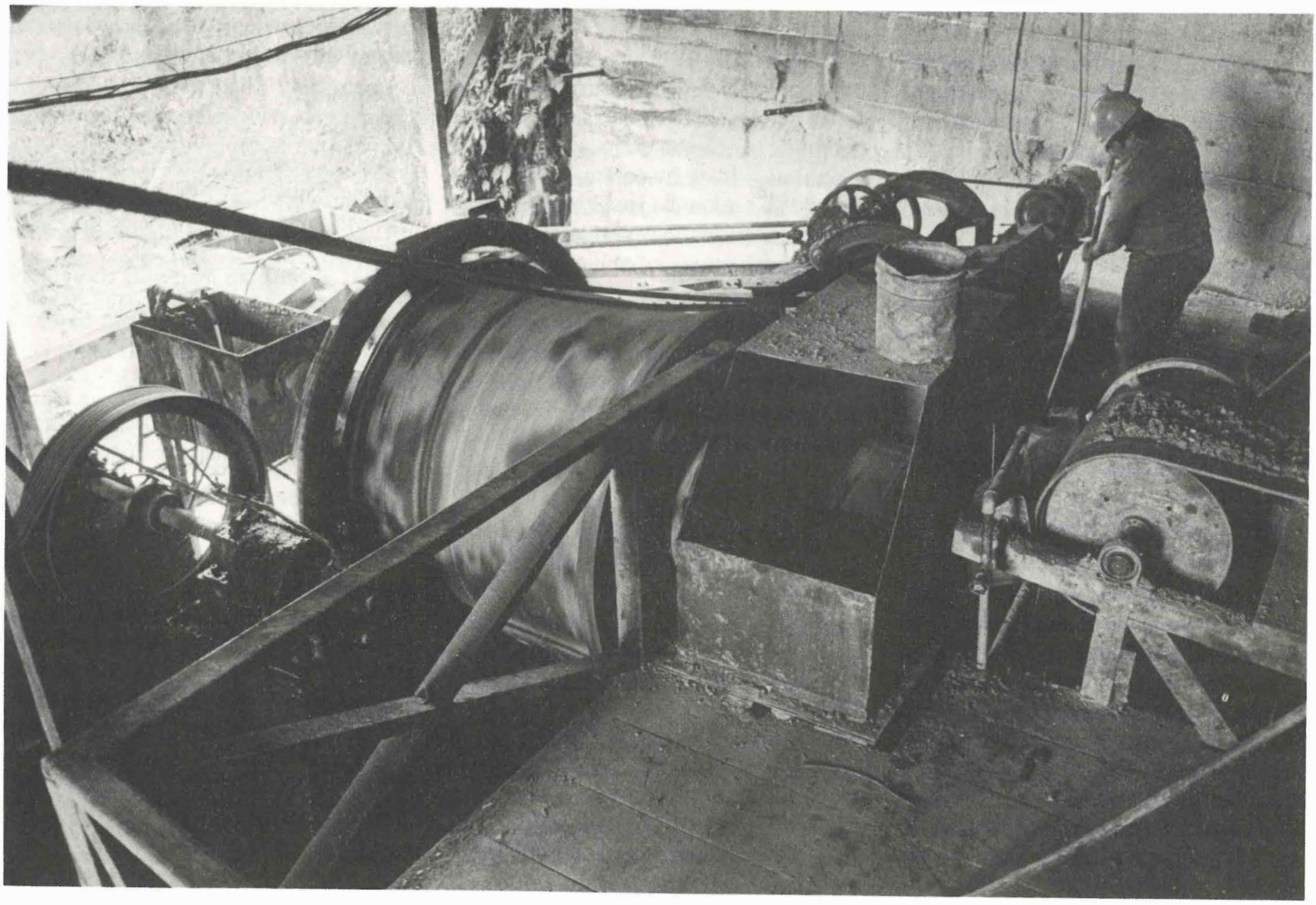

The gold mine at La Libertad. The ore is put into a silo for transport to the ore dressing installations (above).

Ore dressing installations (below).

Gold mining in Nicaragua

By Robert A Rice

Gold mining is inextricably woven in Nicaragua's economic and geographic history. In the following article Robert A Rice analyses this tradition and the efforts of the present government to increase gold production in the midst of a social experiment which goes against the long standing relations between Central and North America.

The links between Nicaragua and gold stretch back almost to the "discovery" of the New World, when Columbus landed on the swampy eastern shore of Nicaragua in 1502. He reported:

> "the gold is excellent . . . from gold treasure is made, and whoever has it, can do whatever he likes in the world . . . "[1]

The lure of Nicaragua's gold has shown through the thick mantle of tropical forest and permeated this small country's relations with the rest of the world ever since.

Regardless of the analytic tools or ideological perspective, a salient fact about Nicaragua's mineral resources is that gold has flowed out of the country and into foreign coffers for more than 400 years. From the first days of outside contact, Spanish, British, and later North American interests each have taken turns at the wealth within the narrow-waisted isthmus. For a short period this century, when world copper prices soared, copper was mined in the eastern region of the country along with some lead and zinc. These less valuable metals, however, have figured little in Nicaragua's economy, making the country's history of mineral explorlation and extraction synonymous with the history of gold mining.

The Sandinista government nationalized gold mining just weeks after taking the reins of a popular revolution on July 19, 1979 and negotiated expropriation compensation with three North American mining firms — ASARCO, AMAX, and Noranda Mines. At the heart of the decision to bring the mines into th republic realm is the United Nations 1974 resolution on the New International Economic Order, which, among other things, endorses permanent nationel sovereignty over natural resources. This policy shifted the locus of decision making power over mineral extraction from North America to Managua.

Assuming stewardship of gold mining and other natural resources after years of outside control must be carried out within the conjunctural limits of the industry in question. For gold mining this means not only that the current ore reserves deserve attention, but that mining officials are now heirs to a complex of production relations that have been molded and tempered in the atmosphere of a particular economic and social history. Problems with production can arise from a lack of trained personnel, shortages in modern equipment and spare parts, and incomplete knowledge of potential economic reserves.

Today Nicaragua is developing gold mining in hopes of reaching production levels of past decades. Increased gold production is one way to bolster an economy suffering from back-to-back wars: the popular insurrection against the 45-year Somoza regime; and the ongoing US-supported counterrevolution, known internationally as the "contra" war. Plans to increase present gold production of about 1.9 t per year fivefold by the year 1992 are ambitious, considering the magnitude and scope of problems associated with the social revolution and the low-intensity "contra" war now taking place in Nicaragua. To appreciate what it means for an underdeveloped nation to assume control of a resource it has never managed, we need to understand the historical underpinnings of the industry involved.

Gold: an export with import

Gold retains the most historically consistent position among Nicaragua's exports. Cochineal, indigo, rubber, Indian slaves and turtles flourished and foundered as important commodities in the country's early economic history. Coffee, introduced in the 1840s, emerged as a principal foreign exchange ("brown gold") by century's end, while cotton, lobsters, and sesame have more recently joined the list.

Nicaraguan gold captured prominence as a major source of wealth early in the 19th century. For more than 130

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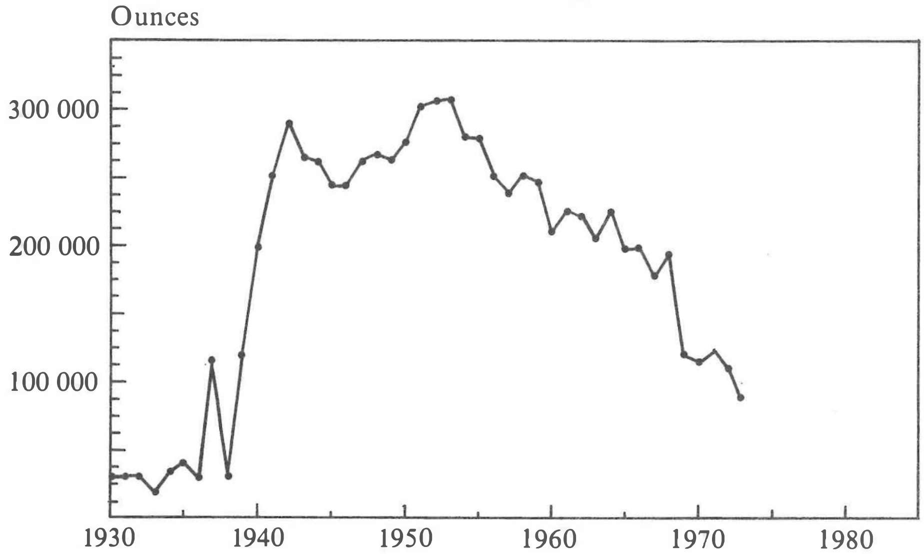
years accounts about Nicaragua repeatedly placed gold at the top of the list of valued products from this Central American nation.[2] For most of this century gold has jockeyed for position first with coffee, and more recently with cotton, as Nicaragua's primary export. The capital accumulated by gold production, however, unlike that from coffee and cotton amassed by Nicaraguans, went to foreigners (see below).

Production peaked in the 1950s (Figure 1), when US and Canadian involvement in Nicaragua was especially intense. Reported production in 1953 was 305 941 oz,[3] and by 1962 that figure had fallen to 221 984 oz, with over 99 per cent being exported to North America.[4]

Over the years Nicaragua has maintained an important regional position in gold production. To the north, Honduran gold mining — located in the eastern uplands and in many valleys along the northern coast — had been developed early by the Spanish, but by the mid-1850s most of these sites had been abandoned.[5] Sporadic stabs at gold extraction in neighboring Costa Rica and El Salvador continued, with only Guatemala among the Central American states having no significant gold production in the historical period. The Osa Peninsula of Costa Rica today supports a mining-gold rush, which is creating friction between gold-feverish companies and prospectors on the one hand, and government officials trying to protect a pristine national park on the other.

Though Nicaragua's recent contribution to world gold production has never exceeded one per cent, it has consistently led the Central American countries (Table 1). The erratic but continual rise in the price of gold on the world market permitted Nicaragua's mines to remain profitable during the later Somoza years, despite absolute production declines. In 1980 the per capita value of gold produced was 14.70 USD, a figure that in real terms falls below the 8.00 USD per capita figure during the highly productive 1950s.[6]

Fig 1 **Gold production in Nicaragua: 1930—1983**



Sources:
Minerals Yearbook "The mineral industry of Nicaragua", Bureau of Mines, International Report, US Department of the Interior 1963—1976; Guandique (1961); and interviews with INMINE staff November 1984.

Table 1

Nicaragua's place in world gold production (in t)

Year	World total	Central America	Nicaragua	Nicaraguan share of CA production (in %)
1967	1 423	5.7	5.5	96.7
1968	1 436	6.2	6.0	95.6
1969	1 444	4.0	3.7	94.5
1970	1 478	3.8	3.6	95.0
1971	1 446	4.0	3.8	94.6
1972	1 394	3.6	3.5	95.7
1973	1 338	3.3	2.6	79.4*
1974	1 233	3.4	2.6	76.1
1975	1 203	3.1	2.2	70.0
1976	1 214	2.8	2.4	83.5
1977	1 211	2.6	2.1	79.5
1978	1 215	2.7	2.1	75.0
1979	1 209	2.6	1.9	73.1
1980	1 219	2.6	1.9	72.3
1981	1 283	2.9	2.2	73.4
1982	1 339	2.8	1.8	64.0
1983	1 325	2.5	1.5	58.8
1984	1 423	1.7e	1.1	62.5
1985	1 470p	1.4e	0.8	54.3

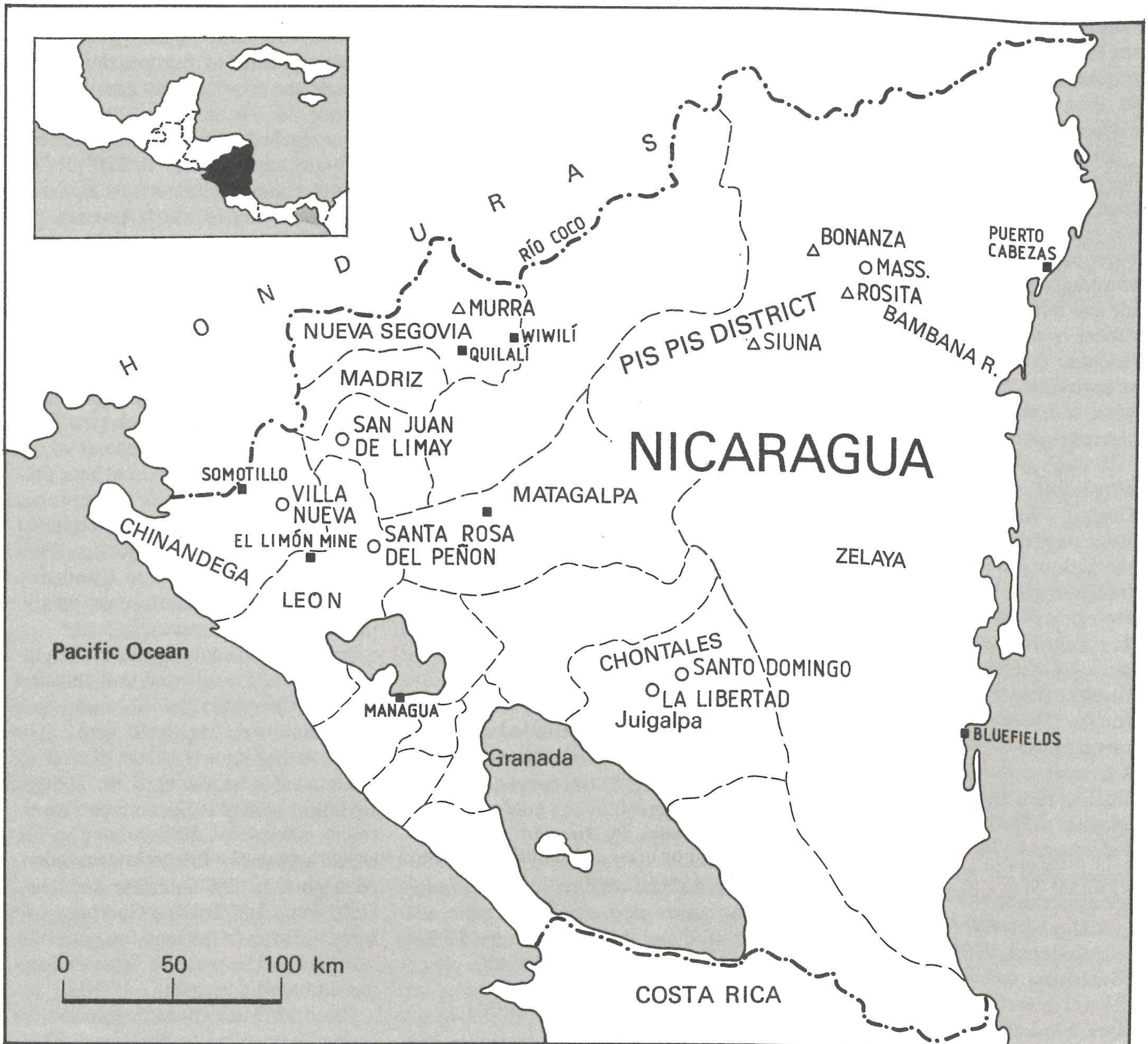
Notes:
p = provisional, e = estimte
* = This drop in per cent Central American production accounted for by Nicaragua is attributable to two things: 1972 was the year of the earthquake in Managua; and Costa Rica increased its gold production by more than 200 per cent from 1972 to 1973.

Source:
Minerals Yearbook — International Area Reports, US Department of the Interior 1963—1985 Washington, DC, Mining Annual Review 1986, World Metal Statistics Yearbook 1986.

Why Nicaragua?

In the geographical lottery of the location of mineral resources, Nicaragua has been fortunate. Its 2.5 million inhabitants ride the crumpled western edge of the Caribbean plate in an area the size of Bulgaria or Pennsylvania, in position to reap the benefits of tectonic activity that occurred during the Tertiary. Vulcanism and other plate margin stresses have infused the crust beneath Nicaragua with a network of auriferous quartz veins. Like ponderous lace tacked beneath the Nicaraguan soil, they stretch through the isthmus, and are most numerous in the perennially warm and humid northeastern region near Siuna and Bonanza — the rainforests of the Pis Pis district. In the first quarter of this century, ore assays in the Pis Pis district reported 4 USD to 22 USD of gold per ton; mines in Chontales contained ores with about 0.45 oz per ton.[7]

A tropical temperature regime and annual rainfall patterns ranging from 1 000 to 5 000 mm have worked for millenia to sprinkle placer deposits and weathered surface ores across the Nicaraguan landscape. These deposits and free milling ores marked the early



sites of gold production, and were soon left barren of any easily attainable gold. Gold seekers found that access to the harder, deeper sulfide ores required shafts and tunnels, heavy equipment, and more know-how and capital.

A problem of accessibility

A chronic problem for the mining industry in Nicaragua has been that of accessibility, especially to the more potentially productive eastern region. Were it not for the low bulk/high value nature of gold, the industry would have perished long ago in this green tangled wilderness.

The rainforests and pine savannas of the Atlantic coast region have always been isolated from the more populous western side of Nicaragua. A legion of waterways carves the landscape, anastomosing an otherwise impenetrable and difficult terrain. Workers in the rubber trade, poling their small crafts through the network of rivers and streams that drain toward the Caribbean, were the first to report gold in this eastern region.

Though gold, silver and other metals were known to exist in various parts of Central America,[8] travellers and students of the region usually attributed the lack of development of mining to transportation difficulties.[9] The remoteness of the Atlantic coast region kept only the most adventuresome from pursuing the riches within the rainforest. The "going" was extremely rough. "The energy, pluck and perserverance of the US and Canadian miners who opened up this isolated area . . . has few parallels in the annals of pioneer mining." [10] These North Americans had help from the Miskito Indians, Caribbean blacks and mestizos who worked alongside them and in the mines.

Today Nicaragua has about 1 600 km of paved roads, compared to 2 800 km in Guatemala and 2 100 km in Costa Rica,[11] both of which are smaller in area. Most of these roads connect Pacific zone activites. Ground travel today in eastern Nicaragua is only slightly improved over past decades, with a single road connecting Managua and Puerto Cabezas, which is passable only in the dry season.

Getting to the gold mines of the eastern region was a major task, even as late as the 1920s. From New Orleans to the Pis Pis district around Bonanza and Siuna (see map) miners and engineers travelled first to Bluefields by steamer; then coasted to Prinzapolka by schooner, and a canoe to Tunki on the Bambana river; a smaller dugout hauled them upriver to Miranda, where a tramway or mule team carried them on through the rainforest to the mines. Under the best conditions the trip took 10 days, but usually twice that time was required.[12] These 1921 modes of transport appear to have been quite good compared to those of 30 years earlier, when "the (gold) fields (were) not to be reached except by tedious travel in canoes and on the backs of Indians".[13] Bullion leaving the area took the same route that supplies and foreigners took to get in.

Freight costs reflected the Herculean feat of transporting mining supplies and equipment into the mining areas. Rates from New York to the Pacific port of Corinto ran at 14 USD per ton, whereas the short distance from the port to the north-central mining district was 66 USD per ton.[41] A few years earlier the rates for an eastern route were even higher, starting at 130 USD per ton.[15]

Relatively low-intensity extraction continued until the 1930s, when North American companies enlisted the services of aircraft to transport goods and heavy equipment in and gold out of the eastern region. By the 1950s these companies held contracts with the Somoza-owned LaNica Airlines to move equipment, spare parts, building materials and food and drink enough for 10 000 people into the Bonanza area.[16]

A legacy of lopsided relations

The history of gold extraction in Nicaragua has been dominated by relations established during the colonial period. The rise and fall of economic and military might in Western Europe and North America have been reflected in which foreign countries have controlled the gold fields of Nicaragua.

The outside power was at first political, with Spain dominating most of Latin America during the early phase of European expansion. By 1823, when Spain had relinquished control of the region, and London emerged as the financial center of Europe, the British became the economically dominant influence in Nicaragua. This foreign flavor reached its climax as US interests gradually replaced the British around 1900. As control shifted from Spain to Britain and then to North America, the sites of gold production in Nicaragua tended to shift as well.

In the 1500s the Spanish operated principally in Nueva Segovia and Madrid. That portion of the indigenous population not transferred to Peru to work the silver mines was used in the northern mountains to wash gold from the placer deposits.[17] The people of the Nueva Segovia region seem to have provided a particularly docile labour force, for, as the 19th century naturalist Thomas Belt explained, workers from the north were brought to Chontales, where the local population was unwilling to work in the mines.[18]

British efforts concentrated in Chontales around La Libertad and Juigalpa in the 19th century. In 1871 more than 300 claims were registered here.[19] The Javali mine, known as the "jewel of Chontales" and managed by Thomas Belt from 1868 to 1872, represents an extreme example of foreign sway within the mining sector. British investors signed a lease in 1868 that gave the Javali Gold Mine and Trading Company Ltd mineral rights to the land for *one thousand years.* The rent was "five shillings per annum if demanded . . . "[20]

From 1869 to 1930 forty-four British concerns operated in Nicaragua. Their presence cannot be explained so much out of realized profit as from speculation.[21] Companies formed and dissolved in London by the score with the hope of striking it rich in Nicaragua. But the successful operations offered little toward Nicaragua's development, as profits and investments were linked to British companies. The mining sector functioned with few ties to other economic activities in Nicaragua, and decisions relating to the industry were made with indifference toward any long-range strategy for developing the country's mineral wealth.[22]

Political economy of gold mining

Though North American capital did not fully penetrate the winding waterways of Nicaraguan gold country until the 1930s, US mining engineers and prospectors roamed the area before the turn of the century. In the 1890s several US mining experts were receiving 30 USD/day in gold to assess the mining potential of the Atlantic cost region. And, as one contemporary account reads, "even capitalists do not pay 30 dollars a day without some hope of getting it back".[23]

North American capital, savy and entreprenuership were important factors in opening up the eastern lowland region of Nicaragua to mineral exploitation. But US influence did not stop there. In 1906 when Nicaraguan President Zelaya strengthened his country's economic ties with Britain, US industrialists financed his overthrow, whereupon the US government ordered 400 Marines into Nicaragua "on the pretext of protecting the lives and properties of US citizens".[24] The Vice-President of the newly installed US-supported government was Adolfo Diaz, a former clerk in the US-owned La Luz and Los Angeles Mines Co. Diaz took the reins of government in 1911, and placed the country under the protection of the United States.

Protection worked both ways. In that same year two New York City banking firms, Brown Brothers and Co and J W Seligman and Co, helped to underwrite the National Bank of Nicaragua. Chartered in the state of Connecticut, the bank's final arbitor in any financial controversies was the US State Department.[25] By the end of World War I "nearly all producing mines (were) owned by American capital", and "as (was) well known, the finances of the country (were) being administered, more or less benevolently, by American bankers".[26]

Canadian capital was active in Nicaragua as early as 1937, when Noranda Mines bought 64 per cent of the shares of the Nicaraguan company El Setentrion, which operated El Limon mine about 50 km northeast of Leon. This 100 000 USD purchase of a mine in full production was Noranda's first overseas venture, and after nine months it bore not only enough gold to repay the initial investment, but a net gain of 140 000 USD as well.[27]

The bounty of the industry did not fall solely on outside interests, however. In the 1940s, gold mining ranked second only to beef as a source of income for the Somozas — first family of Nicaragua. Though the President owned the gold mine "El Albino", the bulk of his income from gold came from the legal tax of 17 USD/kilo of gold produced, plus "two further contributions", which totalled about 2.25 per cent (175 000 USD) of the mining companies' annual production.[28] Political influence of North American companies was enhanced during this period by Somoza's foreign minister, who also served as attorney for the La Luz Mining Co.

Foreign attitudes

An interesting aspect in the relations that have existed between Nicaragua and foreign interests has been the attitudes held toward the host country by the companies. The enslaving of indigenous Nicaraguans by the Spaniards reflected prevailing European attitudes of the time, when the population of what is today known as Latin America represented a vast pool of cheap labor waiting to be exploited in an array of colonial operations. Nineteenth century British activities continued in the same vein.

When North American capital displaced its predecessors early this century, a definite attitude remained, reflected in mining reports about the area. Nicaragua was seen as "the backward child of the Central American republics".[29] As for the Nicaraguan worker . . .

> . . . wealth means nothing to him. Fortunately, however, he has cultivated a taste for white man's food, and "plun apo" ("no grub") are the magic words which send terror into soul, located in his stomach, and drive him to toil.[30]

The general assumption today is that overseas investment fosters development, raises the standard of living in host countries, and has our southern neighbours' best interests at heart. A good measure of commitment to real development is a willingness to pay adequate workers' wages. Yet, a 1974 advertisement in a major US periodical shows that attitudes toward workers of this region have changed little, and that low wages still rank as an important reason for locating abroad. The ad urges businesses to locate in Nicaragua. Among the benefits listed for firms locating there are abundant hydroelectric power, mineral resources and precious hardwoods. As for labor, the ad explains that Nicaragua has "a labor market in which the work ethic is not a topic for philosophic discussion, but a way of life".[31] This "way of life" emerged principally because most Nicaraguans lacked access to adequate farmland on which to live and support themselves; wage labor became survival, a way of life brought on by necessity.

Wage scales have been used continually to control worker productivity in the Nicaraguan mines, with wage dependent on the amount of ore removed and bonuses paid for anything over a certain quota. Such practices foster high accident rates, exposing miners to unnecessarily dangerous work conditions. As a result, labour organizing efforts among miners centered around wages and work conditions in the 1940s and 1950s. Strikes during this time were quickly suppressed by the National Guard.[32]

The 19th century and beyond: golden opportunities

The social relations forged and continued between Nicaragua and foreign interests are more complex than a simple "foreign control" model. The power imbalance is domestic as well, and the degree to which the development of the nation's natural resources progressed has depended on the attitude of Nicaraguan policymakers toward foreign influence. When Spain's power waned in the early 1800s, and the Liberal movement in Central America overshadowed the political garden of the Conservative federalists, economic development became a priority among the young nations of the region. Liberal reforms sought to stimulate economic activity in areas outside the cities. A positivist mentality, coupled with the obvious succes to the US's economic development, spurred the Liberal power elites to think in terms of national development. Members of the region's governments had European and North American educations, which undoubtedly figured in Central America's attitudinal change toward outside economic interests.

An era of protectionism in the region gave way to an open door policy, and an infusion of foreign investment. Laws prohibiting non-Nicaraguans from acquiring mining concessions were annulled and others encouraging foreign investment in mining were passed soon after Independence.[33] Regulations pertaining to export duties on gold were softened, and penalties for non-payment of duties went unenforced. Not only did these changes focus capital from abroad into the hinterland of Nicaragua, but they reportedly aided the local people, as witnessed by a self-serving account relating that around the British gold fields near La Libertad in Chontales, the people were "immensely superior (to people of other areas), having benefitted much by foreign presence".[34]

Interestingly, not everyone nurtured the idea of hunting reasure in the rainforest. A 1920 article argued for restraint:

> "The history of gold hunters of the Conquest compares with that of those of the present age, and chronicle the vices, the few virtues, and the superstitutions and violences of the bygone."[38]

Such advice got buried in the excitement brought on by a combination of relaxed investment regulations and adventuresome financiers. By 1920 the atmosphere was one in which the "mining laws of the country (were) excellent" and "government (was) particularly friendly to American capital".[36]

US investors and industrialists prospered in a tropical environment laden with economic incentives, where mining supplies and machinery were imported duty free, and tax holidays filled the company calendars.

Benefits also came to those who made the laws. In the early 1900s, for instance, the Director of Mines in Nicaragua received a gift from the Javali Gold Mine and Trading Co amounting to 20 000 shares in that operation. A similar connection existed in Honduras, where Honduran President Marco Aurelio Soto (1876—83) owned part of the US-based Rasario Mining Co.[37]

In 1936 the Canadian firm Ventures Ltd obtained a 30-year contract for mines in Siuna, granting the company freedom to export unlimited amounts of gold at a reasonable (1.5 per cent) customs duty. Ventures also was exempted from any tax increases during the life of the contract.[38]

The combined attraction of promising gold reserves, cheap labor and gilded operating conditions pulled foreign interests into an otherwise hostile and difficult landscape, where they mined an untapped resource with imported technology. Because labor in the mining industry has always been cheap, companies refrained from investing in state-of-the-art equipment. They did not need it. As a result, ore processing machinery installed in the period 1920—1940 was being used when the Sandinistas came to power, and it still operates today.

Dependence on spare parts from the US for milling equipment, along with the US-backed "contra" war, now threaten Nicaragua's productive capacity. Moreover, much of the technical know-how left the country when expropriation of the foreign-owned mines occurred. These production problems must be solved before Nicaragua can increase its output. Other problems that were decades in the making concern some social and ecological side effects of gold mining.

Some consequences of gold mining

At the dawn of the Sandinista government, officials discovered a mining engineer's nightmare. Five mines were operable in 1979, owned wholy or partly by North American firms, e g Noranda Mines Ltd, ASARCO Inc and AMAX Inc. During the growing political instability of the 1970s, fear of losing access to the mineral wealth in Nicaragua led to decisions in which the extraction of top-grade ore took precedent over long-range exploitation and mine safety. As a result, the physical condition of the mines in 1979 had deteriorated to the point of being more dangerous than usual. The mine at Rosita, formerly owned by AMAX Inc, especially suffered during these years, and was finally closed in 1982.

The use of cyanide in extracting gold

A militiaman and his son defending a gold mine against attacks by the Contras.

from the ore has led to pollution of streams and rivers. First used in 1904 at La Leonesa mine in Matagalpa, cyanide solution found its heaviest use around the Bonanza/Siuna/Rosita area. A study by the *Instituto de Recursos Naturales* (IRENA) estimated that over 3 767 t of cyanide were cast into the Rio Sucio at Bonanza between 1961 and 1978. From 1975 to 1979 nearly 435 t entered the Rio Bambana at Rosita.[39] Interviews conducted by IRENA workers suggest that several aquatic species have disappeared from the Miranda, Matis and Sucio rivers. The toxins can also disrupt the human ecology of the area, as indigenous communities of Miskito are highly dependent on aquatic resources for significant portions of their diet.

Forests have not escaped the impact of mining centers, a consequence noted years ago. By the second decade of this century, the forest near Siuna was already receding, falling to various uses that included construction material for buildings, equipment, shafts and tunnels, as well as serving as a fuel source.[40]

Worker health and safety records in Nicaragua's mining sector are tarnished with lifetime illness and disabling accidents. A common disease of miners has been silicosis. Company policy of paying bonuses based on the daily volume of ore removed probably contributed greatly to the incidence of silicosis among miners who, trying to make as much money as possible, would rush into a mine after the dynamite blast before the dust settled.[41] Accidents for cave-ins and other mishaps also took their toll. In the years 1951 to 1964, a period covering the most productive years of gold mining in Nicaragua, there were 14 165 reported accidents in the industry.[42]

Current conditions, constraints and plans

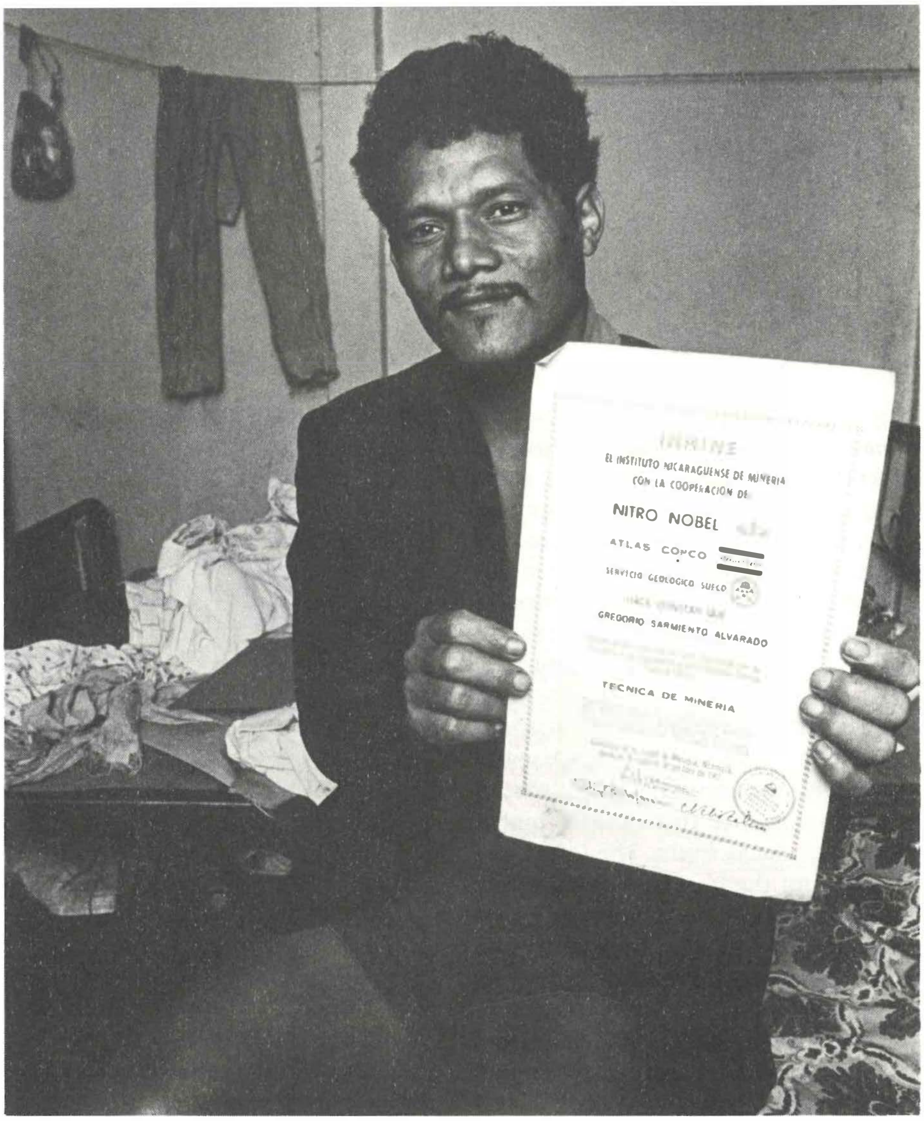
Shafts and tunnels are used to extract much of Nicaragua's gold. Some of the sites have developed open-pit mining, such as El Limon in the west and La Luz at Siuna. At Bonanza two new open-pit areas have recently begun operation. El Limon currently provides about 40 per cent of Nicaragua's gold production, but is hampered by super-heated subterranean water that courses through some of its more productive shafts, exposing workers to tea kettle temperatures.

The task before the Sandinista government and mine managers is to produce gold, the one commodity that can boost the national economy with certainty. Production, however, is more than neat columns of figures in the custom house export ledger. It involves technical expertise, up-to-date equipment and an atmosphere in which mining plans and operations can proceed unhindered — all of which are in short supply right now.

Most of the mining technicians left when the government expropriated the mines from the foreign companies, and only a few have been rehired as consultants over the last six years. Today Bulgarian, Soviet and Swedish technicians advise mining operations in some areas, assisting with exploration, mine rehabilitation and milling operations. Sweden has given about 20 M USD through 1986, 60 per cent of which will go toward quipment purchases.[43] With economic assistance totalling 10 M USD, the Soviet Union in 1982 pledged to help Nicaragua acquire mining equipment and build a 200 student technical center to train Nicaraguans as mining technicians.[44] But the problem of the lack of trained personnel will take years to remedy. Most of the milling and processing equipment is outdated and of US origin, making the acquisition of spare parts virtually impossible — especially since the US imposed an economic ambargo on Nicaragua in May, 1985.

Mining operations in the northeastern area of Nicaragua have suffered from the contra war, which forced the withdrawal of Soviet and Bulgarian technicians from the Pis Pis district in 1984. Despite these difficulties, a Russian team assessed ore deposits in the area, and found ore grading between 1.5 g/t and 6.2 g/t for gold. Some northeastern samples also contained economically exploitable quantities of base metals like lead, zinc and copper. All told, there are nearly 30 million st of possible, probable and proven reserves in this region.[45]

Nicaraguan miner Gregorio Sarmiento has attended his first course in drilling and blasting, arranged by Swedish companies as a part of a Swedish development project.



The proposed goal of increasing gold production five-fold by 1992 will challenge the mining industry for the rest of the 1980s. Historically, operations were located with little or no concern for the overall picture of potential reserves. With aid from the Swedish Geological Co the *Instituto Nicaraguense de Mineria* (INMINE) technical staff is conducting a national survey that will evaluate the country's mineral reserves, map these reserves in their regional contexts, and develop a plan to exploit the mineral wealth. Part of this effort includes a modern assay laboratory in Managua built in 1983 with funds from the Swedish government.

In 1983 a total of 2 427 miners worked at the four operable mines, which is about two thirds the number employed just prior to the Sandinista's coming to power. These industrial miners' wages averaged around 3 000 cordovas (NIC) a month, which, at the official 1983 exchange rate was 300 USD. At the everyday devalued rate, however, this wage is dismally low.

In addition to these industrial miners, the government recognizes the small-scale, independent gold panners who cover the network of small waterways in the gold-rich Pis Pis district. Numbering about 150 in all, they are organized into cooperatives that entitle them to government credit used to purchase equipment. One the government's biggest problems is the strong black market for gold. Part-time panners sell to contraband gold dealers who in turn sell to jewelers in Managua, or smuggle the gold to Costa Rica or Honduras. The government cannot compete with the prices paid by these dealers, and is losing gold to the illegal market. Plans are to implement an identification card for gold panners, hopefully eliminating this underground economy.

A new pension fund program for disabled miners was estblished in the early 1980s, the purpose of which is to find former mine workers now disabled and offer them government support. By 1984 INMINE had reviewed 5 523 individual cases for potential funding, and compensation had been awarded to 4 819 disabled miners or miners' widows, orphans and other beneficiaries in need of support.

Summary

Gold mining is inextricably woven in Nicaragua's economic and geographic history, and from the time of Colombus to the comandantes it has upstaged many other commodities. Its extraction has had little beneficial impact on the overall Nicaraguan economy, due mainly to the fact that not only the gold itself, but the value it represents, has been siphoned from the country to foreign nations like Spain, Britain, Canada or the US. For the cost of workers wages, equipment maintenance and some very low export duties, gold has flowed out of Nicaragua in large quantities for the past one hundred years.

Only since 1979 has the mining sector been under Nicaraguan control. The enclave quality of the industry historically — weak financial links to the rest of Nicaraguan society, and technology, expertise and capital investment from abroad — surfaces today as a crippling agent to current production plans.

In the midst of a social experiment which goes against the long-standing relations between Central and North America, Nicaragua wants to increase annual gold output from 1.9 t to 9.3 t. The challenge is more than one of production. It is a challenge to generations of foreign control of a very important natural resource.

Notes:

[1] *ANI,* Una revista de la Costa Atlantica Numero 1, Sept—Dic 1984, p 3.

[2] Geographical sketch on St Domingo, Cuba and Nicaragua: remarks on the past and present policy of Great Britain, affecting those countries 1850, p 26—35.

[3] O'Shaughnessy H, *Nicaragua: government and business snarl among the ruins, Financial Times* 1981-05-27.

[4] Guandique F E, *La minera en al econo-*

mia, nacional revista conservadora del Pensamiento Centroamericano 13 1961, p 34—37.

[5] Squier E G, *The states of Central America:* their geography, topography, climate, population, resources, productions, commerce, political organization, aborigines, etc, etc, Harper and Brothers, New York, 1858, 782 pp.

Bengtson N A, *The Resources of Honduras, Journal of Geography* 24(4) 1925, p 125—139.

Honduras has produced the lion's share of silver in Central America in colonial times, see W L Wortman's *Government and Society in Central America, 1680—1840,* Columbia University Press, New York, 113—117, and today: *Mineral Industries of Latin America,* US Department of the Interior, Bureau of Mines, December 1981, 5 pp.

[6] Parsons J J, *Gold mining in the Nicaragua Rainforest Yearbook of the Association of Pacific Coast Geographers* 17 (1955), p 49—55.

[7] Playter H, *Nicaragua: commercial and economic survey,* US Deapartment of Commerce Trade Promotion Series No 54, 1927, 158 pp.

[8] Baily J, *Central America:* describing each of the state of Guatemala, Honduras, Salvador, Nicaragua, and Costa Rica. London 1850, 164 pp. Squier, EG *op cit.*

[9] Squier E G, op cit. Munro, D G, *The Five Republics of Central America,* Oxford University Press, New York 1918, 332 pp.

[10] Parsons J J, op cit.

[11] Wilkie, J W and A Perkal, *Statistical Abstract of Latin America* 23, UCLA Latin American Publiclations, Los Angeles 1984.

[12] Hawxhurst, R, *The Pis Pis gold district, Nicaragua, Mining and Scientific Press,* No 122, 1921, p 353—360.

[13] *Gold mining in Nicaragua, Mining and Scientific Press,* No 61 1890, p 24.

[14] 4Cumberland, W W, *Nicaragua: economic and financial survey,* US Department of State, 1927, p 43.

[15] Hawxhurst R, op cit.

[16] Parsons J J, op cit.

[17] West R C and Augelli J P, *Middle America: Its Lands and Peoples,* Prentice-Hall 2nd edition 1966, p 246 and 445.

[18] Lanuza M L, La minera en Nicaragua 1821—1875, *Anuario de Estudios Centroamericanos* 3, 1977, p 215—224.

[19] Lanuza M L, op cit.

[20] *Javali Gold Mine and Trading Co Ltd* (JGMTCL), Facimile of Certificate 63344 on microfilm in Bancroft Library, University of California, Berkeley. Filed under The Companies Acts in London in August, 1899, this certificate shows that JGMTCL took over the Nicaraguan mine from the Javali Company Ltd, originally formed in 1868. The occupations of the company's shareholders reflect the degree to which British capital not from industrialists and other capitalists, so much as from the merchant and worker class, ventured to fund operations outside Britain. Of those shareholders' listed in 1900, the majority were merchants and/or clerks of some kind. Other London based companies conducting gold mining operations in Nicaragua included the Central Gold Development Syndicate, Ltd, incorporated in April 1903 with nominal capital amountingto 25 000 pounds, and Smeddle's gold Co, Ltd, which acquired the Crimea gold mine in Nicaragua in October 1890. While the Javali operation lasted until 1909, the other two companies dissolved within three years of their incorporation.

[21] Quesada M R, La inversion britainca en America Central: dos companias mineras en Nicaragua, 1868—1910, Estudios Sociales Centroamericanos 10(30), 1981, p 125—145.

[22] Bengoechea A, La Exploracion de los recursos mineros en el litoral atlantico, *Revista Conservadora del Pensamiento Centroamericano* 68, 1966, p 3—6. Lanuza M A, op cit.

[23] *Mining and Scientific Press* 75, 1897, p 171, 296, 433, and 556.

[24] Crawley E, *Nicaragua in Perspective,* St Martin's Press, New York, 1984, p 38.

[25] Cumberland W W, op cit, p 136.

[26] Garbrecht L, *New mining fields in eastern Nicaragua Engingeering and Mining Journal,* 1920-04-30, p 791—797.

[27] Klein J L and O Pena, Empresas multinacionales y espacios geograficos: el caso de Noranda Mines *Revista de Geogrfia,* Departamento de Geografia de la Universidad de Barcelona, No 16—17, 1982—83, p 87—112.

[28] Garbrecht L, op cit.

[29] Ibid.

[30] *Wall Street Journal,* 1974-11-20. This ad was a multinacional's (St Regis Paper Co) response to the December, 1972 earthquake that devastated Managua. It's title was "Earthquake . . . a Phenomenon of Development".

[31] Adams T M, Siuna: an overview of the mining community and the people who work there, May, 1980. Manuscript obtained form the offices at the Instituto Nicaraguense de Mineria (INMINE) in Managua.

[32] Lanuza M A, op cit.

[33] Boyle F, *A Ride Across a Continent: a personal narrative of wanderings through Nicaragua and Costa Rica,* London 1868, p 181—183.

[34] Stout P F, *Nicaragua: Past, Present and Future,* a description of its inhabitants, customs, mines, minerals, early history, modern fillibusterism, proposed inter-oceanic canal and manifest destiny, Philadelphia 1859, p 351—352.

[35] Garbrecht L, op cit.

[36] Ropp S C and Morris J A, *Central America: crisis and adaptation,* University of New Mexico Press, 1984, 311 pp.

[37] Plecash, J and Hopper R, Operations at La Luz mines and Rosita mines Nicaragua, Central America, *Canadian Mining and Metallurgical Bulletin,* August 1963, p 624—641.

[38] Ruscio, A, *A las transnacionales mineras Nicaragua no les debe nada,* Agencia Nueva Nicaragua, Managua, no date, 12 pp.

[39] Scobey J, The La Luz and Los Angeles mine in Nicaragua, *Engineering and Mining Journal,* 110, 1920, p 6—13.

[40] *CIERA,* Las minas en el departemento de Zelaya Mosquitia en la Revolucion, 1981, p 151—208.

[41] *Estadistica Minera,* obtained at the offices of INMINE in Managua, no date, 11 pp.

[42] *Engineering and Mining Journal,* February 1985, p 21.

[43] Erlick J, Nicaraguan gold mining lags after revolution, *American Metal Market,* 1985-09-13, p 5.

[44] *Engineering and Mining Journal,* February 1985, p 21.

[45] Nicaragua planning 80 % boost in gold production, *American Metal Market,* 1986-06-16,p 6. ■