The great projects in mining and industry

Part 22
Ibero-American integration

The great mineral wealth of Ibero-America must be converted into great heavy industry. That is the only way that the continent can overcome its historical underdevelopment in this indispensible sector for economic independence.

This installment opens Chapter 7 of *EIR*'s exclusive English-language serialization of the Schiller Institute's book, *Ibero-American Integration: 100 Million New Jobs by the Year 2000!* The next two installments will deal with heavy industry and industrial concentration zones.

The book, published in fall 1986 in Spanish, was written by an international team of experts elaborating Lyndon LaRouche's proposal to free the continent of economic dependency and spark a worldwide economic recovery, "Operation Juárez."

Numbering of the figures, tables, and maps follows that of the book.

Ibero-America's construction of the great infrastructure projects outlined in the preceding chapter will be the engine, the driver, for the greatest industrial boom the region has ever seen. To service the enormous requirements for construction materials, heavy industry, and capital goods, a dramatic leap in industrial output will be required. This will have to be done on the basis of continentally coordinated investment strategies, and Common Market tariff agreements designed to protect the new infant industries until they get off the ground.

The industrial strategy will also have to take advantage of the multiplier effect that accompanies successful development. This means that every dollar invested generates tens of dollars worth of orders in a dozen other industries, as, for example, purchases of locomotives in turn generate a demand for engines, chassis, bodies, instruments, and so on; which in turn create demand for machine tools and the products of foundries, stamping plants, and other types of plants; which in turn generate demand for steel, aluminum, and other types of metals. To fully benefit from such a potential multiplier, it will be necessary for Ibero-America to develop vertically integrated industries.

This has traditionally been one of the weakest features of the Ibero-American mining and industrial sectors. Much is mined, for example, but very little mineral processing and elaboration occurs in Ibero-America, and therefore, the value-added component is very low, as we can see in the prices per ton of various minerals and their respective finished metals, shown in **Figure 7-1**.

Thus, Ibero-America exports under-priced metallic minerals, or sometimes refined or semi-refined metals, and im-

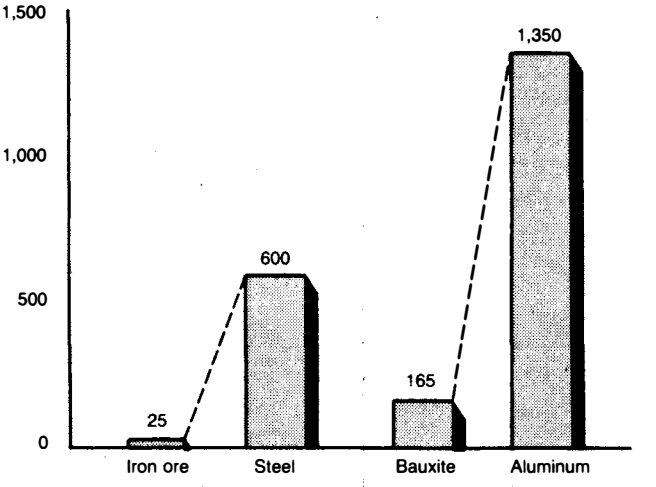
ports expensive finished products containing the metal, or at best imports the parts for final assembly plants. Omitted have been the intermediate stages, the capital goods and heavy industry manufactures, which are the most undeveloped industries on the continent. This explains the dangerous imbalance within the manufacturing sector between capital goods, intermediate goods, and consumer goods.

Rather than protecting capital goods production, the ECLA-influenced strategy across Ibero-America has been to protect consumer goods industries if anything. Hence we see the spectacle of Peru under Belaúnde Terry receiving loans for investment projects, in which the entirety of the investment goods were imported, even when Peruvian industry could have produced a portion of these goods. In Colombia, the tariff structure heavily protects the manufacture of consumer durables such as refrigerators, but discriminates against the manufacture of capital goods to produce parts for the refrigerators. Brazil exports steel, even though its consumption of steel is a small fraction of that needed for its own development, and it imports capital goods made from steel that it would be capable of manufacturing domestically.

The result has been a dwarfed industrial goods sector, as **Table 7-1** indicates, with no prospects for self-sustaining growth.

The practice of postwar Japan under the guidance of its Ministry of International Trade and Industry (MITI) shows a contrary approach which is far more desirable as a model for the Ibero-American Common Market. MITI used tariff policy, interest rates, and other incentives to foster one industry after another in the capital goods and heavy industry sectors, beginning with those the country was most capable of developing, but moving on quickly to ever more sophisticated industries as expertise was gained. As soon as an industry came into being, it was pushed to expand to meet all national investment needs, in order to replace imports.This, too, could perhaps be called an "import substitution" policy, but it is focused on replacing the import of *capital goods* with domestic production at the most rapid possible rate. Combined with appropriate credit policies and other government guidance and support, this policy served to turn a devastated

FIGURE 7-1
Average prices for minerals and metals 1984
(dollars per ton)



Source: U.S. Bureau of Mines

TABLE 7-1
Per capita production of industrial products in various countries 1980
(per 1,000 inhabitants)

	Steel (tons)	Fertilizers (tons)	Newsprint (tons)	Commercial vehicles* (units)	Refrigerators (units)
Argentina	95.1	1.0	3.5	2.3	9.2
Brazil	126.5	16.6	0.9	4.5	13.9
Colombia	16.3	3.4	n.a.	0.4	8.0
Chile	63.4	11.2	11.8	0.4	8.6
Mexico	102.6	13.5	1.0	1.5	8.2
Peru	25.8	4.5	n.a.	0.4	4.4
Venezuela	126.5	10.8	n.a.	4.4	n.a.
Japan	951.3	18.8	21.9	33.4	37.1
West Germany	722.2	81.0	10.0	5.2	48.9
United States	447.9	99.4	18.1	7.2	30.1

n.a. = not available
* Includes production and assembly
Sources: ECLA, United Nations.

postwar Japan into the number-two capitalist superpower in less than 30 years.

There are some bright spots in the Ibero-American economy where certain heavy industries have achieved some level of development. Although the per capita production of steel is eight times below consumption in the developed countries, Mexico and Brazil have gained some experience in developing sizable new steel plants over the last 10 years, valuable experience needed for the rapid expansion of these industries in the future. The cement industry also has a good start toward the rate of expansion that will be needed. And Brazil's capital goods industry, and to a lesser extent Argentina's, while still quite small, have achieved medium levels of sophistication in machine tool production, and represent a precious resource toward the effort that will be required in this branch of industry.

Thus, there are two principal features to our industrial policy for Ibero-America: 1) heavy industry must be emphasized, rather than low value-added extractive activities; and 2) in-depth capital-goods capabilities must be created. The steel and metallurgical industries, machinery fabrication, machine tools, power generation equipment, transport equipment, and instruments, are what must be emphasized.

We categorically reject ECLA's failed strategy of import substitution of consumer goods. We emphatically dismiss the kooky idea of creating a "post-industrial information society," in which computers (a necessary tool, to be sure) are proposed to substitute for the growth of heavy industry. And

TABLE 7-2
Production and reserves of metallic minerals in Ibero-America*

	Production 1983	% of world total	Reserves	% of world total	Principal producers
Basic minerals:	**Thousands of tons**		**Millions of tons**		
Iron ore	142,300	26.8	52,000†	46.3	Bolivia, Brazil Venezuela
Nickel	93	13.7	20.3	38.5	Cuba, Brazil
Copper	1,822	22.5	111	32.6	Chile, Peru
Bauxite	23,378	n.a.	5,800	27.6	Brazil, Caribbean
Titanium	14	1.5	34.5	20.0	Brazil
Zinc	987	15.7	20	11.8	Mexico, Peru
Tin	40	19.0	0.3	8.5	Bolivia, Brazil
Lead	494	14.7	6	6.3	Mexico, Peru
Manganese	1,046	13.1	30.6‡	3.4	Bolivia, Brazil
Strategic minerals:	**Tons**		**Thousands of tons**		
Columbium	6,977	73.1	3,221	78.9	Brazil
Lithium	1,279	15.2	1,270	66.7	Chile, Brazil
Rhenium	4.8	31.5	1.4	45.5	Chile, Peru
Berylium	1,250	18.3	165	43.2	Brazil
Telurium	125	23.6	7,280	33.1	Chile, Peru
Selenium	375	19.9	25	31.3	Chile, Mexico
Silver§	144.2	36.7	2,290	29.2	Mexico, Peru
Cobalt	1,650	7.1	1,048	28.9	Cuba
Molybdenum	23.8	36.7	1,361	25.0	Chile, Peru
Cadmium	2,503	12.7	75	13.5	Mexico, Peru
Antimony	19,053	39.9	554	13.3	Bolivia, Mexico
Thallium	1.9	14.3	0.05	12.0	

*Quantities measured in metallic content
†Includes estimates of the reserves of Mutúm in Bolivia and of Carajás in Brazil
‡Manganese reserves could be considerably larger, given the undetermined quantities in the reserves of Mutúm
§Millions of troy ounces

Source: U.S. Bureau of Mines

we totally reject the neo-colonialist scheme of identifying Ibero-America's considerable mineral wealth in order to base development primarily on that.

Rather, the importance of its mineral wealth for Ibero-America lies primarily in the independence from foreign supply that possession of this wealth permits. Since, unlike Japan, Ibero-America represents a region large enough in land area and population to be substantially self-sufficient, developing its mineral wealth, primarily focused on internal requirements, not export, should be a natural extension of the overall industrial development program.

Mining

Due to the legacy of colonial trade relations with the industrial countries, mining is the relatively most well-developed industry in Ibero-America. Gold and silver, of course, were the area's first exports, and by the 19th and 20th centuries, mineral development became the primary object of foreign investment in the continent. They are still important products today. The copper of Chile and Peru, the tin of Bolivia, the iron ore of Brazil, and a host of other minerals, represent a very important element of the continent's GNP and exports. Yet very little of these minerals is actually refined into final metallic form in Ibero-America, despite the fact that the continent has abundant and cheap energy sources—a major component in all metals refining.

Table 7-2 shows the production in 1982 of all the important minerals of the continent, grouped by basic minerals and strategic minerals. The second column shows the percentage of total world production accounted for by this output. As can be seen, the continent accounts for a very considerable share of such basic minerals as iron ore, nickel, copper, zinc, and tin. It also accounts for large percentages of production of several of the strategic minerals.

Table 7-2 also shows the estimated reserves, and the percentage of world total, of the same minerals. It can be seen from this table that the continent has an even greater share of reserves than of production: 49% of world iron ore reserves, 39% of nickel, 33% of copper, and 28% of bauxite. As for the strategic minerals, the table shows that it has more than 40% of four of them, and more than 25% of five others.

Map 7-1 shows the locations of the major deposits of the basic minerals. As can be seen, Brazil, Chile, Bolivia, Peru, and Mexico are the five major mining countries on the continent. However, the already identified resources do not represent the entirety of the resources that exist. One of the first priorities of an integrated development program is to employ all the most modern means of locating new deposits, including satellite reconnaissance, to take an inventory of the true resources of the continent, as the basis for rational resource-development planning for the next 30 years. It is certain that major discoveries are yet to be made in almost all countries, and there are vast regions, especially in the Andes and the Amazon basin, that have hardly been explored.

The resource development policy must be to focus mining investment on the needs of the continent's development program, and not primarily for export. From this standpoint, the continent already produces more than enough copper, tin, and iron ore for its present and immediate future needs, whereas its bauxite production is relatively much lower. While development of these minerals must not be stopped, it should be phased according to the pace of requirements for Ibero-American industry.

Second, the policy must in general be to develop first those resources that can be integrated into broader development projects. The Gran Carajás project of Brazil—as originally conceived by the Companhia Vale do Rio Doce, as opposed to its degradation by former Planning Minister Delfim Netto's monetarist crowd—is a model for such development. In the original concept, extraction of iron and bauxite ore were linked with the overall development of an area larger than all of Italy, with refining industries, steel mills, farming, cattle, forestry development, and other industries. When proximity to power sources and land suitable for habitation permit, metal refineries should be located near the sources of ore, such that mining projects become vehicles to open up new regions for settlement in the interior.

Third, Ibero-America is rich in the strategic minerals, but they are virtually not refined at all on the continent. The advance of technology in metallurgy, ceramics, electronics,

MAP 7-1

Reserves of the principal metallic minerals in Ibero-America

lasers, and other high technology areas is such that new important uses for the rarer metals are being discovered all the time. **Table 7-3** gives some of the more important high technology uses for most of the minerals found in Ibero-America. The list is not a complete list of all important uses, as most of the items listed are also employed in many other branches of industry, but only those that pertain directly to capital goods, aerospace, and high technology. Thus, particular emphasis should be put on developing these minerals, as their use both on the continent and abroad can be expected to grow much more rapidly than most of the basic minerals.

TABLE 7-3
Applications of strategic minerals in areas of high technology

alumina	ceramics, refractories, abrasive for precision grinding
aluminum	high voltage electrical transmission
antimony	batteries, electrical transmission equipment
bauxite	petroleum drilling equipment, abrasive
beryllium	computers, heat shields for aerospace equipment, ceramics for electronic components, material test reactors
cadmium	anticorrosive coatings for aerospace equipment, electronics, electrical industry, batteries, television sets
cobalt	high temperature resistant materials for airplane turbines, nuclear reactors, gas turbines, aerospace equipment, abrasion resistant tools, drills
columbium	superalloys for gas turbines, nuclear equipment, airplane turbines, superconductors, stainless steel, magnetic resonance equipment for nuclear applications
copper	special alloys in the electronic industry, energy exploration equipment, aerospace uses
lead	automotive batteries and electrical industry uses
lithium	foundry and metal refining processes, batteries for computer backup, heart pacemakers, and intercontinental missiles, liquid lithium in nuclear reactors
manganese	fabrication of carbon and special alloy steels
molybdenum	special alloys for high temperature equipment, refractory materials for electrical and electronics industries, nuclear reactors, lubricants, catalysts
nickel	alloys for turbines, heat exchangers, nuclear reactors, ships, airplanes
rhenium	alloys for measuring instruments, electromagnets and semiconductors
selenium	ceramics, superconductors, photocopiers
silver	photographic and photocopying equipment, catalysts in petrochemical industry, high quality mirrors
tellurium	alloy of steel to improve machineability, numerous chemical industry uses, infrared sensing equipment
thallium	electronic applications, semiconductors, radiation detection equipment, electromagnetic transmission
tin	engine bearings, electronic components, solders for electronic components, computers, and military vehicles
titanium	aerospace industry, guided missiles, airplanes, turbines for airplanes, electrical plants
zinc	construction of industrial plants, bridges, roads, buildings

One bright spot on the strategic metals front is Brazil, in particular its titanium processing facilities near Minas Gerais, which are utilizing Japan's most advanced titanium processing facilities, modified to Brazil's requirements. Experts estimate that in just a few years, Brazil could become the world's leading titanium metal producer. Titanium is one of the most critical metals in the world at present, given its importance in the aerospace industry and other applications requiring light weight and strength.

Fourth, there are several minerals which are relatively undeveloped at present which warrant specific attention. In particular, Brazil has large reserves of titanium ore, which are hardly developed. Aluminum is also very important, and has been significantly expanded in recent years. But the continent still produces much more bauxite than it refines. There are several large aluminum complexes scheduled for Gran Carajás which should be completed, but many more will be needed.

In general, the growth of mineral production can be somewhat slower than for other parts of the economy. Using the consumption of the major minerals in the United States economy as a rough guide and converting this to a per capita basis and applying it to the estimated Ibero-American population for 2015, copper ore production will need to rise only 4-5% per annum, antimony 1.5-3%, tin and nickel 5-6%, and lead 7-8%. Refined aluminum must rise by 9-10%, but bauxite production can rise more slowly.

While exports will not be eliminated, investments will not be made specifically to produce for export. In the cases of iron and steel, and aluminum, it will undoubtedly be the case that the continent will not have any excess of either ore or metal to export within a few years, as the challenge will be to build refining plants fast enough to meet domestic demand. Some of the other minerals may continue to be exported, such as copper, but they should be exported as refined metals when possible, given the higher value-added than for ores.

Map 7-2 shows Ibero-America's major deposits of petroleum, natural gas, and coal. After the Middle East and the Soviet Union, Mexico has the largest proven oil reserves in the world, almost double those of the United States, with at last 48 billion barrels. Venezuela has at least 25 billion barrels, and the official reserves of the entirety of Ibero-America come to about 90 billion barrels. Ibero-America accounts for close to 20% of the world's prospective area of petroleum and natural gas (sedimentary basins), but comparatively little exploration has been carried out. Even though such areas are 53% larger than those in the United States, and the yield per foot drilled nearly nine times higher, only some 100,000

wells, almost exclusively in Mexico and Venezuela, had been drilled in the region by the end of the last decade. This compares to 2.5 million in the United States. Official estimates of recoverable oil and natural gas from undiscovered deposits
serves.

Between the Mexican oil company, Pemex, Petrobras of Brazil, and the Venezuelan national oil company, PDVSA, the continent has an invaluable source of expertise, which will be necessary to confront the monopolistic practices of the oil multinationals.

Ibero-America also possesses sizable deposits of natural gas in Argentina, Mexico, Bolivia, and Venezuela.

In terms of energy minerals, the present bottleneck is coal, especially coking coal for steel and other industrial processes, which presently has to be imported. The most important deposit being exploited right now, with over 1 billion tons of surface mineable coal, is located on the Guajira Peninsula of Colombia, and is being developed into a mine that can produce 25 million tons a year—El Cerrejón. Colombia also has over 25 billion tons of coal reserves, most of it located in the Andes mountains and along the edge of thein the reg jungle east of the Andes. Many of these coal deposits in the mountains are of very high grade that can be used for coking, and the deposits along the jungle edge are very large.

Brazil has over 14 billion tons of coal reserves and Venezuela has large coal deposits in Zulia for which there have been plans for exploitation as part of a large steel complex for more than 20 years. Many of the geological formations in South America are similar to those in North America, which suggests that there may be large undiscovered accumulations of coal in the interior of the continent, particularly in Bolivia, western Brazil, and eastern Colombia, in addition to the deposits already identified in these and other countries.

MAP 7-2

Coal, oil, gas, and uranium reserves in Ibero-America