THE INTERNAL FRONTIER AND TECHNOLOGICAL PROGRESS IN LATIN AMERICA

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Two recent events originating outside Latin America have had powerful negative effects on the growth process under way in most countries of the region. These were the OPEC oil crisis of October 1973 and the ensuing economic decline in the industrial world in 1974 and 1975—the worst international recession since World War II. If the trends represented by these events continue, they threaten to render unmanageable the acute short-term problems they have imposed on countries that were already in difficulty, such as Argentina, Chile, and Uruguay. Moreover, emergency measures undertaken by several governments have tended to distract attention from long-term pressures that are inexorably building up in the region and may even aggravate these pressures before they are recognized as requiring a concerted regional response.

This article will describe the impact of the OPEC crisis and the recession in order to draw attention to the severity of their effects. It will then review the broad characteristics of long-term forces within the region that, by wide agreement among students of Latin America, will exert growing structural pressures and probable distortions on prospective economic and social development. The basic thesis contends that, given the limited outlook for outside assistance, Latin Americans must turn increasingly to their own internal frontier for the resources with which to avert these distortions. Under rapidly changing circumstances, an effective ecological adaptation between human and natural resources will require an extensive search for and utilization of appropriate technologies necessary to internal development. The article surveys the current distribution of major resource reserves in order to estimate realistically where the greatest potentials for feasible adjustments in development strategy lie. The final section suggests some implications for policy and continued research.

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THE SEVERITY OF THE SHORT-TERM CRISES

The impact of the abrupt decision by the Organization of Petroleum Exporting Countries to raise and eventually quadruple the price of oil, reinforced by an embargo, was clearly intended to be felt chiefly in the industrial countries.[1] However, it is now widely recognized that the increased cost has hurt oil-consuming countries in the underdeveloped world more than it has the industrial countries. In Latin America it aggravated tendencies toward inflation already present and, except for a few countries that export oil, it imposed severe problems of curtailing fuel consumption and maintaining an uninterrupted supply of an essential resource.

The shock wave took several forms. In Brazil, in part because of its rapid industrial growth and in part because of its paucity of domestic sources, the cost of petroleum imports doubled in 1973 over the previous year (from $513 million to $1,042 million) and again nearly tripled in 1974, reaching $2,895 million.[2] In the five years from 1971 to 1975, Brazil's cost of petroleum imports rose eightfold.

A paradoxical effect of the crisis in Argentina was that domestic production of oil dropped substantially in 1975 because YPF, the state petroleum entity, sustained such losses on the cost of imported oil that it had to reduce its expenditures on finding and developing new reserves. As a result, Argentina's dependence on imported petroleum was increased.

Even those countries in Latin America that have been able to export oil—Venezuela, Ecuador, Bolivia, Trinidad and Tobago, and (until 1974) Colombia—were unable to escape the general inflationary burden on their own people before the foreign-exchange windfall from higher oil prices could produce any appreciable development effect.

The world recession that followed the OPEC crisis cannot be attributed solely to that event, but the multiplied cost of oil contributed to the unusual circumstance that this recession was everywhere accompanied by inflation, so that the awkward labels "stagflation" and "slumpflation," originally applied in the United States and England, now took on a worldwide meaning. The effects of the recession were transmitted to Latin America mainly in two ways: in a decline in the world demand for primary products, especially copper, tin, lead, zinc, iron ore, sugar and coffee, and in sharply higher prices for imported goods from the industrial countries.

A major outcome of the steep rise in oil prices while other commodity prices were falling has been to shift the benefits of trade strongly from most countries in the region to a few oil-exporting countries. The

principal beneficiary has been Venezuela, which by 1975 was the only country enjoying a surplus in the current account. It is an irony that cannot have escaped the notice of Latin American integrationists that if the region had been organized as a politically and economically integrated unit, with a single redistributive tax system, much of the real, as well as the financial, burden of the OPEC crisis might have been mitigated.

The economic characteristics of the short-term crises faced by most Latin American countries may be summarized as (1) massive increases in balance-of-payments deficits for the oil-consuming countries, (2) an acceleration and a regional spread in the rising cost of living, (3) difficulty in sustaining previous rates of growth, (4) widening disparities in income distribution, especially in the most rapidly growing countries, and (5) increased political tensions associated with austerity brought about by the crises. A brief review of these effects will reveal the gravity of the abrupt changes that have swept the region, even as one recognizes that the previous growth path had hardly been smooth.

Massive Increases in Balance-of-Payments Deficits for the Oil-Consuming Countries

For the region as a whole, the quadrupling of oil prices is estimated to have added $4.8 billion in 1974 to the combined import bill of those countries that must import oil, and $5.2 billion in 1975, despite strenuous efforts to curtail consumption.[3] A special loan fund established temporarily by the International Monetary Fund to offset the initial shock to the economies of less developed countries only partially alleviated these costs for some Latin American countries, and has since been terminated.[4] Venezuela has provided some special assistance to its oil customers in Central America and the Caribbean, yet these countries continue to show abnormal deficits.[5]

The OPEC action was not the only factor accounting for the deterioration in the balance of payments. To the increased cost of oil must be added other imports at inflated prices and the rising proportion of export earnings that are required to service growing external debts, only some of which were acquired to finance longer term development.

The balance-of-payments effects can most clearly be seen in marked increases in current account deficits for the countries that do not export oil, which reached unprecedented levels in 1974 and 1975 (see table 1). The combined current account deficits for eighteen Latin American countries in this group tripled from $3.9 billion in 1973 to $12.8 billion in 1974 and quadrupled in 1975 to $15.7 billion.

TABLE 1 Current Account Balances, by Countries, 1970–75 (Millions of dollars)

Non-oil-exporting countries	1970	1971	1972	1973	1974	1975
Argentina	−156	−385	−218	703	108	−1,319
Barbados	−42	−45	−42	−50	−55	−34
Brazil	−561	−1,317	−1,490	−1,757	−7,179	−6,751
Chile	−26	−191	−452	−464	−384	−641
Costa Rica	−74	−114	−100	−112	−251	−217
Dominican Republic	−103	−101	−61	−78	−242	−60
El Salvador	9	−14	12	−44	−134	−104
Guatemala	−8	−49	−12	8	−103	−112
Haiti	2	1	7	−16	−20	−17
Honduras	−64	−23	−9	−36	−107	−135
Jamaica	−153	−173	−197	−248	−92	−253
Mexico*	−1,076	−846	−916	−1,415	−2,876	−4,056
Nicaragua	−39	−44	−6	−37	−257	−108
Panama	−64	−75	−97	−109	−260	n.a.
Paraguay	−16	−23	−5	−16	−54	−72
Peru	202	−34	−31	−261	−725	−1,569
Uruguay	−45	−64	59	37	−133	−203
Subtotal	−2,214	−3,497	−3,558	−3,895	−12,764	−15,651
Oil-exporting countries						
Bolivia	−23	−40	−45	−21	73	−163
Colombia**	−293	−454	−190	−55	−350	−178
Ecuador	−113	−156	−77	7	27	−168
Trinidad & Tobago	−80	−137	−161	−26	271	−40
Venezuela	−56	27	−151	587	5,600	2,589
Subtotal	−565	−760	−624	492	5,621	2,040
Latin America	−2,779	−4,257	−4,182	−3,403	−7,143	−13,611

Source: *International Financial Statistics* 29 (September 1976). Data for Bahamas, Cuba, Grenada, and Guyana not available.

*Mexico began exporting crude oil in significant quantities in 1974.
**Colombia ceased exporting crude oil after 1974.

The four countries most severely affected were Brazil, Mexico, Peru, and Argentina. Brazil's current account deficit of $1.8 billion in 1973 mounted spectacularly to $7.2 billion in 1974 and was followed by another staggering deficit of $6.8 billion in 1975. Mexico's deficit of $1.4 billion in 1973, complicated by sharply rising service charges on the external debt and a loss of tourist trade, doubled to $2.9 billion in 1974 and reached $4.1 billion in 1975. By August 1976, Mexico could no longer maintain the stability of the peso that had prevailed since 1954 and was obliged to accept a de facto devaluation in two stages of 53 percent.

Peru's current account deficit rose steeply from $261 million in 1973 to $725 million in 1974 and exceeded $1.5 billion in 1975. Much like Mexico, Peru was forced to devalue the sol by 44 percent in July 1976. Good crop years permitted Argentina to enjoy current account surpluses in 1973 and 1974, but by the following year the external forces that have been described, combined with domestic disorders, placed Argentina in the billion-dollar deficit category, with a current account gap of $1.3 billion. So strong was the impact of imported inflation that by 1975 even the oil-exporting countries of Ecuador, Bolivia, and Trinidad and Tobago were running current account deficits (table 1).

The strain of meeting these deficits is considerable, even though some countries, such as Mexico and Chile, were granted exceptional assistance by the International Monetary Fund and other agencies. To service its foreign borrowings alone, Brazil was obliged by 1975 to commit about 40 percent of its annual foreign exchange earnings, and Chile 45 percent. Argentina witnessed its former accumulation of foreign currency reserves shrink by 65 percent in 1975.

As a consequence of the shocks that began in 1973, the external debt of Latin America as an aggregate climbed precipitately by 21 percent in 1973 to $36.0 billion and by another 26 percent in 1974 to $45.3 billion, the sharpest increases ever recorded in the region.[6] By 1976 Brazil and Mexico ranked third and fourth among the nations of the world (after Great Britain and the Soviet Union, with its satellites in Comecon) in the size of their total external debts.[7] A continuation of this trend will confront many countries and their creditors with the necessity for constant renegotiation of outstanding debt and will eventually produce a compelling demand for a general moratorium, such as has already been proposed in a number of international conferences. This would amount to a massive income transfer from the lending countries and international agencies to the countries that can no longer produce the means of repayment, and might endanger the structure of normal transfers of investment for development purposes.

Acceleration and Regional Spread in the Rising Cost of Living

Three countries—Chile, Argentina, and Uruguay—suffered hyperinflation in recent years. The Chilean official consumer price index showed increases of 320 percent in 1973, 586 percent in 1974, and 380 percent in 1975 (see table 2). In Argentina the index rose 63 percent in 1973, 23 percent in 1974, and 171 percent in 1975. In Uruguay, the index climbed 99 percent in 1973, 77 percent in 1974, and 83 percent in 1975. Inflationary trends were already strong in these countries and cannot be attributed wholly to the effects of OPEC and the world inflationary recession, yet there was a general acceleration of price increases throughout most of the region after 1973.

TABLE 2 Annual Variations in the Consumer Price Index by Countries in Latin America, 1961–75

A. Countries with annual price increase below 5 percent

1961–65		*1966–69*		*1970*	
Guatemala	0.1	El Salvador	1.1	Paraguay	−0.8
El Salvador	0.2	Paraguay	1.3	Haiti	1.3
Venezuela	0.4	Dom. Republic	1.3	Guatemala	2.4
Panama	0.9	Guatemala	1.5	Venezuela	2.5
Nicaragua	1.6	Panama	1.6	Trin. & Tobago	2.6
Barbados	1.7	Venezuela	1.6	El Salvador	2.9
Mexico	1.9	Honduras	1.7	Panama	2.9
Trin. & Tobago	2.2	Nicaragua	1.7	Honduras	3.0
Costa Rica	2.3	Haiti	1.9	Dom. Republic	3.8
Honduras	2.7	Costa Rica	2.6	Bolivia	3.9
Dom. Republic	2.8	Mexico	3.7	Costa Rica	4.7
Jamaica	2.9	Trin. & Tobago	3.9		
Haiti	3.8	Barbados	4.2		
Ecuador	3.9	Ecuador	4.8		

1971		*1972*		*1973*	
Guatemala	−0.5	Guatemala	0.6	Venezuela	4.2
El Salvador	0.5	El Salvador	1.5	Honduras	4.5
Panama	1.8	Venezuela	2.8		
Honduras	2.2	Haiti	3.2		
Costa Rica	3.0	Costa Rica	4.6		
Venezuela	3.3				
Trin. & Tobago	3.5				
Bolivia	3.6				
Dom. Republic	3.7				
Paraguay	4.9				

TABLE 2 (continued)

B. Countries with annual price increase between 5 and 15 percent

1961–65		*1966–69*		*1970*	
Bolivia	5.2	Jamaica	5.4	Ecuador	5.2
Paraguay	5.4	Bolivia	6.0	Mexico	5.2
Peru	9.4	Peru	9.9	Peru	5.3
Colombia	12.9	Colombia	10.2	Colombia	6.8
				Barbados	7.8
				Jamaica	9.8
				Argentina	13.4
1971		*1972*		*1973*	
Mexico	5.7	Guyana	5.0	Bahamas	5.5
Jamaica	6.6	Mexico	5.1	El Salvador	6.4
Peru	6.8	Honduras	5.2	Panama	6.9
Barbados	7.5	Panama	5.4	Guyana	7.6
Ecuador	8.3	Jamaica	5.8	Peru	9.5
Colombia	9.1	Bolivia	6.5	Mexico	11.2
Haiti	9.6	Bahamas	6.8	Brazil	12.6
		Peru	7.3	Paraguay	12.8
		Ecuador	7.9	Ecuador	12.9
		Dom. Republic	8.7	Guatemala	13.8
		Paraguay	9.2	Trin. & Tobago	14.7
		Trin. & Tobago	9.3		
		Barbados	11.9		
		Colombia	14.3		
1974		*1975*			
Venezuela	8.3	Panama	6.1		
Bahamas	13.1	Honduras	6.2		
Dom. Republic	13.2	Paraguay	6.8		
Honduras	13.3	Guyana	8.0		
Haiti	14.9	Bolivia	8.1		
		Venezuela	10.4		
		Bahamas	10.5		
		Guatemala	14.0		
		Dom. Republic	14.5		

C. Countries with annual price increase higher than 15 percent

1961–65		*1966–69*		*1970*	
Argentina	23.0	Argentina	19.7	Uruguay	17.3
Chile	28.0	Chile	26.1	Brazil	22.1
Uruguay	30.4	Brazil	29.3	Chile	32.5
Brazil	63.0	Uruguay	65.2		

TABLE 2 (continued)

1971		1972		1973	
Brazil	20.1	Brazil	16.7	Dom. Republic	15.0
Chile	20.1	Argentina	57.9	Barbados	16.7
Uruguay	23.6	Chile	72.7	Jamaica	19.0
Argentina	34.7	Uruguay	75.0	Costa Rica	19.2
				Haiti	22.8
				Colombia	22.8
				Bolivia	31.5
				Argentina	62.5
				Uruguay	99.0
				Chile	319.5

1974		1975	
Panama	16.2	Ecuador	15.7
Guatemala	16.4	Jamaica	16.6
El Salvador	16.8	Haiti	16.8
Peru	16.9	Mexico	17.0
Guyana	17.5	Trin. & Tobago	17.1
Costa Rica	22.0	El Salvador	19.3
Trin. & Tobago	22.1	Barbados	20.7
Mexico	22.4	Costa Rica	21.0
Argentina	23.4	Peru	23.6
Ecuador	23.4	Colombia	26.1
Colombia	24.5	Brazil	29.0
Paraguay	25.3	Uruguay	83.4
Jamaica	27.4	Argentina	171.2
Brazil	27.5	Chile	380.2
Barbados	38.9		
Bolivia	64.0		
Uruguay	76.5		
Chile	585.9		

Source: *Economic and Social Progress in Latin America: Annual Report, 1975* (Washington: Inter-American Development Bank, 1976), Table 1–5; *International Financial Statistics* 29 (October 1976): 32.

Particularly significant was the tendency for inflation to spread to the slower growing countries that had previously managed to escape its effects. Up to 1970 fourteen Latin American countries enjoyed relative price stability, and only three or four experienced price increases in excess of 15 percent per year (table 2). By 1973 all of the Latin American countries with the exception of Venezuela and Honduras recorded in-

creases in excess of 5 percent. The following year, eighteen countries exceeded the 15 percent annual rate, and Venezuela exceeded 8 percent. In 1975 rates of inflation moderated somewhat in parts of the region but continued strong in Chile, Argentina, Uruguay, Brazil, Colombia, and Peru.

Difficulty in Sustaining Previous Rates of Growth

The decline in output in the industrial countries in 1974 and 1975 was reflected in slower rates of growth in the less developed countries. The most prominent example is the much discussed "demise of the Brazilian miracle," as the annual real growth rate slowed from an average of about 10 percent in the period 1968–74 to about 4.2 percent in 1975.[8] In view of the longer term experience in Brazil, it is too early to determine whether this is indeed a "demise" or merely a cyclical interruption such as has occurred in the past. Mexico also experienced a disturbing drop in the annual growth rate from 6.4 percent for the period 1970–73 to 5.9 percent in 1974 and about 4 percent in 1975. Argentina has long been plagued with a tendency toward stagnation, but until recently was able to maintain vitality in its leading sectors, especially manufacturing. Recent increases in business failures and plant shutdowns were contributors to an absolute decline in growth from an average of 4.4 percent during 1970–73 and 7.0 percent in 1974 to −1.4 percent in 1975. For the region as a whole, the real growth rate declined from an average of 6.9 percent in the period 1968–74 to 2.7 percent in 1975, a rate which reflected no increase in per capita output.

Widening Disparities in Income Distribution

A number of studies, such as those of Albert Fishlow and C. G. Langoni for Brazil, and others for Argentina, Mexico, and Puerto Rico, have established the tendency for income disparities to widen during accelerated growth periods.[9] David Felix has cited evidence for Mexico that indicates that income concentration rose in each successive decade since 1940, all of the absolute income gain going to the upper 60 percent of households; mostly to the upper 40 percent.[10] Unlike other studies based on comparisons of current money incomes, Felix's analysis seeks to take into account the differential effect of inflation on the real incomes of major social groups.

Research has yet to be conducted to measure the effects of more recent accelerated price increases on income groups. However, since some groups such as the unskilled and the elderly are especially vulner-

able to inflation, it is evident that disparities in real income have been intensified. Even where labor organization is strong, few governments can permit wage increases to compensate for rises in the cost of living, and unprotected groups suffer even more.

As one example, in Argentina after prices had risen 40 percent within two months after the last official wage adjustment on 1 January 1976, the government of Isabel Perón allowed a wage rise of only 12 percent on 1 March, and sought to impose a 180-day moratorium on further increases.[11] The action did not hold, and a few days later the government was obliged to allow a further increase to 20 percent, still far below the rate of inflation. The cumulative losses in real income for Argentine workers, as well as for those in other chronically inflated countries, are substantial, and thus are a source of constant unrest.[12]

Increased Political Tensions Associated with the Short-Term Economic Crises

Although the causes of political tensions are complex, recent repressive measures taken by the governments of Chile, Uruguay, and Brazil, and the turmoil reflected in incessant violence and the military takeover in Argentina are to some degree reactions to the severity of the economic crises. The economic problems as perceived by governments are essentially financial, fiscal, and redistributive ones, as contending political factions and other organized groups clamor for a just share of a shrinking pie. Yet the roots lie in the causes for shrinkage of the pie, or a decline in the real growth rate.

The evident relation between the severity of recent crises and the exogenous origin of the OPEC decision and the world recession tends to reinforce a prevalent belief that Latin America's problems arise chiefly in the outside world, and that the logical response is to assert greater national autonomy. In the wake of failure of earlier efforts at regional integration, governments feel constrained to apply nationalistic remedies to problems that increasingly have a common regional character. These remedies ordinarily take the form of economic austerity programs, increased protectionism and efforts to increase national self-sufficiency, and the suppression of political and academic dissent.

Moving in the background are larger forces, mainly of domestic origin, that are destined to affect the entire region and that will more and more demand the common attention of the Latin American nations, if not indeed a commonality of policy. Some of the purely national measures currently being undertaken that run counter to a recognition of these larger needs will be cited below.

THE LONGER TERM FORCES IN THE REGION

The forces to be singled out here are largely familiar to students of Latin American affairs.[13] It is their cumulative and interrelated character that threatens major distortions in the growth process.

The most significant forces creating long-term distortions are the following: (1) the high rate of population growth in the region during the latter half of this century, (2) the accelerated and premature formation of great centers of urban concentration, (3) the market exhaustion reflected in the declining effectiveness of prevailing development strategies, (4) the sluggish response of the agricultural sector to the changing structure of the Latin American economies, and (5) the failure to build—and some tendency to dismantle—the institutional sources of innovation, skills, and manpower necessary to the solution of growth problems. Only a few salient aspects of these forces can be noted here.

The High Rate of Population Growth in the Region During the Latter Half of This Century

Latin America had about 213 million people in the region in 1960.[14] In the succeeding fifteen years it added about 111 million, more than the entire present population of Brazil.[15] During the past year alone the population grew by 8 million, as much as the combined populations of Bolivia and Paraguay. The number of people in the region is expected to reach 620 million, nearly double the present number, during the next quarter century, according to the United Nations medium estimate. This will be more than the present population of India. Even if we assume a maximum decline in fertility, the population will reach 567 million, yet few demographers are sanguine that such a reduction in the birth rate is likely to occur.[16]

Although these projections are well known, there is hardly a government in Latin America that can be said to have invested significant resources in a program that will modify the rapidity of the present trend toward population growth.[17] Rather, there appears to be implicit confidence that the low utilization of land space throughout most of the region will provide adequate room for a release of population pressure. Even so, a few small, overcrowded nations such as Haiti and El Salvador are having difficulty in containing the expansion within their own borders. A substantial spillover of illegal immigrants from Latin America to the United States may be expected to increase as one of the consequences of the internal pressures within the region.[18]

Even if the growth of population is given little attention, the

higher dependency ratio resulting from an increasingly youthful society cannot be ignored.[19] An evaluation by UNESCO has shown that despite intensive campaigns to eradicate illiteracy in designated countries, such as Ecuador, the number of functional illiterates has substantially increased.[20] It is probable that this trend is reflected in most countries of Latin America, where the construction and staffing of schools has fallen far behind the growth in the number of school-aged children. It is difficult to see how a technically advanced society can be created on a base of spreading illiteracy.

The Accelerated and Premature Formation of Great Centers of Urban Concentration

Urbanization in the region has been proceeding at roughly twice the rate of population growth.[21] With the assistance of leading Latin American demographers in the countries represented, Robert W. Fox has made projections of urbanization trends based on country-by-country estimates of expected population growth and movements. These indicate that by the end of the present decade, Latin America will have nineteen cities each with more than one million people.[22] These cities have grown so rapidly that even persons reasonably familiar with the region would have difficulty naming them all. Their expected population increase during the current decade will exceed the total population of these cities thirty years earlier. Even more startling are the projections of growth of the megalopolises that are forming in Latin America. By 1980 there will be seven great cities with over three million each, and by 2000, less than a quarter of a century away, all of these cities are projected to reach at least six million (see table 3).

The consequences of these trends, if indeed they can be continued, stagger the imagination. Mexico City would reach 31.7 million people by the end of the century and, merging with its nearby neighbors, Toluca and Cuernavaca, could encompass 35 million, or twice the 1970 population of the New York metropolitan zone (16.6 million). São Paulo would attain nearly 25 million and spread to join Rio de Janeiro and Belo Horizonte, its partners in the industrial triangle of Brazil, to form a vast urban agglomeration of almost 47 million, or nearly one-fourth the 1970 population of the United States.

In this study, which is comparable to estimates made by United Nations demographers, Gran Buenos Aires is projected to reach 14.1 million; Lima, 9.2 million; Santiago, Chile, 6.7 million; and Caracas, 6.5 million.[23] Caracas is expected to merge through its constricted Venezuelan lowland with Maracay, Valencia, Barquisimeto, and Maracaibo to

TABLE 3 Enumerated and Projected Populations of Leading Cities and Urban Agglomerations of Latin America, 1970–2000, in Millions

	Enumerated	*Projected*	
	1970	*1980*	*2000*
Mexico City, Mexico	8.6	13.6	31.7
São Paulo, Brazil	7.8	12.3	24.7
Rio de Janeiro, Brazil	6.8	9.6	17.6
Greater Buenos Aires, Argentina	8.4	10.2	14.1
Lima-Callao, Peru	3.3	4.7	9.2
Santiago, Chile	2.9	3.9	6.7
Caracas, Venezuela	2.1	3.2	6.5

Source: Robert W. Fox, *Urban Population Growth Trends in Latin America* (Washington, D.C.: Inter-American Development Bank, 1975), pp. 16, 31.

form a contiguous agglomeration of over 12 million people by the year 2000.

Fox points out that ecological and environmental limitations, such as shortages of housing and water, may make it impossible for the primary cities to sustain these rates of growth. The pressure will then shift to the secondary cities such as Guadalajara, Mexico; Córdoba, Argentina; and Pôrto Alegre and Recife, Brazil, as it has already begun to do. Increasingly, urbanization is being fed less by migration from rural areas and more by population growth within the cities themselves, even at reduced levels of fertility.

The accelerated urbanization that is taking place in Latin America at this time is not a process of effective adjustment of people to resources and occupational opportunities such as is normally associated with the historic growth process in the advanced countries.[24] It is in part a result of short-term policies adopted by a number of governments to stimulate import substituting industrialization in urban areas to the neglect of more balanced development in the rural areas. The location of industry and social infrastructure, as well as official wage policies, has tended to favor the urban sector. It has not taken the younger, more mobile members of the society long to discover that governments are more responsive to the vocal and visible masses in the cities than to the peasants who quietly suffer neglect in the countryside. At the same time, few countries have functioning programs to attract population to new development sites in the interior.

Market Exhaustion under Prevailing Development Strategies

Quite apart from the short-term shocks of the OPEC crisis and the world recession, it has been apparent for some time that a number of the Latin American countries that based their twentieth-century development strategy on import substituting industrialization have been having difficulty in sustaining markets for the output of domestic industry.[25] This has occurred despite the increased number of consumers in the urban population and the stimulus to demand represented by monetary inflation. One result has been a substantial rise in urban unemployment.

David Felix has described the limitations of not only import substituting industrialization, but of subsequent growth strategies designed to provide alternative market outlets: regional integration and export-oriented industrialization.[26] Space does not permit a review of his entire analysis, but in essence Felix argues that import substitution lost its effectiveness in the 1950s as a consequence of excessive concentration on the development of the "modern" sector and of efforts to preserve the vitality of the market by the introduction of a succession of novelty goods of foreign origin. This led to "substitution chaining," in which countries lost the foreign exchange savings of the "easy phase" of import substitution, when simple products using domestic raw materials, such as cotton cloth, first replaced imported products. As rayon, synthetics, and new weaves, knits, and finishes were introduced in a chain of substitutions, countries became dependent on new types of imports in the form of raw materials, processes, and franchises. Such chaining occurred as well in other lines, such as electronic appliances, automobiles, and home furnishings. In the recent inflationary period, chaining has had particularly severe effects on the current account deficits of countries dependent on the imports required for these types of production.

Concentration on product novelty tends to limit the domestic market to households in the upper third of the income scale. Also it predisposes businessmen to search out and exploit foreign products and productive techniques in preference to pursuing indigenous innovative efforts. We have seen that it likewise encourages a flow of population to the cities, where opportunities for productive employment have proved for many to be a mirage.

In an effort to break out of the limitations of national markets and small-scale production, most countries turned to regional economic integration in the 1960s. Political difficulties have plagued these efforts, but underlying the political issues there have also been economic disparities between the least developed of the Latin American nations and the larger, more industrialized countries looking for markets to exploit.

So long as the poorer countries of Latin America are expected to serve chiefly as market areas for the "modern" countries and receive few reciprocal benefits, they are much in the position of the neglected rural sectors of their more advanced neighbors and are unlikely to display active interest in integration. Regional economic integration remains an important goal for Latin America, but the present tendency to adopt highly protectionist solutions to short-term crises has severely set back the efforts to work out the obstacles to effective regional cooperation.

As an alternative to a drive to expand internal domestic and regional markets, several countries, notably Brazil, Argentina, and Mexico, have sought to stimulate growth through export-oriented industrialization along nontraditional lines. This has led them to seek trade preferences in order to break into the markets of more advanced countries. In an interesting simulation model, Felix has shown that for the Latin American countries to maintain a minimum satisfactory growth rate of 7 percent by increasing industrial exports to the nonsocialist developed world during the next three decades, it would be necessary for the advanced market economies to accept a substantial displacement of their normal export trade and to transform themselves into "rentier economies," covering their growing commodity trade gap with net earnings from capital exports and commercial and technical services to the less developed countries.[27]

Even if this appears to be an unduly pessimistic prediction of the outcome, Felix is probably correct when he says: "The essential point is that Latin America's rate of penetration of world industrial markets would depend on decisions largely under the control of the advanced economies. There would be neither the irresistible competitive power to pressure nor the major economic benefits to induce the advanced market economies to incur the heavy adjustment costs of transforming themselves into rentier economies."[28]

As a long-term trend, the short-term strategies of development have tended to reinforce economic dualism in Latin America and to leave a large proportion of the population effectively outside the development process. This is a major distortion of a balanced growth process.

The Sluggish Response of the Agricultural Sector to the Changing Structure of the Latin American Economies

During the past century, agriculture has gradually been changing its functional significance for development in the region. During the neocolonial stage of development, agriculture could provide a motor to diversified growth, as it did in Argentina, Brazil, and Colombia, by

supplying a great deal of the foreign exchange with which investment in transport, communications, and industry could be financed. More recently, with changes in the internal structure of these economies, agriculture might have contributed to balanced growth by increasingly serving the domestic needs of producing food for a growing nonagricultural population and raw materials for industry. A really *dynamic* agricultural sector might have continued to provide the export earnings necessary to *rapid* growth.

It is the failure of these developmental functions that we are now witnessing in dramatic form, although the trends have been well defined for some time. In 1972, the region, which had previously been self-sufficient in food production, for the first time was unable to supply its own home needs for basic foodstuffs such as wheat, barley, rye, and even corn.[29] Again, in 1973, the region was a net importer of grains.[30] Weather factors accounted for the sharpness of the reversal, as the drop in Argentine corn production in 1972 alone was sufficient to change the Latin American region from an exporter to a net importer of this staple foodstuff. Also, it must be recognized that substantial improvements in agricultural productivity have been made within recent years in some areas of a few countries, notably Mexico and Brazil.

Nevertheless, it is instructive to observe that Argentina, that great reservoir of agricultural resources, has been obliged to import wheat from Spain in some recent years, as well as cattle from Paraguay and Uruguay, to sustain its flow of essential exports while meeting domestic needs. Yields of corn and wheat have increased only moderately in Argentina since the 1930s, while they have risen substantially in countries with poorer land resources.[31] The unsatisfactory performance of Argentine agriculture is related to policies adopted during the earlier Perón era and sporadically thereafter to discriminate against the rural sector with respect to investment in equipment for crop and livestock production. As recently as 1969, only 7 percent of Argentine farms were served with electric power, and a new rural electrification program announced in 1974 is barely under way.[32] In addition, the development of basic research in plant genetics and its application to crop production have long suffered from weak support and repeated political intervention.

What is true for Argentina is reflected in a number of other countries, where crop production on a per capita basis has been virtually stagnant or has actually declined. Data compiled for the region as a whole by the Food and Agriculture Organization, using 1961–65 as a base, show that the index of agricultural production per capita has declined during the past decade.[33] Food production is simply not keeping up with the population increase.

This trend has implications not only for Latin America but for the entire world food supply. In the 1930s there were countries in each of the regions of Asia, Africa, Eastern Europe and the U.S.S.R., Latin America, Oceania, and North America that regularly supplied grain surpluses to Western Europe, the only region with a net deficit.[34] One by one in the postwar period, Asia, Africa, and Eastern Europe and the U.S.S.R. dropped out as grain surplus regions, and in this decade Latin America joined the drop-outs. Only Australia, New Zealand, and North America (principally the United States and Canada) remain as surplus producing regions which supply the basic food deficits of the other regions of the world.

It is necessary to stress that according to most analyses, Latin America's lapse into a food deficit region is premature and not a result of a depletion of physical resources. This outcome is chiefly a result of a failure to mobilize agriculture to anything like its potential technological capability. There are few agricultural research centers in the region (although some excellent ones exist), and a recent study made in six countries has shown that the number of farmers reached by extension services in the early 1970s was under 8 percent of the total.[35]

The Failure to Build the Institutional Sources of Innovation, Skills, and Manpower Necessary to the Growth Process

A major deficiency in the long-term development process in Latin America has been the relatively small recognition given to the role of higher education and organized research and development in preparing the human capital for independent decision-making and strategic planning, as well as for other development tasks. In the University Reform of 1918, which swept through the region, no provision was made for peer review of the qualifications of university professors, nor for security of tenure for professional academicians. Furthermore, the research function of the modern university was given scant attention. With significant exceptions, these deficiencies still exist in most countries.

Recent attention has been drawn to Venezuela, whose sudden bonanza in dollar inflow since the OPEC increase in oil prices has dramatically demonstrated that it is not a lack of financial resources that is holding back national development; rather, it is a dearth of scientific, technical, and managerial personnel to carry out a comprehensive development program, as well as adequate educational institutions for their training.[36] Yet these conditions existed well before the OPEC action. Recognition that functionally effective educational institutions are essential in the long run for the planning and execution of major development projects has been slow to come. Only a few years ago the

Ford Foundation spent over one million dollars to help Venezuela develop an educational planning capability in *Eduplan*, the planning arm of the Ministry of Education, only to see a change in administration result in the dispersal of the trained staff. One critic of Venezuelan economic planning and execution has asserted that "in the sixteen years of democracy since the fall of General Pérez Jiménez, 164 billion bolivares have been spent, more than three times what the USA laid out to rebuild Europe under the Marshall Plan, yet have produced no more than the first stages of the Guri dam and the El Tablazo petrochemical complex, and the steel flat-products rolling mill at Puerto Ordaz."[37]

Short-term crises in several other countries have impelled governments to take actions that have amounted to the dismantling or the severe retardation of their own educational and scientific institutions. The Brazilian universities, which are now the recipients of massive injections of government funds, are still recovering from heavy interventions which began in 1964. Uruguay's single university was totally shut down during the Tupamaro period and is only gradually being permitted to resume functioning in some of its faculties.

The Argentine universities have been repeatedly intervened since the 1940s, notably in 1955, 1966, 1973, and 1976. In the intervention initiated in 1973 by President Héctor J. Cámpora and continued under the second presidency of Juan Domingo Perón, solid instructional programs that had been built up during the previous decade were set aside and the most competent professors—many with advanced training abroad—were dismissed.[38] Conditions at the University of Buenos Aires became so chaotic that the Peronist government was forced to change rectors five times within a year and a half in an effort to impose control. During this period, active research within the universities virtually ceased, and the best investigators were obliged to carry out their work in private institutes or outside the country. The government of President Jorge Rafael Videla promised to restore autonomy to the national universities, but a short time later, Minister of Education Pedro Bruera announced that ninety-five career programs, including those in anthropology, psychology, and sociology, would be eliminated because of an excess of persons trained in those fields, and the corresponding teaching faculty dismissed from their posts.[39]

The situation in the Chilean universities, once noted as outstanding centers of free inquiry in Latin America, has deteriorated severely under the government of General Augusto Pinochet. The entire national university system, as well as the Catholic University in Santiago, was placed under firm military control.[40] Massive dismissals of professors were carried out, and thousands of students were barred from returning

to their universities. The faculties of entire departments, including those of biology and physics in the National University in Santiago, left the country to conduct their research and teaching elsewhere. The Latin American Faculty of Social Sciences (FLACSO), organized as a graduate level institution by UNESCO, was unable to continue operations in Santiago and has moved to Buenos Aires.

The governments which have imposed draconian measures on the Latin American universities invariably assert that they are not really centers of learning but hotbeds of political agitation and rebellion, and that these forms of subversion justify the most severe measures of repression. In their indiscriminate short-term actions, however, they effectively deprive their countries of essential long-term sources of innovation, skills, and trained manpower necessary to solve the increasingly complex problems of rapidly changing societies. Where else will they turn for these resources?

THE INTERNAL FRONTIER AND ITS RESOURCES

The combination of pressures represented by population growth, accelerated urbanization, market exhaustion, sluggish agriculture, and inadequate educational institutions is pushing Latin America toward a Malthusian outcome that will become the central concern of the peoples in the region during the coming generation, unless means are found to redirect these forces. Only one country—Brazil—is likely to have within its borders the resources to stem these trends through national policy; other countries in the region will increasingly be obliged to align themselves in one grouping or another for joint efforts to overcome the general impoverishment. Income transfers from abroad are almost certain to be insufficient in relation to the magnitude of the need, especially as much poorer regions will also be making demands on the international agencies.[41] A vigorous utilization of the resources of the internal frontier offers an alternative to the dependency relationship about which there has been so much complaint.

In another article, I have described the characteristics of Latin America as an "Ayresian frontier."[42] "A frontier," according to C. E. Ayres, "is a penetration phenomenon." It is a region that offers the space for expansion of population in movement, for a rupture with old institutions, and for the application of techniques brought from other regions to achieve an accelerated rate of development. These possibilities exist within Latin America, although they may be limited for individual nations.

A frontier permits a continuity of technological transfers, while at

the same time it fosters detachment from previous institutional controls. There are innumerable possibilities for cultural cross-fertilization from the world storehouse of useful knowledge, and some of these have already been realized, notably in the transfer of genetic science from leading universities and experiment stations to the applications that brought the Green Revolution to Mexico in the postwar period. As a result, Mexico presents an outstanding exception to the general stagnation of agricultural development in Latin America.[43]

The exploitation of the internal frontier will require conscious attention to the structural and ecological forces that are tending to fly out of balance as growth proceeds. It will require realistic attention to the limitations of resources as well as to their more effective utilization. Among the major resource characteristics of the region are its land area, its energy resources (coal, petroleum, firewood, water power, nuclear energy), and the possibilities for energy substitution in rural areas.

Land Area

In land space, Latin America is six times the size of India. Taking the region as a whole, the population density is low enough to allow considerable flexibility in adjusting the location of population to resources. However, in the present state of the arts, many areas are not suited to development purposes. These include the rain forest areas of the Amazon basin and of northwestern Colombia; very rugged terrain in Mexico, Central America, the Andean chain, and the Brazilian highlands; some desert areas in Mexico, along the Pacific coast, and in the Chaco; and the colder regions of southern Chile and Argentina. Moreover, some of the desert areas, particularly in Argentina, Chile, and the northeast of Brazil, are spreading in size as a result of excessive woodcutting, overgrazing, and wind erosion.

A major contribution to the development of the land frontier will be the application of methods of water control. In the Cauca Valley of Colombia, for example, a great imbalance has existed between the deficiency of water in the upper highlands and the excessive moisture in the swampy marshlands of the lower valley. The use of water retention dams and irrigation systems in the highlands and drainage systems in the lowlands under the regional development program of the Corporación del Valle del Cauca is intended to repair this imbalance.[44]

It is also significant that much of the recent expansion in Mexican commercial agriculture has occurred in arid lands in the states of Sonora, Durango, and Sinaloa that were previously uncultivable, and has come largely as the result of more effective water management. The technology

of arid land cultivation, as it is being developed in experimental work in Israel and in Arizona and New Mexico, has potential application to Latin America, and productive forms of cooperation are developing between, for example, the University of New Mexico and the University of Sonora.[45]

Energy Resources: Coal

In energy resources, Latin America suffers severe limitations and, therefore, cannot follow closely the pattern of growth laid out by previously developed regions. In contrast to the regions of the United States, the Soviet Union, and China, which together are estimated to possess 90 percent of the world's coal resources, Latin America has little more than ½ percent of the total.[46] The region is particularly deficient in coking coal for steel making. Brazil, which has a moderate supply of coal from its own mines, must nonetheless import nearly two-thirds of the low-ash coal used for smelting from the United States, and provides only about 60 percent of its total consumption of coal from domestic sources. Argentina and Mexico are also substantial importers of coal. The Argentine deficit in coal supply, necessitated chiefly by the need to produce power thermally but also to make steel, has risen sharply since the energy crisis. Venezuela has not developed its own limited coal reserves sufficiently for its present industrial requirements.

Colombia has the largest known coal reserves in the region, and most of its coal, both anthracite and bituminous, is of good quality, with low percentages of ash and sulfur. Much of the bituminous is suitable for coking. Yet the country is not a major producer of coal and exports only small quantities, mainly because of the remote location of deposits and the lack of adequate railways, roads, river systems, and ports.

The most promising recent development is the discovery of large reserves of sub-bituminous coal in the extreme south of Chile. While these deposits are reported to be convertible into synthetic fuels and chemical products, their utilization must await investment in and construction of major facilities.

Petroleum Resources

In petroleum, as we have seen from the balance-of-payments figures, the region is also severely deficient. Even the countries with the largest reserves must now consider that they are only temporarily blessed. The proven reserves of Venezuela, which produces nearly three-fourths of the crude oil of the region, reached a peak of 17 billion barrels in 1960 and

have since declined to an estimated 13 billion in 1975.[47] Government leaders are genuinely concerned about the rapid depletion of this resource and have imposed a conservation policy limiting production, not simply to support prices, but in fear that the basis of Venezuela's present prosperity may be a transient one.

Mexico's proved reserves have been estimated by Pemex, the national petroleum enterprise, at about 8 billion barrels in 1975, an increase from 5.8 billion barrels the previous year. These estimates do not include recent important discoveries of petroleum in the state of Veracruz and offshore near Chac, Campeche, nor of natural gas in the Nuevo Laredo and Soto La Marina areas, about which the government has refused to divulge details. As of the present, Mexico has not been a major supplier in the international market and is exceeded by Trinidad and Tobago in exports, but may become an important producer.

Argentina, which is estimated to have the third largest petroleum reserves in Latin America, has steadily increased its imports of fuel. At present rates of consumption, Argentina's oil reserves are not expected to last more than fifteen years.[48] Colombia barely meets its own needs, and after the first quarter of 1974 ceased to export crude oil. Ecuador and Bolivia so far have been able to export only small quantities in the world market. Because of its large size, Brazil has long been considered to have the potential for becoming a major oil producing country, but extensive explorations to date have been disappointing. The country produces only about 15 percent of its daily requirements and is heavily dependent on foreign oil.

Firewood

Latin America has made the transition to a heavily oil-consuming region only in relatively recent times, but by 1970 more than 70 percent of all the energy consumed was provided by oil, and another 20 percent by natural gas. For many years, an important part of the region's energy supply was derived from burning wood, and it is probably still true that the greater portion of wood cut from native forests is used for fuel, rather than for construction, papermaking, or other uses. Not long ago, the capital of Paraguay derived its electrical power from burning hardwood in steam plants, necessitating an ever-widening circle of deforestation around Asunción. Until the late 1950s, interior railways in Argentina also depended on massive quantities of wood to fuel their locomotives. In the recent period the entire system has been dieselized, and not only were thousands of woodcutters thrown out of work, but the country has experienced a deepening balance-of-payments deficit to meet the increased need for imported oil.

It is hard to think of a region encompassing the great Amazon rain forest as being short of wood, yet that zone does not lend itself to commercial forestry, and there are areas in the region, such as the Altiplano, where even firewood is in extremely short supply. Conifers and other softwoods are relatively scarce, but most of the rural population will continue to depend on wood for fuel and basic building material. Since the introduction of the eucalyptus, a fast-growing species from Australia, earlier in the century, little attention has been given to the possibility of increasing or upgrading forest resources. Postwar advances in forest genetics would permit the introduction of hybrid softwoods that mature much more rapidly than native trees and that would be useful not only for firewood and lumber but for pulpwood, a growing import.[49]

Water Power

The most abundant underutilized energy resource in Latin America is water power. Much of the success of the Brazilian industrial miracle must be attributed to the harnessing of rivers for hydroelectric power, and with the prospective power supplies from the great Ilha Solteira dam on the Paraná river, the government plans to reduce its need for foreign oil by electrifying the railroads. Water power development is also going on rapidly in a few other countries, spurred by the policy of international lending agencies to replace private investment that formerly dominated this field.

While water power sites are by no means evenly distributed over the region, they are to be found even in the smaller countries such as Ecuador, Bolivia, Paraguay, Uruguay, and the Central American nations. From a developmental point of view, these resource sites have the merit of being geographically dispersed, and are thus likely to attract industry to new areas and aid in population redistribution. The attractive force of surplus power has been demonstrated in the zone around Córdoba in Argentina, in the states of Santa Catarina and São Paulo in Brazil, and more recently near the Acaray dam in eastern Paraguay. Furthermore, wherever rural electrification has been vigorously promoted, it has radically improved the lives of farmers and their capacity for production—one of the more hopeful aspects of frontier development.

Since by historical circumstance major rivers often form national territorial boundaries, border resources must be developed as international enterprises, but such ventures have frequently been impeded by exclusively national interests. A current instance is the construction of the Itaipú dam on the Paraná River between Brazil and Paraguay, which

when completed at an estimated cost of $20 billion will be the largest hydroelectric complex in the world.[50] The project was long delayed by a dispute between Argentina and Brazil over navigation and water rights on the lower Paraná. In addition, the government of Paraguay has insisted that 50 percent of the power to be generated be produced in the 50-cycle form corresponding to the Paraguayan distribution system, rather than to that of its larger neighbor to which the surplus power will be sold. This would require a costly conversion plant. Engineers estimate that it may cost ten times as much to install the conversion plant as to rewire the entire distribution system for Paraguay and equip the country with new appliances. Paraguay has a legitimate interest in preserving access to one of its few energy resources, the recent development of which has already begun to transform the growth pattern of the eastern portion of the country. Yet the needs of all of the affected countries could best be served by seeking the most efficient utilization of the available water power.

Developing increased capacity for the production of electrical energy from water power is critically important to the long-range development of Latin America. To take one example, in 1973 Argentina produced only 6 percent of its electricity from water power, as compared with 89 percent from petroleum and natural gas and 5 percent from coal.[51] Yet the estimated reserves, in petroleum equivalents, of water power far exceeded those of the oil fields. The development of water power, which has proceeded intermittently over the years, would enable Argentina to electrify the railroads and to devote some of its oil reserves to more essential uses.

Nuclear Energy

The prospects for nuclear energy are farther down the road. Although Argentina has completed the first nuclear energy plant at Atucha, the contribution of atomic energy to national production of electricity is expected to be no more than 2 percent by 1985. Because of its strategic significance, the Argentine atomic energy agency for many years was relatively untouched by the frequent interventions of the national universities and other research centers. Recently, however, many of the technical personnel in this field have felt obliged to leave the country to work in Iran.

The Brazilian government is eager to enter the atomic energy field, and the National Research Council has announced plans to offer 1,200 fellowships for studies in nuclear engineering alone. The first of three nuclear power plants scheduled to be erected at Angra dos Reis, in

the state of Rio de Janeiro, is nearing completion.[52] An agreement concluded with West Germany in June 1975 provides for the construction of eight more nuclear power stations, which would greatly reduce the need for petroleum. However, this agreement was severely criticized in the United States because it provides that in exchange for natural uranium, West Germany will supply Brazil with the technology for a complete nuclear fuel cycle process that would generate fissionable enriched uranium and permit the construction of atomic weapons. Brazil has agreed to only limited international inspection of these facilities.

In view of the heavy investment costs, uncertainties in the supply of reactor fuel, and the danger of environmental contamination, the future of atomic energy development in Latin America remains in doubt. Above all, as long as Latin American countries refuse to sign broad nonproliferation agreements, the fear that reactor wastes will be converted into weaponry or that terrorists may obtain easy access to materials for making explosive devices will hamper continued access to foreign technology and processed reactor fuel.

For some time to come, the most feasible line of development appears to be the exploitation of hydroelectric power, a virtually inexhaustible resource utilizing available technology, which can have enormous impact toward regional integration and balanced growth.

Possibilities for Energy Substitution

Considering existing levels of education and income among the farm population of Latin America, there is an urgent need for practical research to devise and introduce appropriate energy-saving technologies into the improvement of agricultural production and rural handicrafts during the next generation. In view of present and prospective costs of petroleum products, it is vain to think that small-scale agriculture can be greatly improved by reliance on gasoline tractors and fertilizers from petrochemical sources.

It may be necessary, despite a general preference for only the most modern techniques, to turn to horse farming, which is still successfully practiced in several parts of the world, and which for many Latin American farmers would be a considerable advance over the ox and crude wooden plow. Horses require no petroleum and provide a natural source of organic fertilizer; used effectively, as they are among Mennonite farmers in the United States, Canada, and Paraguay, as well as in other communities in Europe, they are highly productive.

Bio-gas generators to produce usable heat from human and animal waste have the same advantage and require small investment.[53]

Other substitutes for fossil energy, such as small solar cookers, that are adapted to rural use must be sought. Renewed interest in the use of the windmill water pump of the Great Plains and the wind-driven generator for home electricity has led to a special program at New Mexico State University and to similar research at other institutions.

One of the more interesting possibilities for decreasing reliance on chemical fertilizers is research in natural nitrogen fixation arising from a recent discovery by Dr. Johanna Doebereiner, a Brazilian plant biologist, which has been confirmed by horticulturists at the University of Wisconsin.[54] It has long been known that microbes in the nodules of leguminous plants fix inert nitrogen gas from the air to make it available to plants, but Dr. Doebereiner found that some soil-depleting crops, such as corn and pasture grasses, may benefit from similar microbes that attach themselves to their roots and increase the amount of nitrogen absorbed directly into the plant. This and other research into methods of increasing plant self-fertilization from natural sources may come to rival genetic hybridization as a factor increasing crop yields.

There is thus an enormous field developing for systematic research in what have been called "appropriate" or "intermediate" technologies that can be utilized by indigenous and other local groups to open the internal frontier. In contrast with those who believe that the peoples of the region are hopelessly dependent on the exploitative manipulations of the great transnational corporations and imperialist governments, investigators in these fields take the view that vigorous exploration of these opportunities offers a constructive alternative to the fatalism that has long characterized the culture.

HUMAN RESOURCE DEVELOPMENT AND TECHNOLOGICAL PROGRESS

It is beyond the scope of this article to discuss the complex social and political adjustments that must be made to open the internal frontier. If more effective techniques are to be applied to develop the region's resources, basic changes in geographical and occupational orientations as well as in the educational preparation of the new generation will be required. In view of the gravity of the short-term crisis and the distorting pressures of long-term forces that have been described, it is entirely possible, if not probable, that no global strategy will emerge that will alleviate these trends. However, enough investigation has been made to suggest some of the indicated policy priorities, in which a vigorous educational program stands high.

With respect to slowing the rate of population growth, public policy has rarely been successful, even after officials have become con-

vinced that there is a problem. In Latin America the operative forces impelling a reduction in the death rate are strong and direct, since they are related to the ongoing revolution in medical care and public sanitation. The operative forces on the birth rate are weak and indirect. While *machismo* and other traditional attitudes tend to keep rural birth rates high, the most effective checks to natality appear to be urbanization, higher incomes, and education, particularly when they occur in combination.[55] The acceleration of urbanization may therefore be regarded as beneficial in the long run, since it has a potent effect on the birth rate, but unfortunately in the short run it magnifies the demonstration effect and thus creates acute problems in stimulating the demand for an ever-expanding variety of consumer goods. Rapid urbanization, as ample evidence indicates, also imposes severe social costs when it forcibly lowers the fertility rate through sheer overcrowding.

A policy that would seek to induce a decline in the birth rate through a deliberate increase in incomes also confronts the limitation in the short run that it would stimulate inflation, since higher incomes would be more likely to be accomplished by monetary expansion than by increases in real output. Better education thus offers the most feasible prospect of influencing the birth rate, as people come to anticipate the consequences of having large families in a changed environment. Although the family planning movement has been slow to take off in Latin America, workers in this field report an increasing receptivity to information about effective means of birth control that reflects a marked generational change in attitudes.

More attention will also have to be given to redirecting the flow of population, insofar as this can be done by noncoercive means. Latin Americans have long been discouraged from moving into their own frontier zones by lack of economic opportunities, poor transportation, and inadequate facilities for health, education, and recreation. In many parts of the region access to the frontier is increasing dramatically as new roads are cut and colonization is encouraged. The role of the international lending agencies will be a significant factor in determining whether new poles of attraction can be established through strategic investments that will disperse population to interior development zones.

Recent policies of the Brazilian government applied through the National Institute for Colonization and Agrarian Reform (INCRA) have established a pattern that resembles the U. S. homestead movement of a century ago. As described by David J. Myers:

> The basic INCRA strategy involved settling migrants from the Northeast in *agrovilas* on government-owned strips that extended for six miles on either side of newly constructed roads in the Amazon. *Agrovilas*, small rural settlements,

were planned with primary schools, health services, and a few shops. Every 25 miles or so along the highway INCRA anticipated developing an *agropolis* in which would be located commercial services, warehouses, a sawmill, a bank, and retail stores. Novo Mundo, the first *agropolis*, was founded in 1970, and within three years, more than 15,000 families had settled along the partially completed Transamazon highway.[56]

So far this resettlement program has absorbed only a small proportion of the migrant streams annually entering the large cities of Brazil, but it represents perhaps the most aggressive attempt in the region to populate the new frontier. In recent years the Venezuelan government has also undertaken the redirection of migratory flows toward interior resource areas, such as in the Guayana regional development program, and sporadic efforts at resettlement are occurring in the Andean countries.[57]

Above all, there is a need for a much stronger educational base for the opening of the internal frontier. It is critically important that governments be induced to change their attitudes toward universities and research institutes as centers of rebellion and recognize their indispensable role in the development process. One way to overcome the general politicization of the universities might be to establish an international jury of distinguished academicians in each discipline and authorize it to nominate those Latin American scholars who have already gained recognition for outstanding competence in their fields.[58] These would become the leaders of new or reorganized Latin American universities whose principal support could come from international development agencies in order to insulate them as much as possible from dependence on shifting national administrations. Once appointed, such scholars should be guaranteed tenure in their careers and freedom from political interference, as in all great universities, and they should be charged with developing centers of excellence in research and advanced teaching. There are, of course, already existing institutions in Latin America with some of these characteristics, but they are too few to supply the manpower with the requisite technical and managerial skills that the region will require.

Beneath the university level, frontier development strategy calls even more urgently for a genuine popular education movement, such as may be observed in some areas of Mexico and Central America, but which is poorly supported in most parts of the region. Such a movement embraces not only an extension of educational opportunity as broadly as possible to rural as well as urban zones, but involves the conscious adoption of functionally more effective methods of relating what is taught to development needs. This process as it is occurring in some areas of Latin America—although with insufficient rapidity—is described in another study.[59]

By its nature an educational process takes time, and the trends described earlier may be moving with such speed that the development problems of Latin America will become increasingly intractable. However, because the region is in a frontier stage of development, it offers scope for an exceptional range of technological solutions. Scholars identified with the study of Latin America will not be content with describing—and deploring—the visible trends. They will be interested in exploring the constructive means of affecting the outcome.

NOTES

1. Venezuela and Ecuador did not join the other OPEC countries in imposing the oil embargo.
2. *Latin America in the World Economy* (Washington, D.C.: Inter-American Development Bank, 1975), p. 41; *Bank of London & South America Review* 9 (April 1975): 206.
3. The data are for nineteen oil-importing countries, excluding Cuba and Surinam, for which data are not available. E. Walter Robichek, "Demand and Balance of Payments Management in Latin America and the Caribbean," paper presented at a meeting of the American Economic Association, Dallas, Texas, 30 December 1975, p. 1.
4. As of 30 June 1976, the four largest borrowers under the International Monetary Fund's special oil facility were Chile, SDR 244 million; Uruguay, SDR 95 million; Argentina, SDR 76 million, and Peru, SDR 53 million. Total borrowings of all Latin American countries under the oil facility reached SDR 618 million. *International Financial Statistics* 29 (August 1976): 9. The oil facility went out of existence in March 1976.
5. "Venezuela—Loans to Less Developed Nations," *Keesing's Contemporary Archives* 22 (1976): 27681 B.
6. *Economic and Social Progress in Latin America: Annual Report 1975* (Washington, D.C.: Inter-American Development Bank, 1976), p. 95.
7. Leonard Silk, "The Problem of Enormous Buildup of International Debt," *New York Times*, 11 November 1975, p. 60.
8. Growth data are from *Economic and Social Progress, 1975*, and *World Bank Annual Report 1976*. Figures for 1975 are preliminary.
9. Albert Fishlow, "Brazilian Size Distribution of Income," *American Economic Review* 62 (May 1972): 391–402; C. G. Langoni, *Distribuição de Renda e Desenvolvimento Econômico do Brasil* (Rio de Janeiro: Editora Espressão e Cultura, 1973). Other income studies for Argentina, Mexico, and Puerto Rico are summarized in Richard Weisskoff, "Income Distribution and Economic Growth in Puerto Rico, Argentina, and Mexico," *Review of Income and Wealth* 16 (December 1970): 303–32. See also Hollis Chenery et al., *Redistribution with Growth* (London: Oxford University Press, 1974).
10. David Felix, "Trickling Down in Mexico and the Debate over Long Term Growth-Equity Relationships in the LDCs," mimeographed. See also Ifegenia M. de Navarrete, "La Distribución del Ingreso en México, Tendencias y 'Perspectivas,'" in *El Perfil de México en 1980* (México: Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México, 1970), 1: 15–72.
11. Juan de Onis, *New York Times*, 6 March 1976, p. 6; 11 March 1976, p. 14.
12. For an account of recent experience with wage policy in relation to inflation in Brazil, Chile, and Colombia, see Walter Krause, "Indexing: Lessons from Latin American Experience," paper presented at a meeting of the Association for Evolutionary Economics, Dallas, Texas, 30 December 1975.
13. This analysis of long-term forces draws heavily on the work of Osvaldo Sunkel and other structuralists who first called systematic attention to such factors in Latin American development. See, for example, Sunkel, "The Structural Background of

Development Problems in Latin America," *Weltwirtschaftliches Archiv* (Kiel) 97 (1966): 45–47.

14. United Nations, *Demographic Yearbook* 1973, p. 81.
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