for countries such as Venezuela, with a large outflow of investment income.

(6) For purposes of comparison, it is important to explain how the concepts described above relate to other terms in common use. The concept of gross product as used by ECLA is identical with the definition of gross *domestic* product at market prices given in the report of the group of national income experts appointed by the Secretary-General of the United Nations.[7] On the other hand, it differs from the gross *national* product at market prices in that the latter includes net factor income payable to the rest of the world. A similar difference exists between the concept of gross income as defined above and that of *gross national income* used in the studies of the Organization for European Economic Co-operation and other international organizations.

(b) *Measurement of structural changes*

In the same way as changes in the gross *per capita* product were considered the most adequate measure of economic growth, the break-down of the *gross product by branches of economic activity* (agriculture, mining, manufacturing, etc.) has been adopted in ECLA studies as the best available indicator of shifts in the economic

structure of Latin America as a whole, as well as of selected countries.

Some countries make estimates of the gross product by economic sectors, and, if available, such estimates have been used. When these estimates refer to only one year (usually 1950), the official figures relating to the break-down of the gross product in that year by sectors of origin have been extrapolated by means of the production indices for agriculture, mining, industry and building activities, in order to obtain the corresponding estimates for other periods.

In view of the difficulties in measuring their physical output, a similar method could not always be applied to the service industries. The contribution of these sectors to the total gross product has been obtained in such cases by an indirect method. In the first place, to calculate the aggregate gross product at constant prices current values have been deflated, in accordance with official estimates, by price indices representative of the variations in the over-all price level within each country's economy. The contribution of goods-producing sectors (agriculture, industry, mining and building) has then been deducted from the total gross product. In these instances, therefore, the estimates for the service industries are residual, and are subject to a greater margin of error.

Also important in relation to the structural changes which accompany economic development, are relative and absolute shifts in the *labour force* and the *economically active population*, and changes in productivity. For instance, the way in which higher income levels are obtained through a shift of economically active population from low productivity sectors to other of higher productivity, or through an increase of productivity within each sector, must be investigated and measured. In this content, *productivity* has been defined as the gross product per person employed, be it in the economy as a whole or in specific branches.

Estimates of the economically active population and its distribution over the various sectors, which are indispensable for the above measurement are obtained for benchmark years from population and economic censuses carried out by the individual countries. Data for intercensus and post-census years are interpolated or extrapolated on the basis of such indicators as the growth of urban population, or those provided by sample surveys of industrial employment, etc.

(c) *Measurement of growth of productive capacity and of its utilization*

The national product is determined by the productive capacity accumulated in a country and the ratio of its utilization. The first of these determinants—the installed productive capacity—has been considered in ECLA studies under the concept of the *Stock of capital*.

The stock-of-capital figures that have been used measure in principle the depreciated replacement value of all construction and durable producer goods assessed at 1950 prices. Land, durable consumer goods, inventories and monetary metals have not been valued. Unlike gross product statistics, estimates of the stock of capital are mostly unofficial figures and have generally been prepared by ECLA (almost always with the assistance of economists in each of the various countries) in connexion with economic development studies. Even so, the estimates that have been calculated to date relate only to certain Latin

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[6] This also explains why, for practical purposes, the *gross* product was felt to give a better indication of the rate of development than the *net* product, which in theory should constitute a more accurate measure. Reference to the latter would involve the use of very unreliable estimates of depreciation costs, in order to deduct these from the gross product.

[7] See *A System of National Accounts and Supporting Tables*, Studies in Methods, Series F, No. 2, Statistical Office, 1953.

American countries, which include, however, all the larger ones.

The procedure adopted in estimating the stock of capital is briefly as follows. By the use of the figures for the fixed capital employed in various industries as collected in censuses of agriculture, manufacturing, etc., a total evaluation of the stock of capital in these sectors in a particular year is arrived at. In order to calculate total capital it has been necessary to estimate the capital stock of those economic sectors for which census data were unavailable or incomplete. For example, censuses of transport and communications have been carried out only in some of the Latin American countries, and consequently ECLA has had to prepare its own estimates on the basis of partial data on fixed assets, obtained from the annual balance sheets of the main transport companies (railways, motor vehicles, airlines, shipping companies, etc.).

For years other than the base year, figures are arrived at by a cumulative process, consisting in adding the value of net investment to the preceding year's stock of capital. Net investment is obtained by subtracting depreciation estimates from the value of gross investment.[8]

The stock-of-capital series are expressed in 1950 prices and converted into dollars of the same year at the rates described below.[9]

As to the *degree of validity* of estimates of the stock of capital, it should be recalled that the census statistics taken as a basis are unreliable, and that therefore the stock-of-capital series are only rough approximations, to be used with great caution.

Census coverage and methods of assessing fixed capital, margins of error in depreciation estimates, the preparation of the series in question at constant prices, and the process of conversion into dollars, are the main sources of inaccuracy in the stock-of-capital series.

In view of the heterogeneous quality of the basic statistics available in the various Latin American countries, estimates of the stock of capital also display differing degrees of validity.

The stock-of-capital and gross-product series have been used to calculate the *product-capital ratio,* which measures the ratio of utilization of the stock of capital, or its productivity. To calculate this ration, which indicates the average product per unit of capital, the gross product at constant prices is divided by the stock of capital for the same year, also expressed in constant prices. In view of the reservations attaching to the latter series, it is clear that the absolute level of the resulting ratios may be subject to a considerable margin of error. Nevertheless, it is believed that the long-term fluctuations (though not the yearly variations, save when they are very marked) of the product-capital ratios give a more or less satisfactory indication of average productivity trends in the Latin American countries.

For example, the series for the product-capital ratio in the case of Colombia indicates that from 1925 to 1954 the economy's average productivity increased from 0.21

to 0.35. Although the series for the stock of capital and, in lesser degree, the gross product series, are subject to fairly wide margins of error, so substantial a variation clearly leaves no room for doubt that average productivity in the Colombian economy has improved over the last twenty-five years. On the other hand, the annual fluctuations observed are not equally valid, since over very short periods the magnitude of such variations is often of little significance as compared with the probable margin of error affecting the series.

(d) *Measurement of the incidence of the foreign sector*

The incidence or impact of the external sector upon a national economy may be considered from different angles. Among the various concepts used by ECLA in this connexion may be mentioned *external payments capacity,* capacity to import and their determining factors.

The analytical importance of these concepts will be more clearly grasped if it is recalled that in the Latin American countries imports contribute a large proportion of availabilities. This is especially true of capital goods, imports of which account for a high percentage of total gross investment. Any appreciable change in the capacity to import may therefore have severe repercussions on the domestic economy.

It is also interesting to relate the variations in the capacity to import to the fluctuations in the gross products; for instance, the persistent disparity between the growth rates of the gross product and of the capacity to import registered in previous periods has often played a decisive role in determining the substitution of domestic production for imports.

The *external payments capacity* results from the algebraic sum of exports of goods and services, the terms-of-trade effect and the inflow of foreign long-term capital.[10] In the case of individual countries, the basic data for measuring the above concepts, with the exception of the terms-of-trade effect, are obtained from the balance-of-payments statistics supplied by the International Monetary Fund and expressed as a rule in current United States dollars. Constant dollar series are obtained through deflation on the basis of the index of the unit value of imports. The terms-of-trade effect is computed by ECLA along the lines already discussed.[11]

The *capacity to import* may be defined as the value of goods and services a country can import without affecting its foreign exchange or gold reserves or contracting debts abroad. This concept is measured statistically as the algebraic sum of the external payments capacity, the outflow of long-term capital and net factor income paid abroad.

Table 3, which is taken from the *Economic Survey for Latin America, 1955,* presents an example of the computation of the external payments capacity and the capacity to import.

Other useful tools for economic development analysis and programming are *import coefficients,* which serve

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[8] The very tentative nature of depreciation figures has already been mentioned. In view of the respective magnitude of the two aggregates (depreciation in 1955 was calculated at about 10.9 billion dollars, and Latin America's total stock of capital at 106.7 billion dollars, at 1950 prices) the margin of error in the former has a relatively small influence on the latter's degree of accuracy.

[9] See point (e).

[10] In practice it is often impossible to distinguish between gross capital inflows and outflows, except in the case of official transactions. As is well known, the figures on private investments, as included in balance-of-payments statistics, usually reflect net movements. To the extent to which this is true, therefore, the external payments capacity will be under-estimated.

[11] See the relevant paragraph under point (a) above.

Table 3

LATIN AMERICA: EXTERNAL PAYMENTS CAPACITY AND CAPACITY TO IMPORT,
1945, 1950 and 1954

(Millions of dollars at 1950 prices)

Year	Exports (A)	Terms-of-trade effect (B)	Long-term foreign capital inflow (C)	External payments capacity (D)=(A)+(B)+(C)	Long-term foreign capital outflow (E)	Factor income paid abroad (F)	Capacity to import (G)=(D)−(E)−(F)
1945	6.522	−2.504	333	4.351	81	543	3.727
1950	7.317	—	360	7.677	335	787	6.555
1954	7.571	462	555	8.588	258	792	7.538

to measure the proportion of total available goods and services represented by imported commodities. In accordance with this concept, coefficients are calculated (a) for the over-all total, for which the relation between total imports and available goods and services is obtained; and (b) for the main classes of commodities, such as consumer goods, capital goods, fuels, raw materials, etc.[12]

Each of these coefficients illustrates a significant aspect of the role of imports and their impact on the national economy. The coefficient for consumer goods, for example, measures the percentage of total consumer expenditure which was devoted to imported goods of this class. Similarly, the import coefficient for capital goods shows how large a share of total investment consists of imported capital goods. To suggest how important it may be to take these partial coefficients into account, for the period 1950-54 the over-all import coefficient of Latin America was about 15 per cent, whereas the partial coefficients were 5 per cent in the case of consumer goods, 35 per cent in that of capital goods and 6 per cent in that of raw materials and semi-finished products.

(e) Conversion to common monetary units

At various points of the analysis it is necessary to have estimates expressed in a common unit of currency, namely, the United States dollar; and the fairly general use of dollar estimates has become one of the characteristic features of ECLA's annual *Economic Survey*. This necessity arises mainly from two causes. In the first place, conversion to a common currency is a prerequisite for appraising developments covering Latin America as a whole or a group of countries taken together, and for inter-country comparisons between absolute levels of significant economic aggregates. In this respect, illustrative reference could be made to the possibility of computing income-elasticities of demand for consumer goods on the basis of the composition of consumption in countries with unequal *per capita* income levels. In the second place, conversion of national accounts data into dollars may be needed in order to integrate the external with the internal sector of the economy, since some countries publish foreign trade figures only in a foreign currency (such as the United States dollar). The problem is much more complex for countries which use multiple exchange rates or one single rate (generally over-valued) which differs appreciably from the parity rate.

In the most recent *Economic Surveys*, estimates of national product and similar aggregates have been expressed in terms of a United States dollar of 1950 purchasing power. The principal problem involved in expressing national currency figures in dollars is unquestionably the determination of appropriate conversion rates.

Exchange rates actually prevailing in 1950 were considered unsatisfactory in view of the often complex exchange rate systems prevailing in Latin America. The method ultimately adopted therefore consists in selecting the exchange rate in force in a pre-war year—when official rates were probably nearer to purchasing power parity—and in adjusting such rates in accordance with relative price variations in the country in question and in the United States.[13] Other significant factors available in each case are also taken into account. It is recognized that the application of this procedure is not a satisfactory solution, involving as it does the judgement of the individual investigator, but, in view of the absence of a systematic body of information relating to prices for common products in different countries, no better alternative was available. In other words, the actual rates established for this purpose must be regarded as *approximations only* to the over-all purchasing power parities between the currencies of the different countries and the United States dollar of 1950. The lack of a systematic body of price data has, moreover, made it impossible to establish specific conversion rates for major national accounts components, such as consumption, investment, industrial and agricultural production, etc.

The Economic Commission for Latin America has been conscious of the tentative nature of the dollar figures published, and, in collaboration with the Statistical Office, has therefore recently initiated a comprehensive study designed to permit of better international comparisons in dollar terms.[14] The actual conversion rates arrived at by

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[12] It should be noted that, in accordance with the above definitions, these coefficients cannot be used to interpret the relationship between imports and domestic production of the various types of goods.

[13] It should be noted that the procedure has also been used to estimate the purchasing power parity rate in selected countries over several periods, in order to form an approximate idea of the extent to which the national currency was over- or under-valued in different years.

[14] In general, this study will follow the lines of a similar investigation carried out recently by the OEEC for a group of European countries and the United States. See Gilbert and Kravis, *An International Comparison of National Products and the Purchasing Power of Currencies*, OEEC, Paris, 1954. It should be realized, however, that in view of the frequently serious limitations of country data in the region, many practical and theoretical problems will arise in the application of the complex techniques involved, and that results can therefore be expected to become available only after a considerable lapse of time.

Table 4

LATIN AMERICA: CONVERSION RATES FOR 1950

(Units of national currency per U.S. dollar at 1950 prices)

Argentina	6.3	Guatemala	1.0
Bolivia	103.0	Haiti	1.0
Brazil	25.0	Honduras	2.0
Chile	85.0	Mexico	8.0
Colombia	2.7	Nicaragua	7.0
Costa Rica	8.8	Panama	1.0
Cuba	1.0	Paraguay	8.0
Dominican Republic	1.0	Peru	15.0
Ecuador	18.4	Uruguay	1.9
El Salvador	3.0	Venezuela	3.5

the procedure described are given in table 4. It will be seen that for several countries the units of national currency are shown as being at par with the United States dollar. For these particular countries (and in some others) the rate is an official one and was adopted for want of a suitable statistical basis on which the purchasing power relationship of the national currency with the dollar could be more accurately calculated.

Inasmuch as data for other years were already expressed in 1950 prices by means of the methods explained above, the conversion of these estimates to United States dollars of 1950 purchasing power did not present any further problem.

Appendix

GENERAL SOURCES

ARGENTINA: 1945-54: *Producto e Ingreso de la República Argentina en el período 1935-54*, Poder Ejecutivo Nacional, Secretaría de Asuntos Económicos, Buenos Aires, 1955; 1955: estimates by the Economic Commission for Latin America (ECLA).

BRAZIL: 1945-52: *Revista Brasileira de Economía*, December 1954; 1953-55; Instituto Brasileiro de Economía (Fundação Getulio Vargas).

CHILE: 1945-52: Statistics from the Departamento de Planificación y Estudios of the Corporación de Fomento de la Producción; 1953-55: preliminary estimates by the Instituto de Economía of the University of Chile.

COLOMBIA: 1945-53: Banco de la República, Departamento de Investigaciones Económicas; *XXXII Informe Anual del Gerente de la Junta Directiva*, 1 July 1954 to 30 June 1955; 1954-55: provisional data from the Banco de la República (January 1956).

ECUADOR: 1950-53: *El Ingreso Nacional y las Cuentas Nacionales de la República del Ecuador, 1950 a 1953*, prepared by H. Rijken van Olst, United Nations Technical Assistance Administration, 10 March 1954; 1954: Note from the Director, Departmento de Investigaciones Económicas, Sección Ingreso Nacional, of the Banco Central del Ecuador (February 1956); 1955: estimates by the Economic Commission for Latin America.

PARAGUAY: 1950-53: Memorandum from the División de Renta Nacional, Departamento de Estudios, Banco Central del Paraguay; 1954-55; estimates by the Economic Commission for Latin America.

PERU: 1945-52: *La Renta Nacional del Perú, 1942-1952*, Banco Central de la Reserva del Perú, Lima, 1954; 1953: *Boletín del Banco Central de la Reserva del Perú*, May 1955, p. 38; 1954-55: estimates by the Economic Commission for Latin America.

VENEZUELA: 1945-55: estimates of the Economic Commission for Latin America on the basis of information from official sources on the volume of production and value added in 1950 for the main sectors of activity. Investment, 1945-54: *Memoria del Banco Central de Venezuela correspondiente al ejercicio anual 1954* (and statements of previous years); Investment, 1955: estimates by the Economic Commission for Latin America.

CUBA: 1945-55: Banco Nacional de Cuba, *Memoria de 1952-53* and *Revista del Banco Nacional de Cuba*, September 1955 (the figure for 1955 is a preliminary estimate by the Banco Nacional de Cuba).

DOMINICAN REPUBLIC: 1950: *Producto y Gasto Nacional de la República Dominicana, 1950*. Banco Central de la República Dominicana, May 1952; 1951: Banco Central del la República Dominicana, *Boletín Mensual*, January 1953, p. 63; 1952-54: information provided by the Banco Central de la República Dominicana, Ciudad Trujillo, 30 June 1954 and 11 and 15 June 1955; 1955: estimates by the Economic Commission for Latin America.

EL SALVADOR: 1945-46: Henry C. Wallich and John A. Adler, *Proyecciones Económicas de las Finanzas Públicas: un estudio experimental en El Salvador*, Mexico, Fondo de Cultura Económica, 1949; 1947-49: ECLA, *Recent Developments and Trends in the Economy of El Salvador* (E/CN.12/217/Add.6) ; 1950: *Estimate of the Gross National Product of El Salvador*, by A. Derosso, Economic Assistant to the Technical Assistance Mission to El Salvador, 1950 (unpublished) ; 1951-55: estimates by the Economic Commission for Latin America.

GUATEMALA: 1945-51: *Producto Nacional Bruto de Guatemala en los últimos 24 años*, by J. Antonio Palacios G., Banco de Guatemala, 1952; 1952-55: estimates by the Banco de Guatemala and the Economic Commission for Latin America.

HONDURAS: 1945-52: *Estadísticas del Producto e Ingreso Nacional, 1925-52*, prepared by Manuel Tosco, Banco Central de Honduras, Departamento de Estudios Económicos, Tegucigalpa, D.C., April 1954; 1953-55; estimates by the Economic Commission for Latin America.

MEXICO: 1945-51: *El Desarrollo Económico de México y su capacidad para absorber capital del exterior*, study prepared by the Joint Mexico/International Bank Mission, Mexico, D.F., 1953; 1952-54: annual reports of Nacional Financiera; 1955: preliminary estimates by the Economic Commission for Latin America.

PANAMA: 1945-52: *El Ingreso Nacional y las Cuentas Nacionales de la República de Panamá, 1944-52*, study prepared by H. Rijken van Olst, United Nations Technical Assistance Administration; 1953-55: estimates by the Economic Commission for Latin America.

ENERGY CONSUMPTION IN LATIN AMERICA

I. GENERAL CONSIDERATIONS

Although the energy sector makes only a comparatively modest contribution to the gross product, it exerts a decisive indirect influence, for better or for worse, on the attainment of an adequate rate of growth. As energy is in such general use, it constitutes a fundamental determinant of the standard of living and an indispensable adjunct to the productive process. This is why, as a first approach to the question, a distinction should be drawn between the energy used as a factor of production and that supplied directly to the community for consumption.

Economic development is, in essence, the raising of the average productivity of labour, a process which is directly affected by the amount of energy available for production. The energy consumed per worker in relation to the results obtained may be regarded as a preliminary indication of the degree of development that an economy has achieved.

It is in the intermediate stages of development, when the process of mechanization begins to affect agriculture and transport and there is intensive replacement of artisan by factory production, that energy consumption per worker tends to rise most sharply.

This dependence of production upon available energy is still greater in the field of commercial energy—where the main interest of this analysis lies—because, as it is for these types that modern equipments and techniques create a rising demand, they not only meet all increments in consumption, but also partly replace animate forms of energy and vegetable fuels.

A similar process affects energy supplies consumed by the population. Demand for energy, as for other consumer goods and services, depends on the level of available *per capita* income and on income distribution. Since energy is practically irreplaceable and of vital importance, the dynamics of demand are somewhat the same as in the case of foodstuffs. The income-elasticity of energy is small where consumption is very low, rises sharply at its intermediate levels and decreases once more in the higher brackets, at which stratum consumer requirements are approaching saturation point.

Energy consumption in the rural sectors of under-developed economies mainly takes the shape of self-service. The demand for community services is small and limited to commercial types of energy. With development, such population groups are drawn into the energy market as they migrate to the cities. The two-fold consequence is a relative contraction in the consumption of non-commercial fuels and an expansion in the demand for commercial energy.

All this clearly shows that energy supplies play a strategic role in economic development. In almost every case, such supplies must be increased before new investment in the other production sectors can acquire economic significance. Moreover, if investment in the field of energy lags behind and supply becomes inelastic, many sectors of production will be partially paralysed. The existence of reserve capacity in this sector is therefore indispensable for development purposes.

This has been particularly apparent in the Latin American countries. Many have been affected for long periods by shortages of certain types of energy—especially electric power—which have seriously hampered normal development. The inadequacy of public energy supplies has sometimes led to the adoption of anti-economic private solutions, for the entrepreneur attaches much greater importance to the availability of energy than to its cost, since productive activities cannot do without energy, while its incidence on costs is usually very slight.

As the stage of development reached by most Latin American countries at present is one at which the demand for energy increases rapidly, and as supply plays a key role in all phases of development, a dynamic policy for the energy sector is clearly of fundamental importance if the rate of growth is to be accelerated. Moreover, as the projects which must be executed to improve the supply situation are usually of a kind which take a long time to mature, their very nature demands a farsighted policy enabling future needs to be adequately forecast, so that the required investments can be properly timed. High capital density is also a characteristic feature of energy production; hence the severity of its pressure on the capital formation capacity of most Latin American countries. Thus, though the desirability of abundant energy supplies is manifest, lack of capital constitutes an impediment which makes it necessary to reconcile energy plans with the competing claims of other economic sectors from which substantial capital resources might otherwise be needlessly diverted. The problem is further complicated by the heavy foreign exchange requirements for both investment and fuel imports.[1]

A satisfactory policy for the energy sector must therefore be conceived as part of an over-all development policy. Indeed, any energy expansion programme which is not based on some hypothesis as to the volume of resources available for the country's total economic activity will be very limited in scope.

Apart from an assumption as to the over-all growth of the economy, other pre-requisites for every energy programme include a more or less clear picture of the structure of the demand for energy as a consumer service and as a factor of production, and some hypotheses on the changes which will probably take place in this structure as a result of development itself.

1. RELATIONSHIP BETWEEN ENERGY CONSUMPTION AND ECONOMIC ACTIVITY

Stress having been laid on the importance of energy and the need for adequate planning to meet future requirements, the method of measuring the relationships between energy consumption and economic activity must now be

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[1] Some of the exporter countries are indirectly affected by a similar problem. When domestic demand increases without a parallel expansion of production, there is a decline in exportable surpluses and consequently in foreign exchange availabilities.

more thoroughly analysed, along with the dependence of the former on the structure of production, in order to determine what projects and investment in the energy sector will enable economic development to attain the desired proportions and characteristics.

It has already been noted that the energy used by the public for final consumption is basically connected with the purchasing power of the population, that is, with average *per capita* income. For any individual country, therefore, the ratio of energy as a consumer good to national income constitutes a simple way of expressing in global terms the relationship between energy consumption and the standard of living. Similarly, by relating the gross product to the input of energy in the production process, it is possible to obtain the other index needed for quantifying the energy required to attain a specific income level.

Since the two large sectors of total energy consumption have different dynamics, they should be separately subjected to strict analysis. The lack of adequate statistics, however, makes it impossible to prepare two different historical series for the Latin American countries. For this reason, only the behaviour pattern of the whole has been studied, principally in relation to the gross product, since the major part of energy is consumed as a production factor.

This needs to deal with the two sectors together may no doubt mean that many aspects of consumption are disregarded which it would be of great interest to elucidate, as is obvious when it is remembered that the distribution of energy for final consumption and production varies from country to country, and even in one and the same country during different periods.

Thus, for instance, the share of energy absorbed by household heating is far from being the same in Colombia as in Argentina and Mexico, and from this point of view, any comparison would be difficult. Colombia is one of those under-developed countries whose income is mainly derived from a single activity—usually agriculture—which does not require much energy, as is the case with Colombian coffee. Most of their energy consumption—in this instance two-thirds of the total—is therefore accounted for by such domestic uses as cooking and household heating.

Where production is diversified as a consequence of economic development, energy is mainly channelled towards the industrial and transport sectors, while' the relative incidence of mechanical work on total consumption becomes increasingly important. Mexico and Argentina are in a position of this kind, similar to that of the United States. (See table 1.)

Apart from the distribution of energy between consumption and production, the influence of another series of factors—several of which have conflicting effects—operates on demand for energy and partly explains why countries whose *per capita* gross product is similar show different consumption values per unit of gross product. The impact of some of these factors also makes itself felt, though to a lesser extent, as a country develops in the course of time, so that a mere analysis of total unit consumption may give a misleading impression of energy supplies and needs.

Among such factors, the most important are the structure of production, the efficiency of energy utilization, climate, distribution of the population between urban and

rural areas, income distribution, and patterns of consumption. It is perhaps the structure of production that is preponderant in determining the rise or fall of energy consumption per unit of gross product with respect to theoretical average levels. It is a well-known fact that some activities require more energy than others to make the same contribution to the gross product. For instance, industry—particularly heavy industry—and mining are larger consumers than agriculture.

This example becomes clearer if the unit consumption of the industrial sector is divided by that of the economy as a whole. In relation to total energy, the ratio of these two consumption values is 1.95 in Argentina; 2.87 in Chile; 1.26 in Mexico, and 1.20 in the United States. The difference between unit consumption in the industrial sector and in the economy as a whole is still more marked in the case of electricity. In the countries mentioned the respective quotients are 1.96; 2.20; 2.91 and 1.83.

But even within the industrial sector itself there are striking dissimilarities. In Argentina, for instance, consumption of energy per unit of value added is about forty times greater in the cement than in the textile industry.

In the services sector, marked differences are also to be observed among relative consumption values, unit consumption being greatest in the production of energy itself and in transport.

In view of the structure of production, Bolivia, Chile, Peru and Cuba exemplify countries whose energy consumption is bound to be relatively heavy, owing to the predominance of mining activities in the first three and of sugar production in the last-named. At the other extreme lie certain Central American countries where income is mainly derived from agricultural activities, as yet largely unmechanized.

Among the remaining factors, the yield from energy utilization should be stressed. Some countries—which apply advanced energy utilization techniques—achieve the same results with a much lower net consumption than those which possess only old-fashioned equipment. (See table 2.)

In this respect the Latin American Republics, like most under-developed countries, are at a disadvantage in relation to others where industrialization has made it necessary to obtain a high yield from the input of energy. Different situations of course arise within Latin America

Table 2

APPROXIMATE THERMIC YIELDS IN THE USE
OF ENERGY

(Percentages)

	Indus- trialized countries	Latin America	
		Countries with more advanced techniques	Countries with less advanced techniques
Thermoelectric generation	25	19	15
Industrial heating	30 — 35	22 — 27	15 — 20
Household heating	60 — 65	50 — 55	30 — 35
Transport (railways)	3.6	2.9	2

Source: Economic Commission for Latin America.

itself, according to the degree of over-all development which the individual countries have attained.

The significance of this can be appreciated if it is pointed out that, though the pattern of consumption is very similar (see again table 1), the total yield from the energy utilized is 30 per cent lower in Argentina than in the United States.

Finally, attention must be drawn to the influence exerted by the climates of the Latin American countries on energy requirements. Although its greatest incidence. falls on that part of energy supplies used for domestic heating, this factor also affects the other sectors of energy consumption. Its impact in Latin America, which can to some extent be quantified in terms of degree-days, has been taken into account as far as possible. Unfortunately, no great progress could be made in this direction for want of meteorological records.

In addition, inadequate energy supplies may likewise be reflected in unit consumption. In several Latin American countries which have suffered from a chronic deficit of electric power and occasional fuel shortages, there has been a resultant reduction of consumption in relation to normal demand. Cases in point are those of Argentina — with a deficit estimated at 600,000 kW installed power capacity; Brazil, where the deficit in the São Paulo area alone amounts to 500,000 kW; and certain areas in Colombia, Ecuador, Mexico, etc.

If the influence of all the factors accounting for distortions of energy consumption per unit of gross product in the Latin American countries could have been satisfactorily assessed, correction coefficients might have been prepared which would have improved the accuracy of forecasts. Unfortunately, this was not possible. Work had to be based on global relationships and the effects of particular causes only approximately estimated. This problem opens up a wide field for future research.

2. MEASUREMENT OF ENERGY

It must be explained that the concept of total energy used herein is only an abstraction, since real consumption comprises various forms of energy, the expression of which in one single total gives rise to innumerable difficulties. Physical and chemical differences, fields of application, yields obtained and the technical processes involved in both generation and utilization are almost insuperable obstacles to the representation of such heterogeneous parts as one coherent whole. The task is further complicated by the need to avoid distorting the relative

importance of each factor or introducing elements likely to falsify the technical and economic significance of real consumption.

In order to obtain a precise picture of any given energy structure, it is necessary to examine energy at various points in its flow from natural resources to final utilization. Hence three successive stages are proposed, chosen both for their importance in the interpretation of the process and for their economic significance. These are as follows: level (i) gross energy;[2] level (ii) net energy;[3] and level (iii) utilized energy.[4]

These phases give a clear and systematic picture of the technical and economic facts affecting energy utilization. Moreover, since they cover all types of energy, the transition from one stage to the next is achieved through the appraisal of losses in utilization, and their simultaneous analysis provides a detailed balance sheet for each energy system.

The consumption of net energy constitutes the phase of intermediate utilization, and is the only one which—by excluding consumption within the energy sector itself— gives a measure of the supply available for the economy and subsequently to be reflected in the production of goods and services. For this reason, when energy consumption has to be related to economic activity, net energy is considered, while the analysis of the composition of total consumption and problems bearing on production, imports and investment is based on gross energy.

A ton of normal crude petroleum (10,700 kilo calories) has been chosen as the common unit to measure all forms of energy, because this fuel has a more uniform calorific power than others. Moreover, it is the form of energy most widely used in Latin America, and figures will therefore give a clear idea of the amount they represent.[5]

Once the different forms of energy have thus been computed, a given economic system's total energy consumption can be calculated and its behaviour pattern analysed.

II. ENERGY CONSUMPTION IN LATIN AMERICA

1. HISTORIC CHARACTERISTICS OF CONSUMPTION IN LATIN AMERICA

To embark upon a more specific aspect of the topic, the characteristics of total net consumption of energy and of the production of electricity in Latin America will now be analysed, together with their relation to the gross product.

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[2] "Gross energy" is that potentially contained in all types of energy at the time of their incorporation into the economy, either through domestic production or in the form of imports. That is to say, it includes primary fuels and such forms of direct energy as hydro-electricity, mechanical energy, etc.

[3] "Net energy" implies the potential energy contained in fuels and electricity (both thermic and hydraulic) in the forms and places in which it will be utilized, but without weighting as regards the characteristics or yield of such utilization. It is therefore equivalent to gross energy less the amount required to produce it, transform it and transmit it to the final consumer.

[4] By the term "utilized energy" is understood the mechanical work, heat or light into which part of net energy is converted for absorption in a given process (work, transport, heating, lighting, etc.).

[5] It should be noted that other units are used in the literature on this subject to express total energy, such as B.Th.U., calories, kWh, tons of coal. They all ultimately represent a specific quantity of thermic energy, and it is easy to express them as a function of any of the others.

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Figure I shows the historic evolution of the net consumption of total energy per unit of gross product, for the region in general and for five Latin American countries in particular. Long-term trends in unit consumption vary very little among the individual countries under review, even when their economic structures differ. The falling rates register annual fluctuations which range from 0.3 to 2.0 per cent.[6] (See table 3.)

Figure I

LATIN AMERICA: EVOLUTION OF NET TOTAL ENERGY CONSUMPTION PER UNIT OF GROSS PRODUCTION

(1950 = 100)

(SEMI-LOGARITHMIC SCALE)
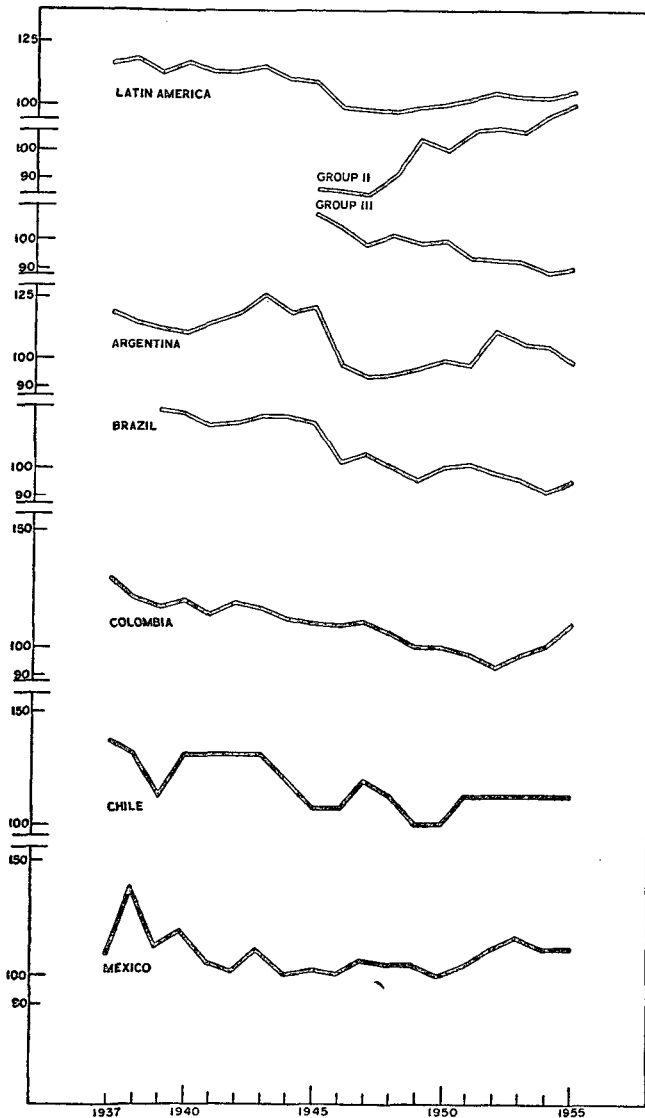
NOTE: The second group of Latin American countries comprises Cuba, Peru, Uruguay and Venezuela; and the third, Bolivia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama and Paraguay.

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[6] Over the last forty years, net unit consumption of energy in the United States has declined by approximately 1.6 per cent annually.

Table 3

LATIN AMERICA: NET CONSUMPTION OF TOTAL ENERGY AND PRODUCTION OF ELECTRICITY, PER UNIT OF GROSS PRODUCT

Country	Net consumption of total energy		Production of electricity	
	Value in 1953-55 (Kg. of petroleum equivalent per dollar at 1950 prices)	Annual growth rate 1940-55 percentage	Value in 1953-55 (kWh per dollar at 1950 prices)	Cumulative annual growth rate (Percentages)
Argentina	1.01	—1.1	0.60	2.4
Brazil	1.39	—2.0	0.94	4.9
Chile	1.62	—1.2	1.74	2.7
Colombia	1.19	—1.1	0.64	7.1
Mexico	1.68	—0.3	1.04	2.5
Latin America	1.37	—0.8[a]	0.81	3.1

Source: Economic Commission for Latin America.

[a] The smaller annual decrease in unit consumption for Latin America as a whole, which would seem to indicate that there was an increase in the other countries, is attributable to the influence of Venezuela's peculiar position. In the period under review, Group III (see note to figure I) registered an annual rate of —2.0 per cent; Cuba, Peru and Uruguay together, —0.5 per cent; and Venezuela, 12 per cent.

Within periods of one year, or over the short term, unit consumption has varied, reaching levels either higher or lower than the trend curve averages This is mainly due to the greater inertia which prevents energy consumption from adjusting itself to the rapid fluctuations of the gross product, so that unit consumption may decline in years when the product rises sharply or increases during periods of economic depression. In importer countries like Argentina and Brazil, the effect of the Second World War is also apparent, in the shape of supply difficulties leading to the use of vegetable fuels with lower yields.

The downward trend of unit consumption deserves special comment. As has been noted, the stages of development through which the Latin American countries have been passing of late have been characterized in greater or less degree by a marked tendency towards a relative expansion of industry and transport, which might logically have been expected to raise unit consumption. The better utilization of energy might be adduced as a reason for the opposite trend; but it is well known that in Latin America the technical improvements introduced have not been enough to produce such an effect.

Since, then, global energy consumption has increased less than the product, the cause must be sought in the demand for energy as a consumer good. The slowness of its growth as compared with that of the gross product has offset and surpassed the greater relative increments in energy for the use of the production system. At the stage of economic development reached by most Latin American countries at present, the domestic consumption of the majority of the population does not vary much, because the *per capita* income level at which the income-elasticity of energy consumption increases intensively has not been attained as yet. Variations in gross energy consumption by sectors in Argentina and Colombia (see table 4) constitute a case in point, and indicate that the decline in the relative consumption of the residential sector has been much sharper in Colombia than in Argen-

tina, possibly because Colombia at the moment has a lower *per capita* income level.

Table 4

GROSS ENERGY CONSUMPTION BY SECTORS IN ARGENTINA AND COLOMBIA

(Percentages)

	Argentina		Colombia	
	1948	1954	1945	1953
Industry	34	35	15	24
Transport	35	32	15	22
Energy industries	7	11	14	12
Residential and others	24	22	56	42
TOTAL	100	100	100	100

Source: Economic Commission for Latin America.

Obviously, the differences in the various countries' net energy consumption per unit of product are also partly attributable to the unequal incidence of other factors, such as the characteristics of industrialization (heavy or light industries), the degree of intensiveness of the electrification process, and the predominance of the production of mining or agricultural raw materials.

An analysis of other cases leads to the conclusion that the influence exerted on total unit consumption by the decline in energy for consumer use per unit of income is stronger in the countries which are less developed economically, and that, when a higher level of *per capita* income has been attained, this influence is weakened and largely superseded by the structure of production and the yield obtained.

It is useful to compare not only the historic evolution but also consumption in Latin American countries with that of other countries of the world. The correlations shown in figure II enable such a comparison to be made in relation to the respective levels of the *per capita* product.

The position of the countries offers a further proof of the relationship between net energy consumption and gross product. The normal relationship between these two series can be expressed in lineal equations indicating the average level of energy consumption to be expected at a given stage of development.

The figure also reveals that the deviations of individual countries from the average common trend curve are fully as important as the curve itself. These deviations are an expression of the manifold factors which help to shape the pattern of demand for energy. A thorough analysis of such variations would prove of the greatest interest, and would lead to more valid conclusions in a comparison of this kind.

The relative position of the countries with respect to the average curve is an expression of different unit consumptions of energy. Thus, when countries have an economic structure based on industries which consume large amounts of energy, their trend curves are parallel to but above the average, while the curve for countries which alongside their industrial development carry on other equally important activities, such as agriculture, forestry, etc., nearly coincides with the average line. In the lower part of the latter group appear the first Latin American
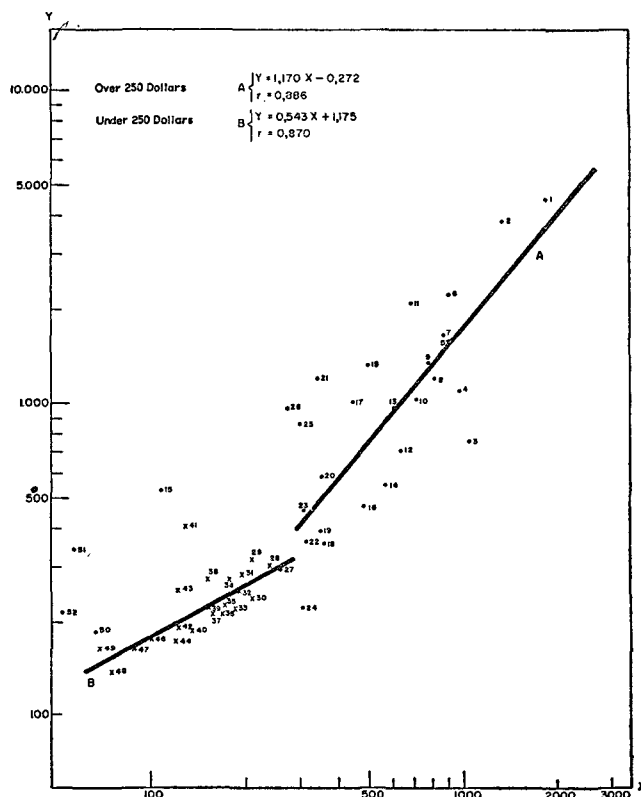
Figure II

CORRELATION OF *PER CAPITA* NET ENERGY CONSUMPTION AND *PER CAPITA* GROSS NATIONAL PRODUCT

(average for 1949-51)

Y = *Per capita* total energy net consumption (kilogrammes of petroleum)

X_1 = *Per capita* gross national production (dollars at 1950 prices)

(LOGARITHMIC SCALE)

• Countries outside Latin America
x Latin American countries

NOTE: *Order of countries:* 1. United States; 2. Canada; 3. Switzerland; 4 New Zealand; 5. Sweden; 6. United Kingdom; 7. Australia; 8. Denmark; 9. Norway; 10. France; 11. Belgium and Luxembourg; 12. Venezuela; 13. The Netherlands; 14. Argentina; 15. Federal Republic of Germany; 16. Israel; 17. Ireland; 18. Spain; 19. Uruguay; 20. Cuba; 21. Finland; 22. Italy; 23. Chile; 24. Costa Rica; 25. Austria; 26. Union of South Africa; 27. Panama; 28. Yugoslavia; 29. Mexico; 30. Colombia; 31. Brazil; 32. Turkey; 33. Greece; 34. Portugal; 35. Egypt; 36. Guatemala; 37. Honduras; 38. Dominican Republic; 39. El Salvador; 40. Nicaragua; 41. Japan; 42. Ecuador; 43. Peru; 44. Ceylon; 45. Southern Rhodesia; 46. Paraguay; 47. Thailand; 48. Haiti; 49. Bolivia; 50. India; 51. Northern Rhodesia, and 52. Belgian Congo.

countries to rank among the region's largest relative consumers of energy—Venezuela, Cuba, Chile and Peru—whose economies are based on important and highly mechanized export activities. Countries in which agriculture is preponderant or which possess only light industries with a low unit consumption of energy appear below the trend curve. In the period 1949-51, for instance, to obtain one dollar of gross product, the United States required 2.43 kilogrammes of petroleum equivalent of net energy; Canada, 2.88; New Zealand, 1.14; France, 1.47; the Federal Republic of Germany, 2.73; Italy, 1.18; Greece, 1.20, and India 2.81, figures which can be compared with the details given for some Latin American countries.

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The relative positions of the various countries with respect to unit consumption of energy—sometimes markedly different[7]—cannot change sharply over the short term, since in every case the unit consumption undergoes gradual modification in the course of each country's development process.

It seems of interest at this point to formulate a preliminary hypothesis on the behaviour pattern of the relationship between total consumption of energy and economic activity, mainly on account of the indications of future energy requirements which might be obtained. In the initial phases of development, energy consumption is as a rule likely to grow less intensively than the gross product, so that a declining unit consumption will be registered (product-elasticity considerable below unity).

In contrast, later on, at intermediate development levels, when pronounced changes take place in the structure of production—mainly taking the form of an increased expansion of industry and other activities whose input of energy is proportionally higher—and when the improvement in home consumption gathers momentum, supply requirements will at least keep pace with the growth of the gross product (product-elasticity close to unity). Finally, when a more advanced stage of development is attained, and the various production sectors acquire a more stable structure, unit consumption will again follow a downward trend, this time because of the possibility of more efficient utilization of energy and the partial saturation of household consumption.

The importance of electricity justifies an analysis on lines similar to those followed for total energy consumption. Figures III and IV show the historical evolution of consumption per unit of gross product for some Latin American countries and the position of more than fifty countries throughout the world in the period 1949-51.

Figure III

LATIN AMERICA: EVOLUTION OF TOTAL ELECTRICITY PRODUCTION PER UNIT OF GROSS PRODUCT

(1950 = 100)

(SEMI-LOGARITHMIC SCALE)

Figure IV

CORRELATION OF *PER CAPITA* ELECTRICITY CONSUMPTION AND PER CAPITA GROSS NATIONAL PRODUCT

(average for 1949-51)

Y = *Per capita* net total energy consumption (kWh)
X_1 = *Per capita* gross national product (dollars at 1950 prices)

(LOGARITHMIC SCALE)

* Countries outside Latin America
x Latin American countries

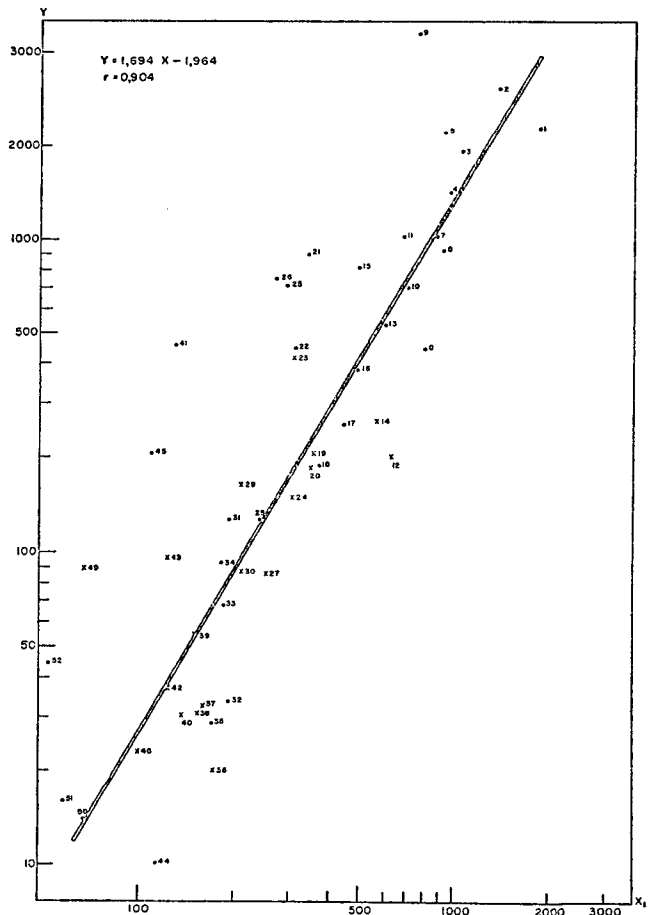NOTE: For *order of countries* see note to figure II.

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[7] It must be taken into account that the substantial differences in the unit consumption of the various countries may be affected by inaccuracies in the conversion of gross national products into dollars.

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The behaviour pattern of electricity can be seen to differ from that of total energy. Broadly speaking, the growth of electricity consumption outstrips that of the gross product and leads to constant increments in unit consumption; the differences in the rates of increase are much more marked from one country to another. (See again table 3.) Unit consumption in the individual countries also varies much more widely. Argentina ranks lowest, which is a reflection of the relatively little attention received by this sector. Brazil, too, has been affected by electricity supply difficulties, but it stands at a higher level, on account of its policy of intensive utilization of hydraulic resources to offset its substantial demand for imported commercial fuels. In Colombia also the level of consumption is low, but is rising rapidly thanks to the interest now shown in this sector, which up to a short time ago had been somewhat neglected. Chile's high relative consumption is due to the heavy energy requirements of the large mining companies.

The close relationship between electricity consumption and *per capita* gross product is confirmed by inter-country comparisons, although, as in the case of total energy, differences are to be noted in unit consumption (Argentina, 0.47 kWh per dollar; Australia, 1.16; Brazil, 0.66; Chile, 1.33; Denmark, 0.55; Ecuador, 0.30; Japan, 3.55; Norway, 5.91; Peru, 0.79; Switzerland, 1.8; Turkey, 0.17; United Kingdom, 1.01; United States, 1.20).

If electricity consumption expressed in kWh is related to net consumption of fuels as such[8] in terms of kilogrammes of petroleum equivalent, the index thus obtain-

[8] Excluding fuels used to generate thermic electricity.

able provides a measure of the relative electrification of each country. In 1949-51 the following indices were obtained: Latin America, 0.46; Argentina, 0.50; Brazil, 0.47; Chile, 0.93; Australia, 0.62; Norway, 4.49; United States, 0.54.[9]

When a comparison is drawn between the electricity consumption growth rates obtained from inter-country correlation and those registered in the Latin American countries, it may be noted that the latter have on the whole been appreciably more rapid. This bears witness to the great interest felt in electricity and to the pressure of demand on this type of energy on account of its technical advantages and convenience.

2. COMPOSITION OF CONSUMPTION

Another aspect of great importance in the interpretation of energy trends is the share of the various types in total consumption. Table 5 provides a basis for the analysis of this problem in Latin America. It can be seen that, on the whole, consumption of vegetable fuels has remained practically stationary, representing a progressively smaller proportion of the total as the commercial types of energy gain ground.[10] Consumption of coal has increased very little, since the increment resulting in recent years from

[9] The differences in electrification coefficients are mainly due to the incidence of hydroelectric resources and to the level of direct fuel consumption in each country.

[10] A point that should be recalled, though it has not been taken into account here, is that some vegetable fuels are incorporated in commercial fuels.

Table 5

LATIN AMERICA: GROSS ENERGY CONSUMPTION

	1937	1955	1937	1955	Cumu-lative annual rate 1937-55
	(Millions of tons of petroleum equivalent)		(Percentage of total)		
(a) *Total energy*					
Petroleum derivatives	11.7	49.8	27	55	8.4
Coal	6.2	6.5	14	7	1.0
Hydroelectricity	2.4	8.9	6	10	7.6
Total commercial energy	20.3	65.2	47	72	6.7
Vegetable fuels	23.3	24.8	53	28	1.0
TOTAL	43.6	90.0	100	100	4.1
(b) *Production of electricity* (Millions of kWh)					
Hydroelectricity	6.5	22.8	57	55	7.2
Thermoelectricity	4.8	18.7	43	45	7.8
TOTAL	11.3	41.5	100	100	7.5

Source: Economic Commission for Latin America.

the installation of steel making industries in several Latin American countries has offset the decline observed in other consumer sectors, especially the railway systems.

Production of hydroelectricity, though small in relation to total gross consumption, has expanded much more rapidly, as a result of the effort expended in almost all countries on harnessing this renewable resource with a view to relieving the foreign exchange shortage in coun-

tries which have to import the fuels they require. Moreover, virtually the same rate of growth has been maintained by the production of both hydro- and thermo-electricity, so that total electricity consumption has risen at an average annual rate of slightly over 7 per cent, thus reproducing the typical growth pattern for this form of energy, consumption of which normally doubles every ten years. The increase in total electricity production

raised the electrification coefficient from 0.275 kWh/kilo-gramme of petroleum in 1937 to 0.521 in 1954.

Petroleum, on account of the expansion of demand—in conjunction with the widespread improvement in exploitation conditions and with price and foreign exchange policies that have given it an advantage over other fuels—has absorbed practically the whole of the increment in total energy consumption, besides partially replacing other fuels for a variety of purposes. The annual rate of increase registered for petroleum (8.4 per cent) has thus been more intensive than that of any other type of energy, including even electricity; and it is still higher in certain specific countries of the region.[11] Considerably more is being consumed even in countries such as Argentina, Brazil and Chile, where serious import difficulties are encountered. How indispensable petroleum has become is demonstrated by the fact that it has been imported at the sacrifice of other purchases. (See table 6.)

[11] For the last five years it has been 14.7 per cent in Brazil, 10 per cent in Chile, 17.4 per cent in Colombia and 14.2 per cent in Venezuela.

Table 6

LATIN AMERICA: INCIDENCE OF IMPORTS ON GROSS ENERGY CONSUMPTION

(Percentages)

Country	Total energy		Petroleum derivatives and natural gas	
	1937	1955	1937	1955
Latin America	20	29	42	49
Argentina	41	52	39	64
Brazil	15	37	97	97
Chile	24	31	100	85

Source: Economic Commission for Latin America.

Naturally, the composition of gross consumption of total energy varies from one country to another. Table 7 shows the divergences in the composition of *per capita* consumption in some representative Latin American countries.

Table 7

LATIN AMERICA: *PER CAPITA* GROSS ENERGY CONSUMPTION IN SELECTED COUNTRIES, 1954

(Kilogrammes of petroleum equivalent)

Country	Petroleum derivatives and natural gas	Coal and coke	Hydro-electricity	Vegetable fuels	Total energy
Argentina	545	60	7	145	757
Bolivia	66	2	34	140	242
Brazil	131	23	69	181	404
Chile	252	257	133	129	771
Colombia	145	74	45	129	393
Costa Rica	148	—	85	142	375
Cuba	360	5	1	433	799
Mexico	374	26	43	43	486
Venezuela	1,095	4	25	93	1,217

Source: Economic Commission for Latin America.

3. POSITION OF LATIN AMERICA WITH RESPECT TO WORLD CONSUMPTION

Latin America's world position with respect to total energy consumption must now be analysed. Since figures on world consumption are difficult to obtain, approxima-tions have been used, which therefore have only relative value. Two significant years were chosen for the analysis —1929 and 1950—whence some considerations can be deduced on Latin America's position and the movements registered in the region's energy consumption in relation to that of the world. (See table 8.)

Table 8

GROSS ENERGY CONSUMPTION IN LATIN AMERICA AND THE REST OF THE WORLD[a]

	Year	Total consumption		Per capita	
		Commercial	Total	Commercial	Total
		(Millions of tons of petroleum equivalent)		*(Tons of petroleum equivalent)*	
Latin America	1929	17.1	...	0.170	...
	1950	51.7	76.6	0.318	0.47
World	1929	1,114.0	...	0.985	...
	1950	1,578.0	2,940.0	1.035	1.93
World excluding United States	1929	552.0	...	0.547	...
	1950	739.0	1,438.0	0.539	1.05

Source: Economic Commission for Latin America.
[a] Excluding the countries of Eastern Europe and the People's Republic of China.

With regard to the commercial forms of energy, Latin America's relative world position has improved since 1929. While in that year the region consumed only 1.5 per cent of the world's energy, in recent years its share has risen to 3.3 per cent. Slightly less progress is seen to have been made if averages for commercial energy consumption are based on population figures. A Latin American accounted for 17 per cent of world *per capita* consumption in 1929 and 31 per cent in 1950. If the United States is excluded from the total, *per capita* consumption in Latin America represented about 60 per cent of the average world figure for this latter year. The relative improvement in the region's position resulted from the marked increase in consumption of commercial fuels since the years preceding the Second World War.

An examination of total consumption on inanimate energy shows that Latin America was responsible for about one quarter of average world *per capita* consumption in 1950, a proportion which rises to 45 per cent if the United States is excluded from the calculation.

In 1954 Latin America's gross consumption of total energy amounted to 510 kilogrammes of petroleum equivalent *per capita*, that is, one fifth and one tenth of the corresponding figures for Western Europe and the United States respectively.

III. CURRENT INVESTMENT SITUATION

In view of the growing demand for energy in Latin America, as well as the continuous process of readjustment among the various forms of energy in accordance with the exigencies of modern technique and the resource potentials of each country, a heavy task lies ahead if the region's future energy requirements are to be satisfactorily met. In recent years the Latin American countries have become increasingly alive to the role of energy supplies in economic development, and measures are being adopted to facilitate expansion in this direction. The undertaking is so vast as to create a growing conviction that only through co-ordinated action on the part of both public and private enterprise can it be successfully tackled. Various official entities, which came into being a little before or as an outcome of the Second World War, have done valuable work in the promotion and direct implementation of effort, often along the lines laid down by systematic national programmes. Private enterprise, too, has several important projects under way. All such action has been mainly focused on the production and refinement of petroleum and petroleum derivatives and on the generation of electric energy, these being the fields in which the pressure of demand, as was earlier pointed out, has become most urgent.

In 1955 approximately 1.2 billion dollars, or little less than 14 per cent of the region's total gross investment, were invested in Latin America's energy sector. If account is taken of domestic supplies alone—excluding, for example, facilities for petroleum exports—investment in the energy sector during 1955 amounted to 875 million dollars, i.e., about 10 per cent of total gross capital formation in that year. Of this amount, about 60 per cent was invested in electricity and the rest almost entirely in petroleum, a very small quota being allocated to coal.

Thanks to investment in electricity production, there has been an improvement of late in Latin America's power supply, though substantial deficits still exist in many urban centres. In the course of the year electricity networks of 690,000 kW generating capacity were installed, and by the end of 1955 there were some 3.6 million kW under construction, to be completed during the next three or four years. This programme, which means that about one million additional kW will be put into operation every year, should raise present capacity—8.6 million kW—by more than 10 per cent annually, which is undoubtedly a very good average for Latin America if it can be maintained over a relatively long period. Of these projects 75 per cent were undertaken by enterprises financed with public funds. As a rule, government programmes have been channelled towards the optimum utilization of hydroelectric resources, the establishment of the necessary long-distance inter-connexions, standardization of characteristics of supply, etc.

In virtue of the encouragement afforded by official policy, the group of foreign enterprises that contribute some 4.6 million installed kW to Latin America's electricity supply, or 53 per cent of the region's total for public use, have announced the forthcoming expansion of the programmes already initiated.

With respect to petroleum, thanks to the large sums of private foreign capital formerly and currently invested in Venezuela, this country's output of petroleum was 14 per cent higher in 1955 than in 1954, while in the rest of Latin America production rose by only 6 per cent. With Venezuela's contribution, Latin America's crude petroleum availabilities (156 million cubic metres) exceeded domestic requirements by 101 million cubic metres. Nevertheless, the relative difficulty encountered by many countries in allocating the necessary foreign exchange for fuel imports, which in 1955 totalled 28 million cubic metres, has given rise to almost universal concern for the development of domestic resources. To this end, legislation has been passed to stimulate private investment, while governments have intensified their activities in countries where they participate directly in the production and refinement of petroleum. Thus, if Venezuela is excluded, 57 per cent of gross investment in the Latin American petroleum industry during 1955 was accounted for by official organizations in countries like Argentina, Bolivia, Brazil, Chile, Colombia and Mexico. These entities have had to overcome serious difficulties in the financing of their programmes, since high capital density is a characteristic feature of the petroleum industry. The saving achieved when results are satisfactory, however, gradually enables operations to be financed on the basis of short-term credits granted by the suppliers of equipment. Since petroleum production requires heavy investment and is a risky venture, priority has often been given—without neglect of prospection—to investment in refineries, which results in a sure and substantial saving of foreign exchange. Difficulties in the transport of petroleum and its derivatives have also hampered the development of the industry, and considerable attention has therefore been devoted to this matter.

Yet, notwithstanding every effort, scarcely any Latin

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American country, broadly speaking, was able to reach all its 1955 targets for the development of the various energy sources. In most cases, there were financial obstacles, but in many, too, shortcomings were attributable to lack of foresight. Even if no financing problems existed, it would be difficult to embark on adequate undertakings, for want of specific projects, and, very often, of qualified personnel to carry them out.

IV. Consumption prospects and energy production in Latin America

1. Hypothetical projection of consumption and future production of energy

In the foregoing pages, the main characteristics observed in the evolution of energy consumption were analysed, together with supply conditions. On the basis of these objective background data, the prospects for demand in 1965 must now be examined, as well as its composition and the means whereby it can be satisfied. The ten-year period covered by these projections seems suitable for this kind of analysis, since it is long enough to allow for the programming of investments which usually take a considerable time to mature, but not so prolonged as to preclude the extrapolation of the characteristics observed in energy consumption, without the intervention of factors which are difficult to assess, such as the development of new energy sources or processes.

In this preliminary over-all study of Latin America as a whole, future energy requirements have been determined—for illustrative purposes only—on the basis of arbitrary hypotheses as to the development of the per capita gross product.

Table 9 shows in detail the final figures for gross consumption of energy in 1965, assuming annual growth rates of 1 per cent, 2.5 per cent and 4 per cent for the per capita gross product. It may be noted that energy requirements in Latin America will vary according to the different gross product levels which it is hoped will be attained in 1965. The possibilities of expanding domestic production will also of course be determined by the capital formation consistent with each rate of development.

Table 9

LATIN AMERICA: PROJECTION FOR 1965 OF GROSS ENERGY CONSUMPTION
IN ACCORDANCE WITH THREE ALTERNATIVE GROWTH
HYPOTHESES FOR THE GROSS PRODUCT

(Millions of tons of petroleum equivalent)

Type of energy	Annual growth of per capita gross product		
	1 per cent	*2.5 per cent*	*4 per cent*
Petroleum derivatives and natural gas	76	94.4	114
Coal and coke	8	10.7	13
Hydroelectricity	12	18.3	26
Vegetable fuels	25	24.2	23
Total energy	121	147.5	176
Total production of electricity[a]	57	86.1	128
Thermoelectricity[a]	24	30.3	52

Source: Economic Commission for Latin America.
[a] Billions of kWh.

The hypothesis which assumes a growth rate of 2.5 per cent will now be examined. On the basis of available data, use was made chiefly of over-all figures for energy consumption, without going into detail as to future modifications in its structure. If the projections of the demand for energy had been made separately for the different economic sectors, the distribution of total energy consumption over the various fuels and electricity could have been more accurately determined and the possibilities of replacing one type of energy by another more thoroughly examined. But no sector-by-sector projections of the economic development of the individual countries exist. A sectorial analysis would permit an evaluation of the influence of foreseeable changes in the economic structure of a country—for instance, the increase in the relative importance of manufacturing activities—and the substantial input requirements of certain specific industries (steel making, petroleum, thermic generation of electricity, etc.)

Nevertheless, the results obtained by various procedures, which were checked against derived coefficients, are felt to provide a reasonable approximation. Moreover, as far as possible, due consideration was given both to the structural changes that may take place (especially the greater incidence of industrial activities), and to the heavy consumption of particular industries. Similarly, besides historic trends and the peculiar characteristics of each country, the points suggested by comparisons with other countries, as well as economic expedience, were taken into account in the calculations.

Individual calculations were made for five countries, namely, Argentina, Brazil, Chile, Colombia and Mexico. No special analysis was made of the remaining Latin American countries, which were divided into two further groups.[12]

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[12] See note to figure I.

A hypothesis for the expansion of the gross product having been established, total energy consumption was calculated first, since, according to historical analyses, their relationship varies between very narrow limits.

As will be recalled, consumption of total net energy per unit of gross product has on the whole registered a declining trend in all Latin American countries for which this kind of analysis has been made, the downward movement being more marked in countries at lower than in those at intermediate stages of development. But, in view of the characteristics of the phase of development upon which most countries have entered, unit consumption was assumed likely to remain constant over the next few years, except in Argentina and Mexico—where a slight increase of 0.5 per cent annually was considered reasonable because consumption is low in comparison with that of similar economies—and in the third group, comprising the less developed countries of the region, for which an annual decrease of 1 per cent was postulated.

Various methods were tried out for the projection of electricity production, and the final figures were obtained through comparative analysis of those given by each procedure. Moreover, inter-country comparisons were constantly borne in mind (see figure IV), as well as the targets set up by national plans or programmes, wherever they were available. The figures were finally checked against electrification coefficients.

Although the possible existing deficits, whose pressure combines with that exerted by the normal growth of demand, were not evaluated for projection purposes, the methodology adopted takes them indirectly into account. Thus, the hypothetical volumes assumed for 1956 should prove large enough for the complete coverage of total electricity requirements under the conditions postulated.

When the projections for total electricity production had been established, the proportions to be derived respectively from hydraulic resources and from thermic power stations were determined. To this end, hydro-electricity possibilities were first examined on the basis of each country's water-power reserves and of specific programmes under way or in course of consideration.

An examination of the prospects for an increase in net consumption of total energy and in thermic electricity production was followed by an analysis of the possible contributions of the various types of fuel. For this purpose, the historic behaviour pattern of each was taken into account, together with potential modifications in consumption and national production programmes. The possibilities of covering the largest possible proportion of total energy consumption with domestic production were likewise considered.

Domestic production forecasts are based primarily on current knowledge of the region's energy resources, and on their technical and economic exploitation possibilities, with due regard to their location and to probable demand. For the projection of production, no quantitative analysis was made of the relationship between available resources and the production they render feasible. Whenever possible, energy production was calculated on the basis of existing national programmes, the periods envisaged for their execution being brought into line with the target set for 1965. In default of specific national programmes, recourse was had to the recommendations of technical missions, and where these too were lacking,

hypotheses based on general guiding principles were used.

As it is not yet certain whether the large petroleum reserves announced by Brazil will materialize in the near future, two alternative production hypotheses had to be set up. It was assumed that each country would refine the whole of the petroleum derivatives it consumed, except in the case of Brazil (75 per cent only), Chile (75 per cent, excluding the consumption of the large mining companies) and the countries in the second group, where no refining will be undertaken. (From this group Bolivia and Ecuador are excluded.)

Since the projection of total consumption is reasonably accurate, differences in real consumption deriving from one of the component types of energy will be offset by corresponding fluctuations in some other type. Similarly, any rise or fall in domestic production will cause a contraction or expansion of imports.

The estimate of possibilities for meeting the demand forecast for 1965 with domestic resources disregards the implications of certain so-called "non-traditional" energy resources. Of these nuclear energy is the most important, and its proven economic possibilities will have to be taken into account in long-term programmes.

Tables 10 to 13 summarize the final results of the projection of energy consumption and sources of supply in 1965, on the assumption of an annual growth rate of 2.5 per cent for the *per capita* gross product.

Gross energy consumption in Latin America will increase by 75 per cent between 1954 and 1965, according to the arbitrary development hypothesis adopted. This rate of growth is slightly higher than the 67 per cent forecast for the gross product. Petroleum derivatives and natural gas will absorb the major part of the increment, both absolutely and relatively, since consumption of these fuels will be practically doubled. This is particularly true of Argentina, Mexico and the countries of the third group. The countries with the best possibilities of increasing their energy potential on the basis of hydro-electricity are Brazil and Colombia, followed by Chile.

It is expected that the use of coal for industrial purposes, which seems likely to be intensively developed in several Latin American countries, will be one of the strongest contributory causes of a sharp relative increase —to more than double its present level—in the consumption of this fuel.

During the period in question, *per capita* electricity production will register what are considered adequate, and in some cases maximum increments, by comparison with those observed in other countries which are more advanced or at stages of economic development similar to those at present reached in Latin America. Higher electrification coefficients indicate electricity's greater relative contribution to total energy consumption, and, like the annual increments in total production, are proportionate to the individual countries' hydroelectric resources. The low annual increment in Chile's production of electricity is due to the fact that in 1954 the consumption of the large mining companies represented as much as 40.3 per cent of the total, whereas its future growth rate will apparently be slow in relation to other activities; if the large mining companies are excluded, the annual rate rises to 7.5 per cent. Colombia registers a sharp annual increment in comparison with the remaining countries because it possesses hydroelectric resources with optimum

Table 10

LATIN AMERICA: PROJECTION FOR 1965 OF GROSS ENERGY CONSUMPTION

	Total gross consumption	Petroleum derivatives and natural gas	Coal and coke	Hydro-electricity	Vegetable fuels
(Millions of tons of petroleum equivalent)					
Argentina	24.7	19.8	18.8	1.0	2.2
Brazil	43.3	20.4	2.7	9.8	10.4
Chile	7.9	3.5	2.1	1.6	0.8
Colombia	9.4	4.0	2.2	1.9	1.3
Mexico	25.5	20.8	1.3	2.2	1.2
Group II[a]	27.6	21.1	0.5	1.3	4.6
Group III[a]	9.2	4.8	0.01	0.6	3.8
Latin America	147.5	94.4	10.7	18.3	24.2
Increments 1954-65					
Argentina	10.5	9.6	0.7	0.8	—0.6
Brazil	20.2	12.9	1.4	5.8	0.1
Chile	2.9	1.8	0.4	0.7	—0.1
Colombia	4.5	2.2	1.3	1.3	—0.3
Mexico	11.5	10.0	0.6	0.9	—
Group II[a]	10.9	9.9	0.3	0.4	0.2
Group III[a]	3.1	2.7	—	0.3	—
Latin America	63.6	49.2	4.7	10.3	—0.7

Source: Economic Commission for Latin America.
[a] See note to figure I.

Table 11

LATIN AMERICA: PROJECTION FOR 1965 OF AGGREGATE PRODUCTION OF ELECTRICITY

	Total[a]	Rate of annual increment 1954-65 (Percentages)	Per capita 1954	Per capita 1965	Electrification coefficient[b] 1954	Electrification coefficient[b] 1965
			(kWh)			
Argentina	14.0	7.4	339	618	0.526	0.688
Brazil	30.0	8.9	205	404	0.605	0.906
Chile	6.2	5.0	557	834	0.915	1.002
Colombia	6.6	11.7	157	415	0.464	0.949
Mexico	14.0	7.6	218	361	0.569	0.665
Group II[c]	11.9	7.1	239	404	0.376	0.496
Group III[c]	3.4	8.1	65	106	0.275	0.397
Latin America	86.1	8.0	217	390	0.521	0.719

Source: Economic Commission for Latin America.
[a] Billions of kWh.
[b] Consumption of electricity in kWh divided by net consumption of fuels as such (excluding those used for thermoelectricity), in kilogrammes of petroleum equivalent.
[c] See note to figure I.

utilization conditions, and Colombian projects envisage substantial expansions of installed capacity.

The high annual rates of increase in production of crude petroleum and natural gas which will be necessary if domestic production is to supply the internal requirements foreseen for 1965, exceed those for other types of energy, and indicate the importance that will have to be given to this energy sector. In Latin America as a whole, production will increase three-fold, and in some countries the increment will be still greater in relation to the small initial output of 1954.

Despite the anticipated expansion in domestic petroleum production, many countries will have to continue importing this fuel. By 1965 the region's aggregate petroleum imports may be 23 per cent higher than in 1954. The situation will deteriorate for some countries, particularly Brazil, Uruguay and those belonging to the third group, with the exception of Bolivia. But, according to the hypotheses adopted for refining activities, imports of derivatives should decline, their place being taken by crude petroleum to be processed in the countries concerned.

Large percentage increases will also be registered in domestic production of coal, though the absolute figures are far from equalling those for petroleum. The proportion of total consumption covered by imports should decrease in all countries. Needless to say, these calculations are hypothetical, and cannot be regarded as forecasts. The figures on energy consumption are, therefore, simply indicative of reasonable levels that must be attained if economic development is to proceed at the arbitrary rate postulated. Moreover, the formulation of a specific programme would have required a series of surveys which are outside the scope of the present study.

Table 12

LATIN AMERICA: PROJECTION FOR 1965 OF DOMESTIC PRODUCTION OF PETROLEUM AND COAL FOR HOME CONSUMPTION[a]

	Production of crude petroleum and natural gas (Millions of tons of petroleum equivalent)	Rate of annual increase 1954-65 (Percentages)	Refining of crude petroleum (Millions of tons)	Rate of annual increase 1954-65 (Percentages)	Production of coal (Millions of tons)	Rate of annual increase 1954-65 (Percentages)
Argentina	14.2	12.1	15.6	6.3	0.9	21.4
Brazil[c]	{11.7 / 6.0	{54.9 / 45.8	{16.6 / 16.5	{44.8 / 44.7	3.4	8.2
Chile	1.3	26.0	2.1	30.2	3.0	2.5
Colombia	4.2	11.8	3.9	8.9	3.0	8.3
Mexico	21.8	7.8	22.8	7.1	2.0	3.9
Group II[d]	16.0	6.2	21.8	10.0	0.6	11.0
Group III[d]	1.4	10.5	1.6	11.4	—	—
Latin America	70.7	10.4	84.4	10.3	12.9	6.4

Source: Economic Commission for Latin America.

[a] Excluding production for export.

[b] Coal for consumer market with the following calorific power: Argentina, 6,200 cal/kg; Brazil, 5,700; Chile, 6,800; Colombia, 6,500; Mexico and Group II, 7,200 cal/kg.

[c] Two hypotheses were adopted for Brazil's domestic petroleum production. The total for Latin America includes only the higher estimate.

[d] See note to figure I.

Table 13

LATIN AMERICA: PROJECTION OF FUEL IMPORTS FOR 1965

	Petroleum				Coal and coke 1965 (Millions of tons)
	Crude		Derivatives		
	1954	1965	1954	1965	
	(Millions of tons of petroleum equivalent)				
Argentina	3.9	6.3	2.5	—	1.9
Brazil[a]	0.1	{ 4.9 / 10.5	7.5	{4.6 / 4.6	1.4
Chile	0.1	0.8	1.5	1.5	0.3
Colombia	—	—	0.6	—	—
Mexico	—	—	1.7	—	—
Group II[b]	1.6	7.0	2.0	—	0.2
Group III[b]	0.0	0.2	1.7	3.2	—
Latin America	5.7	19.1	17.5	9.4	3.7

Source: Economic Commission for Latin America.

[a] See note [c] to table 12.

[b] See note to figure I.

2. INVESTMENT AND FOREIGN EXCHANGE REQUIREMENTS

Investment in electricity plants and networks, petroleum fields and refineries, coal mines, etc., will be high in the period 1956-65, and will account for sizable proportions of Latin America's capital and foreign exchange availabilities. Details of installed capacity, in the case of electricity, are given in table 14.

It should be noted that during the period Latin America's total capacity will be more than doubled (rising by 7.4 per cent annually), which presupposes the existence of a large-scale construction programme. Certain countries—Brazil and Colombia—will actually treble their installed capacity. The proportion represented by hydroelectric power stations will increase from 46 to 56 per cent in the period, so that fuller advantage will be taken of this renewable resource. As regards petroleum and coal, daily production capacity can be deduced from table 12.

In order to assess facilities, they were divided in each country and energy sector into groups alike in type and characteristics, their geographical location being specified as far as possible. Their cost could thus be computed by comparison with typical examples of recent or projected installations in Latin America or elsewhere. It was also determined what proportion of investment expenditure will have to be effected abroad. Here again the pertinent calculations were based on examples chosen for purposes of comparison, and suitably adjusted.

In the case of electricity, the cost per installed kW—including transmission and distribution—was computed on the basis of an average which varied in the different countries from 480 to 560 dollars at 1954 prices for systems dependent on hydraulic plants and from 425 to 475 for those with thermoelectric power stations. Individual margins of variation are naturally very wide, and are determined by such factors as the size, type and complexity of the hydraulic works, transmission grids,

Table 14

LATIN AMERICA: ELECTRIC GENERATING CAPACITY REQUIREMENTS, 1955-65

(Thousands of kW)

	Installed 1955			Projected for 1965		
	Hydro-	*Thermo-*	*Total*	*Hydro-*	*Thermo-*	*Total*
Argentina	85	1,984	2,069	735	2,765	3,500
Brazil	2,408	657	3,065	6,071	1,286	7,357
Chile	514	442	956	1,050	690	1,740
Colombia	338	187	525	1,395	232	1,627
Mexico	922	1,008	1,930	1,571	2,000	3,571
Group II[a]	503	1,308	1,811	1,017	2,246	3,263
Group III[a]	206	348	554	480	437	917
TOTAL	4,976	5,934	10,910	12,319	9,656	21,975

Source: Economic Commission for Latin America.
[a] See note to figure I.

projected future expansion, characteristics of power sta-tions and type of fuel used, etc. For thermoelectric power stations, the fluctuations are smaller, but still considerable. As regards petroleum, unit costs for the installations re-quired in order to obtain a specific extraction capacity differ greatly according to the location of the resources concerned. It is therefore a hazardous undertaking to make projections in this field. Rather high coefficients were adopted in order to cover a wide range of possi-bilities, i.e., from 2,900 and 3,000 dollars per barrel of daily production capacity (including transport costs for crude petroleum) in the case of countries like Mexico, with long-established and relatively rich fields, to 3,600 for others where average conditions prevail (Bolivia, Cuba, Ecuador, Peru), and up to 3,800 and 4,100 for less fully-prospected or more remote areas (Chile and Brazil). These figures were also compared with those recorded for the United States (2,800 dollars in 1950).

Refining can be forecast with more precision, and the cost of facilities for processing one barrel of crude per day was found to fluctuate between 1,000 and 1,200 dollars, according to the size of the refinery and the range of products obtained. In some recent instances in Latin America slightly lower figures seem to have been regis-tered, but usually the installations involved were of a simpler type.

With the addition of transport of derivatives and marketing of final products, unit costs for the over-all development of the industry vary in the different coun-tries from 5,600 to 6,800 dollars per barrel of daily capacity.

Investment requirements for coal mining fluctuate con-siderably. Nevertheless, since the countries which will develop these resources are few in number, and no definite information is available, a single representative value of 20 dollars per ton was worked out, which, although it disregards regional differences, does allow of a reasonable degree of approximation, since the total figures are relatively low.

Total investment throughout the period 1956-65 was computed on the basis of unit costs and the corresponding production capacities. (See table 15.) Of the 984 million dollars needed annually, 54 per cent represents the share of electricity, about 44 per cent that of petroleum and 2 per cent that of coal.[13] Purchases abroad should absorb 57 per cent of the total.

[13] For the sake of simplicity, it was assumed that total invest-ment for the 1955-65 programme will be effected in ten equal annual quotas, for although this is not what really takes place, year-to-year differences give rise to short-term financing problems only.

Table 15

LATIN AMERICA: CAPITAL INVESTMENT FOR LOCAL ENERGY SUPPLY 1946-65

(Millions of dollars at 1954 prices)

	Electricity		Petroleum		Coal		Total energy	
	Total	*Foreign exchange*	*Total*	*Foreign exchange*	*Total*	*Foreign exchange*	*Total*	*Foreign exchange*
Argentina	702	421	985	640	15	7.5	1,702	1,069
Brazil	2,041	947	1,532[a]	920[a]	38	19.0	3,611	1,886
Chile	353	141	137	96	40	20.0	530	257
Colombia	551	276	102	70	24	12.0	677	358
Mexico	790	440	919	550	13	6.5	1,722	997
TOTAL	4,437	2,225	3,675	2,276	130	65.0	8,242	4,566
Group II[b]	705	430	588	412	9	4.5	1,302	847
Group III[b]	191	109	95	67	—	—	286	176
TOTAL	5,333	2,764	4,358	2,755	139	70.0	9,830	5,589

Source: Economic Commission for Latin America.
[a] Corresponding to the most favourable hypothesis for petroleum production. (See note [c] to table 12.)
[b] See note to figure I.

What proportion of domestic capital formation will this investment in energy represent? For a growth rate such as has been assigned to the Latin American economy in the present article, gross capital formation, according to estimates, should amount to about 17 per cent of the gross product, that is, approximately 9.7 billion dollars (at 1954 prices) at the beginning and 14.7 billion dollars at the close of the period. The energy sector, with its average quota of 983 million dollars annually, should therefore absorb from 10.2 to 6.7 per cent of aggregate investment.

Historic data to show whether these percentages represent an effort compatible with the possibilities and traditions of the Latin American countries are available for Chile and Mexico only. In these countries, energy absorbed varying percentages of annual gross capital formation in 1940-52, ranging from 6 per cent at the beginning to 11 per cent at the end of the period for Chile, and from 5.5 to 14 per cent for Mexico. The high figures registered in more recent years comprise the expenditure arising from electrification programmes and petroleum development undertaken by official organizations. These situations may be considered comparable with the future developments postulated here, which presuppose from 15.2 to 10.5 per cent for Chile and 13.2 to 8.7 for Mexico at the beginning and end of the coming ten-year period, respectively.

It is also important to ascertain how far energy requirements will affect the various countries' foreign exchange availabilities. Such requirements comprise equipment and services for the energy sector not locally obtainable, as well as those fuels which have to be imported to cover the deficit in domestic production.

Situations will therefore vary considerably in Latin America, according to the stage of development attained by domestic manufacture of equipment and the availability of natural resources. Brazil's case is one of those in which the future drain on foreign exchange availabilities caused by the energy sectors may be greatest. If imports are assumed to grow at a rate of 3 per cent annually,[14] by 1965 they will total approximately 2 billion dollars (at 1954 prices). Fuel imports in the same year might reach some 370 million dollars, thus accounting for 18.5 per cent of the above total. Purchases of equipment will probably represent an additional 9 per cent.[15]

Colombia affords a typical example of a country in which the abundance of natural resources makes it possible to satisfy all energy requirements, purchases abroad taking the shape of equipment only. By 1965 this country will have to devote about 6 per cent of its capacity to import—estimated at 660 million dollars[16]—to purposes of capital formation in its electricity, petroleum and coal industries.

The proportion of imports represented by these fuels in certain countries can be utilized in the comparison of the above figures with historical data. In Argentina, fuels absorbed 19 per cent of the total foreign exchange used for imports in 1951-53 and 18 per cent in 1954. The

corresponding figures for Brazil fluctuated around 13 per cent between 1951 and 1953 and reached 21.7 per cent in 1955. Chile and Uruguay have recorded about 15 and 13 per cent respectively in recent years.

These percentages are the highest in the region. Since 1951 the average for Latin America has been in the neighbourhood of 10 per cent. Some smaller countries, like those of Central America and the Caribbean area, as well as Paraguay, which are obliged to import almost all their commercial energy requirements, earmark only 3-7 per cent of their foreign exchange availabilities for this purpose, or perhaps somewhat more in recent years. Thus it can be seen that the estimate of Latin America's average fuel imports in 1965 is relatively high, and covers individual cases in which undoubtedly serious balance-of-payments problems will arise.

No reliable data could be collected on purchases of equipment for the energy sector, but there are grounds for estimating them at about 4-6 per cent over the last ten or fifteen years in the case of countries like Argentina, Brazil, Chile and Mexico. The figures calculated for 1965 apparently fall within normal limits.

In order to reduce excessive foreign exchange expenditure on current fuel import requirements, it would have been necessary to increase domestic energy production without prejudice to the rates of development projected. The hypotheses on domestic production adopted here are based on present knowledge of available resources. Unless such resources have been grossly underestimated or government programmes are executed more rapidly than is expected, the domestic contribution of energy can hardly be raised to much higher values than have been calculated here. In some cases, undoubtedly, domestic energy resources could be intensively utilized if a special effort in this direction were made, but in others such possibilities are physically limited by the lack or shortage of resources or by high exploitation costs.

Since the chief energy deficit is felt in connexion with petroleum, it is this fuel that will constitute the heaviest burden on imports. Where petroleum prospects are favourable, the deficit might be partly covered through more active prospecting, in combination with the investment required to work any deposits thus discovered.

Finally, as already indicated, some nuclear energy stations might perhaps be built in the region towards the close of the period envisaged. But it should be recalled that at present unit costs are high and that such facilities will only supplement the electricity required.

Other methods of reducing foreign exchange disbursements would be to increase domestic manufacture of certain capital goods which at present have to be imported, or to make less use of foreign technical services. Both possibilities depend upon the industrial development of each country and on future structural changes which may justify the production of a series of elements indispensable for the execution of the projects.

No hypotheses are formulated on the sources that will be drawn upon to finance capital requirements in Latin America's energy sector, since this aspect depends on a great variety of factors which are difficult to foresee, and analysis of which would be outside the scope of the present article. Nevertheless, it is useful to point out that international credit institutions have co-operated actively in the financing of electricity projects in Latin America.

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[14] See the study on the *Economic Development of Brazil* (E/CN.12/364), chap. IV, table 7. (This report in its final form is now in the press.)

[15] These figures correspond to the more favourable of the hypotheses for petroleum production (see table 11, note c). On the other assumption, the situation would be still worse.

[16] See *Economic Development of Colombia* (E/CN.12/365), part I. chap. II.

Loans have been granted to public enterprises and also to private companies with State guarantees.

The International Bank for Reconstruction and Development has lent 307 million dollars for electric energy development in Latin America, a sum which constitutes about 46 per cent of aggregate credits granted for electricity throughout the world and about 49 per cent of the total allocated to Latin America. Moreover, in the early months of 1956, the United States Export-Import Bank had credits outstanding to a value of 160 million dollars for electric energy supplies in Latin America, an amount representing 10 per cent of its aggregate loans to the region.

Mexico's case can be cited as an example of the distribution of over-all investment in electricity. From 1939 to 1950 the investment of the four main companies, which supply about 90 per cent of the country's total production, was financed as follows:

	Percentage
Local financing:	
Private	14
Public	57
Foreign financing:	
Private	6
Public	23
	100

3. DESIRABILITY OF AN ENERGY POLICY

The subjects dealt with in the foregoing pages in connexion with the projection of total demand for energy, its composition and the resources—physical, technical and financial—available for its satisfaction, indicate that an energy policy should be adopted in each of the Latin American countries. The aim of such a policy should be to ensure the attainment of the proposed targets for production or financing, so that energy may be economically supplied in the amount and form required, when and where it is needed.

The inference can also be drawn that the development of the energy sector must proceed in close, constant and dynamic contact with the remaining sectors of the economy, since it is substantially affected by variations in these latter. Changes in the volume and structure of production, the relative weight and composition of transport systems, and the incidence and types of residential consumption are among the factors which determine the amount of total energy required, its composition and its relative costs.

It is also evident that such close, dynamic and flexible relationships are manifested in innumerable ways, and call for co-ordination within the energy sector itself, since in approximately 75 per cent of the cases arising one type of energy may be substituted for another, so that government action can influence the structure of consumption as best suits the country concerned.

The need to establish an integrated energy policy whereby the various sources can be developed in accordance with a series of methodical and inter-dependent principles, is therefore based on the following general considerations: (1) energy constitutes a fundamental requisite for the development of a country's production and for raising the standard of living; (2) the possibility of replacing one type of energy by another calls for a global approach enabling the fullest advantage to be taken of both natural and financial resources; and (3) the lack of a policy at the national level for the co-ordinated development of energy potentials aggravates unsatisfactory utilization of resources, and leads to losses, low yields and waste in a higher degree than might normally be expected in under-developed countries.

These general considerations are further supported in Latin America by the following facts: (a) low energy consumption is the rule at present both in the residential sector and in production and transport; (b) in most branches of consumption, energy is utilized with very low yields; (c) such potential energy resources as are immediately accessible are not always large enough, and are often remote from the main consumer centres, or require a vigorous and intensive economic development of the area if they are to be exploited in economically satisfactory conditions; (d) the shortage of financial resources—especially of foreign exchange—is felt most acutely in the energy sector, since its industries have a high capital density; and (e) serious pressure is exerted on the balance of payments of the Latin American countries by the need to import large volumes of fuel.

The various Latin American Governments have repeatedly shown an active interest in considering energy as an organic whole and at the same time, as an integral part of the national economy. Numerous examples can be adduced of measures aiming at the promotion of a more efficient utilization of energy resources, in all spheres of official economic action. But, though the administrative steps taken have often been extremely well-conceived, they have not always given rise to institutions capable of effectively promoting an integrated energy policy.

RECENT TRENDS IN UNITED STATES IMPORTS OF LATIN AMERICAN PRODUCTS

1. INTRODUCTION

The variables determining the fluctuations in United States imports of Latin American products comprise, as regards demand, the evolution of real income in the consumer market, prices of the products concerned and competition from other regions; on the supply side, they include production conditions and the prospects offered by other consumer markets. The influence of these factors has made itself felt in different ways at different times. The main determinant is usually considered to be the level of real income in the United States. Yet this country's recent development has not been accompanied by a proportionate increase in the demand for Latin American products. During the last five years, despite the fairly substantial increment in the value of United States purchases from Latin America, their volume has decreased. And in any event, the increment in question fails to match the expansion registered in total imports or the rate of growth of real income and economic activity in the United States. It will therefore be useful to analyse the behaviour of the variables mentioned over the five years under review.

If the year 1950—when prices and demand had not yet felt the full impact of the hostilities in Korea—is taken as a point of departure, it will be observed that the annual rates of growth of real income and industrial activity in the United States for the five-year period were 4 and 5 per cent respectively. This expansion was reflected in the United States' total imports, of which the volume increased by 3.6 per cent yearly and the value by 5.7 per cent. The import coefficient (in relation to the gross national product) rose to 2.9 per cent, after a prolonged decline.

During the same lapse of time, the volume of imports from Latin America did not follow the same course as their value. While the former decreased on an average by 2.4 per cent annually, the latter rose by 2.9 per cent. Not even demographic growth, for which an annual rate of 1.7 per cent was recorded, and which is a primary factor (see table 1) in an expansion of demand, had the repercussions that might be expected on imports of Latin American products.

It can be noted that total United States imports have

Table 1

UNITED STATES: ANNUAL VARIATIONS IN THE NATIONAL PRODUCT, INDUSTRIAL ACTIVITY AND IMPORTS

(Year-to-year percentages)

Year	Gross national product	Industrial activity	Imports			
			Total volume	Volume from Latin America	Total value	Value from Latin America
1947	—0.7	11.1	— 4.6	— 8.0	16.5	19.1
1948	5.0	4.0	13.7	— 3.9	23.7	8.5
1949	—1.0	— 6.7	— 2.1	—	— 7.0	— 2.2
1950	9.6	15.4	21.7	1.0	33.7	26.5
1951	6.9	7.1	— 1.8	— 1.0	24.0	15.0
1952	3.7	3.3	5.4	4.0	— 2.3	1.9
1953	4.5	8.1	4.6	— 1.0	1.4	0.9
1954	—2.0	—10.1	1.2	—11.7	— 6.1	— 4.5
1955	6.1	16.2	11.0	3.4	11.4	1.3
Annual average						
1947-50	3.2	5.9	7.2	— 2.7	14.2	12.5
1951-55	3.8	5.0	3.6	— 2.4	5.7	2.9

Source: Statistics supplied by the United States Department of Commerce, and *Survey of Current Business.*

followed—though at a somewhat slower rate—the upward trend pursued by the gross product and industrial activity, especially in 1947-55. Latin America's share in this aggregate has been gradually declining, the downward movement being more marked in its volume than in its value. The proportion of the value of imports for which those from Latin America accounted was 38 per cent in 1947, a coefficient which had fallen to 29 per cent by 1955. But a more complete impression of the course taken by the region's sales to the United States can be obtained from the absolute figures for import values, which, in

addition, help to define the importance that should be attributed to percentage variations in volume from one year to another and to the reduction in Latin America's contribution to total imports. (See table 2.)

From this angle, the value of imports from Latin America can be seen to have risen by 41.7 per cent, a favourable development which makes the above reductions rather less significant. Furthermore—to demarcate the influence of the permanent factors as distinct from that exerted by others of a circumstantial nature— it should be recalled that Latin America's 29-per-cent

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Table 2

UNITED STATES: LATIN AMERICA'S SHARE IN IMPORTS

Year	In current values		In constant values	
	Millions of dollars	Percentage of total	Millions of dollars[a]	Percentage of total
1947..........	2,168	38	2,356	39
1948..........	2,352	33	2,261	33
1949..........	2,301	35	2,234	34
1950..........	2,910	33	2,328	29
1951..........	3,348	30	2,277	28
1952..........	3,411	32	2,321	28
1953..........	3,442	32	2,341	27
1954..........	3,289	32	2,056	25
1955..........	3,327	29	2,248	24

Source: Statistics supplied by the United States Department of Commerce.

[a] At 1947-49 prices.

share in United States imports in 1955, while comparing unfavourably with the 38 per cent attained in 1947, is nevertheless higher than the pre-war levels of round about 22 per cent. Again, 1947 is not the most suitable year for purposes of comparison, as the percentage of imports from Latin America was at that time abnormally high. The fact is that in the years immediately following the war, Europe and Japan had not yet recovered their productive capacity, still less their traditional position as regards their sales in the United States market.

2. INFLUENCE OF RELATIVE PRICES

The explanation of the divergent trends followed by the volume and value of imports from Latin America is obviously to be found in their higher prices. This price increase, together with the evolution of prices for imports from other sources, also accounts for the fact that the volume of Latin America's contribution to total imports decreased more than its value.

While a sharp upswing in the average price of imports from all sources in 1951, which raised it 26 per cent above the preceding year's level, was succeeded by a slow decline, prices of imports from Latin America remained high, and even exceeded those prevailing at the time of the war in Korea. Only in 1955 did they fall, and then to no very great extent. (See table 3.)

Table 3

UNITED STATES: COMPARATIVE EVOLUTION OF IMPORT PRICES

(1947-49 = 100)

Year	Total	For imports from Latin America
1950.........................	109	125
1951.........................	137	147
1952.........................	130	147
1953.........................	124	147
1954.........................	126	160
1955.........................	125	148

Source: Statistical data supplied by the United States Department of Commerce.

The reasons for this disparity are easily to be discovered. In the first place, the unit price of aggregate United States imports is an average figure for an immensely wide range of articles, and is affected by the prices of manufactured goods, which did not rise as much as those of raw materials. Among imports from Latin America some few products are pre-eminent. Of the principal items, coffee, cacao and copper at times attained very high price levels, while quotations for petroleum remained steadily above normal and even increased in 1953. When the tension caused by rearmament was relaxed and prices for certain metals consequently declined, those of two foodstuffs, coffee and cacao, demand for which outstripped supply, continued to rise and more than offset the decreases registered for some of the other products.[1] Relative prices have thus been more favourable to Latin America than to other regions in trade with the United States. And a more important development than this comparative advantage has been the upward movement in quotations for Latin American products which has raised the region's own terms of trade with the United States to very satisfactory levels. (See table 4.)

Table 4

UNITED STATES: TERMS OF TRADE

(1947-49 = 100)

Year	With Latin America	With the world	Percentage difference in favour of Latin America
1947..............	108	108	...
1948..............	100	100	...
1949..............	95	97	2.1
1950..............	74	87	17.6
1951..............	72	79	9.7
1952..............	72	89	23.6
1953..............	73	87	19.2
1954..............	66	93	25.5
1955..............	72	85	18.0

Source: Statistics supplied by the United States Department of Commerce.

All this means that in recent years Latin America's productive effort has proved more profitable, since the capacity of its exports to pay for purchases from the United States is increasing while at the same time the productive effort required of it is less. Attention must be called, however, to the fact that this trend has become manifest over a relatively short period, during which abnormal factors of international scope have made their influence felt. The improvement has not yet been sufficient for price indices to have regained, in the years under review, the high levels reached before the long pre-war decline.

3. THE VOLUME OF IMPORTS AND THE ELASTICITY OF DEMAND

It is impossible to disregard the negative aspect of the question constituted by the trend of the volume of im-

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[1] Moreover, the over-all index for total imports includes prices of Latin American products, and has remained at high levels partly on their account. A price index which excluded Latin American products would show the trend in each sector more clearly.

ports, especially as the contraction registered may be due to structural causes which over the long term would affect the outlook for Latin America as regards the foreign trade of the United States.

A major proportion of imports from Latin America consists of foodstuffs, mainly unprocessed; these ac-counted for 63 per cent of the whole in 1954, having represented 58 per cent in 1950 and only 47 per cent in 1940. Hence there has been a gradual falling-off in the relative importance of raw materials and semi-manu-factured products, demand for which is directly linked to industrial activity. (See table 5.)

Table 5

UNITED STATES: VOLUME OF IMPORTS OF SELECTED LATIN AMERICAN PRODUCTS

(1947-49 = 100)

Year	Coffee	Cacao	Sugar	Wool for clothing	Wool for carpets	Copper	Tin	Crude petroleum
1936-38	65	100	61	17	28	41	a	27
1951	96	84	86	96	34	93	64	126
1952	94	78	86	64	42	116	62	134
1953	97	92	84	81	71	99	91	126
1954	76	95	81	26	47	90	62	134
1955	85	99	83	21	56	101	48	154

Source: United States Department of Commerce, *Indexes of United States Trade with Latin America; Foreign Commerce Weekly,* 16 April 1956.
ᵃ Less than 0.5. Bolivian tin was refined exclusively in Great Britain before the Second World War.

The indices for certain staple products as shown in table 5 reveal a decrease in the volume of foodstuffs. Although such reductions are not very marked, their influence is magnified because they carry increasing weight within the whole. And they are taking place just when a rise in income in the United States is being recorded. Again, in certain exceptional cases, it can be observed that price-elasticity has played a decisive role. A well-known example is the case of coffee in 1954. The reaction of United States consumers to the high prices of this commodity took the form of a deliberate restriction of demand.

The smaller volume of imports was not of course reflected in a decrease in the income of exporter countries where all products were concerned. In some instances, the rise in prices more than offset the contraction in volume, whereas in others it failed to do so; and there were cases — those of petroleum and zinc — where the higher prices and larger volume actually raised receipts. As has already been shown, the final outcome was an increment in the total value of Latin America's exports to the United States.

More significance attaches to the decline undergone by the volume of imports of raw materials and semi-manufactured products at the very time when an expansion of industry is taking place in the United States. This fact calls for fuller explanation. It may well be asked why Latin America, whose exports and income have tra-ditionally displayed such great sensitivity to the fluctua-tions of income and industrial activity in the United States, has not benefited by the expansion registered in the last few years, at least as far as the volume of its sales is concerned.

A cursory examination of the way in which income and industrial production have expanded in the United States will show how far these two factors may be re-garded as linked to the demand for Latin American products.

To approach the subject first from the angle of con-sumer expenditure, whereas in 1947 as much as 56.4 per cent of income available for consumption was used for the purchase of non-durable goods, this proportion had fallen to 52 per cent by 1950, to 51.1 per cent by 1954 and by 1955 to 50 per cent. The normal tendency when income rises in highly-developed countries is to spend a larger share on durable goods and services, apart from the sums used for investment purposes. Such a trend was bound to be detrimental to imports of Latin American products, two-thirds of which consist of foodstuffs.

Neither has the recent expansion of United States in-dustry, which might have promoted a greater demand for raw materials from Latin America, been of a kind to result directly in their increased use. In the first place, the observation already made in connexion with con-sumer expenditure is confirmed by the fact that the growth of industrial activity has been less intensive in the non-durable than in the durable goods group, including production goods. (With 1947-49 as base years, the over-all index for manufactures in 1955 was 139; for durable goods it was as high as 155, and for non-durable goods 126.) Few Latin American products are destined for the durable goods industry, which absorbs only copper, iron ore and certain other metals from this source. Of the raw materials in question, the major share goes to the non-durable goods industries, mainly textiles, leather manufactures and processed foodstuffs.

But the behaviour of those branches of industry where Latin American raw materials can be utilized, as far as can be judged from the fluctuations of the United States industrial output index, does not seem to have been cal-culated to encourage imports, since the indices for several of these industries are lower than they were four years ago.

Great interest would attach to a precise assessment of the quantitative relationship between industrial activity in the United States and imports of raw materials and semi-manufactured products from Latin America. To this end, detailed research into the former country's input-output ratios would be of value. The nearest imme-diate approximation to such a study—which is of a long-term nature—would be to consider the weight within the over-all index of each of those branches of industry whose input presumably includes raw or semi-manufactured materials from Latin America, and, further, to determine

how intensive has been the participation of these branches in the recent expansion of United States industry. This is what table 6 attempts to show.

It should be noted, in the first place, that the sum of the weight coefficients for the activities consuming Latin American products barely amounts to 5 per cent of the total. It is impossible to define exactly how far the conclusions that might be drawn from the above indices are invalidated by this fact; the determinants of the volume of United States purchases from Latin America are undoubtedly spread over a variety of related activities, many of which do not appear in the table. But one significant point is apparent from the statistics. A substantial proportion of the industries using raw or semi-manufactured materials from Latin American sources failed to share in the industrial expansion registered in the United States economy as a whole, and even suffered considerable setbacks. However inadequate the statistical data, this evidence partly accounts for the contraction in United States imports from Latin America.

Table 6

UNITED STATES: INDICES OF INDUSTRIAL PRODUCTION

(1947-49 = 100)

Branches of industry	Weighting	1950	1951	1952	1953	1954	1955
Iron ingots	0.37	113	123	107	130	101	134
Non-ferrous metals	1.67	115	126	116	129	120	146
Tinplate	0.30	123	120	122	129	131	142
Woolen textiles	0.97	100	97	85	78	66	79
Carpets	0.31	110	78	90	86	71	79
Cowhide manufactures	0.29	94	87	87	92	92	99
Cane sugar	0.11	111	102	109	113	106	113
Chocolate and confectionery	0.71	104	102	102	102	99	101
Cigars	0.17	97	101	105	107	105	104
TOTAL	4.90						

Source: Federal Reserve Bulletin.

4. FOREIGN COMPETITION

A salient question that remains to be considered is that of competition from other supplier countries. The geographical distribution of United States imports has undergone several changes during the last twenty years, chiefly, of course, as a result of the Second World War, which deprived two continents—Europe and Asia—of their pre-eminent status as suppliers of the great United States market. Latin America stepped in to fill a part of the gap thus left, and it was in this way that its contribution to the whole rose in value from 23.8 per cent in 1936-40 to 36.5 per cent in the first five years after the war. Canada, too, greatly benefited by the new direction of trade; and the position of Oceania and Africa also improved.

But the second five years of the post-war period witnessed a further change. The process of reconstruction tended to restore Europe to its former place. The share of Canada continued to increase, and that of Africa was consolidated. In contrast, Latin America seems to have lost ground in relation to the other regions.

Table 7 expresses the total value of imports in percentage terms, and provides some basis for the appraisal of the modifications that have taken place, though it cannot be considered an entirely satisfactory means of assessing them. The figures corresponding to Latin America are somewhat distorted by the high prices of its products after the Korean War, and it has already been seen how marked was the decline in the volume of its sales to the United States.

Table 7

UNITED STATES: GEOGRAPHICAL DISTRIBUTION OF IMPORTS

(Percentages of total value)

	1936-40	1946-50	1951	1952	1953	1954	1955
Africa	3.3	5.6	5.4	5.7	5.5	5.9	5.4
Asia	31.6	18.7	18.8	16.9	15.0	14.4	16.4
Canada	14.8	21.5	20.8	22.3	22.7	23.3	23.3
Europe	25.3	15.2	18.6	18.9	21.5	20.4	21.6
Latin America[a]	23.5	36.5	33.3	33.9	33.6	34.4	30.8
Oceania	1.5	2.5	4.1	2.3	1.9	1.6	1.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistical Abstract of United States, 1955, and United States Department of Commerce, *Statistical Reports,* Part 3, No. 56-13, 1956.

[a] The inclusion of European possessions in this table raises the percentages approximately two points higher than the figures for Latin America alone.

Available figures for 1955 are less favourable to Latin America in this context. Although the prices of its products were still relatively higher than the average level for United States imports, the region accounted for a smaller percentage of the total value.

This is apparently due to a combination of several factors. On the one hand, United States demand for manufactured products, stimulated by the rise in income, has been to some extent deflected abroad, as not all domestic industries have been able to meet the substantial increase in the orders placed by consumers. Probably, too, there has been a tendency to look to foreign markets for luxury or more highly-finished goods. Again, in the case of foodstuffs and raw materials—which constitute almost 90 per cent of imports from Latin America—the positive influence exerted only by certain very active industries was not strong enough to offset the effect of two negative factors. These were (a) the success of Latin America's effort to place elsewhere (especially on the European market) a part of its exports for which it was unable to find a satisfactory sale in the United States, either because of their price, or in consequence of bilateral agreements, or on account of the saturation of the United States market;[2] and (b) competition with similar products from other regions, a problem which will now be examined.

5. RELATIVE POSITION OF SOME STAPLE PRODUCTS

It is a rather hazardous undertaking to generalize as to the nature and scope of the influence which fluctuations in demand have exerted on the relative position of Latin American products in the United States market. A special study of each product would have to be carried out to determine a number of different factors, including, among others, changes in consumer habits, measures for quantitative control, competition with products from other sources and replacement by less expensive articles, technological progress, voluntary restriction of consumption in face of price increases, etc. In some cases it would also be necessary to take into consideration the inelasticity or limitations of supply, and, above all, to try to separate factors of a structural character from those whose operation or influence is purely circumstantial.

Until such time as the problem can be more thoroughly analysed, all that is attempted here is an indication of those changes of position which are reflected in the available statistics, and which suffice to give a preliminary idea of what has taken place over a relatively long term.

Only a few products—at least among the staple items —have maintained or improved their relative position. Bananas virtually monopolized the market throughout the whole period; there was very slight competition from the African product in 1953. A substantial improvement was recorded for residual petroleum, a threefold increase in the total volume imported coinciding with the doubling of the percentage share in foreign supplies to the market. Sales of iron ore also increased both in total volume and in percentage terms, although the relative position was better in 1952-54 than in 1955, owing to the expansion of consumption and the progress made by other foreign producers. The situation of cacao, on the other hand, improved only in relative terms, as, although competition

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2 Specific cases in point would be those of copper, coffee and sugar, and perhaps that of wool.

from the African product was less keen, the volume of sales attained in 1950 was not equalled in the five succeeding years. The case of zinc ore provided a slight contrast with the foregoing examples. The total volume imported by the United States increased sharply and substantially, especially in 1952 and 1954, but in the five years subsequent to 1950 Latin America maintained its relative position more or less successfully; in other words, the effect of competition was imperceptible.

It must, however, be pointed out that these five products, which were apparently unaffected by competition, could do little to modify the general downward trend of United States imports of Latin American products. Their aggregate value represented only 6.8 per cent of the total in 1955, as against 5.5 per cent in 1950.

The impact of competition on most imports was patent. A case in point is that of coffee, whose importance within the total is great, and whose percentage share in terms of volume gradually declined from 95 per cent in 1950 to 88 per cent in 1955. The import item most seriously affected under the regulations in force was Latin American sugar, whose contribution to the total imported by the United States fell from 87 per cent in 1950 to 75 per cent. Competition also made itself felt in that an increase in the volume of aggregate imports was accompanied by a 5-per-cent decrease in the volume of those from Latin America; this is mainly to be attributed to the quantitative regulations applied by the United States to imports of sugar.

Wool from Latin America also lost ground in relation to that exported by other suppliers, though all suffered the adverse affects of the contraction of demand. In relative terms, only 36 per cent of United States imports of wool in 1954 and 1955 came from Latin America, as against 46 per cent in 1950, while the volume imported from this source dropped to less than half that registered in the latter year. Domestic production remained stationary, and did not therefore contribute to the reduction of the market for Latin American wool. There can be no doubt that the main reason for the curtailment of United States demand was competition from textiles made from artificial fibre, which in a few years have gained a secure footing in several consumer sectors.

The position of another fibre of Latin American origin —henequen—also varied greatly as a result of competition from sisal hemp from other foreign sources. Between 1950 and 1953, its share in the total volume imported by the United States fell from 88 to 41 per cent; a recovery then set in, and according to preliminary data for 1955, the figure reached in this last year was 69 per cent.

As regards crude petroleum, although Latin America's contribution decreased (from 80 per cent in 1950 to 56 per cent in 1955), the total volume continued to expand.

Copper also constitutes a special case. Less was imported by the United States (56 per cent of the total in 1954 as against 62 per cent in 1950 and 71 per cent in 1952), but the deflecting of Latin American production towards other markets carried decisive weight within a total volume that was subject to marked fluctuations.

Lead from Latin America was doubly handicapped, by a reduction in world demand and by competition from other suppliers. Much the same was true of tin, except that the contraction of demand made itself felt only from

1954 onward, and affected Latin America more than other producers.

The proportion of nitrogenous fertilizers for which Latin America accounted, after dropping from 63 per cent in 1950 to 31 per cent in 1953, showed a tendency towards recovery, within a volume which in the main exceeded that recorded for the base year. (See table 8.)

Table 8

UNITED STATES: RELATIVE POSITION OF IMPORTS OF SELECTED LATIN AMERICAN PRODUCTS

(Percentages of total volume)

Products	1950	1954	1955
Foodstuffs			
Coffee	95	91	88
Sugar	87	74	75
Cacao	45	51	55
Bananas	100	100	100
Fibres			
Wool	46	36	36
Sisal hemp	88	54	69
Fuels			
Residual petroleum	22	39	44
Crude	80	61	56
Minerals			
Iron	42	61	47
Copper	62	61	56
Lead	55	32	44
Zinc	61	59	60
Tin	60	59	50
Nitrogenous fertilizers	63	47	51

Source: Data supplied by the United States Department of Commerce.

6. VARIATIONS IN INCOME BY PRODUCTS

Hitherto, attention has chiefly been devoted to fluctuations in the volume of United States imports of Latin American products. As a reflection of productive effort and of the degree to which it is absorbed by a given market, the concept of volume undoubtedly suffices.

From the standpoint of the income accruing to exporter countries, the products considered could be divided into three categories, as follows: (a) those which enjoyed the double benefit of an increase in value and in volume; (b) those which registered an increment in value only; (c) those affected by a decline in both.

The first group comprises petroleum—crude and residual—iron ore and zinc; and in the period 1950-55 represented on an average 16 per cent of total imports from Latin America.

The second category is made up of coffee, cacao, bananas, copper, tin and nitrate. This group is the most important of all, owing to the heavy preponderance of coffee, and embraces 50 per cent of the value of United States imports from Latin America.

The third group includes sugar, wool, sisal hemp and lead, whose aggregate value fluctuated between 15 and 20 per cent of the total over the period under review.

If the 1950 figures are taken as base, the cumulative increment in the income accruing to the exporter countries of Latin America from their exports to the United States totalled 2,274 million dollars. Of this sum only 700 million were contributed by the group of products of which a larger volume was sold at higher prices. The bulk of the increase—1,850 million dollars—derived from those commodities which had the advantage of a rise in prices although the volume of sales contracted. But of this increment almost three fourths was accounted for by a single product, i.e., coffee. Thus, if coffee were excluded from the total, the income distribution pattern would be substantially different.

The fall in receipts deriving from the group of staple products that were doubly affected (both in value and in volume) amounted to 586 million dollars. (See table 9.)

Hence it is plain that during 1951-55 the increase in Latin America's dollar earnings from its sales to the United States was virtually concentrated in three products, namely, coffee, petroleum and copper.[3] This implies a very uneven geographical distribution of the profits obtained by the region as a whole.

From the above analysis it would be impossible to deduce any definite conclusions as to future trends. The period reviewed, during which Latin America's trade with the United States seems to have levelled off, is a short one (1950-55), and circumstantial factors played an important role in determining the volume as well as the prices of Latin American exports. The trend of United States imports from Latin America over the long term—i.e., from 1900 to 1950—reveals an upward movement in both value and volume which more or less kept pace with the expansion of industrial production in the United States, although the rate of growth of total United States imports was distinctly lower. Whether United States imports from Latin America will resume this long-run pattern will depend to a considerable degree not only on the impact of technological changes but also on commercial policy in the United States, as well as on Latin America's ability to adapt its exports to changes in the structure of U. S. imports. For the present, the best prospects seem to be for certain raw materials and by-products, including crude petroleum, bauxite, iron ore, ferro-alloys, titanium and some of the "atomic metals", such as zirconium, uranium, etc.

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[3] The exact figure was 2.171 billion dollars out of a total of 2.274 billion.

Table 9

UNITED STATES: VARIATIONS IN THE VALUE OF IMPORTS FROM LATIN AMERICA

(Millions of dollars)

		Increases or decreases in relation to 1950				
	1951	1952	1953	1954	1955	*Total*
First group[a]						
Crude petroleum	—	29	36	69	103	237
Residual petroleum	—5	6	31	48	85	165
Iron ore	10	27	34	56	66	193
Zinc ore	10	58	9	16	8	101
TOTAL	—15	120	110	189	262	696
Second group[b]						
Coffee	253	251	325	314	182	1,325
Cacao	—8	—15	—7	49	11	30
Bananas	—2	—1	11	9	10	27
Copper	42	137	113	64	88	444
Nitrate	5	6	1	5	—	17
Tin ore	9	4	12	—6	—10	9
TOTAL	299	382	455	435	281	1,852
Third group[c]						
Sugar	—16	—6	—11	—33	—26	—92
Wool	28	—90	—65	—124	—117	—368
Sisal hemp	16	—4	—20	—19	—17	—44
Lead ore	—40	29	—16	—35	—20	—82
TOTAL	—12	—71	—112	—211	—180	—586
GRAND TOTAL	302	431	453	413	363	1,962
OVER-ALL TOTAL[d]	438	501	532	379	424	2,274

Source: Data supplied by the United States Department of Commerce.
[a] Increase in both volume and value.
[b] Increase in value only.
[c] Decrease in both volume and value.
[d] Including the remaining products not specifically mentioned.

EXPORTS AND PRICES OF SOME PRODUCTS

I. COTTON

The most significant feature of the world market situation in the first half of the present year, as far as cotton was concerned, was the new system adopted by the United States to liquidate its cotton surpluses. The decision to take this step was based firstly on the need to prevent the greater part of such surpluses from continuing to pile up on the hands of the United States Commodity Credit Corporation (C.C.C.), and secondly on the desire to restore the country to its former position in the world cotton trade. The latter objective implies an attempt on the part of the United States to regain its former export levels of approximately 5 million bales annually, after a period of several years during which the volume in question definitely declined.[1]

The concern caused by this new sales policy among the other producer countries is due to the change it involves in immediate market availabilities of cotton. The system of guarantee prices prevailing in the United States had in fact enabled the other producer countries to compete favourably, as regards prices, with United States manufacturers of similar fibres, so that in recent years a considerable proportion of each crop had had to be purchased and stored by the C.C.C. As, moreover, this organization was not authorized to sell its inventories at less than 105 per cent of the guarantee price, these stocks in practice never reached the market.

The new sales policy (which in reality was already being applied at the end of 1955, although only to a limited quantity of short-fibre cotton) radically alters the situation described. All the stocks in possession of the C.C.C.[2] now constitute market availabilities, which can be sold abroad at prices capable of competing with those of fibres from other sources. Consequently, at the present time two price levels exist for United States cotton, one for the domestic market, where the minimum is the guarantee price, and another for the world market.[3]

For producers in other regions this change in United States sales policy has a twofold significance. It will result on the one hand in the substantial increment in market availabilities noted above, and on the other, in the disappearance of the United States system of guarantee prices as a "protective" standard for cotton prices on the world market. Hence there will be keener competition among the various producer countries to secure a larger share in a market which has not expanded at the same rate as production. It is possible that a fall in world market prices may encourage consumption, but, unless and until such a development takes place, the possible expansion

in the volume of United States exports will mean a contraction in the sales abroad effected by its most direct competitors, above all, Brazil, Mexico and the Central American Republics. This becomes still more evident if the advantageous terms that the United States can offer purchasers by virtue of Act 480 are taken into consideration.[4] However, it may be that the new sales policy will indirectly help to slow down the rate of expansion of cotton production both in the United States and elsewhere, in so far as lower world market prices lead to a reduction of the areas under cultivation. In the United States legislation has been passed making such a reduction compulsory, but the noteworthy increase in yields has offset the effects of this measure. The latest United States agricultural legislation provides for further plantation restrictions and also for a small cut in the guarantee price.

The increment in United States inventories has been striking in recent years, and the major share is held by the C.C.C. (See table 1.) Stocks in other countries, which registered only negligible fluctuations during 1952-55, had decreased considerably by the close of the trade year 1955-56, although the volume of production remained almost the same as in the preceding year, and no increase in consumption was recorded.

Attention must be called to the fact that although consumption has steadily expanded over the recent period, in the United States, far from rising, it has been more inclined to decrease in specific years. This is partly attributable to the rapid development of the artificial fibre industry, which has fostered a progressive substitution process. For certain industrial purposes cotton has been entirely replaced by rayon.[5] The former product is increasingly used for domestic articles — paper for tablecloths, towels and face tissues — while plastic materials are preferred by the consumer for curtains, waterproofs, upholstery, and so on. Furthermore, this substitution process has been encouraged by the gradual but steady change in the relative prices of cotton and artificial fibre in favour of the latter, as a result of the growing number of technological advances achieved during the last few years.

The effects of the new United States sales programme on Latin America's cotton exports cannot yet be appraised in their entirety, partly because data on these exports are limited to the first three or four months of 1956 (when the programme in question was only just being put into effect) and partly because shipments of cotton sold under the new conditions will begin as from August.

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[1] From August 1953 to July 1954 total United States exports of cotton amounted to 3.8 million bales; in the subsequent period (1954-55) they fell to 3.4 million and for the year 1955-56 the corresponding figure was only 2.3 million bales.

[2] 8.2 million bales in June 1955 and 10.0 million in June 1956.

[3] The guarantee price is about 0.35 dollar cents per pound for Middling 15/16. On the world market—in accordance with the sales effected up to last June under the new programme—the average was 0.25 dollar cents per pound for cotton of the same quality.

[4] During the fiscal year beginning in July 1955 and ending in June 1956, United States cotton exports under the Act in question amounted to 468,000 bales, that is, more than one fifth of total exports of this commodity.

[5] In the United States 610,000 bales of cotton were used in 1939 for the manufacture of tires. In 1955 the amount of cotton earmarked for such purposes was virtually negligible, whereas total consumption of rayon for tires was equivalent to one million bales of cotton.

Table 1

COTTON: PRODUCTION, CONSUMPTION AND STOCKS

(Millions of bales)

	1952-53[a]	1953-54[a]	1954-55[a]	1955-56[a]
World production[b]				
United States	15.1	16.4	13.6	14.5
Other countries	13.7	13.9	16.0	15.8
TOTAL	28.8	30.3	29.6	30.3
World consumption[b]				
United States	9.4	8.6	8.8	9.2
Other countries	16.5	18.3	18.8	18.8
TOTAL	25.9	26.9	27.6	28.0
Stocks at end of year				
United States	5.6	9.7	11.2	14.4
Other countries	9.9	9.2	9.4	7.4
TOTAL	15.5	18.9	20.6	21.8
Stocks held by C.C.C.[c]	2.0	7.0	8.2	10.0

Sources: International Cotton Advisory Committee, *Monthly Review of the World Situation;* United States Department of Agriculture, *The Cotton Situation.*

[a] Trade years August-July.

[b] Excluding the People's Republic of China, the Soviet Union and the countries of Eastern Europe.

[c] Commodity Credit Corporation.

Nevertheless, it is important to point out that according to preliminary information, the C.C.C.'s sales already amounted to 3.1 million bales, or, in other words, exceeded total exports for the trade year which ended in July.[6]

It should be noted, however, that exports from Mexico and Peru were still substantially larger in the first three months of 1956 than in the corresponding quarter of the preceding year. Between these two periods Peru's exports rose from 12,247 to 18,337 tons (a 50-per-cent increment), while Mexico's increased from 57,172 to 130,292 tons (i.e., by 127 per cent). In contrast, a sharp decline was registered in exports from Brazil, which had to be temporarily suspended on account of the partial failure of the Brazilian harvest. No information is available on the volume exported by the Central American countries, but in some cases exportable surpluses for the current years are known to be smaller than in 1955.

II. COFFEE

During most of 1955 the world coffee market underwent the depressive influence of discouraging forecasts as to its capacity to absorb the whole of the chief producer countries' export availabilities, and the resultant expectation of a period of sharp price declines. This situation induced the Inter-American Economic and Social Council to carry out a study on coffee market prospects. One of its most important conclusions took the form of a recommendation that negotiations be set afoot between the governments of the producer and consumer countries for the signing of an international agreement which would guarantee some degree of price stability, while at the same time setting up proper machinery for the methodical liquidation of surpluses.[7]

However, the evolution of the market during the first six months of the current year was not quite what had been anticipated, owing to those classic unknown quantities which affect agricultural production — weather conditions. Both in Colombia and in certain Central American countries, the crops suffered the effects of a long period of heavy rainfall, which not only reduced yields, but made it difficult to transport the coffee from the producer areas to the ports of embarkation. Consequently, market availabilities of the milder grades of coffee for immediate delivery not only decreased in the first six months of 1956, but are expected to be still smaller in the next trade year. A considerable decline in Brazil's exportable surpluses is also anticipated, but the large volume of stocks outstanding from previous years has prevented prices for the grades of coffee produced by this country from following the same upward trend as quotations for the milder varieties.[8]

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[6] See information in the *Journal of Commerce*, New York, 13 August 1956.

[7] The decision of the Government of the United States not to accede to an agreement of this kind constituted a serious obstacle to the plans in preparation, since the United States is the largest consumer country. However, almost all the producer countries have expressed their determination to continue promoting such studies as may enable an international agreement to be concluded, even though the need is not considered so very pressing over the short term.

[8] Nevertheless, estimates of the current crop (that is, of exportable surpluses for the trade year 1956-57), as calculated by the competent organizations in the United States and the producer countries concerned, indicate greater differences than in other periods. In United States coffee trade circles, it has been pointed out that traditionally this country's forecasts have tended to overestimate, and those of the producer countries to under-estimate, the real volume of exportable surpluses. It should, however, be recognized that in the present situation the United States import trade has based its activities on the smaller export availabilities estimated for both Brazil and Colombia.

At the close of the first half of the year, the world market situation displayed two clearly defined features. On the one hand there was a relative shortage of the milder grades of coffee (produced mainly in Colombia and Central America); on the other, a substantial increase could be noted in inventories of the inferior grades (grown chiefly in Brazil and Africa). And as a result of this change in immediate availabilities, the scale of prices for the different grades of coffee was modified in the direction of considerably higher quotations for the mild varieties.

Difficulties nevertheless exist. The rise in prices for the milder grades of green coffee have led to successive increases in the price of the roasted beans, and the industry is once again faced with a situation not unlike that of 1954, when the high prices provoked consumers to strong protest and a reluctance to buy that ultimately affected the demand for this commodity. Although the

price level regarded as critical for the consumer (1.15 dollars per pound for average grade packed coffee) has not yet been reached, by the end of June quotations already stood at 1.10 dollars per pound, and were therefore approaching the point at which every further price increase leads to a proportionally larger falling-off in consumption.

By mid-1956 there were as yet no symptoms of a weakening of demand. Total imports for consumption in the United States amounted to 11.2 million sacks (24 per cent more than in the first half of 1955), while a preliminary estimate of world imports during the first five months of the year indicated a total of about 16 million sacks (21 per cent more than in the previous comparable period). As regards United States imports, the increment was reflected partly in the growth of stocks (which in mid-1955 had fallen to their lowest levels) and partly in increased consumption. According to the latest figures, *per capita* consumption, which had stood at 14.7 pounds in 1954, rose to 15.1 in 1955 and 15.6 in the early months of 1956.

From the standpoint of the exporter countries, the main features of the situation were those already described; availabilities of inferior grades of coffee were considerably greater, and the better grades were in relatively short supply. At the end of June the Brazilian crop amounted to 22 million sacks, whereas in June 1955 only 14.5 million sacks had been recorded. Although Brazil's exports during the first six months of 1956 were 63 per cent higher than in the corresponding period of 1955, export availabilities were estimated at 11.0 million sacks at the end of June as against 7.0 million twelve months before. In Colombia,
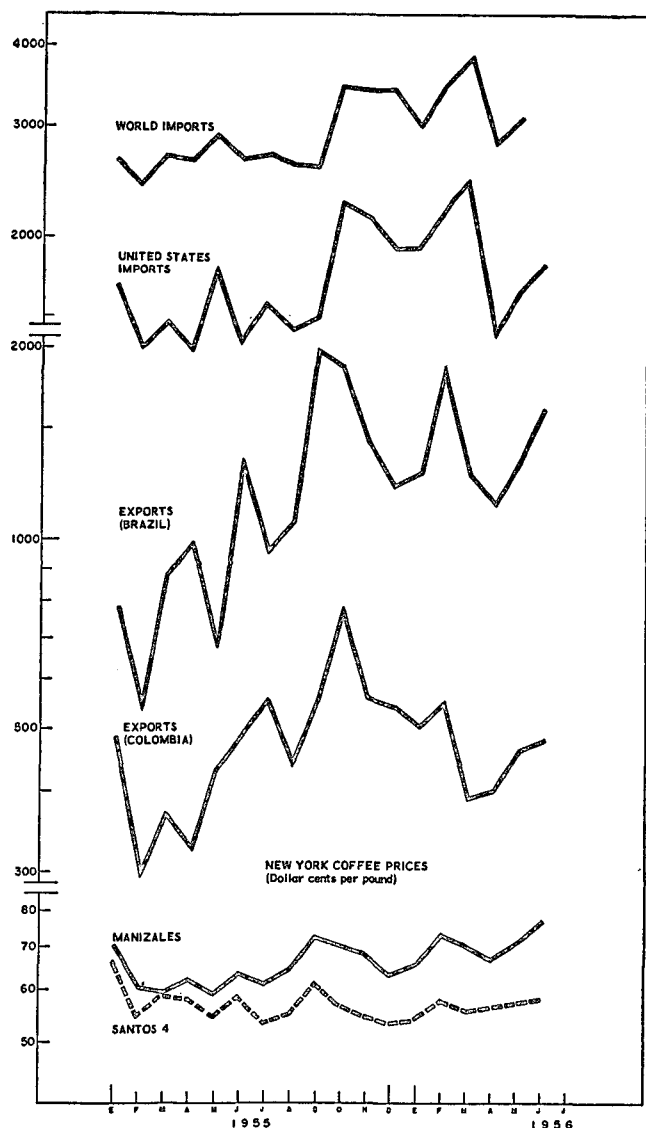
Figure I

COFFEE

(SEMI-LOGARITHMIC SCALE)

Table 2

COFFEE: PRODUCTION, IMPORTS, EXPORTS AND PRICES

(Millions of sacks)

	1954/55	1955/56
Exportable production[a]		
Brazil	14.2	21.0
Colombia	5.7	5.5
Others	13.7	13.7
World total	33.6	40.2
Imports	*1955*	*1956*
World total[b]	13.2	16.0
United States[c]	9.0	11.2
Exports		
Brazil[c]	5.2	8.5
Colombia[c]	2.4	2.8
Stocks on 30 June		
Brazil	7.0	11.0
Colombia	2.4	1.6
New York prices[d]		
Santos No. 4[e]	58.5	56.5
Manizales[e]	62.4	70.7

Sources: Merrill Lynch and Co., *Weekly Coffee Letter*, New York: G. Gordon Paton, *Complete Coffee Coverage*; United States Department of Agriculture, *Foreign Crops and Markets*.

[a] The exportable production shown here is that marketed in the appropriate coffee year. Discrepancies between the estimates made by the United States Department of Agriculture and those of official organizations in the producer countries correspond to the crops which will be marketed in the year 1956/57.

[b] January-May.

[c] January-June.

[d] Dollar cents per pound.

[e] Average for January-June.

on the other hand, the increase in the volume of exports, which was 17 per cent larger in the first half of 1956 than in the comparable period of 1955, combined with the smaller harvest to reduce inventories from 2.4 million sacks at the end of June 1955 to 1.6 million at the corresponding date in 1956.

Table 2 and figure I sum up the market situation during the first six months of the year as compared with the position in the corresponding half of 1955. It may be noted that, while the increment in Brazil's exports was really remarkable, their average price slightly declined; whereas in Colombia's case a relatively large price increase was accompanied by a more moderate expansion in exports.

This discrepancy in the evolution of prices was determined by two contributory causes. Not only did the position as to exportable surpluses vary from one country to another, but also psychological market factors came into play. Changes in Brazil's export exchange policy gave rise to frequent rumours of modifications of the exchange rate applicable to exported coffee. Although such rumours proved unfounded, their influence on the market was patent. Another source of uneasiness—also belied by subsequent events—was the idea that the Government would probably take steps to liquidate the stocks held by the Commissão de Financiamento da Produçã (an official body). There was also talk of a possible devaluation of the Colombian peso (in consequence of this country's balance-of-payments difficulties and its heavy trade debts), but the smaller export availabilities of coffee and the adoption of measures to reduce the amount of payments in arrears helped to impart greater stability to the market.

III. Cacao

There was a certain similarity between the market situation for this product and that described for coffee. The spectacular rise in prices during the first half of 1954 substantially curtailed consumption of both commodities, and quotations on the world market consequently declined. However, in the case of cacao the downward trend in prices was both sharper and more prolonged than in that of coffee, and former consumption levels were more slowly regained. As the supply situation simultaneously improved in the main producer countries, the carryover from the last harvest was relatively large, and thus helped to keep prices down. During the first half of 1956, London and New York quotations were lower than in the preceding five-year period, and barely comparable with those prevailing in the first six months of 1950. (See figure II.)

Nevertheless, it must be noted that although the present flow of supplies is considerably in excess of consumption, the policy of industrial consumers is to maintain price levels for the product delivered to the final consumer. In other words, the substantial drop in quotations for cacao pods was not reflected in lower prices for the processed product or in a proportionate growth of consumption, partly because it was offset by the rise in the prices of the other ingredients involved, and partly because the substitute products introduced during the previous boom are still being utilized. Only to a very small extent has the consumer indirectly benefited by the current low prices of cacao pods through an increase in the size or net weight of the final product, and this in the case of such articles as had undergone reductions in consequence of the higher price of cacao.

The market situation is summed up in table 3. It may be noted that a strong influence was exerted by the wide fluctuations in stocks, this having been in the last two years the fact chiefly responsible for the depressed level of cacao prices on the world market.

For Brazil, the largest Latin American producer, the market situation was very favourable in the first half of the year. Production in 1954/55 was calculated at 150,400 tons, and for 1955/56 was estimated at 172,700.

Exports during the first quarter of 1956 amounted to 29,000 tons, that is, 39 per cent more than in the corresponding period of 1955. For the whole of this latter

Figure II

CACAO: NEW YORK PRICES

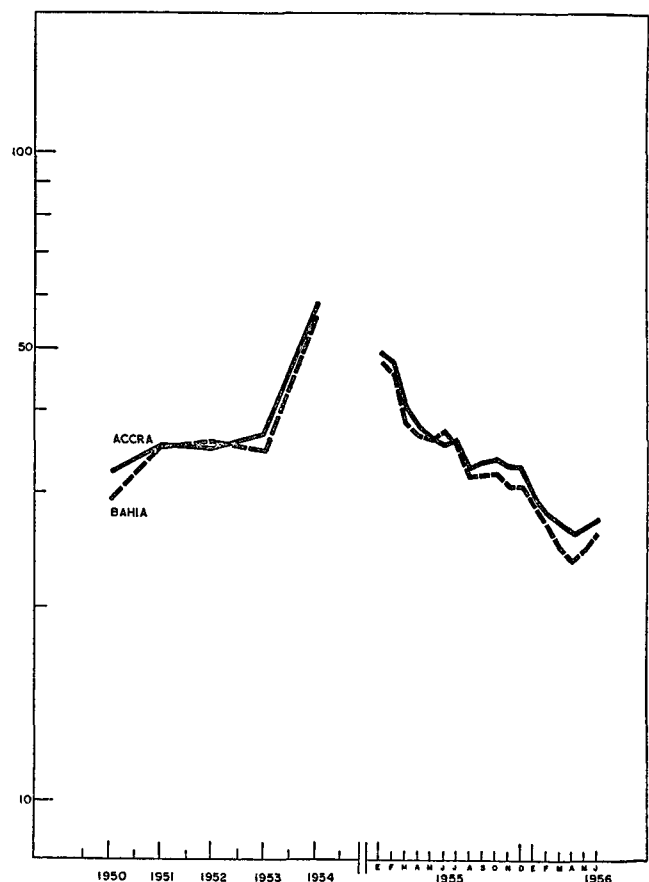*(Dollar cents per pound)*

(SEMI-LOGARITHMIC SCALE)

Table 3

CACAO: MARKET SITUATION

(Thousands of tons)

Year	World production	World consumption	Annual variations in stocks (percentages)
1953	799	801	—2
1954	765	739	26
1955	809	715	92
1956[a]	841	787	53

Source: *Cocoa Market Report*, No. 99, London, 24 July 1956.
[a] Preliminary data.

year Brazil's exports totalled 122,000 tons, so that if the high level recorded for the first quarter is maintained throughout the rest of 1956, the year's total will be considerably larger than for 1955, especially if it is borne in mind that from April to September, Brazil is the chief source of supply.

No recent data are available on exports from other countries which are producers on a small scale, with the exception of Ecuador, where approximately the same figure was reached as in the first quarter of 1955, and the Dominican Republic, where there was a drop of nearly 50 per cent between the two comparable periods in question.

IV. WHEAT

Two unusually significant events characterized the evolution of the world wheat market in 1956. For the first time since 1953, there was no appreciable increase in total stocks of this cereal in the main producer countries; and a group of traditional exporters (the Soviet Union and some of the republics of Eastern Europe) entered the market as purchasers of large quantities of wheat.

The first of these developments is clearly reflected in

the figures appearing in tables 4 and 5. Total availabilities in three of the principal producer countries (the United States, Canada and Australia) had increased at exceptionally high rates during 1953 and 1954; there had also been a substantial increment in Argentina's stocks, but most of this merely represented a recovery in that country's production of cereals, which had been seriously affected by drought in previous years. In mid-1955 stocks were still growing, though at a much slower

Table 4

WHEAT: STOCKS IN THE FOUR MAIN EXPORTER COUNTRIES[a]

(Thousands of tons)

Year	United States	Canada	Argentina	Australia	Total
1945-49[b]	5,253	3,919	2,340	1,306	12,819
1950	11,567	3,511	1,388	2,694	19,160
1951	10,777	6,015	1,252	2,014	20,058
1952	6,967	7,076	136	1,388	15,568
1953	15,295	11,648	3,429	1,959	32,333
1954	24,576	16,956	3,103	3,592	48,227
1955	27,924	14,152	3,620	3,511	49,207
1956	28,032	15,078	2,232	4,164	49,506

Source: United States Department of Agriculture, *The Wheat Situation*.
[a] On 1 July of each year.
[b] Average.

Table 5

WHEAT: UNITED STATES STOCKS, PRODUCTION AND CONSUMPTION

(Thousands of tons)

Year[a]	Stocks[b]	Production	Total supply	Total domestic consumption	Net exports	Stocks held by C.C.C.[b]	Stocks held by C.C.C. as percentage of total
1951	10,777	26,889	37,667	18,643	12,057	5,650	52,4
1952	6,967	35,544	42,511	19,160	8,056	4,216	60,5
1953	15,295	31,924	47,220	16,901	5,742	13,404	87,6
1954	24,576	26,781	51,357	16,085	7,348	21,082	85,8
1955[c]	27,924	25,501	53,425	16,330	9,063	26,560	95,1
1956[d]	28,032	25,556	53,588	16,629	9,144	26,182	93,4

Source: United States Department of Agriculture, *The Wheat Situation*, 22 August 1956.
[a] All figures relate to the trade year, beginning on 1 July of the preceding year.
[b] On 1 July.
[c] Preliminary data.
[d] Estimates made by the United States Department of Agriculture.

rate than in 1953 and 1954. By the end of June 1956, on the other hand, the increase in inventories was practically negligible.

It should be pointed out here, however, that such a result was largely due to the marked decline in production and, therefore, in stocks, in Argentina, where smaller availabilities offset an increment registered for Canada and Australia, while supplies in the United States remained at approximately the same levels as in the preceding year.

Furthermore, last winter was so severe in Europe as to cause the partial failure of the harvest in some countries, and a decided impetus was thus given to the demand for wheat on the world market. This can be noted in the aggregate volume of shipments effected by the six largest producers (the United States, Canada, Argentina, Australia, the Soviet Union and Turkey), which easily exceeded 20.0 million tons between July 1955 and June 1956,[9] as compared with 18.6 million in the corresponding period of 1954/55.

There can be no doubt that the most important market development was the entry of the Soviet Union and other countries of Eastern Europe as heavy purchasers of wheat. The agreement between the Soviet Union and Canada under which the former will buy quantities ranging from 550,000 to 650,000 tons annually during the next three years has considerably improved the prospects for the international wheat trade.

Quotations on the world market, despite minor fluctuations, remained more or less stationary; but as a result of the renewal of the International Agreement—which expired on 31 July 1956—the minimum and maximum prices previously fixed were cut down by 5 dollar cents per bushel. Of the exporter countries, Argentina and Sweden became contracting parties. At all events, the total volume of wheat to be sold under the Agreement decreased from 10.6 to 8.2 million tons, so that the proportion of the world wheat trade represented by such transactions will be reduced to only one third, should the importer countries absorb their entire quotas.

Within Latin America the most significant event was the substantial decline in Argentina's production to which allusion has already been made. According to the latest statistics, only 5.2 million tons were produced. A comparison of this figure with that of 7.7 million tons recorded for the year 1954/55 reveals a decrease of 31 per cent. Consequently, the net exportable surplus, which at the beginning of 1954/55 had been 4.2 million tons, dropped to 2.6 million tons in 1955/56, the million tons maintained by the Government as a prudential reserve being deducted in both cases. Exports in the first half of 1956 amounted to about 1.6 million tons, as against 2.0 million in the first six months of 1955. If exports are maintained during the rest of the year at a level sufficiently high for the remaining million tons to be absorbed, by the end of 1956 Argentina will have virtually liquidated its stocks and will have retained only its emergency reserve.

The market situation is very much the same for Uruguay. Export availabilities for the current year have been estimated at 475,000 tons. The agreement with Brazil signed at the end of last April provides for the sale of 320,000 tons to this latter country, and thus guarantees the marketing of practically the whole of the exportable surplus. The remainder outstanding at the beginning of 1956 (130,000 tons) may be reduced to only 80,000 tons by the close of the year.

V. Sugar

Sugar quotations on the free market during the first half of 1956 remained slightly above the minimum envisaged in the International Agreement, with very minor fluctuations. This has been the case ever since the Agreement entered into force in 1954. As the date when it must be reaffirmed or denounced approaches, negotiations between the contracting parties reveal a wide divergence of opinions as to the quotas that should be assigned to each exporter. The root of the problem is simply that the exporter countries wish to raise their quotas to a total ranging from 7.7 to 8.5 million tons, when the figures justified by estimates of free market requirements barely reach 5.0-5.3 million.

Up to the end of July, the exports of countries members of the Agreement were limited to 80 per cent of the quotas originally established. As from August a 10-per-cent increment was authorized. Total demand on the free market in 1956 was estimated at 5.0 million tons, this figure being 500,000 tons higher than the preceding estimate (December 1955).

As a result of the improvement in the demand for sugar on the world market, Cuba's total exports expanded in the first four months of the year by about 300,000 tons, or approximately 20 per cent in relation to the corresponding period of 1955. Almost one third of this increment was absorbed by the United States preferential market, while the remainder was distributed over the considerable increase in exports to Japan, the Soviet Union and the United Kingdom.[10]

Peru's exports in the first half of 1956 registered a much smaller increment than those of Cuba, i.e., 18,000 tons, or 10 per cent more than in the comparable six months of 1955. The first quarter of the year also witnessed a sharp rise in exports from the Dominican Republic. Brazil, on the other hand, which had sold 122,000 tons abroad in the first three months of 1955, exported only about 15,000 tons in the first quarter of 1956. Exportable surpluses were reduced in consequence of the marked growth of domestic consumption.

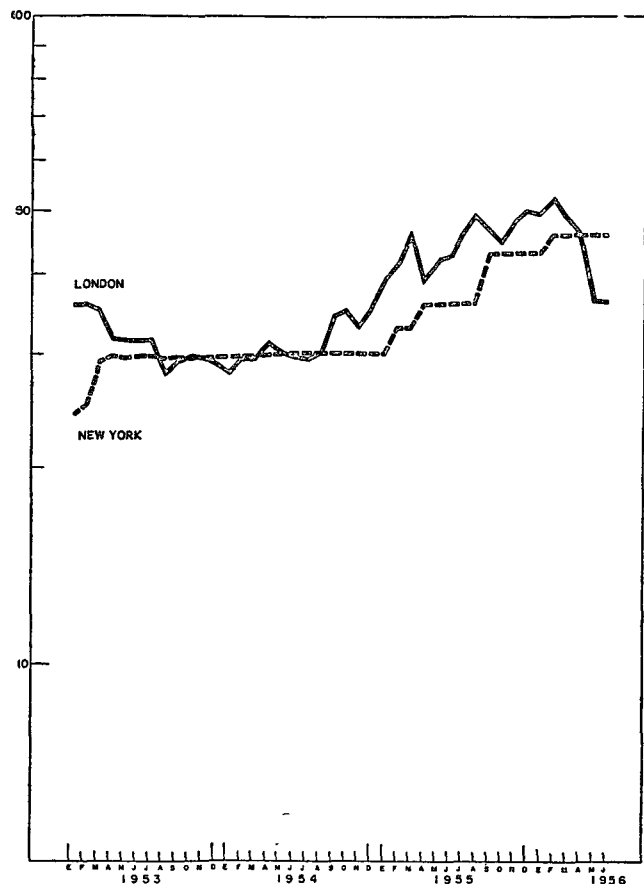[9] Figure for the end of June, only a week before the close of the trade year.

[10] By mid-1956 Cuba's total exports to the free market had amounted to 1.9 million tons, as against 1.6 million in the first half of 1955.

By mid-1956 the boom on the copper market had apparently come to an end. Up to that date the situation was characterized by the heavy pressure of demand on available supplies, which raised quotations for copper to record levels. As from the beginning of 1955, this position was clearly reflected on the London Metal Exchange, where a price level appreciably higher than that prevailing on the New York market was maintained throughout 1955 and the first quarter of 1956. During the second quarter of the current year, copper quotations in London again set the standard for the market, but this time in the opposite direction, as a downward movement began whereby prices fell below their New York level. This is still the state of affairs at present.[11] (See figure III.)

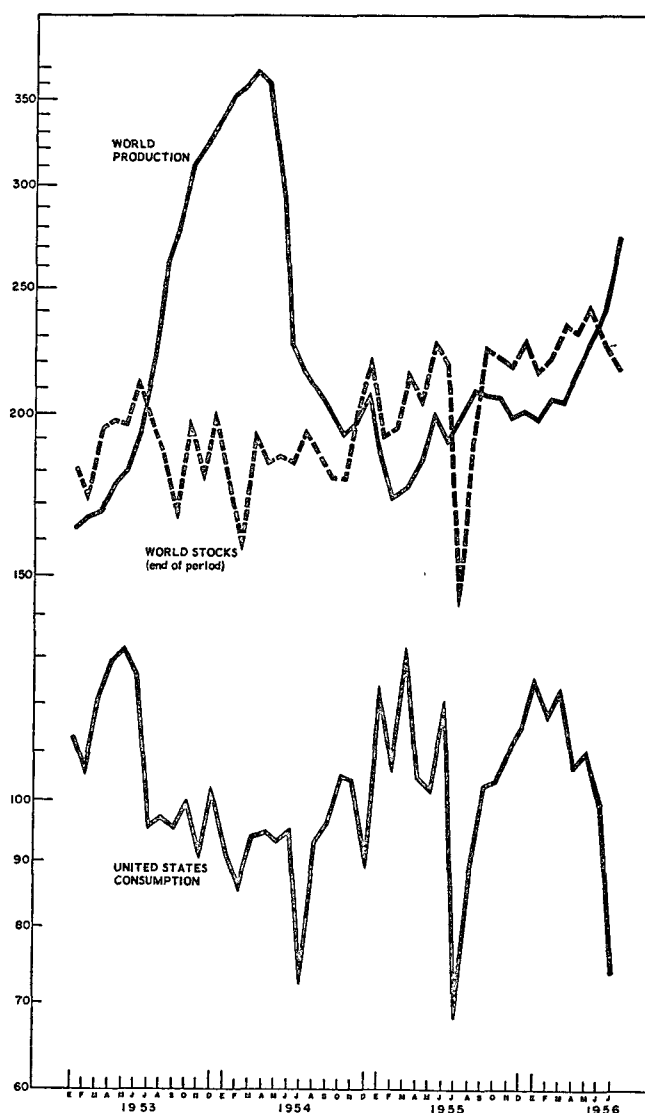The change in the market situation was linked to the steady expansion of world copper production. On an annual basis, the world output in the first three months of 1956 was 300,000 tons, or approximately 9 per cent higher than in 1955, when the figure for the three previous years had already been considerably exceeded. At the same time, there were symptoms of a decline in consumption in some industrial sectors (especially with respect to the use of copper in the production of automobiles in the United States, and the demand for certain finished products).[12] (See figure IV.)

Figure III
COPPER: ELECTROLYTIC COPPER PRICES
(Dollar cents per pound)
(SEMI-LOGARITHMIC SCALE)

Figure IV
COPPER: WORLD PRODUCTION AND STOCKS OF REFINED COPPER, AND COPPER CONSUMPTION IN THE UNITED STATES
(Thousands of tons)
(SEMI-LOGARITHMIC SCALE)

NOTE: Figures for stocks exclude government strategic stockpiles.

[11] Since the London Metal Exchange is a marginal market, quotations for copper were very sensitive to changes in the supply-demand ratio. In the United States, on the contrary, the large copper producers are also the chief consumers, so that a considerable proportion of the transactions conducted are negotiated between subsidiaries. This largely accounts for the fact that prices rose throughout 1955 and, conversely, fell during the second quarter of 1956, at a slower rate in New York than in London.

[12] It has been observed, for example, that during the current year the Soviet Union has not made such heavy purchases of copper cable and wire on the London market as it effected last year.

Nevertheless, the current position with respect to copper prices compares favourably with the situation in 1955, not only inasmuch as quotations have remained relatively high on the United States market, which is the most important for the Latin American producers, but also because steadier prospects are held out for the future development of the industry, threatened as it has been by growing competition from aluminium.[13] Furthermore, it is important to recognize that alongside the altered price levels recorded in London and New York, there was also a modification in trade supplies of copper on both markets, which tended to be mutually compensatory. Thus, while the United Kingdom announced its intention of placing 37,000 tons of its strategic reserve on the market,[14] the United States Office of Defense Mobilization declared that it intended to renew its purchases for the official United States stockpiles. It also arranged for about 33,000 tons of copper, delivery of which had been postponed so that this tonnage might be placed at the disposal of industrial consumers, to be reincorporated into the stockpiles before December 1956.

Although the change in market conditions was relatively

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[13] Apart from the technological factors favouring the replacement of copper by aluminium for certain industrial purposes, attention has often been drawn to the fact that the relative prices of these two metals have been modified in favour of aluminium during recent years. It is in the electrical and building industries, as also in specific sectors of the automobile industry, that the advance of this substitution process has been most clearly evident.
[14] For sale between August 1956 and December 1957.

high, Chile's exports of copper substantially decreased (by about 40 per cent) during the first five months of the present year, in relation to the corresponding period of 1955. Clearly, in the preceding year the level of exports had been very high; but estimates by the competent organizations suggest that during 1956 it will be possible for approximately the same volumes to be maintained, as a further expansion of total production is expected during the current year.[15] The falling-off in the export trade during the first five months of the year, however, may conceivably be related to the difference between the London and New York prices. Exports in January and February, in fact, were exceptionally limited, but a recovery set in which it was announced that the large Chilean copper companies' shipments would be negotiated at London prices, which were at that time higher than the New York quotations. A further sharp drop in exports took place in May, by which time prices had fallen lower on the London than on the New York market.

Statistics for the copper exported from Mexico and Peru, the region's other two large producer countries, do not reveal the same trend as the figures for Chile. Between January and April 1956, Mexico's exports remained at the same levels as in 1955, while Peru's rose slightly during the first quarter of 1956 in comparison with the same months of 1955.

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[15] Official production statistics for the first three months of the current year show a decline of 8,000 tons, or about 7 per cent, in relation to the first quarter of 1955.
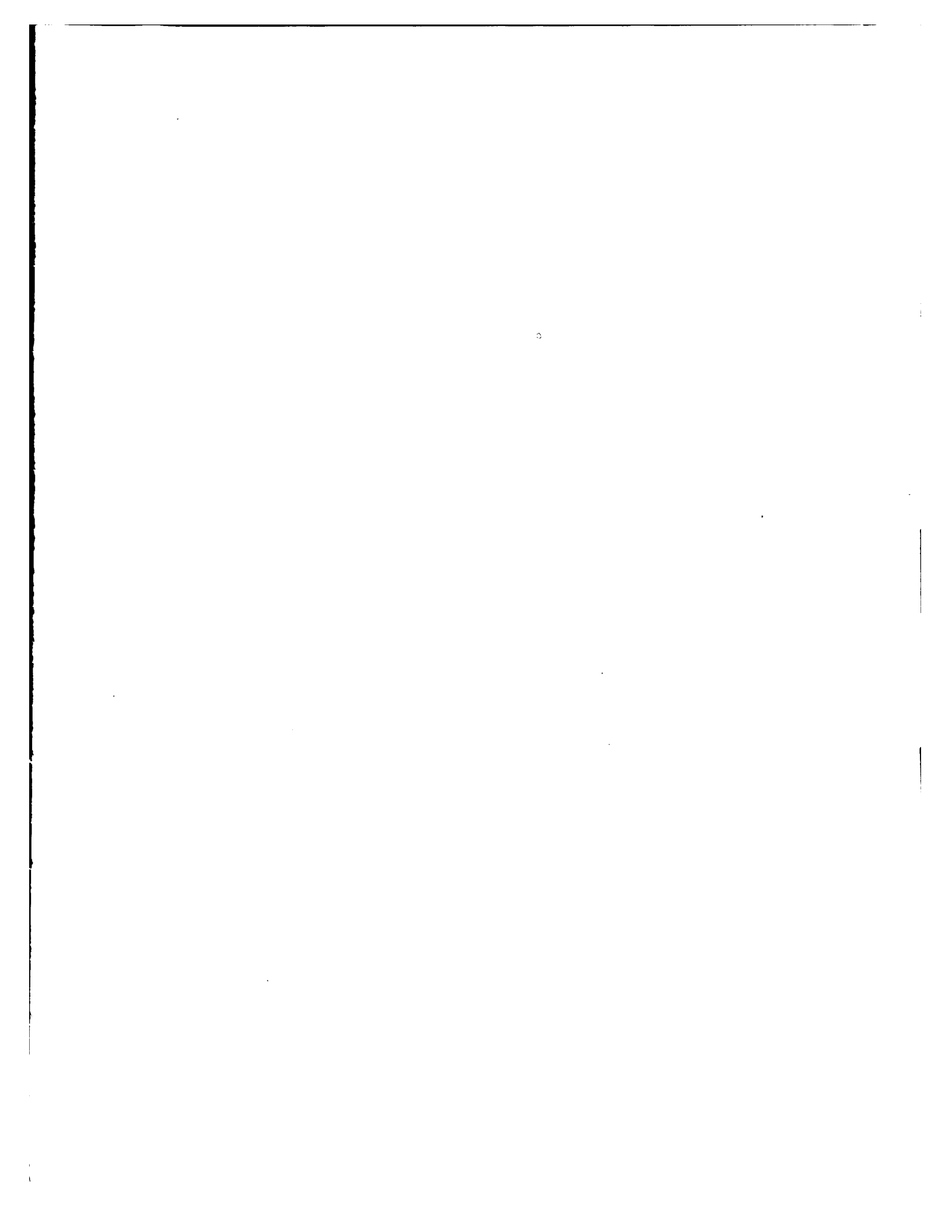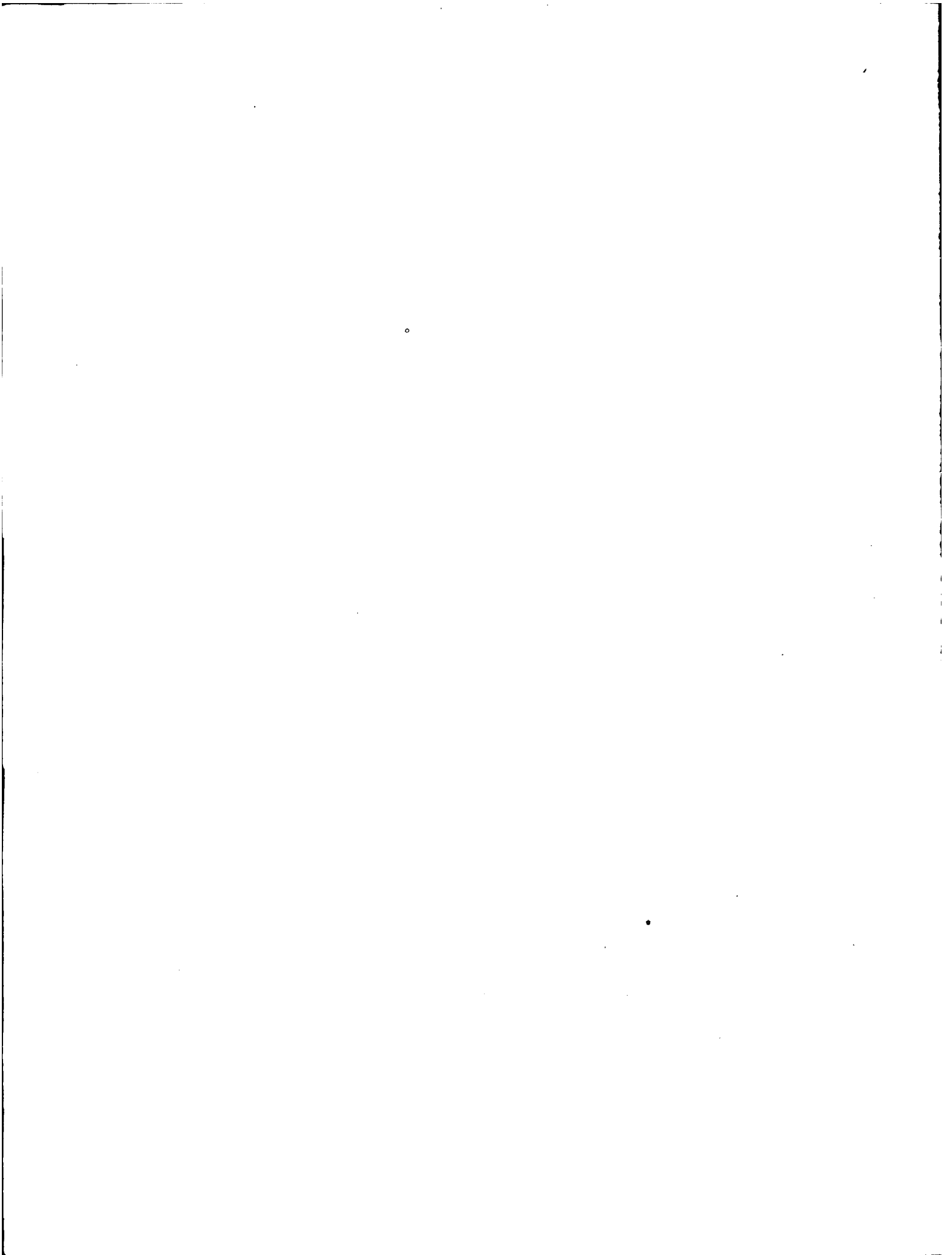
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