Peru: God Offers His Challenge to Engineers

by Sara Madueño Paulet de Vásquez

Now that the Peruvian elections are concluded, and President Alberto Fujimori has been elected for five more years, it is time to address the principal challenge facing Peru—and the world—in light of the ongoing international economic crisis. The following is the edited translation of a presentation by Peruvian architect and analyst Sara Madueño de Vásquez, to the annual conference of the Schiller Institute in Lima, on Dec. 28, 1999.

There is no point at this time in getting into how bad the national and world economy is, and how the ultra-liberal, free-trade measures that have been imposed on our nations, especially in recent years, have brought us to the edge of the abyss. No one can doubt any longer, that we are heading toward the disintegration of the international financial system. We can see their Dantesque sequel in our own national economies. These facts have led us to a crossroads: Either we give up the fight and let ourselves be dragged impotently into total crisis, or we turn it into an historical moment for moving forward and, as Lyndon LaRouche says, "return to the place where we took the wrong path, and take the correct one, the road of the new Bretton Woods." Each nation, from its specific vantage point, each world citizen, now faces the same choice.

Here in Peru, our political class suffers from an alarming programmatic understanding. Their gaze is fixed, and they can't see beyond their noses. Their so-called programmatic platforms, regarding how to deal with economic matters, all appear to be prescriptions made up of the many little pills that the International Monetary Fund (IMF) distributes so freely: globalization, monetarism, free trade, all the clichés now accepted as "universal truths."

The virtual reality of liberalism has transformed our country's economy into shops whose display windows carry imported products that almost no one can afford to buy. It is the *light* economy, which subjects the population to enforced anorexia. We have an alarming 40% of the population living in conditions of extreme poverty. The real economy, the physical economy, the industrialization of the country, is not on the political agenda. Our incipient manufacturing industry operates at less than 50% of capacity. Free market *dumping* is drowning our national industry. Yes, our industry must be competitive, but that can be accomplished by regulating it, not killing it.

There is certainly a method for achieving development, and this has been successfully applied in many nations, all of them protagonists of economic miracles. This is the case with the United States itself, Germany, Japan, and now China. It is useful to re-create the development method already successfully tried by other nations, which is the strategy of *Development Corridors*. This is a method that never fails. It is a daring and optimistic perspective on development. With this method in mind, let us look at the "forest" from above and, with optimism, put together the picture of a prosperous future. Then we can undertake to make it a reality.

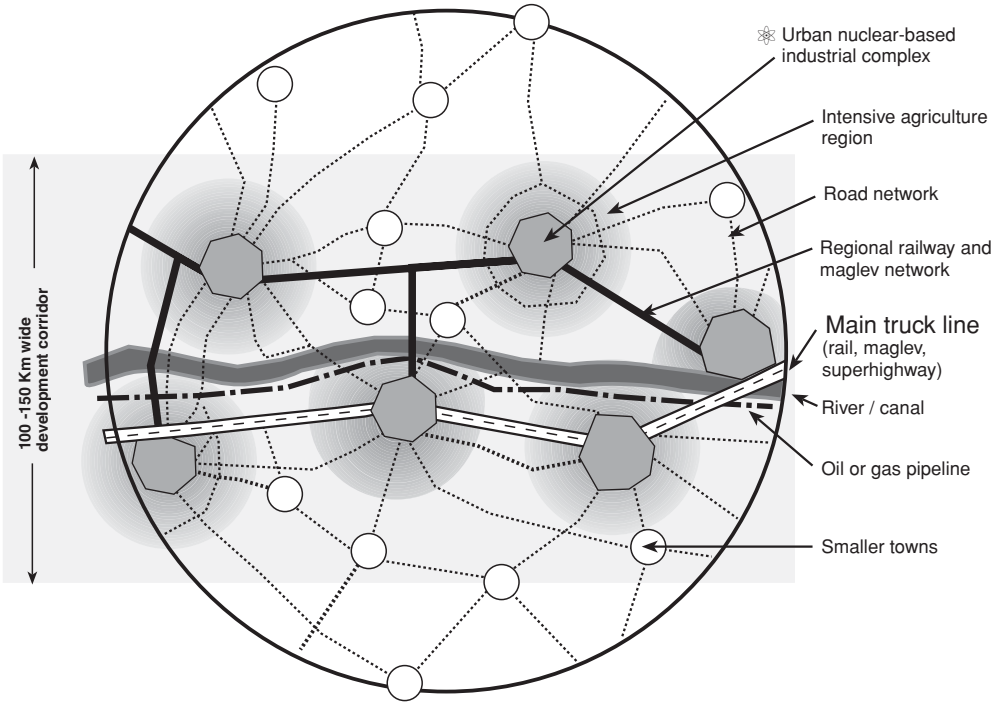
The Hamiltonian Method

The pioneer, and thus far most successful example, is that of the United States. A manual of this "method for development" is the famous report by Alexander Hamilton, father of the *American System of Political Economy* who, in 1791, as U.S. Treasury Secretary, wrote his "Report on Manufactures." There, Hamilton established the principles of economic policy which made possible the progress and industrialization of that nation. Less than a century later, Abraham Lincoln took up that Hamiltonian method. Then, Franklin D. Roosevelt drew on that same *American System* method in

planning for post-war reconstruction. We also have the extraordinary German economic miracle, inspired by the *American System* model. One current example, occurring even as the West goes through its Hamlet-like "To be or not to be" crisis, is in China, with its extraordinary Eurasian Land-Bridge project.

What is the singularity of the economic development strategy used by these nations and which has guaranteed such success? That singularity is the concept which guided the construction of economic infrastructure (transport, communications, energy, etc.) necessary for the development of cities, industry, agro-industry, and so forth. This concept is then joined to an appropriate credit policy through a National Development Bank for Infrastructure and Industry, both public and private, with credit directed only to investment in infrastructure projects and in productive industrial projects—a bank on the model of Hamilton's National Bank.

FIGURE 1
Graphic Representation of a 'Development Corridor'



But this strategy would not have succeeded anywhere, had it not been accompanied by a policy of universal education, which, based on a Classical curriculum, encourages the development of creativity and technological assimilation. An educational policy of this sort would produce a real enthusiasm among youth for the development of private initiative, in both science and business. In this way, we would forge the leaders of a machine-tool sector of the Peruvian economy, key to sustained economic development because it requires constant technological innovation. The German educational reform at the beginning of the 19th century, under the direction of Wilhelm von Humboldt, is exemplary. Indeed, therein lay the key to the success of the post-war German miracle.

All the economic miracles stemmed from viewing economic infrastructure from an integral standpoint, as a collection of industrial projects associated with modern infrastructural axes, or "development corridors," which cut through large tracts of territory. These corridors were generating productivity throughout their length and breadth, and spreading progress through modern cities being built up all along these corridors. This was the principle employed in the construction of the great canals in the United States, and in the decision to criss-cross its territory with highways, railroads, and energy grids. The physical geography was modified to build an economic geography coherent with the requirements of an agreed-upon national development project. This is also the principle behind the Eurasian Land-Bridge.

What Is a Development Corridor?

The "development corridors" are thus part of the motor infrastructure of the economic miracles (see **Figure 1**). LaRouche put it like this: "The proper design for the development of any very large land-area must be based on certain geographical principles. In modern history of the past two centuries, the center of these geographic principles is transportation routes, chiefly for water-borne commerce and trunk railways, still the cheapest and most efficient modes for movement of produced goods. . . . Do not think of this as merely passageways for transportation; think of them as development corridors, just as the U.S.A.'s Lincoln reform of 1861-1876 defined the relationship between transcontinental railways, and economic development of the land-areas through which the railways passed. Think of these as

strategic development routes . . . not as merely conveyor-belts of people, goods, water and power, but as like production-lines: a zone of efficient, high-density production of agricultural, mining, and manufactured goods, running the length of the trunk-line, and with a width of up to approximately a hundred kilometers. . . . Within this zone, there are nodes, such as cities and towns, areas of intensive agricultural and industrial production."

The city that extends from a radiating nucleus, is conceptualized in a series of concentric circles, each one of which defines a specific use of urban space. In the center, the cultural and administrative sector is contiguous with urban housing. An industrial complex is located in the second concentric circle, and an agro-industrial complex in a third circle. The city is connected to other cities through regional railroads. The succession of cities thus conceived, which are themselves developed along an infrastructural route, make up the development corridor.

The Eurasian Land-Bridge, under China's initiative and leadership, involves the direct participation of nearly 20 other Eurasian nations. Once it is built as planned, it will transform not only the economic geography of Eurasia, but it will have a domino effect throughout the world. It is worth taking a closer look at it, as an example, and because it will directly shape the near future, if we emerge successfully from the present crisis. With this integral project of infrastructural works, of such an unprecedented magnitude, China is showing the world that there is an alternative to the current crisis.

The Eurasian Land-Bridge is based on four infrastructure corridors, or development corridors, which include: railway lines, some of them high-velocity; energy centers; oil and gas pipelines; fiber-optic cables; 200 new cities of 1 million inhabitants each; industries, ports, airports; hydroelectric and nuclear plants, etc. These four development corridors will integrate China as a nation, linking it with the entire Asian continent, and the Asian continent with Europe. That is, one could travel in one day from Lianyungang (a major Chinese port on the Pacific coast) to Brussels, and back again, on a high-speed maglev (magnetic levitation) train.

But the Land-Bridge is not just about transport. This unique project, premised on the development corridor strategy, includes more than 10,000 projects of every sort. One of these, already under construction since 1994, is the largest hydroelectric project in the world, known as the Three Gorges Dam. This project will have an energy generating capacity of nearly 18,000 megawatts. For comparison's sake, the largest capacity Peruvian hydroelectric plant, at Mantaro, generates only 800 MW. Building the Three Gorges Dam requires taming the vast Yangtze River; a 700 kilometer stretch must be made navigable for ships with maximum draft. At the same time, the diversion of the waters of the Yangtze into the Yellow River, would open up northern China to agriculture, in an area equivalent to twice the size of Germany.

The 'Steel Belt' that Embraces the World

Seeing the development potential of the Indian and Pacific Basins, naturally suggests the future need to extend the Eurasian corridor into a "steel belt," a development corridor that could circumscribe the world, joining Europe and Asia with the Americas (see **Figure 2**), and in the process, incorporating Africa and Australia as well. In these basins are concentrated the demographic center of humanity. Hence the necessity of extending economic and development cooperation to the entirety of this region, of which Peru is a part (**Figure 3**).

The project to integrate the world through such a transmission belt of progress is not new. American historian Anton Chaitkin has documented that the friend and colleague of Abraham Lincoln, economist Henry Carey (1793-1889), and his associates, had hoped to replicate in the world what had already been done in the United States and Europe. Their plans were very explicit with regard to the integration by railroad of Germany, Russia, China, Mexico, Colombia, and Peru. The project involves "crossing the globe with steel tracks [because] only great works lead to the advancement of civilization and the development of the natural wealth of the people," they maintained. Peruvian historian Luis Ernesto Vásquez has documented that it was the American nationalists' plan to reproduce the American model of development in Peru, which was the real *casus belli* behind Britain's setting Chile at war with Peru in the 1879-81 War of the Pacific. To contain the "American Design" was Britain's objective, and to accomplish that, among other actions taken, it orchestrated this war. During this so-called War of the Pacific, says Vásquez, Peru served as a proxy battleground of a war between Britain and the United States.

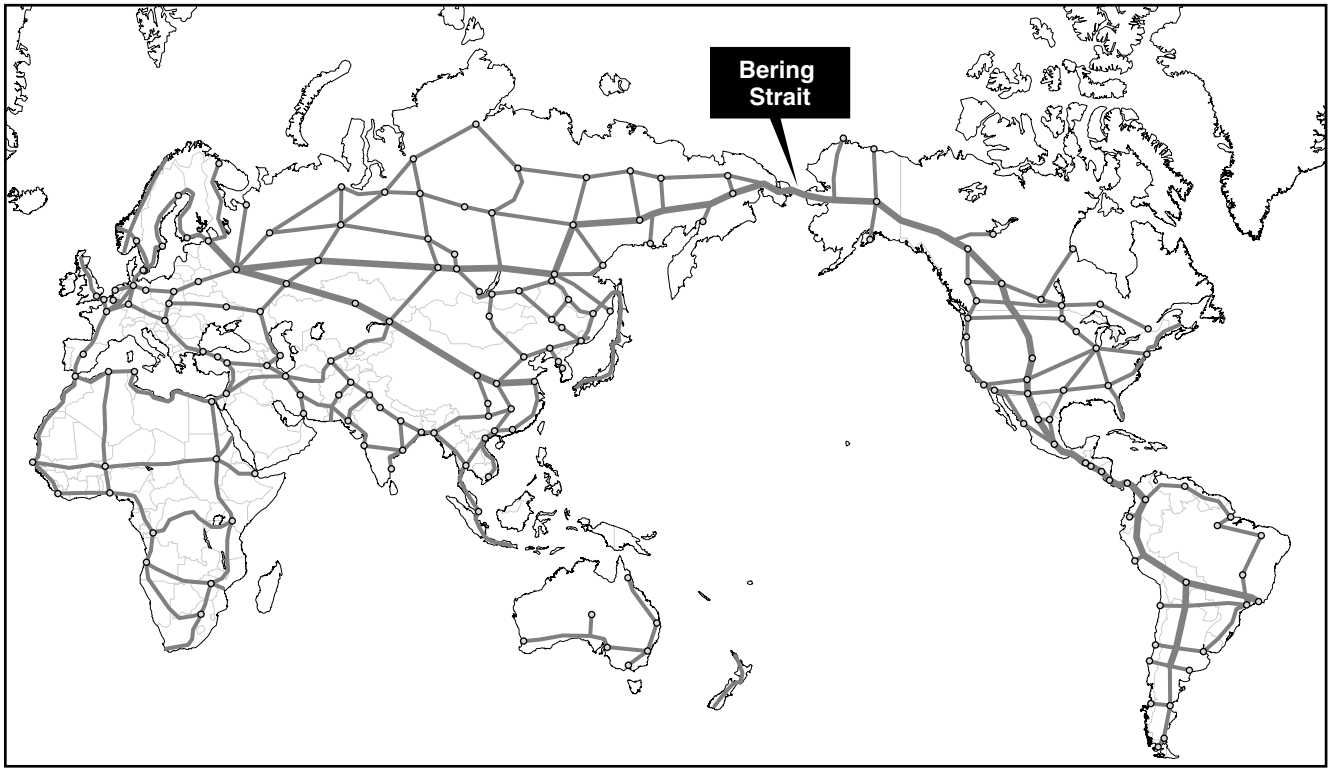
We can see in Figure 2 the route of this "steel belt" that would encompass the world. This is nothing more than an extension of the Eurasian Land-Bridge, whose northern point, after travelling across Eurasia, arrives in Beijing. From there, the project would continue north, to link up with the Trans-Siberian Railroad. This branch, extended east, would cross the Bering Strait, cross Canada, hooking up with the railroad network of the United States, to cross North America, and continue south, traversing all of South America. This "steel belt" would cross Peru from top to bottom.

Let us stop a moment in America; we will have to redefine the economic geography of the continent, to optimize its potential. This means infrastructure works. We would need to build a high density of projects for each geographic area. If we are thinking in terms of making America an economic unity, the first step is to integrate it infrastructurally.

The route of this railway belt would penetrate the south of the continent by crossing Peru from north to south, through the rim of the jungle to the east of the Andes Mountain range. Complementing this railroad line would be the already-existing Pan-American Highway, today just a roadway parallel to the Pacific Coast.

Another important means of continental integration is the

FIGURE 2
Main Lines of a Worldwide Rail Network, as Sketched by H.A. Cooper



maritime route that takes us into the very depths of the south of the continent; from north to south by east (see **Figure 4**). The idea is to integrate for navigation the basins of the Great Lakes and the Missouri and Mississippi rivers in the United States, with the Orinoco, Amazon, and La Plata river basins in South America, passing along the Mexican and Central American coasts, through the Gulf of Mexico and the Caribbean.

The longitudinal railways and high-speed highways will unite the transcontinental routes that will join the Atlantic to the Pacific in the south. These routes will not only serve as alternatives to the Panama Canal, but as development corridors as well (see **Figure 5**). These corridors would extend out from the most industrially and technologically developed zones, and bring that development to the interior of the continent.

In this sense, the most economically dense area of Ibero-America is in southern Brazil, Uruguay, and the northern part of Argentina. And thus, the railway and water-borne infrastructure become the arms that extend from this productive center into the very heart of the continent.

We haven't the space here to go into the particulars of each of the vast regional and national projects that need to be built: dams, railroads, highways, energy plants, new cities,

FIGURE 3
The Pacific Basin and the Economy of Ibero-America

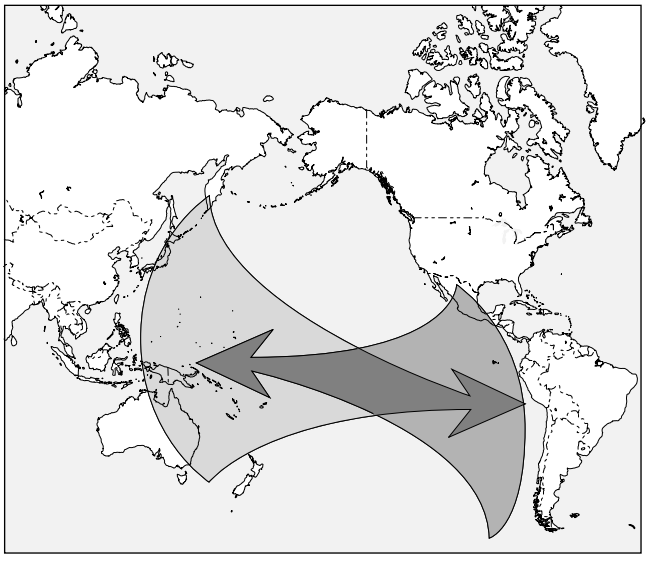
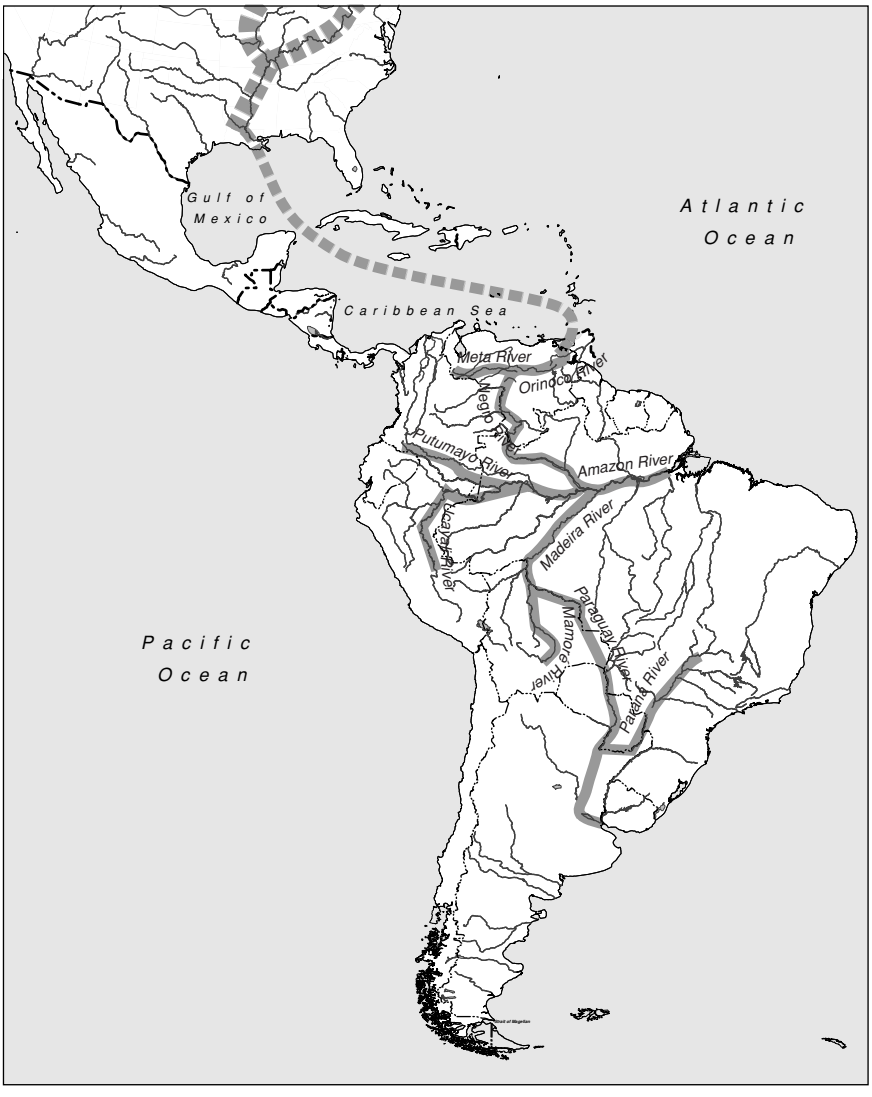


FIGURE 4
Integration of the Orinoco, Amazon, and La Plata River Basins



industrial ports, agro-industrial and mineral-industrial complexes, and so forth. There is an immense array of infrastructural and industrial projects of every kind, that must be developed alongside each of the development corridors. The definition of specific projects will be in the hands of specialists, with the criteria that they must reflect economic complementarity.

In order to forge economic unity in America, our community of sovereign nations should agree to and establish a hemispheric policy for development, as Lyndon LaRouche has recommended. It is within the framework of this policy that the regional and national projects to be constructed are to be defined. Each nation has its own specific projects to develop. In one hypothetical scenario, America could achieve a high degree of self-sufficiency in all the major branches of production.

An Engineer's Eye View

Let us take a closer look at Peru now. Peru is part of this steel belt that will encircle the globe, and looks out on the Pacific Basin. On an orographic relief map of Peru, we can see how the development of any great expanse of land must base itself on certain geographic principles, and how the definition and placement of these development corridors is essentially determined by physical geography. As we can see, Peruvian geography is very rough. The presence of the Andean Mountain range that crosses Peru from north to south, defines it as a nation of contrasts. Its hydrography, its geology, its orography, are all unique, abundant, apparently inhospitable. As we can see, we live in a geographically difficult country, but also one with extraordinary resources.

In itself, Peru is a country which offers a genuine challenge to human creativity. It is a challenge to innovative technology. Our country was made this way by God, to pose a challenge to our ingenuity; it is a country for engineers. Looking at it from this viewpoint, we should consider ourselves a chosen people. The Creator used our geography as a language, to tell us: I give you this country specially formed thus, so that you can have the opportunity to re-create the Creation, carrying out the engineering feats of which the creative human mind is uniquely capable. And so, after putting aside all our laments and expressions of impotence in the face of crisis, we can give free rein to our creativity, and launch ourselves into this great task before us.

We can predetermine how we are going to transform the economic geography of Peru, and that of the south of the continent, crossing the imposing Peruvian Andes by means of an integrated transport system: highway, water, and rail, a system that, at the same time, defines the axes of the transcontinental development corridors to follow.

The development corridor routes will, in turn, define for us the form in which we will occupy our own territory in the future. These routes are naturally defined by geography, as has been proposed since Humboldt's time.

It is easy to see that we could transversely cross Peruvian

FIGURE 5

South America: Great Rail Projects

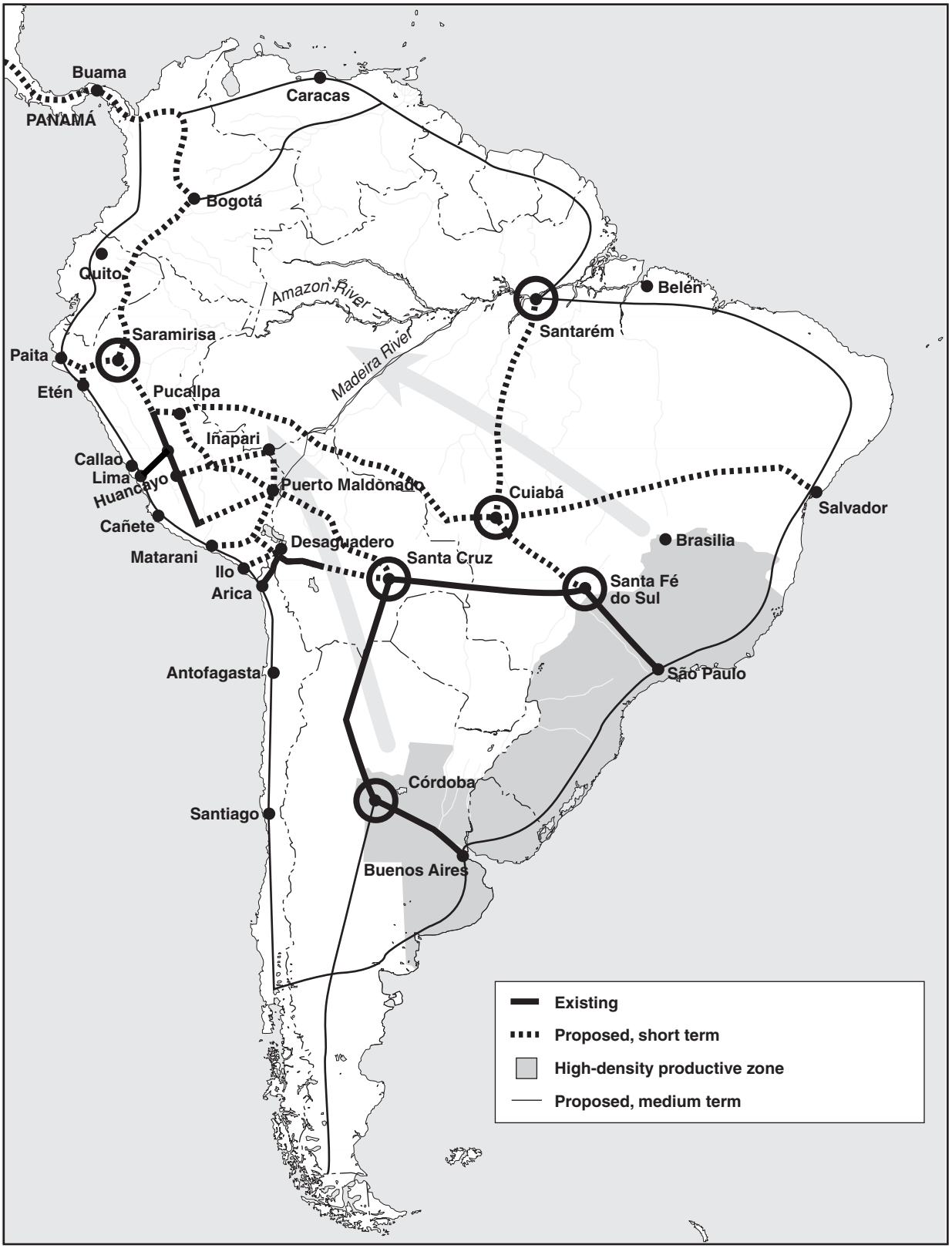


FIGURE 6
Peru: Integrated Transportation Infrastructure

territory with three transcontinental development corridors: to the north, center, and south. These, as *transoceanic* routes of highway and railway transport, are already on the agenda of the respective governments involved, although in no case are they part of a bold perspective of development corridors (see **Figure 6**).

The northernmost development corridor would follow the Paita, Saramirisa, Iquitos, Manaos (Brazil) transoceanic corridor. It would involve first integrating, through a railroad line and high-speed highways of at least 200 km in length, the Pacific port city of Paiti, with the future industrial port on the rim of the jungle called Saramirisa. This path crosses the Andes at their lowest level in Peru, the Porcuya Pass (2,400 meters above sea level). At this point, the railroad and highway routes would intersect the Marañón and Amazon river basins headed out to the Atlantic. This would doubtless be one of Peru's largest development corridors of the 21st century.

Both in the case of Paiti port and with Saramirisa, they must be conceived integrally as industrial ports, not as free ports. Free ports only encourage contraband, gambling, and drug trafficking. In the best of cases, they serve as temporary seats of pseudo-industrial assembly activities. Rather, we need to conceive of our ports as the basis for consolidating an industrial sector, which would need large-scale port facilities, energy, and so forth. Our population gains access to dignified jobs as a result.

There is no economic justification why a transcontinental route has not been constructed during our entire existence as a republic. The construction of a highway route between Paita and Saramirisa, the first step in beginning to build our development corridor, could be done today at a cost of $200 million. Peruvian phosphates exported to Brazil alone would represent $600 million a year in sales, meaning that investment in the highway would be recovered in less than a year.

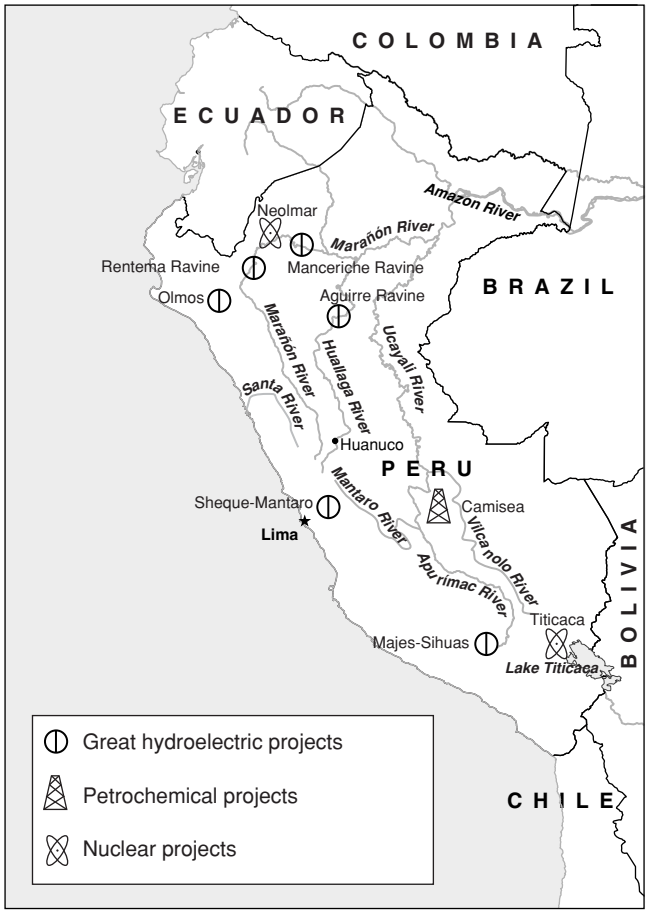
Hydroelectricity in the Marañón

We are not talking about simple transport routes here, but about strategic development routes. Given that each one of these development corridors involves a great density of projects, we need to endow these corridors with sources of high-density energy as well. In fact, the development of energy sources is the motor of these development corridors. Where to place these large energy projects is determined by the economic vocation of the various geographic areas, and the way in which we occupy our territory. Using a hydrographic map (**Figure 7**), we can concentrate on analyzing Peruvian hydrography, particularly in the north. Here, nature has been generous with Peru. Most striking in our rough land is the existence of tremendous water resources. By definition, Peru is a hydro-energy nation.

The Amazon is not only the most abundant river in the world, but it is the longest and the most navigable for its entire length. This great river is shared between Peru and Brazil. The Amazon basin which gave birth to Peru, has two great river branches in Peru. The Huallaga River flows into the Marañón. The Marañón, Huallaga, and Ucayali rivers, in their meanderings along the eastern Andes, pass through several ravines (called *Pongos* in Peru), which immediately suggest the natural damming of the waters and the spontaneous generation of energy. This observation leaps into view: Since the 19th century, there have been projects that propose using the electrical energy generated by this water and transferring it to the western part of the Andes Mountain range, so as to irrigate the arid Pacific coast of Peru, and convert it into a rich breadbasket. Part of this is the great Olmos project in northern Peru, which has been perpetually under construction.

In 1970, Japan's Agency of International Technical Cooperation, in agreement with the Peruvian government, sent a team of technicians to explore the hydroelectric potential of the Pongo de Manseriche on the Marañón River at the point where it joins the Santiago River. The result was the "Report on the Study of the Pongo de Manseriche Project," which recommended the construction of a dam 85 meters high and 800 meters long. This dam would regulate a maximum flow of 6,000 cubic meters per second, feeding a hydroelectric

FIGURE 7
Peru: Great Energy Projects



plant with a 2,500 MW capacity while, at the same time, allowing the passage of ships with 10-foot draft year-round, from the Pongo de Manseriche to Nazaret. This project was elaborated in detail 15 years ago, by Peruvian engineer Santiago Antuñez de Mayolo.

The immediate result of this project would be making more or less 1 million hectares available to agriculture, between the Nazaret and Santiago rivers. Suffice it to say that opening up the jungle rim to development is the only way to combat the drug trade. Coca plants would be replaced by agro-industrial plants.

Months after the report was issued, the Peruvian government requested a second technical opinion, and for that called on the Russian government, so that Russian and Peruvian technicians jointly explored the hydroelectric potential of the Huallaga and Marañón rivers. This team issued a report, entitled "Evaluation of the Hydroelectric Potential of the Marañón River Basin." The report poses the possibility of building and installing a series of dams along the length of the Marañón River—from Lauricocha to the Pongo de Manseriche—and 20 hydroelectric plants which would have a combined capacity of generating 12,000 MW; that is, the equivalent of the Itaipú Dam. Sixty-five percent of that potential would be attained through the hydroelectric plants installed on the Lower Marañón, that is, at the Pongo de Rentama (1,500 MW), Pongo de Escurrebraga (Aguirre) (1,800 MW), and the Pongo de Manseriche (4,500 MW) (see **Tables 1** and **2**).

For comparison, the total current potential of installed electricity service in Peru is 5,000 MW. It is obvious that with this very small installed electrical capacity, there is very little industrial development to which we can aspire. Further, in relative terms, industrial energy demand has decreased because of the severe recession. If Peru is to embark on lasting industrial development, the energy perspective we have outlined is critical (see **Tables 3** and **4**).

To this energy picture, we must add the hydroelectrical potential of the center and south of the country. We also have enormous gas reserves. The great Camisea project in Cuzco Department must be pushed through, with its vast potential vis-à-vis the petrochemical industry, given the quality of gas that the reserves both in Camisea and surrounding zones contain. We can also count on nuclear electric potential. There is the famous Neolmar project, at a point near Saramirisa. We have another nuclear energy project in the south, on Lake Titicaca.

Central and Southern Development Corridors

The transoceanic development corridor in the center of the country corresponds, in its first section, to the central highway and railroad route of Peru, which goes from Lima to the Mantaro Valley, Lima's supplier. But these transport routes have been overutilized. The main highway needs to be modernized, as does the railroad line, which needs to be extended to Pucalpa and from there, over to Brazil, going through the border point of Iñaparí. The Brazilians already have a plan to join Iñaparí to São Paulo, and there is on the drawing boards a plan to link Iñaparí with Salvador also on the Atlantic. This central corridor will connect Lima to the Pacific, and to São Paulo and Salvador on the Atlantic.

The first route is also an optimal route for the placement of a gas pipeline that would carry Camisea's gas to the Atlantic coast. The gas pipeline would also extend from Camisea to the Pacific coast, running parallel to the central railroad line.

There is another complementary route, of highways, railways, and energy lines, which also have to do with the development of the Camisea project as a petrochemical emporium that would transform the economic geography of the entire Department of Cuzaro, and surrounding areas. That would be the route leaving from Lima toward what should become a petrochemical terminal port on the Pacific to the south of Lima, the port of Cañete. From Cañete, the route would continue to Huancayo, crossing Camisea to Madre de Dios. In Madre de Dios, the highway would connect to the great port, which takes us by the Madre de Dios River to the Madeira River in Brazil. It would then cross Brazil diagonally to the

TABLE 1

Peru: Projected Hydroelectric Plants, by Integrated System (1995)

(Megawatts)

Plant	Status	Capacity
Total installed capacity		8,214
NORTHERN INTEGRATED SYSTEM		6,730
Mayush	bidding under way	150
Yuncan	definite	126
Olmos 1.1	definite	200
Olmos 1.2	definite	100
Olmos 2.1	definite	216
Olmos 2.2	definite	108
Gallito Ciego	definite	26
Poechos	definite	8
Carumy	definite	9
Sheque	definite	600
Platanal	feasible	140
Jicamarca	feasible	104
Culqui	feasible	20
Chaglla	feasible	440
Pampa Blanca	feasible	66
Quitaracsa	pre-feasibility	173
Cheves izquierdo/Huaura	pre-feasibility	150
El Chorro	pre-feasibility	196
Cumba	preliminary	825
Sumabeni	preliminary	1,074
Puerto Prado	preliminary	620
Paquitzapango	preliminary	1,378
SOUTHERN INTEGRATED SYSTEM		1,485
San Gaban II	definite	105
Charcani VII	feasible	18
San Gaban I	feasible	80
Quishuarani	feasible	81
Molloco 1.1	feasible	300
Molloco II	feasible	110
Lluta I	feasible	140
Lluta II.1	feasible	70
Lluclla	feasible	380
Vilavilani 3	feasible	38
Aricota 3	feasible	13
Moquegua 1	pre-feasibility	24
Moquegua 3	pre-feasibility	24
Coralaque	preliminary	131

Sources: Ministry of Energy and Mines, Electricity Reference Plan *Peruvian Times;* Mining Letter.

TABLE 2

Peru: Great Hydrolectric Projects Outside Northern Integrated System

(megawatts)

Project	Projected Installed Capacity
Manseriche Ravine	4,500
Rentema Ravine	1,500
Aguirre Ravine	1,800
Total	7,800

Source: Various studies by experts, as reported in text.

TABLE 3

Peru: Electrical Installed Capacity, by Source (1980–97)

(Megawatt/hours)

Year	Total	Hydroelectric	Thermal	Wind
1980	3,140.2	1,867.6	1,272.6	
1990	4,143.4	2,399.9	1,743.5	
1997	5,178.4	2,499.2	2,678.9	0.3

Source: Ministry of Mines and Energy.

north, connecting up with the Amazon and ending at the Atlantic port of Belén.

Along the Madre de Dios River, the existing city of Puerto Maldonado could be extended toward the border area with Bolivia, and then develop as a great bi-national city, sheltering hundreds of thousands of workers who would come to make the petrochemical development of the area a reality. There is also the option of building a great tri-national city (Peru-Brazil-Bolivia) in Iñaparí.

Farther to the south, we would have the development corridor that follows the route of the Liberators, with small variations. This route—conceptualized during the independence era—is another natural transoceanic land route. This corridor would begin at what should be industrial—not free—ports, at Ilo and Mataraní in Peru's south, and would link up by highway and railway to Peru, Bolivia, Paraguay, Argentina, and Brazil. That is, leaving Ilo, heading toward the Pacific Ocean, we would reach Buenos Aires or São Paulo on the Atlantic.

The highway project that would make up part of the southern development corridor is already under construction. The portion from the Port of Ilo to Desaguadero and to La Paz, a 460 km stretch, has just been finished and will be officially inaugurated shortly. Peru and Bolivia have already signed agreements to promote a railroad line between Ilo and La Paz, in addition to a pipeline between Ilo and Cochabamba, for Bolivian gas exports to Pacific Ocean ports.

In the south, the project is to also link up with the Brazilian transoceanic route at Iñaparí. In fact, here is where the project is at its most advanced stage. It was already made official by the Peruvian government, and involves some 1,200 kilometers of highway through Iñaparí, Madre de Dios, Juliaca, Puno, Moquegua, and Ilo.

The central and southern railway and highway routes are already partially on these governments' agendas. The concept that needs to be introduced to these projects is that of develop-

TABLE 4
Peru: Main Electricity Generating Plants

Hydroelectric plants	Installed capacity (MW)
Antunez de Mayolo (Mantaro)	798.0
Huinco	362.4
Restitución	210.4
Cañón del Pato	153.9
Charcani V	136.8
Mantucana	120.0
Machupichu	107.5
Carhuaquero	75.1
Callahuanca	71.7
Moyopampa	63.0
Yuapi	108.0
Malpaso	54.4
Pacchahaca	12.0
La Oroya	9.0
Cuajone	9.0
Viru	7.7
Thermal plants	**Installed capacity (MW)**
Santa Rosa	281.3
Ventanilla	200.0
Chimbote	65.1
Piura	54.3
Malacas	54.0
Chilina	53.4
Ilo	182.3
San Nicolás	69.8
Occidental Corporation	68.3
Pacasmayo	35.5
Paramonga	23.0
Cerro Verde	20.2
Tintaya	18.0
Trupal	15.0

Source: Ministry of Mines and Energy.

TABLE 5
Peru: Employment
(thousands)

Employment	1997	1998
Labor force	7,116.8	7,366.1
Productively employed	50%	48.3%
Underemployed	41.8%	44.2%
Visible	17.7%	16.0%
Invisible	24.1%	28.1%
Unemployed	7.7%	7.6%
Total	100%	100%

ment corridors. In this way, the productive trapezoid of the south of the continent—which spans Brazil's south, Uruguay, and northern Argentina—will extend toward the Pacific, embracing Peru, South America's natural port to the Pacific Basin.

The Military Corps of Engineers

The history of the "economic miracle" has been associated with the organized participation of military corps of engineers in the construction of great infrastructural works. Again, the most illustrative case is that of the United States, where it was the Army Corps of Engineers that were in charge of the management, and in many case the execution of, the railroad network and the Great Canals projects. It was this Army Corps which canalized and linked together the Mississippi and Missouri basins in the 19th century. In the last century, they were involved in the construction of more than 2,500 infrastructure projects on various scales, and in encouraging the intense participation of private initiative in these works.

The history of Peru's military engineering battalions is also exemplary. They fought narco-terrorism under totally adverse conditions, building communications links which put an end to the isolation of narco-terrorist sanctuaries, and then built the highways that enabled them to link up the most remote peasant communities with the rest of the country. Under the circumstances of the current crisis, the military engineers are continuing to build highways, public works, schools, small and medium-sized hydraulic works, and more. Using these battalions, Peru would have the ability to mobilize its labor force on a military scale, to get these great projects built.

The state should therefore authorize the training of civil-military battalions for building development corridors. The military service conscription law should be used toward that end. Our youth, the majority of them unemployed and without a sense of the future, could become the protagonists in building a new Peru. We would thus resolve the serious problem of unemployment in our country, putting our youth to work in building their own future. Let us give them that opportunity (see **Table 5**).

Plans To Occupy the Territory

The occupation of Peruvian territory should be planned from the standpoint of optimizing its economic yield. At this point in history, it can't be anarchistic or happen spontaneously, particularly considering the geographical characteristics of the land, and the imposing Andean Mountain range which runs the entire length of Peru. Thus, it is vital to have a long-term perspective. Opting for the strategy of development corridors allows us to more precisely plan for these objectives.

If we opt for this development strategy, the three great transoceanic routes would also serve as productive axes. The occupation of our territory will be assigned by these three great development corridors, which will have an intensive flow of passengers and cargo from Brazil, Argentina, Paraguay, Uruguay, and Bolivia, toward Peru, toward the Pacific Basin, and from Peru toward the Atlantic. Inter-regional trade will be intense in both directions. Parallel to these productive

routes, there could be built a succession of beautiful and shining cities, or the reconstruction of older cities according to an ordered plan of urban regulation. We would have abundant energy to feed our thriving industries—mining, machine-tools, light industry, general manufacturing, agro-industry, etc.—built around our cities. And between cities would be our breadbaskets, our agricultural centers.

This image sharply contrasts with that of today's Peru, which was not built according to a development master-plan. We are a chaotic country which has grown by spontaneous generation, lacking in physical integration.

In addition to the population shortage in Peru, we have the irrational distribution of our population throughout the national territory. With barely 25 million inhabitants, our population density is just 20 inhabitants per square kilometer. There are extensive jungle areas where population density barely reaches 1 inhabitant per square kilometer. Fifty-two percent of our population is located in the narrow coastal region; 35% lives in the inter-Andean valleys and the remaining 13% in the jungle and jungle outskirts. The greatest population density can be found in the cities of Lima, Trujillo, and Chiclayo, to the north, with 50 inhabitants per square kilometer, and to the south in Arequipa.

Choosing the strategy of development corridors will allow us to establish a "National Regulatory Plan for Territorial Occupation," which would respond to the country's new economic geography. We need to define the occupation of our land, not only in terms of infrastructural axes, but also with regard to the building of new cities, or the consolidation or reconstruction of the old ones. The state should begin a policy of relocation and concentration of the population in these "new" cities which, endowed with urban services and infrastructure according to scale, would permit the necessary minimal-optimal population densities for initiating a process of sustained industrial development.

In this sense, the recently launched Family Plot Program (Profam), through which the state is conducting a census of low-income families without housing, and providing them with a low-cost plot of land on which to build a home, could be transformed into the beginning of a process of population relocation, and their concentration in minimal-optimal densities for this purpose. If, however, Profam does not situate itself within a policy of industrial development that responds to planned occupation of our territory, and which in turn would form part of the development strategy we have delineated, it will become nothing more than a mockery of our citizens, a manipulation of their poverty. We have to resituate our population in urban centers close to what will become industrial complexes, where they will be able to find jobs with dignity. This relocated population, while building its city, could also participate in the construction of communications infrastructure and the other demands of the development corridors.

The schematic expression of our development corridors should simulate a great necklace of cities, which, like pearls, would hang at intervals, parallel to these productive axes. Our cities should, above all, be centers of culture and expressions of progress. The optimal size of each city, in a country like ours, should be in the range of 200-500,000 inhabitants. This would obviously depend on the relative potential population density of each geographic area, but if we take the successful urban planning experience of some developed countries, we would agree on this point.

The rugged terrain of the Peruvian Andes: Huaynapicchu Mountain. "Peru is a country which offers a genuine challenge to human creativity. . . . Our country was made this way by God, to pose a challenge to our ingenuity; it is a country for engineers."

It should be obvious to all that there are minimal-optimal densities for a city to justify itself as such, from the standpoint of being able to provide a better quality of services and infrastructure to the population. It is totally uneconomical and very difficult to share progress when the population is so dispersed, especially with the characteristics of our geography. The city thus conceptualized allows for a greater energy density per capita, that is, greater quality of life for the population, at less cost.

By launching the strategy of development corridors, we

El Infeirnillo Bridge in the Andes Mountains, built by American engineer Henry Meiggs in the 19th century.

will also be doing away with the myth, that Peru lacks high-yield arable land. There is no lack of land. What is lacking is adequate water management. Water from the Amazon and Marañón rivers would be transferred to the coast. Olmos would allow for the agricultural colonization of the northern coast, while the jungle rim region would thrive with the development of agro-industry and lumber industries. The successful pilot experiences which have already been initiated could be expanded throughout this extensive zone. Development will eliminate the drug trade.

A new, rapid railroad in the center of the country would cross the Andes, once again defying this untamed land and reminding us that, when the American engineer Henry Meiggs built a railroad here between 1860 and 1870, it was one of the greatest engineering feats of its kind. It was the highest railroad in the world, which crossed a majestic but narrow stretch of the Andes at an altitude of 4,500 meters above sea level. In the south, we will have channeled the waters of Lake Titicaca in order to irrigate the southern coast. We will have also expanded our agricultural frontier on the coast to nearly 2 million hectares. In the jungle rim region, we could make usable nearly 4 million hectares, and in the inter-Andean valleys, we could optimize the yield of its 1.8 million hectares.

The yield from agriculture and livestock production would thereby become the first parameter for measuring the growth of progress, and therefore, of the potential population density. Our cities will no longer be a succession of poverty belts and refuges for the apparent excess of unemployed rural population. Finally, we will have generated a cycle in which the development of economic infrastructure and the production of industrial goods, will encourage the continuous growth of rural productivity. Agro-industry and mining will in turn generate an ever-greater surplus, which would lead to a greater consumption of infrastructure and industrial products by the rural population.

Mining for Development

Peru has been and will continue to be primarily a mining country, given its enormous and still-unexplored mineral resources, above all in the Andes. According to information recently released by the Mines and Energy Ministry, Peru has 18% of the world's mineral reserves, and only 12% of these are presently being exploited. It is the case that investment should be concentrated in the area where there is guarantee of greater profits. But those profits have to be for the benefit of the country, and not for the world mineral cartels, as is currently the case. Mining only employs 1% of Peru's economically active population.

The problem is that the policy of exporting raw materials has been in force, which confirms the saying that "Peru is a beggar sitting atop a pile of gold." This has to change. The purely monetarist criteria which guide investment in mining have to change. The centers of mineral exploitation, which at present are largely in the hands of British Commonwealth multinationals, particularly the gold cartels, operate virtually as enclaves. These huge companies have no commitment to the development of infrastructure that would link the mining centers to the rest of the country. This stands in contrast to the fact that in recent years, the mining industry, especially of gold, has increased exponentially.

In fact, gross extraction of gold has been one of the areas in which there has been considerable foreign investment. However, under current conditions, medium and large investment in mining is not generating either progress or employment, only profits. An example of how mining reflects the return of colonial exploitation, is in the case of Huancavelica, the country's poorest province but, paradoxically, the one which contributes most to GNP because it is rich in gold reserves under the purview of the multinationals. In fact, the impact of mining is negative, since these companies plunder the area, without introducing improvements of any kind. Their contribution to the rural economy, and to the city of Cajamarca itself, is null.

Obviously, this has to change. The parameters of investment in, and management of, mining have to be changed, such that these companies are committed to contributing to genuine development, at least in the areas where they operate. The principle of equity has to be imposed here. Foreign investment is fine, but looting is not.

As we know, investment in mining, and above all in strategic materials, has become a kind of haven for the multinationals' vast capital flows, protected from imminent financial blowout. This kind of investment which extracts non-renewable wealth, should carry a heavier tax burden than any others. By the same token, it should be made policy that mining investment comes with a high value added, that is, using state-of-the-art technology. It should be an investment with a large technological component which is oriented toward generating advanced industrial-mining-metallurgical processes: We have to break ground in the area of ceramics, of strategic alloys, of superconductors, etc., industries which generate other industrial processes. The mining industry should produce jobs at high skill levels. It should also be directly associated with the creation of advanced mining-metallurgical technological institutes. It is in this sense that investment in mining should be considered a strategic investment, because it should be oriented toward the generation of durable wealth, as part of a chain of development.

Technology and Education

The metal-working and machine tools industries are necessary for carrying out a lasting and self-sustaining process of industrial development. This means technology, and the ability to both develop and assimilate technology. That is therefore crucial. In Peru's case, it can become a derivative of the mining industry.

The production of steel is of primary importance in this. Steel is the basis for the production of machine tools for industry, for mining, for fishing—another of our strong industries. We need to produce steel through high productivity, and to accomplish this, we need to realize the Nazca steel plant project, as well as to expand and modernize the Chimbote steel facility, which today is virtually abandoned.

We have what we need to build these industries. In fact, it is in mining-metallurgy that we have our greatest potential. This sector is one of the few in which we have a workforce with the greatest ratio of engineers, technicians, skilled workers. In any case, we have a young population ready to be trained.

It falls to the state to generate the conditions that would make this opportunity for our youth possible. Advanced research centers in metallurgy and alloys must be created in Huancayo; similarly, a network of specialized technological institutes needs to be created in all the great cities adjoining the development corridors. The specializations of these technological institutes will be determined by the industrial vocations of each development corridor. These institutes would be the seedbeds for the skilled workers and technicians needed by the mining-metallurgy industry, manufacturing, and agro-industry. They would be the seedbeds for our inventors, and for the businessmen behind our future small and medium-sized machine-tool industry.

Let us not forget that every year, another 50,000 youth finish their secondary education and are joining the workforce. The majority of these youth today have no future, and are just swelling the ranks of the unemployed. And yet, they are Peru's true wealth, as long as we give them the opportunity.

If we are to reap this wealth, we must expand the professional and engineering vocation among our youth, and guarantee that this will be their direction in the future. This can only be achieved through the adoption of a curriculum and educational methods designed to encourage, from infancy, a love of Classical arts, research, and discovery. It is a paradox, but in recent years, the flight of our professional talents abroad has grown, especially in the areas of science. And many of those who do remain, have no job options. The few that do, are not allowed to put their talents into practice.

How To Finance Development

With the package of national projects defined, both in infrastructure and industry, and the priorities determined, the immediate issue becomes the preparation of a budget and of an investment plan that answers the question: Who will pay for this, and how?

First of all, it should be obvious that this task cannot be left to the whims of the free market.

The answer is simple. As LaRouche has reminded us, it is the responsibility of the sovereign nation-state to establish a dirigist credit policy, to channel domestic savings and foreign capital into productive investments, on a small, medium, and large scale. This state credit should be selective credit, allocated to specific projects that are directly associated with the physical economy. Our industrialists need to be encouraged and protected. To this purpose, encouragement of foreign investment is of the greatest importance.

This policy should not belong exclusively to the state. Private banks can and should also participate in healthy competition with the state. A rigorous distinction must be drawn between what would be directed credit to infrastructure and production, and what would not. Policy distinctions should be made on a case-by-case basis.

Also, it is the state's responsibility to issue credit, either as money or bonds—IOUs—rediscounted and guaranteed by future yields and products. This credit should be issued in connection with a National Development Bank for Infrastructure and Industry, or with specialized corporations. Repayment terms should be set based upon the timing of estimated yield from each specific project. Grace periods for the beginning of repayment on credit should have the same consideration. Interest rates should be no higher than 3%, and should remain constant, since these are directed credits to industrial production and infrastructure whose yield rates cannot com-

pete with purely speculative or unproductive activities.

Of course, it is not the responsibility of this National Bank or of these specialized corporations to grant credit for unproductive investments, nor consumer credit. This is a function of the private banking system.

A perfect example of such a credit system is the National Bank founded in the United States by Alexander Hamilton in 1791. This model later inspired the re-founding of a Second National Bank of the United States, in 1816. Later, the adoption of Hamiltonian methods of credit for development was fundamental to the recovery of the United States after the Great Depression of the 1930s.

Although Franklin D. Roosevelt did not establish a new National Bank, what he did create in 1933 was the Reconstruction Finance Corporation (RFC), which redefined banking policies — including that of the Federal Reserve — for purposes of generating credit for development backed by the future profits of those projects or products. The credits were to be repaid over the long term, with appropriate grace periods and low interest rates. The means by which Roosevelt did this was through the creation of various corporations empowered to issue IOUs, bonds, or other paper, guaranteed by the state, up to a certain limit. The Treasury was, in some cases, authorized to buy up this debt. In this way, both credit flow and return were guaranteed.

LaRouche recommends that, just as occurred with Hamilton's National Bank, the national banks should be authorized by law to issue a maximum amount of new money, corresponding to an estimated margin of additional employment and additional production, that could be set into motion by the government's economic policies. This credit is not inflationary. The critical connection here is between the emission of money and specific productive projects. With dirigist credit measures, which give priority to projects of physical economy that are needed for the economic and scientific progress of a nation, there is no inflationary credit. What must be achieved is analogous to what was done in the United States in the 1960s, through NASA's intensive space program, which generated technologies with an economic return of approximately $14 for every $1 spent.

We are talking about long-term, low-interest loans that could be allocated through two channels. First, the National Bank could directly issue credit to the government or to the appropriate state agencies responsible for the projects in question, which in many cases will be great infrastructure projects, such as energy plants, railroads, water management systems, and so forth. The credit could be directly employed to purchase equipment and materials and to pay labor costs employed in these projects, as well as for paying private and public subcontractors that might be hired to carry out aspects of the work. Secondly, the National Bank could provide low-interest credit, through participation of the private banking system, to industrial firms that produce the machinery and materials for the infrastructure projects, to help them expand and modernize their operations. The emission of new credit in this form creates what we could call a chain reaction of expanding production and employment. With each new round of purchases, a new cycle of production and expansion of employment takes place, as well as an increase in wages.

The German Credit Bank for Reconstruction (KfW) is another example of Hamiltonian banking. More important for the German post-war miracle than Marshall Plan money, was the mechanism adopted in Germany to transform payment of credit for merchandise into new investments. This was the reason for creating the KfW in 1948, inspired by the successful experience of the RFC in the United States. By 1953, the first repayments began, which were immediately channeled into new credit.

The KfW was founded to provide medium- and long-term credit to businessmen involved in reconstruction projects which other financial institutions considered high-risk and were not prepared to finance. This was the case for projects involving coal, gas, water, electricity, and transport. It was not a bank oriented to the model of the free-trade economy. Rather, it was a bank strictly committed to dirigist investments. KfW's technical executives, together with authorities from the economic agencies, proceeded to elaborate a "list of priorities" for reconstruction of the German economy. This list included: construction or reconstruction of railroads, highways, and national energy infrastructure; housing; construction machinery; local infrastructure, including roads and water supply; high-yield agriculture, agricultural machinery, production of fertilizers, etc. It also promoted export companies. The machine-tool industry was one of the most strongly encouraged.

Housing construction was an area of special attention. Initial estimated demand was for 5 million housing units. There was no free market for housing. Construction of housing would not have gone forward without state intervention. In 1950, some 350,000 houses were built. One of every eight houses was financed by the KfW. By 1956, nearly 3 million housing units were built. Government subsidies to public housing projects became an important pillar of the construction industry. It was only in 1960, after more than 6 million new housing units had been built, that conditions for creating a market appeared for this sector of the construction industry.

A mechanism that made the Credit Bank for Reconstruction's credits more attractive than those of the private banks, was that interest rates were kept constant throughout the entire term of the loan, although market interest rates rose drastically. And if interest rates fell, the debtor had the option of paying off his loan before the term was up. Credits were usually given for repayment terms of 10-30 years, with a 1-3 year grace period. For the reconstruction of post-war Germany, the KfW granted more than a quarter of a million individual loans directed to the "program for medium industry."

Clearly, there exist historic precedents for the kind of economic reconstruction that we are proposing for Peru. If we apply them with determination and creativity, we can look to the future with optimism.