

agreements were struck between the governments of the United States and Panama, and the United States and Colombia, according to which the U.S. committed to financing two-thirds of the total cost of the construction of the remaining span of the Pan-American Highway, in the Darién zone. Although that U.S. law remains in effect, in October 1975, the Federal District Court for the District of Columbia prohibited allocation of funds for the construction of the Pan-American Highway in the Darién, as part of the legal case brought by the Sierra Club and other ecologist groups which questioned the environmental impact studies that had endorsed the decision to begin construction of the Darién highway.

In 1996, after international bidding, Colombia's National Institute of Roads (INVIAS) contracted new environmental studies, this time with a consortium made up of Ecology and Environment, Inc. and Hidromecánicas Ltda. And despite the fact that the National Congress of Engineering of Colombia, held Aug. 14-16, 2004, determined that this project should be given priority, to this date there has been no construction on the Darién Highway, either on the Colombian side or the Panamanian side. It must be noted that President Alvaro Uribe has insisted, to no avail, that the successive Presidents of Panama, Mireya Moscoso and more recently Martín Torrijos, promote the construction of the final span of the highway. But, on the Panamanian side, there has been no political will to carry out the project. In truth, both in Colombia and in Panama, the ministries of the environment have vetoed the highway's construction.

In sum, as LaRouche and his associates have documented, environmentalism is fascism, created by the British Crown to return humanity to the Dark Ages. And this must be stated clearly.

Engineering Projects For Development of Colombia's Atrato Region

by Héctor A. Múnera

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Dedication

During the second half of the 20th Century, Lyndon LaRouche has been an outspoken advocate for the economic development of Third World countries, whose progress may be

hampered by extreme concerns about protection of the environment. As pointed out by him, extreme environmentalism may condemn some regions of the world, like my country, Colombia, to stay in their current state of lesser economic development, while the more advanced countries reap the benefits of development previously attained at a lower cost, when the environment was not given the paramount importance of nowadays. This is clearly inequitable.

Also of great interest to us is a related theme of LaRouche's: the transfer of technological knowledge. A tool towards this end may be the peaceful use of nuclear technology. The latter idea was already envisioned by another statesman, the former U.S. President Eisenhower, with his program of Atoms for Peace in the early 1960s. But the development of nuclear-powered electricity was almost completely stopped by the environmentalist movement in the United States in the mid-1970s. On a global scale, today we are close to a rebirth of nuclear power using inherently safe, modular, small nuclear plants that could also be used in developing countries. The LaRouchian movement has also advocated the massive use of nuclear power as a means to build infrastructure, as in the Eurasian Land-Bridge.

It is a privilege and a pleasure to join the *Festschrift* honoring the very original thinker Lyndon LaRouche on his 85th birthday. This short note is related to the completion of the Pan-American Highway, a project that is a natural complement to the Eurasian Land-Bridge. In a separate, forthcoming note we will advance some ideas for the revival of nuclear technology in Colombia.

Introduction

By the mid-21st Century, will it be possible to go easily by land from the Cape of Finisterre in Portugal to Ushuaia in Argentina? Three key elements are missing today: the Eurasian land-bridge, the tunnel across the Bering Strait, and the Inter-American Land-Bridge. The first two aspects have received ample consideration within the LaRouchian movement, so that this note concentrates on the third element, from the broader context of social and economic development of the isolated Atrato River region in Colombia.

A forthcoming note will address the various roles of nuclear technology for peaceful use in a developing country: (i) a means for transfer of technological knowledge; (ii) a technological tool in medicine, agriculture, engineering, environment; and (iii) a builder of infrastructure for social and economic development, such as electricity, water, and process heat. For the time being, the present note mentions some past proposals for the use of nuclear explosives for the excavation of an inter-oceanic canal in the Atrato region.

The Atrato River is about 700 km long, flows from south to north through a dense rainforest, and has a large mean discharge of some 4000 m³/s into the Gulf of Urabá in the north-western corner of South America, close to the international boundary between Colombia and Panama. In some stretches,

the river serves as a border between the Colombian Departments of Chocó and Antioquia. The Atrato region, one of the rainiest on Earth, is covered by a jungle with an extremely high biological diversity. The population is sparse, mostly Afro-Colombian (over 90%), with some indigenous groups like the Noanamaes, Katíos-Emberas, and Kunas (the latter were forced to move to Panama by tribal fighting). Due to its strategic geographical position, three groups of large engineering projects have been considered for this region: a land-bridge to connect Central and South America; a waterway between the Atlantic and Pacific oceans; and large hydro-electrical power plants taking advantage of the permanent very high water discharges of both the Atrato and San Juan rivers. In some proposals, the hydropower projects could be part of an inter-oceanic canal project. Since the mid-1970s, these hydro projects have been incorporated into the inventory of potential electrical sources in Colombia, and no further mention of them will be made here.

The 21st-Century Balboa Land-Route

In the year 1500, during Columbus's fourth trip, the Spaniard Rodrigo de Bastidas arrived at the Gulf of Urabá. San Sebastián de Urabá was the first Spanish settlement in South America, founded in 1509 on the eastern shore of the Gulf of Urabá by Alonso de Ojeda; it did not survive, due to pressure from local indigenous people. A year later, Santa María La Antigua del Darién was founded on the western side of the same Gulf, and it served as a base for the initial exploration of the adjacent territories, which today are part of Panama and Colombia. It is an irony of history that the region of the Atrato River, the first part of South America explored by Europeans 500 years ago, remains as one of the less developed areas in Colombia at the beginning of the 21st Century.

Vasco Nuñez de Balboa departed from Santa María with an expedition that crossed the Panama Isthmus and reached the Pacific Ocean in 1513. With the help of indigenous guides, Balboa went by boat to Carreto Bay, or thereabouts, navigated in a *piragua* (a dugout canoe) upstream on one of the many rivers discharging into the Caribbean, then crossed by foot the rather low Serranía del Darién, descended following the course of a river draining into the Chucunaque River, and navigated by *piragua* downstream on the Chucunaque until reaching the Gulf of San Miguel on the Pacific Ocean. . . .

The idea of a railroad running from Alaska to Patagonia goes back at least to the first Conference of American States in 1899. Some consideration was given to this proposal as witnessed by the map proposed in 1904 by Charles M. Pepper, United States and Pan-American Railway Commissioner.¹ Instead, in 1923, during the fifth Conference of American States, a decision was made to build a Pan-American Highway, which today is almost complete, except for the Darien Gap, which is about 90 km in a straight line between Yaviza in Panama and El 40 (also called Lomas Aisladas), near Chigorodó in Colombia. When, and if, the Darien Gap is closed, the 26,000 km

backbone of the Pan-American Highway will be complete.

The current project to close the Darién Gap is a road that divides in half the Darien National Park in Panama, which was declared a World Heritage Site in 1981 and a Biosphere Reserve in 1982. The Pan-American highway will parallel the Tuira River, up to Palo de Letras, where it will cross the Serranía del Darién, which in this zone is the border between Panama and Colombia. The road descends into the Katíos National Park in Colombia, which was inscribed on the list of World Heritage Sites in 1994.² The length of the project in Colombia is 41 km from Palo de Letras to Cacarica on the Atrato River (30 km), and then to El 40 (11 km). In the lowlands there are many swamps associated with the Atrato River.

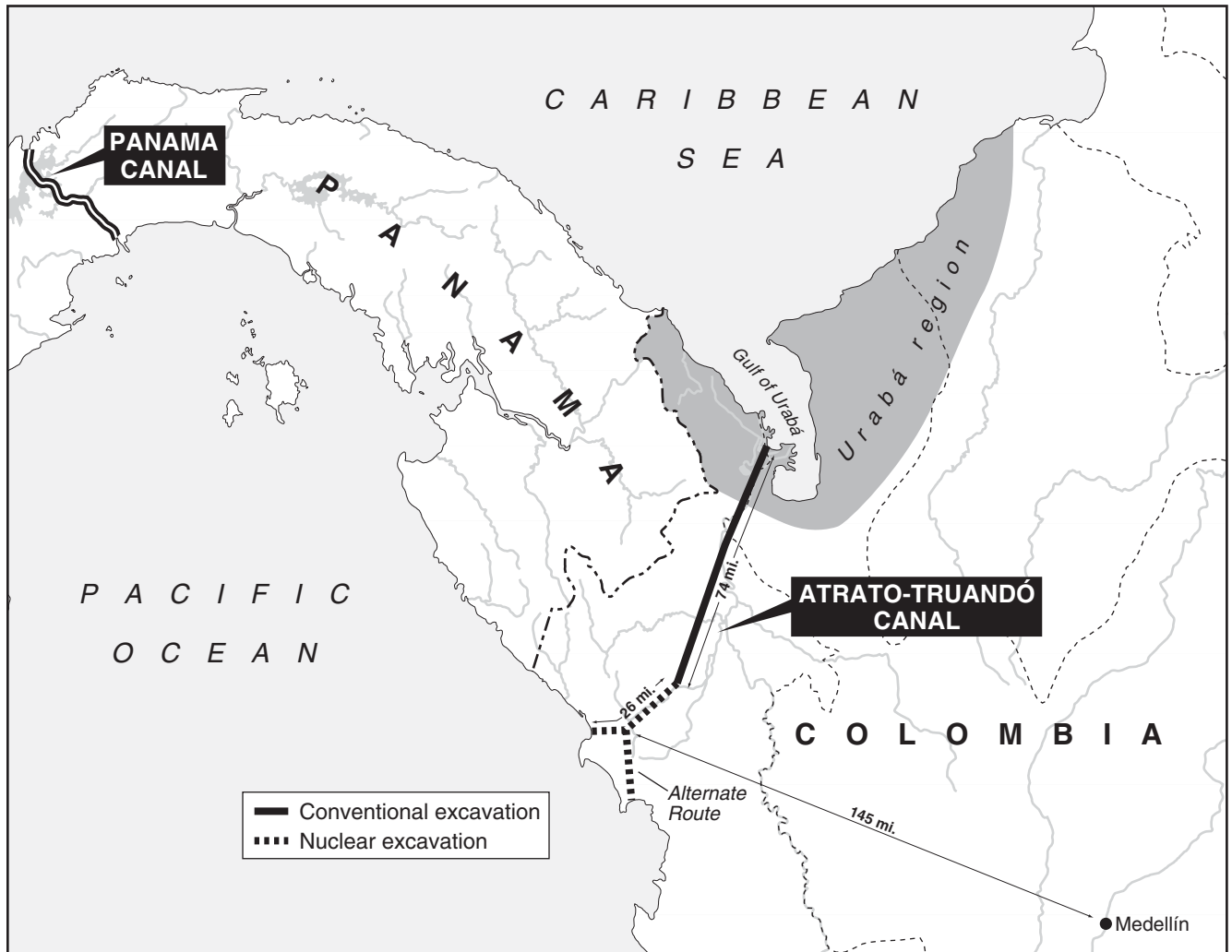
Both in Panama and in Colombia, there are groups in favor and against the construction of the missing portion of the Pan-American highway. Proponents stress political integration and economic and commercial benefits, while opponents stress negative impacts—deforestation, perturbation of habitats—on the two national parks, which harbor a large genetic and biological wealth, and negative cultural effects on the indigenous inhabitants in the national parks, mainly Emberas. An additional negative aspect is the possible migration from south to north of undesirable guests, such as guerrilla groups, drug traffickers, and hoof-and-mouth disease, which still afflicts cattle in some Colombian regions.

As a compromise, there have been suggestions, such as in the Bio-Pacific study, for an alternative way to close the Darien Gap, without crossing the two national parks. It is based on a new road to the Bay of Carreto on the Caribbean coast of Panama, followed by a ferry connection to Turbo on the east coast of the Gulf of Urabá. As expected for a ferry connection, this alternative will limit and slow down the road traffic along the Pan-American Highway.

In the opinion of the present writer, the concerns of the environmental groups for the protection of the two National Parks are legitimate, but it is also clear that a ferry connection is not the most efficient way to complete the Pan-American Highway. Instead of the ferry connection, it is possible to build a land-bridge without entering the Darien and the Katíos National Parks. This novel alternative is called here the Balboa Route-2007.

The Balboa Route-2007 may branch from the existing Pan-American Highway, say at the little town of Palmira in Panama, and go northwest across the Panamanian central plain to reach the Caribbean coast. In this stretch, the road bridges the Chucunaque River near the mouth of Mortí River, follows the Mortí River canyon upstream until a summit pass on the Serranía del Darién, and descends to the coastal plain (alternatively, the Serranía may be crossed by tunnel). On the Caribbean side, the road is in Kuna-Yala Province, and runs southeast, parallel to the Caribbean coast. After passing Carreto Bay, the road reaches the Panama-Colombia border in the vicinity of Tiburón Cape, which is the only zone of the international border outside the Darien National Park. The road will turn south in Colombia

FIGURE 1
EIR's Proposed Route for the Atrato-Truandó Canal (1996)



along the western shore of the Gulf of Urabá, until reaching the Atrato swamps at Unguía. The proposed route turns east, bridges the Atrato River, and joins an existing road leading to Carepa in the vicinity of Caño Carepita.

The Balboa Route-2007 is longer than the current proposal to close the Darien Gap, but it has two significant advantages: It is outside ecologically preserved areas, both in Panama and Colombia; and it brings needed infrastructure to regions currently undergoing economic development. In Panama, the road may open to tourism this section of the Caribbean coast, which today is mostly populated by the Kunas, so that there will be a need to negotiate with the government of Kuna-Yala Province. In Colombia, the proposed route will serve the towns of Zapzurro and Capurganá, which presently are open to ecological tourism, but cannot be reached by land. There exist already stretches of dirt roads between Acandí and Triganá, and between Tanela and Unguía in the Department of

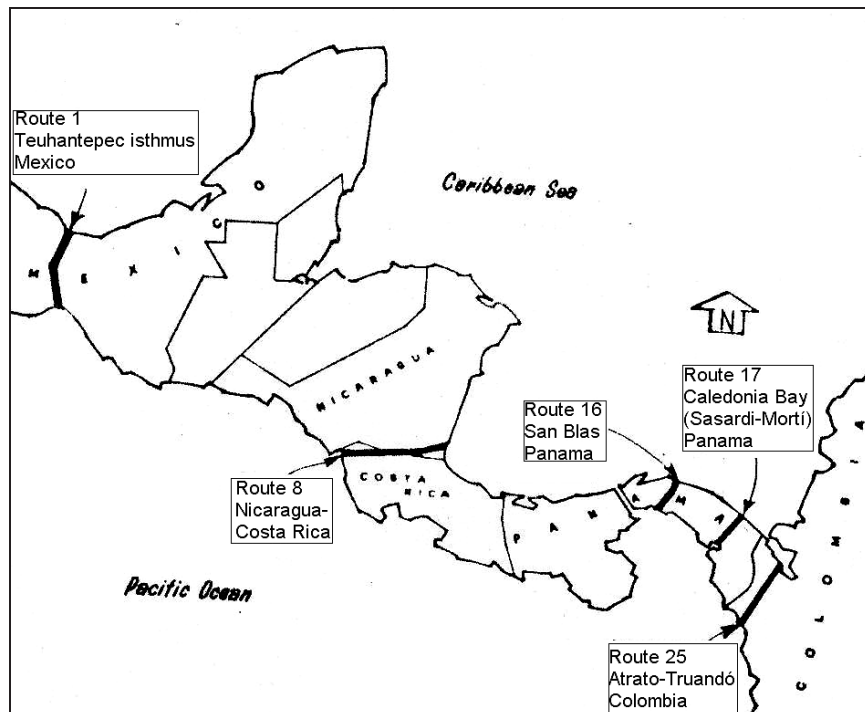
Chocó, and from Caño Carepita to Carepa in a banana-producing region of the Department of Antioquia. The proposed route will complete and improve these roads.

The proposed Balboa Route-2007 will finally complete a project envisioned more than a century ago. An operating Pan-American Highway from Alaska to Patagonia would be the natural companion to a Eurasian Land-Bridge.

The Atlantic-Pacific Interconnection via the Atrato River

In the 1880s, Colombia entered into a contract with France for the construction of a sea-level canal across Panama, which at that time was a Department of Colombia. Ferdinand de Lesseps, who already had built the Suez Canal, was in charge of the project. Unfortunately, malaria and yellow fever led to failure. After Panama separated from Colombia, the present canal with locks was built by the United States, between 1904

FIGURE 2
Five Routes for Inter-Oceanic Canals



These routes are geologically viable for excavation with nuclear explosives.
Source: E. Graves, "A New Canal," Nuclear News (February 1965).

and 1914. The width of the Panama Canal cannot accommodate today's large oil tankers and other modern vessels; additionally the canal is overcrowded. As a partial solution, Panama on Sept. 3, 2007 started construction of a US\$5,000 million expansion of the canal, which will be ready in 2014. This expansion will allow larger ships to cross, but will not solve the problem of overcrowding.

The possibility of building a canal across Nicaragua has been known since the mid-16th Century; different routes, some with locks, other at sea-level, have been considered. Today, at the beginning of the 21st Century, there is still interest, as an alternative for solving the overcrowding in Panama. Routes using the Atrato River are another alternative, as discussed next [see **Figure 1**].

There is a long tradition from the Spanish chronicles that were collected by Baron Alexander von Humboldt in the early 1800s, hinting at the existence in the Atrato River region of a route to pass from the Pacific Ocean to the Caribbean Sea. The Raspadura, a short, small canal of some 8 km in length, has apparently existed at least since 1788, joining the small Quito River, tributary of the Atrato, to another small river flowing into the Pacific Ocean. As an anecdote, it is mentioned in passing that there are suggestions that Chinese explorers could have used this route in pre-Columbian times.³ Recent DNA studies have evidenced a high affinity between Chinese and

Japanese people and some indigenous groups settled in the Atrato region since pre-Columbian times. This evidence lends some credibility to these folk traditions.

After Humboldt's writings, for 50 years there was no serious consideration of the possibility of building a canal to communicate between the Atlantic and Pacific oceans using the Atrato River. In 1852, Mr. F. Kelley of New York funded an expedition to survey the Atrato River from its mouths in the Gulf of Urabá to the mouth of Quito River, near Quibdó,⁴ the current capital of the Department of Chocó. The Atrato River is wide, and may be easily navigated as far as Quibdó, which is at an altitude of 40 meters above sea level, and about 400 km upstream from the Gulf of Urabá, which means that the river has a very small slope of 1 meter in 10 km.

By the mid-20th Century, as part of the U.S. Plowshare project, the possibility of using nuclear explosives to build a waterway between the Atlantic and Pacific oceans was analyzed in considerable detail by the Atlantic Pacific Inter-Oceanic Canal Study Commission.⁵ **Figure 2**

shows five routes that were identified by the former U.S. Atomic Energy Commission (USAEC) as being suitable for the use of nuclear explosives.^{6,7} From the point of view of isolation and sparse population, routes 17 and 25 in Panama and Colombia, respectively, were identified as the most promising routes for using nuclear explosives. The Sasardi-Mortí River Route 16 is relevant in the context of the present writing, because it is part of the Balboa Route-2007 proposed in the previous section. The fact that nuclear explosives are viable, means that the geology in the area of the Mortí River may be appropriate to build a tunnel to cross the Serranía del Darien.

The study released in 1970 by the Atlantic Pacific Inter-Oceanic Canal Study Commission,⁵ also considered Route 23N as potentially suitable for nuclear excavation. The route connects the Gulfs of San Miguel in Panama and Urabá in Colombia, involving the Tuira River in Panama and the Atrato River in Colombia. The study also included an all-conventional Route 23C, and a combined route using conventional and nuclear explosives. In the early 1980s, some attention was given, both in Colombia and Panama, to the possibility of building such a project as a joint endeavor involving both countries. Interest eventually faded away. Since the general route is similar to the current project to close the Darien Gap with the Pan-American Highway, this project would be unacceptable today, on the same grounds as the projected road to

close the Darien Gap (recall previous section), even if built using conventional explosives only.... An exclusion zone would be required if the whole canal were excavated using nuclear explosives only (Route 23C). In an exclusion zone, all population would have to be evacuated for several years, a condition that may not be politically acceptable today.

In addition to the proposals including nuclear excavation, since the beginning of the 20th Century, several alternatives for an all-Colombian sea-level canal have been advanced, using various rivers discharging into the Atrato River from the west.... In all cases, the water divide is low and close to the coast of the Pacific Ocean, so that construction of a canal by conventional means is quite possible. There are several potential sites for deep harbors, such as Cupica Bay. This subject is still alive in several engineering quarters.⁸

Given the growing demand for use of the Panama Canal, it seems that a reconsideration of a sea-level canal in the Atrato region may not be out of the question. Anticipating criticisms, it may be worthwhile to recall one of LaRouche's themes: to be valid as a decision-making tool, cost-benefit analysis must necessarily include long-term social benefits. This issue was clearly summarized in a past editorial of the *21st Century* journal:⁹ "Essential infrastructure—whether nuclear energy, or national rail systems—should not be measured with an annual cost-benefit yardstick that ignores both the future—and the past."

References

1. C.M. Pepper, "The Pan-American Railway," *Bulletin of the American Geographical Society*, Vol. 36, No. 8 (1904), pp. 466-470.
2. www.unep-wcmc.org/
3. G. Menzies, *1421 The Year China Discovered the World* (London: Bantam Press, 2006).
4. F.M. Kelley, "Explorations Through the Valley of the Atrato to the Pacific, in Search of a Route for a Ship Canal," *Journal of the Royal Geographical Society of London*, Vol. 26 (1856), pp. 174-182.
5. U.S. Army Corps of Engineers, *Inter-Oceanic Canal Studies-1970, Annex V—Study of Engineering Feasibility* (Washington, D.C.: Atlantic Pacific Interoceanic Canal Study Commission, Dec. 1, 1970). Appendix 14, Route 23.
6. E. Graves, "A New Canal," *Nuclear News*, February 1965, pp. 13-17.
7. E. Graves, "Nuclear Excavation of a Sea-Level Isthmian Canal," *Proceedings of the Conference on Engineering with Explosives* (Washington, D.C.: USAEC, 1964), pp. 321-334.
8. J.-E. Botaggisio, "Alternatives for an Inter-Oceanic Canal in Chocó" (in Spanish), talk to the Engineering Society of Antioquia (Sociedad Antioqueña de Ingenieros), Feb. 20, 2007.
9. M.M. Hecht, "How To Build 6,000 Nuclear Plants," *21st Century Science & Technology*, Spring 2005, pp. 2-3.