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The Land that Cried Blood

Rebuilding the kingdom of cochineal in Oaxaca

OAXACA, Oaxaca

September 30, 1996

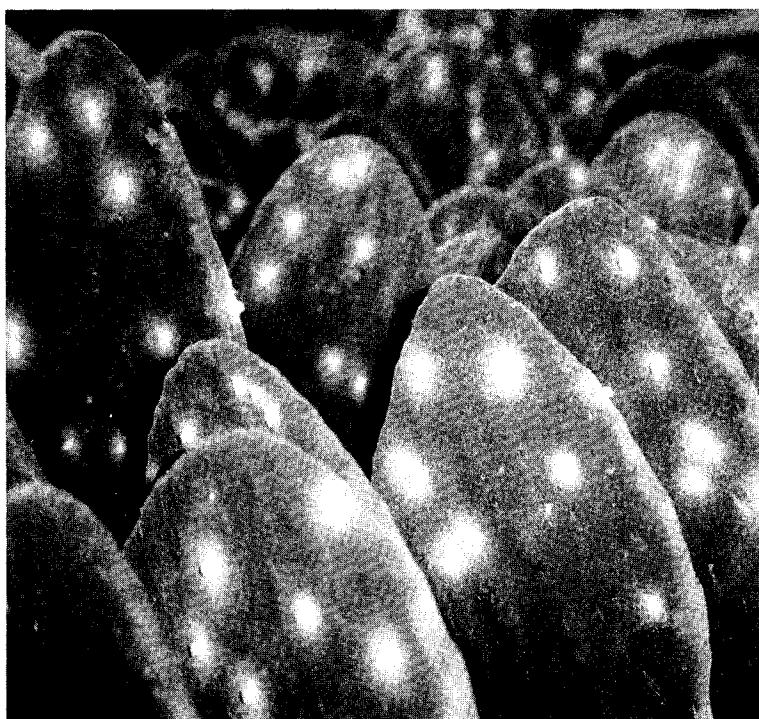
By William F. Foote

The legend began in the Mixteca Region, land of the Cloud Men, located in the eastern corridor of modern-day Oaxaca. Before the advent of mankind, when the earth was inhabited by gods, two powerful deities fought in its mountainous terrain over the possession of an enormous crop of nopal cacti. During the fierce and tragic battle, the gods each inflicted mortal wounds; their blood splattered across the nopal fields. Not wanting the bodies to remain on earth, their siblings descended from the sky and carried the battered remains back to Heaven on a bed of clouds.

Thus the Ancient Mexicans explained the origination of cochineal, an organic dye native to the state of Oaxaca. In reality, the red pigment comes not from the blood of gods but of bugs that cling to the fleshy leaves of the nopal cactus. Approximately an eighth of an inch long, the female insects resemble small brown grains covered with white powder. Ovipositing on the prickly leaves, they feed on the plant juices, converting them into carminic acid, a brilliant red pH reactive compound.

The pre-Columbian tribes of Oaxaca coveted *noschestli*, the Náhuatl word for cactus blood. By boiling it with lemon juice or leaves, they could obtain countless variations of reds and purples. They used these to lend color to their civilization: painting temples and bodies, dyeing textiles, writing codices. Later, cochineal became the favorite form of tribute demanded by their northern conquerors, the Aztecs.

During the European conquest of Mexico in the early 1500s, the Spaniards



Cloud-like powder covering female cochineal bugs that feed on the juices of nopal cacti



Pre-Hispanic chores: a modern Zapotec woman dyes wool in the Oaxacan sierra with traditional vegetable pigments.

witnessed the multiple applications of cochineal. Rapidly they set off to monopolize its production and to sell it as a luxurious fiber dye throughout the world. By the early 18th century, the colonial profits that Spain received from the sale of cochineal were surpassed only by those of gold and silver.

The success story ended abruptly, however, following the introduction of mass-produced, synthetic dyes in the mid-1900s. During the 20th century, the world would forget about cochineal and most other natural colorants. Indeed, Oaxaca's sacred insect might have gone extinct if, in the early 1980s, international health authorities had not declared many synthetic dyes — especially red ones — to be carcinogenic.

Today, the industrial world has sought out cochineal to dye myriad products: cosmetics, medicines, frozen meats, candies and liquors like *Campari*. Since it is the world's only edible noncarcinogenic red pigment, demand for cochineal has skyrocketed. Over the past decade it has risen from close to nothing to nearly 600 tons annually. Since 1990, as the back-to-nature movement has gained momentum and as more countries (espe-

cially in Europe) have prohibited artificial dyes, the price of cactus blood has leaped from nine to 85 dollars per kilo.

"As far as I know," said Victor Chagoya, a successful agro-industrialist in Oaxaca, "the only crops in Latin America that can compete with cochineal in [unit] price are drugs."

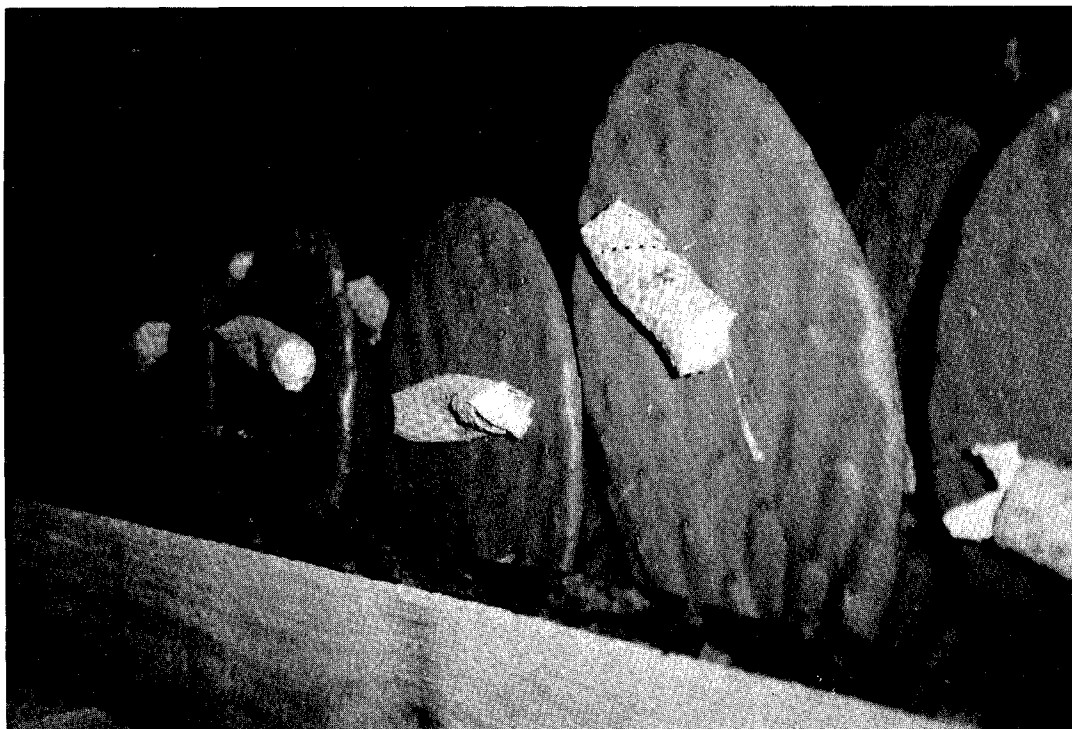
The product could bring much-needed profits to Oaxaca, one of Mexico's poorest states. Unfortunately, cochineal production has all but disappeared here and across Mexico. Since the 1970s, numerous government programs have failed to revive the industry. Today, with an annual output of only 300 kilos per year, Mexico doesn't even register on the global production charts. In stark contrast, Peru ranks first with 420 tons exported last year. At the same time, having begun production only in 1993, Chile logged 40 tons, followed by the Canary Islands and Bolivia with 30 and eight tons, respectively.

How did Oaxaca, the historical cradle of cochineal, fall so far behind? This question underscores the current debate raging over the future of the industry in Mexico. On one side of the issue are bureaucrats and academics — the purveyors of past cochineal projects. They long to rescue traditional production methods that worked so well during the pre-Columbian and colonial periods. Their efforts have involved research, training courses and subsidies for indigenous producers. All these aim to reactivate family production units in destitute rural areas, part of larger designs to rescue Oaxaca's peasant economy in general.

On the other side are businessmen and agro-industrialists who advocate the application of modern technology to create commercial cochineal farms. While not discounting the *campesino* element, they argue that today's industrial buyers (e.g., Warner-Jenkinson in the U.S., Hansen in Denmark, Sumitomo in Japan) purchase only *en masse* — that is, by the ton, not by the kilo. To boost the volume of Mexico's cochineal production, they stress the need for broader, business-oriented vision and bigger investment.

"Peru and Chile did it, so can we," said Ignacio del Rio, owner of the only modern cochineal farm in Oaxaca. Yet the chemical engineer, who once hawked artificial dyes for multinational corporations, warned that Mexico must act now or lose an historic opportunity. With cochineal prices spiraling as global demand outstrips supply, the innovative and impatient market is bound to find a cheaper alternative.

"Mexico succumbed to synthetic dyes a century ago," he concluded. "We have been given a second chance, so we better take it."



These nests of straw are filled with insects and attached to the nopal leaves to "infest" them with cochineal insects.

THE NEAR DEATH OF A ROYALE DYE

Red colorants were scarce back home when Columbus arrived in the New World. In 1523, in a letter addressed to Hernán Cortéz, Carlos V of Spain requested information about cochineal. Soon after, through his contacts with the merchants of Cadiz, El Greco began importing the pigment from Mexico for his paintings. Before long, kings, emperors and popes would be coloring their lips, cheeks and crimson robes with Oaxacan cactus blood. By the early 18th century, the Spanish had built a cochineal empire stretching from Persia to China, from England to Africa.¹

To ensure their supply, Mexico's colonial authorities formed a large organization in Oaxaca for the production, collection and sale of cochineal. They had much to work with: during pre-Hispanic times, the insect had been cultivated in 35 towns that produced some nine tons of cochineal per year. After the conquest, that activity spread to approximately 100 communities in Oaxaca, which, in the year 1774 alone, reportedly exported over 700 tons of the dye. By that time, the industry had also extended to a dozen different states in Mexico as well as other countries, including Guatemala, Honduras, Brazil, Chile, Bolivia and Spain (in the Canary Islands).²

Interestingly, the Spanish conserved the age-old indigenous production system for cochineal. As they had



Dating from the 18th century, this Spanish engraving depicts an indigenous Oaxacan Collecting cochineal from a nopal cactus.

1. *Colorantes Naturales de Mexico*, Industrias Resistol,(1988), pp. 56-63. Also *Sunday Times* - London, 03/31/96.

2. Most historical information obtained from interviews with the following experts: Professor Tito Saldibañez of the Agrarian Technology Institute of Oaxaca (ITAO) and Enrique Audiffred Bustamante, the former director of Handicrafts and Popular Industries of the State of Oaxaca (ARIPO).

since the 10th century, Oaxacan families — grandparents and children included — continued to cultivate the nopal cactus and the cochineal insects on small household plots as part of their daily activities. Consolidating that output for exportation, colonial officials reportedly paid producers one peso for every 1,000 pesos earned from cochineal sales. In hindsight, these terms of tribute, as opposed to trade, would exact a price in return.

In 1810, Mexico declared war against Spain, emulating their northern neighbors' defiance of the British Red Coats (whose uniforms, incidentally, had to be dyed with cochineal, pursuant to English law). At the outset of the War of Independence, Oaxacan rebels burned one of the great symbols of Spanish oppression: the nopal fields. The surviving cacti fell quickly into abandon, just as international cochineal prices plummeted due to increased production from Peru, Guatemala and the Canary Islands. At last, Oaxaca's kingdom of cochineal had begun to crumble...

Then it fell. In 1845, Germany and England began mass-producing synthetic dyes. Addressing a central environmental problem of the industrial revolution, European scientists converted coal soot into a wide range of artificial colorants. As the costs of these were incomparably cheaper than those of organic dyes, the global market for cochineal soon disappeared. By the turn of the century, for the first time in some 800 years, Oaxaca's indigenous communities had stopped cultivating cactus blood. That the insect survived into this century is attributable to a handful of local artisans who, for the sake of tradition, kept using natural pigments.

"Cochineal permeated our Zapotec culture," explained Helario Contreras, 78, a Oaxacan weaver who claims never to have abandoned the dye his grandfather taught him to use. Helario is one of some 5,000 artisans in Teotitlán del Valle, a town located about 30 minutes east of Oaxaca City. Famous throughout Mexico, this Indian community produces 75 percent of the wall hangings and rugs in the state of Oaxaca. During the 20th century, however, only a dozen or so of its craftsmen remained faithful to vegetable dyes: indigo, pomegranate rind, pecan nutshells, moss and cochineal.

To reach Heladio's mud-brick house, I walked 15 minutes into a ragtag residential district far removed from Teotitlán's bustling, centrally-located rug market. This was no tourist show. Sitting before an antique loom inherited from his grandfather, Helario watched his youngest son and apprentice thread wool yarn into a boiling vat of cochineal. As Fausto Contreras stirred the bubbling pot, adding a mixture of vinegar and

lemon juice, the blood red liquid turned Episcopal purple.

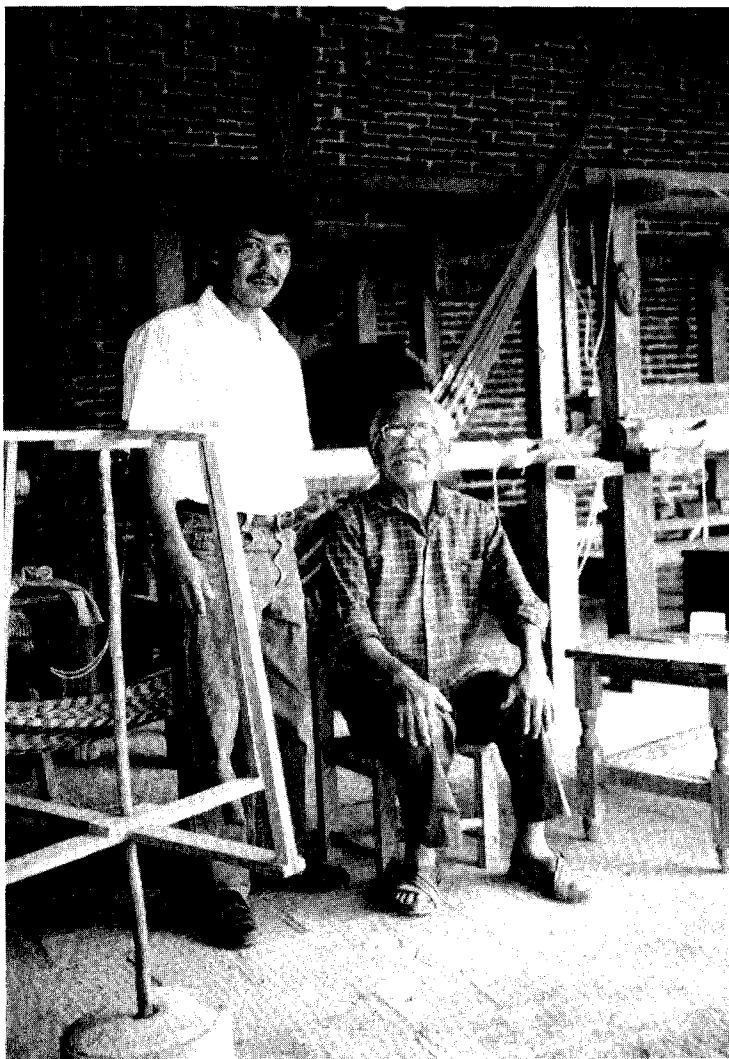
"Beé," said Fausto. "That's the Zapotec word for cactus blood." Conferring with his dad in that language, he explained that his parents always bought their cochineal from an old man who lived about two hours south of Teotitlán. "Don Lauro was his name," said Helario. "For many years, he was the only cochineal producer in the Central Valleys. Thanks to him, we never forgot about *noschestli*."

THE LEGACY OF DON LAURO: FAILED RESCUE PROGRAMS

In the Spring of 1980, Don Lauro Ramirez died while tending his nopals on the outskirts of San Augustin Amatengo, a rural community of some 2,500 inhabitants. In his eighties, the *campesino* had spent a lifetime in the three-room adobe house located around the corner from a sky-blue church. At the end of main street just beyond the town line, corn fields and maguey plants now en-



Fausto Contreras hangs blood-red yarn above a boiling vat of cochineal.



In the Contreras's back yard, Fausto stands beside his elderly father, Helario, with their homemade looms in the background.

croach on the remains of his cacti patch. Sprinkled over the prickly leaves, dabs of white powder cover tiny bugs, living memories of the Father of Cochineal.

"Don Lauro was a significant figure in our history," said Enrique Audiffred, former director of Handicrafts and Popular Industries of the State of Oaxaca (ARIPO). "He alone was responsible for keeping our cactus bug alive during the onslaught of synthetic dyes."

Thus the rescue of cochineal commenced in Amatengo. In 1974, Don Lauro agreed to advise the National Laboratories for Agro-Industrial Promotion (LANFI) in what would be the first of a series of government-sponsored programs to resurrect Mexico's cochineal industry. Extolling the virtues of the natural dye, state authorities claimed it matched perfectly the needs of Oaxaca's dirt-poor farmers: low initial investment, intensive labor, adaptability to deforested land, minimal water requirements, three-month production cycles. Furthermore, cochineal was non-perishable, priced in dollars and enjoyed rising international demand.

In launching that first project, LANFI hired an 18-year-old Zapotec man named Wilfrido Ramirez to live and work with Don Lauro for one year. Raised in an indigenous village in the Sierra Juarez mountains of Oaxaca, Wilfrido had the cultural affinity and small-town bearing needed to facilitate communication with Don Lauro. Years later, those same qualities would prove useful in his job as the local buyer for a ceramics exporter based in Tijuana.

"Looking back," said Wilfrido, standing inside his pottery warehouse, "I wasted a lot of time with Don Lauro considering that just months after the LANFI project ended, I opened a kiosk back home. Within weeks, I was making five times what the state ever paid me."

Wages aside, Wilfrido enjoyed his year in Amatengo. Each day he would accompany the old man to the nopal fields. Having studied agro-engineering in high school, he was skeptical at first of Don Lauro's rustic techniques. Wilfrido doubted, for example, that blowing the smoke of burning chiles onto cactus leaves would actually keep predators from eating the cochineal bugs. Yet upon seeing how the dreaded *teleo* worms wriggled and dropped dead under the fumes, he began to believe.

"The townspeople often chuckled," Wilfrido recalled. "There goes Don Lauro with his witchcraft, they'd say. But everything he did had a purpose. The ancient rites, the old ways, they really work."

According to Audiffred, Wilfrido's twelve-month tutelage successfully uncovered the secrets of cochineal production that might otherwise have died with Don Lauro. Much to Audiffred's dismay, however, the budget of the LANFI project went the way of an outgoing administration in the late 1970s. Several years later, as the new director of ARIPO, Audiffred would hire Wilfrido once again to continue their research.

In 1983, the National Indigenous Institute (INI) launched a program to plant nopal for cochineal production in numerous communities throughout Oaxaca. Meanwhile, ARIPO inaugurated the Lauro Ramirez Experimental Garden in memory of the *maestro* from Amatengo. To maximize productivity, Wilfrido began testing insect acceptance of different types of nopals. He experimented with fertilizers, pest controls, primitive green houses. Over time he would make several important breakthroughs, achievements that, combined with Audiffred's ardent backing, won Wilfrido the 1985 National Award for Campesino Production and Organization.

"Frankly, the prize was premature," said Wilfrido.



Wilfrido Ramirez, Don Lauro's former student, standing inside his pottery warehouse just outside Oaxaca City

"The project had only just begun and Audiffred was already shouting victory."

A momentary celebrity, Wilfrido loathed the lime-light. Asked to instruct academics from Mexico City and visiting students from U.S. universities, he recalled his embarrassment when someone referred to the scientific names of his nopals: "I didn't know there was such a thing," he admitted. While upset that his experimental garden soon became a tourist attraction, he nevertheless enjoyed meeting former President Miguel de La Madrid at the award ceremony in Mexico City.

In late 1986, Audiffred left office and the cochineal project was canceled. Soon after, a group of academics at the Agrarian Institute of Technology of Oaxaca (ITAO) expanded upon ARIPO's research, cultivating insects obtained from Amatengo. Two years later, the State Secretary of Rural Development hired the team from ITAO to apply their findings to the field. Recruiting 16 communities scattered throughout Oaxaca's

Central Valleys, they planted 80 acres of state-supplied nopal and "infested" the cacti with cochineal bugs. Like the Spanish Crown two centuries before, the project sponsors relied on family labor and household plots.

"The idea was to offer a crop complementary to the normal productive activities of *campesinos*," said Feliciano Cruz of the Secretariat of Agrarian and Forestry Development (SEDAF). With grandparents, women and children working weekdays and fathers weekends, cochineal was expected to provide an additional minimum wage per family.

One of six project organizers, Cruz helped design training courses for producers in Oaxaca City as well as in each participant community. Meanwhile, the state government bankrolled all the raw materials: nopal, insects, fencing, rudimentary greenhouses (lumber, nails, plastic), cinder-block storage facilities. In hindsight, Cruz regretted that full subsidy as it served to undermine the producers' commitment, which, according to him, increases proportionally with the level of personal risk.

"When *campesinos* receive something for free," Cruz explained, "they don't value their work, they neglect their responsibilities."

Sure enough, by 1992, the year the ITAO project was officially canceled, virtually all 80 acres of nopal had been abandoned. Predators had eaten the cochineal bugs. Dozens of concrete storehouses had been converted into chicken coups or extra bedrooms. Meanwhile, far from thankful to the government, the 16 communities involved were angry over the time and energy wasted. To this day, in fact, the mere mention of that ruined venture can

flare tempers in the sleepiest of towns.

"It was a crying shame," bellowed Filogenio Ramirez, visibly indignant under the shade of a cedar tree in the heart of Amatengo. As the former head of the local cochineal committee, he offered another view of the failed project. By 1990, according to Ramirez's calculations, Amatengo had over 70 families producing 80 kilos of cactus blood every three months. Yet there was a problem:

"Nobody wanted our product," stated a bristling Ramirez. In fact, he claims to have spent the better part of a year driving around Oaxaca in search of buyers. Judged by his story, it would seem that the government-backed program floundered due to a lack of access to markets rather than of commitment from the *campesinos*, as the SEDAF official suggested. At least, that is what Ramirez argued before the crowd gathered around us.

"We broke our backs," he avowed, waving his fist for

effect. A dozen cowboy hats nodded in agreement. "And for what? to sell a measly kilo or two to the rug weavers? No señor. With no demand, we had no choice but to abandon our nopal crops."

Back at the SEDAF offices, Cruz admitted that in their fixation with rescuing cochineal production, the project organizers neglected to consider marketing issues seriously. "We didn't have relationships with foreign importers," he lamented, adding that the local demand for cochineal was much smaller than the government had anticipated.

As misguided as the market forecasts may have been, faulty commercialization represented but one of a host of shortfalls characterizing the state's rescue programs. Just as damaging, for example, was the lack of project continuity. Reflecting the stopgap nature of many farm-support efforts in Mexico, the cochineal ventures in Oaxaca — including several left unmentioned — ended abruptly whenever their

elected or appointed champions left office.

"Rural assistance has always been a personalized affair in Mexico," commented Ignacio del Rio. According to the chemical engineer, with each new administration, public officials typically impose their tastes according to the latest developmental fads: cochineal, mescal, palm fronds, coffee, etc. "The one thing that has never been fashionable," added Del Rio sarcastically, "is for a politician to continue his predecessor's projects."

Predictably, the champion of the ARIPO program disagreed. As Audiffred saw it, the reason the government failed to rescue cochineal was crystal-clear: the teachings of Don Lauro were poorly applied. Above all else, he blamed that on the cultural insensitivity of state-employed agronomists. Audiffred believes that after he left office in 1986, the project managers imposed inappropriate techniques on indigenous cochineal producers. In so doing, they failed to consider the traditional, Indian way of thinking.

"In general," stated Audiffred, "agronomists think they have all the answers. Unfortunately, that arrogance undermines the syncretism needed for Oaxacan farmers to accept projects as their own."

Of course, the agronomists themselves cite other problems, like land-tenure conflicts. ITAO professor Tito Saldibañez, who wrote his Ph.D. thesis on cochineal, argued that age-old property disputes inhibited cochineal's recovery. Whether based on personal, political or religious differences, these types of internal divisions in rural communities undermine farm-support efforts across Mexico.

As reflected in the case of cochineal, one of the communities that participated in the ITAO project allegedly had four different religions represented, three of them evangelical. At one point, two adversarial denominations burned each others' nopal patches. "In that case," said Saldibañez, "religious fanaticism killed the cochineal."

In retrospect, whatever the causes for failure — bad marketing, project discontinuity, cultural insensitivity, land-tenure disputes — the government rescue missions clearly flopped. The fact remains that more than 20 years after Don Lauro agreed to help resurrect the cochineal industry, Mexico continues to generate only 300 kilos or so of dried cactus blood per year.

Meanwhile, other Latin American countries — especially Peru — are producing hundreds of tons of cochineal annually. The differences are clear. Over the past two decades, while Oaxaca focused on resurrecting a centu-



Filogenio Ramirez displays a nopal cactus planted in Amatengo as part of a controversial state-sponsored cochineal project.

ries-old production system, the South Americans were modernizing cochineal production with late-20th-century technology. Instead of relying on government subsidies and catering exclusively to the peasant economy, the Peruvians and other modernists turned to private investment, commercial nopal farms and economies of scale. These, it would seem, have given rise to the modern kingdoms of cochineal.

Will Mexico ever catch up? Some think so, but only if it follows the example set by Peru and Chile. Granted, saving Don Lauro's secrets was important, a necessary first step. But simply rescuing pre-Columbian traditions was not enough. The Oaxacan countryside is far from modern, but does that mean it should be treated like a museum? To date, the purveyors of past cochineal projects appear to have done just that. With all eyes fixed on the past, their critics argue, the industry has no future.

"It's a clash between romanticism and innovation," said agro-industrialist Victor Chagoya, "the oldest story in Oaxaca."

MODERN KINGDOMS OF COCHINEAL: PERU, CHILE... MEXICO?

During the early 1980s, in Mexico City, Ignacio del Rio helped found a company called *Espectrum S.A.* to import synthetic dyes for sale in Mexico. He and four partners targeted the food and beverage, pharmaceutical and cosmetics industries. When international health authorities linked artificial colorants to cancer, however, *Espectrum* reacted to growing demand for natural colorants. Sales increased, especially those of an organic pigment called Carmine. Unfamiliar with the product, Del Rio soon learned that it was extracted from the dried, crushed bodies of the cochineal bug. Reviewing the company records, he traced their shipments to an unlikely place in the chemical business: Peru.

"It seemed ridiculous," recalled Del Rio. "Why would we have been importing from South America if the dye was native to Mexico?"

In hopes of reducing costs, Del Rio and his colleagues flew to Oaxaca whence, according to their sources, cactus blood originated. They scoured the village markets. "We spent a week searching in vain amid the handwoven baskets, mangos and *chapulines* (edible grasshoppers)," said the chemical engineer. "Boy, was that a wild-geese chase!"

At about the same time, Leopoldo Cabilleses, a Oaxacan entrepreneur who grew up in Peru, traveled to that country with an interest in establishing links with the



Professor Tito Saldibañez shows off a nopal cactus outside his office at ITAO.

Andean cochineal industry. Through family contacts, the engineer had learned of two Yugoslav immigrants who helped turn Peru's traditional cochineal trade into a modern export industry. In the early 1970s, the eastern Europeans patented technology to extract carminic acid from cochineal. Attracting private investors, they employed advanced agro-industrial technology and began marketing the product as the only edible, noncarcinogenic red dye in the world.

Aware of these developments, Cabilleses met with the executives of *Química Universal S.A.* in downtown Lima. Gathered around a conference table, the Peruvians got straight to the point: How much cochineal did Mexico have to offer? Armed with the latest figures, Cabilleses answered confidently: 500 kilos per year. Surprised, Señor Abramovich — one of the Yugoslavs — said, "You mean 5,000 kilos, right?" No, replied Cabilleses, and proceeded to explain how Oaxaca had successfully resuscitated its historic industry. Distracted by the chuckles, however, he asked what was so funny. Abramovich apologized, explaining that Peru was processing 15 tons



Ignacio del Rio during an interview in his Mexico City office. The insignia of Tlapanochestli, his nopal ranch, hangs in the background.

of cochineal per month, or 360 times that of the Mexican output.

That was ten years ago. Since then, the international market for cochineal has exploded, causing demand to outstrip supply. The Peruvians are not laughing. According to a December 1995 market study, industrial buyers need approximately 600 tons of cochineal per year, yet producers can only offer 500.³ Reflecting that shortage, prices have skyrocketed from nine to 85 dollars per kilo since 1990. Logically, industries are looking for a cheaper alternative, which may come sooner rather than later as chemical companies across the world pour research dollars into the search.

"The cochineal insect is like the silk worm," warned ITAO Professor Saldibañez. That is, cactus bugs can adapt themselves to laboratory conditions and artificial

nourishment. Said the academic: "I heard the Japanese are already experimenting with advanced greenhouse technology to cultivate cactus blood in Asia."

At the same time, the Israelis have reportedly developed a natural, fungus-based red pigment called lycopene, trade-named *Tomato-Red*. American companies have also been experimenting with radish-based colorants to replace, among other things, synthetic pigments like red dye No.3, which imparts to maraschino cherries that nuclear shade of red and may also cause thyroid tumors.⁴

Startled by such developments, the Peruvians are looking to Mexico and other potential cochineal producers to help boost supply and thus stabilize the market. Last February, in fact, representatives from Colca S.A., which currently exports 46 percent of Peru's cochineal, paid a visit to Oaxaca. Given the record of Mexico's publicly-funded cochineal projects, they sought out private businessmen involved in the industry. They found only one.

"I feel like Michael Jackson," said Ignacio del Rio, former *Spectrum* executive and current owner of *Tlapanochestli*, the only up-to-date cochineal farm in Mexico. "Everyone calls me: Danes, French, Americans, Japanese, Peruvians. They all want to buy cochineal but I tell them to wait, we need more time."

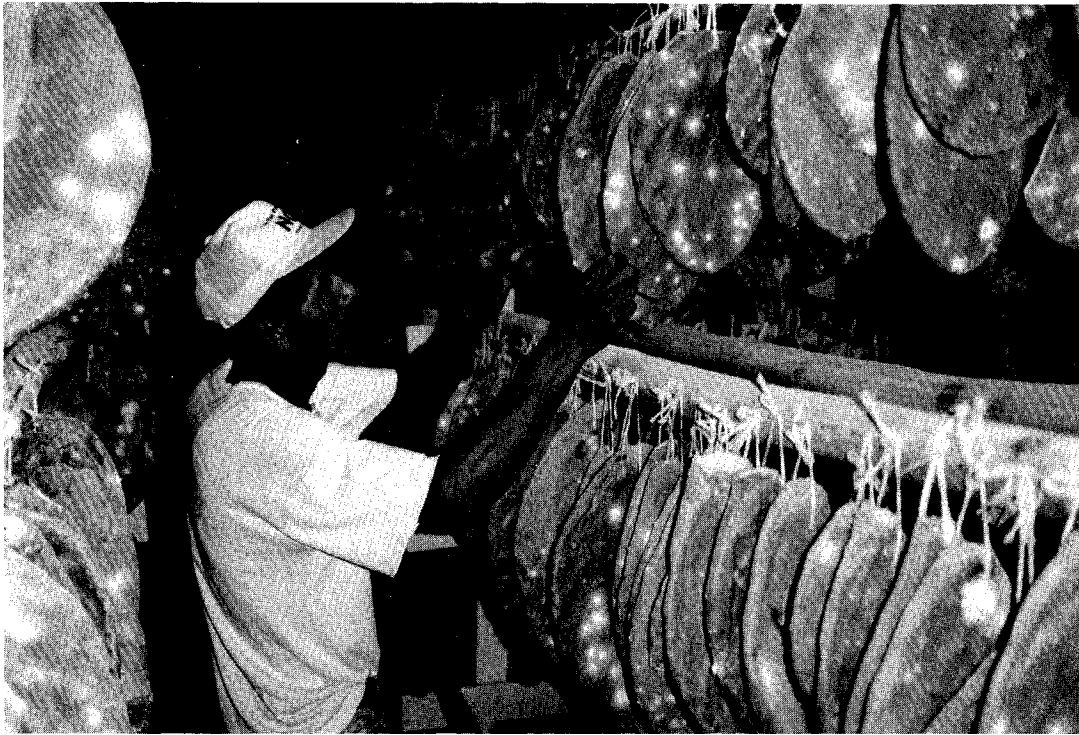
Not that Del Rio has lacked for time. Indeed, his involvement in cochineal production began over 10 years ago, starting with *Spectrum*'s wild-goose chase in Oaxaca. Realizing that cactus blood had all but vanished in the state, his company tried to produce its own. In 1985, it bought 20 acres of farm land just outside Oaxaca City. Hiring local consultants and growers, the executives planned to oversee operations from Mexico City. That distance led to problems. Lacking close supervision, local employees neglected their work and the venture stalled. As the partners lost patience, Del Rio returned south to re-evaluate the investment. He got sidetracked: the more time he spent on the farm, the more attached he became to it — so attached, in fact, that he decided to buy it from *Spectrum* in 1989.

"What can I say?" stated Del Rio. "I fell in love with the bugs."

Fascinated by their former glory, he moved from history books to the research conducted by ITAO, ARIPO and LANFI during the 1980s. With his background in

3. Today, Peru produces 84 percent of the world's cochineal, followed by Chile, the Canary Islands and Bolivia with eight, six and two percent, respectively. Figures come from a market study conducted by Colca, S.A. in December, 1995.

4. "FDA Attempting to Speed Color Additive Orders," Food Chemical News, 11/15/93.



Del Rio's farm hand examines cochineal bugs feeding on nopal leaves hung indoors during the rainy season.

business, however, Del Rio became disillusioned with what he considered to be the government's myopic vision of the industry's future. By the early nineties, it was clear that the state's approach — family labor, household plots, farm subsidies — had failed to reinvigorate peasant production. While appreciating the importance of the *campesino* element, Del Rio believed that social objectives must be underscored by agro-industrial strategies.

This realization reflected his intimate familiarity with the international dye trade. As a founder of *Espectrum*, he knew that Mexico would never penetrate the global market without producing in volume first. Yet that reality, contrary to popular opinion, does not necessarily imply a zero-sum game that renders businessmen winners and small-scale farmers losers. For if Mexico begins producing cochineal by the ton and not the kilo, then the *campesinos* will benefit by combining their production with that of the agro-industrialists. Consequently, indigenous farmers, despite their relatively small output, would enjoy what they had previously been denied: access to foreign markets and international prices.

"In this way," said Del Rio, "both productive arms — *campesinos* and companies — will help rebuild Mexico's cochineal empire."

What is the secret to this strategy? Produce far more cochineal in far less space. To reach that goal, Del Rio has spent several years conducting experiments at his own nopal ranch. He also travels abroad to study state-of-the-art production systems. Just two weeks ago, in

fact, he visited the country with the most sophisticated cochineal farm in the world: Chile.

"It's truly remarkable," said Del Rio. "The Chileans are exporting 40 tons annually yet they began production just a few years ago."

Actually, not all of them are Chilean. In 1993, a Peruvian executive left *Colca S.A.*, moved to Chile, and founded what can only be described as a cochineal factory. With five local investors, Antonio Bustamante formed *Colores Naturales de Chile*, buying 540 acres, 95 of which have already been planted. Today, they are producing an unprecedented 370 kilos of cochineal per acre. To achieve this, the company broke with tradition by planting high-density nopal — that is, 35,000 cacti per acre instead of the standard 7,500. Other innovations include spray irrigation, vacuums to suck the bugs off the cacti, and a 25,000-U.S. dollar processing plant to extract carminic acid from raw cochineal.

Yet this model is expensive. *Colores Naturales de Chile* has invested approximately 10,000 dollars per acre. Hence Del Rio is looking for wealthy investors in Mexico. Speaking at conferences and advertising over the radio, he attracts attention to cochineal in general as well as the training courses offered at his nopal farm in Oaxaca. In recent months, several well-heeled farmers from northern Mexico have visited *Tlapanochestli*, expressing interest in forming an alliance with Del Rio.

"Step one is to produce 100 kilos in a three-month cycle on one hectare [2.7 acres] of land," he explained. "To do that, we need to invest between 100,000 to 200,000



Manuel Loera stands in his father-in-law's experimental cacti patch just outside Oaxaca City.

pesos (13,300 to 26,600 dollars) in bugs and high-density nopal."

Del Rio's son-in-law, Manuel Loera, who is in charge of investor relations as well as the training courses at *Tlapanochestli*, expanded upon their strategy. In a two-pronged approach, they are targeting moneyed investors as well as *campesinos* for joint-production schemes. To minimize the growers' risks, Loera offers guaranteed prices of 40 dollars per kilo of cochineal produced. This is possible, he said, thanks to Del Rio's relationships with most of the world's major industrial consumers. "They're desperate to buy whatever we can produce," he affirmed.

This summer Loera visited half a dozen potential investors throughout Mexico, some of whom own upwards of 500 acres of land. At the same time, he helped launch four cochineal projects — two of which involve small-scale producers — in the State of Mexico, Queretaro, Zacatecas and Puebla. Fall training courses have been scheduled with other rural communities in Morelos and Puebla. In November, in fact, Loera will train a group of agronomists from the Republic of Colombia.

"The response has been great," he concluded. "Everyone seems excited about producing with us — everyone, that is, except the Oaxacans."

THE EMPTY CRADLE OF COCHINEAL

Why is Oaxaca absent from this picture of modernization? Why have neither *campesinos* nor local investors

expressed interest in rescuing cochineal production? Some blame the collective memory of the failed government projects described earlier. Yet things have changed since then. International prices and market access are incomparably better now than in the 1980s. Profit margins are much wider and the South Americans have shown the way. Why hasn't someone followed their lead?

"Because they can't," replied Loera. "People here are not able to seize opportunities because they're paralyzed by poverty."

Consider the typical Oaxacan farmer. According to Loera, most *campesinos* cannot even pay the bus fare to *Tlapanochestli*, let alone cover the cost of training courses. When representatives of one village did reach the nopal ranch, they offered a truckload of firecrackers, that their town manufactured, in exchange for instruction and cochineal insects. "I appreciated the gesture," said Loera, "but we need money, not fireworks."

Having said that, he complained that after years of state paternalism in the Oaxacan countryside, farmers have come to believe that they deserve things for free. "They think we owe them," Loera said, shaking his head in disbelief. "For them, we're rich and therefore we have a moral obligation to help the poor. I explain that we're not the government, that we must cover our costs. They just don't get it."

Regarding local investors, it seems they too have been handicapped by the paralysis of poverty. Sure, they

might have money, but they are extremely wary of investing it in agri-business ventures due to associated risks. Among others, these include radical peasant groups and land-tenure conflicts, both of which stem from the chronic troubles of the countryside in Mexico's poor South.

Leopoldo Cabilleses offered insight into one such dilemma. Alluding to Peru, he argued that with all its problems, that country has something Oaxaca sorely lacks: respect for private property. To illustrate his point, he explained how much of Peru's cochineal comes from the region of Ayacucho, in the highlands that gave rise to the Shining Path movement. Despite guerrilla conflict, however, the cochineal industry survived and even thrived due to Peru's constitutional guarantees, which protect business investment and private property.

"In stark contrast," Cabilleses said, "few intelligent people would dare to invest in capital-intensive production here in Oaxaca. For they know what happens when some peasants'-rights group decides to block the entrance to their property just before harvest time. They know how powerless they will be, how much money they will lose."

Local investors also fear land-tenure conflicts. Painfully aware of their consequences, Ignacio del Rio cited a personal case in point. In 1993, he received a wonderful piece of news: Prince Charles was coming to *Tlapanochestli*! His Highness was visiting Mexico to support environmental projects. In preparation for the trip, the British consulate in Mexico City had identified Del Rio's cochineal ranch as worthy of a royal visit.

Not everyone was happy. Unbeknownst to Del Rio, the good news rekindled a border dispute between his neighbors, two feuding municipalities. In retrospect, the mayors of both Santa Maria and San Bartolomo de Coyotepec should probably have been invited to accompany Prince Charles on his tour; the cochineal farm lies

smack on their common border. Yet they were not. In retaliation, one week before the big day, someone from San Bartolomo set fire to half of Del Rio's nopal crop.

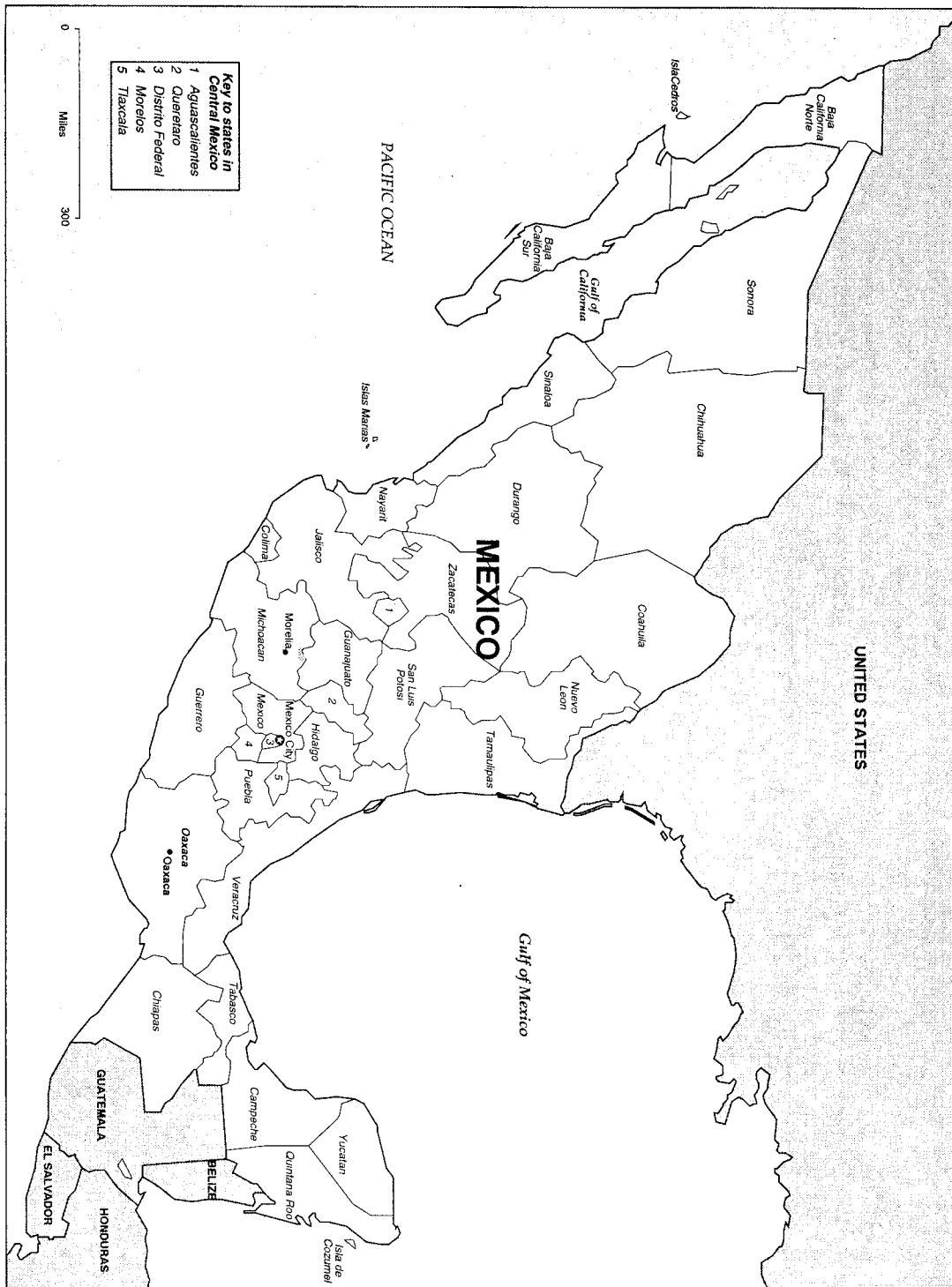
"To be completely honest with you," said the engineer, visibly upset by the recollection, "I have lost my faith in Oaxaca." That said, he remains fully committed to modernizing his industry elsewhere in Mexico. While he continues to develop *Tlapanochestli*, it is mostly due to sentimental and financial considerations. "After all, Oaxaca is where it all began," he concluded, adding that "if the ranch doesn't work out, I can always sell to a housing developer."

Would that every Oaxacan farmer could do the same. With far fewer options, people like Filogelio Ramirez are still betting on their state, feuds and all. Sitting in the town square of Amatengo, the *campesino* was lecturing me on the history of Don Lauro Ramirez, his former neighbor. Reminding me of the debt Mexico owes to his home town, he expressed his conviction that local cochineal production, and indeed Oaxaca's rural economy, will soon recover.

"Otherwise," he added half-jokingly, "we'll all be growing dope or joining the guerrillas before long."

We laughed together on the plaza bench, beside the cedar tree and the tumbledown Church. Darkening the sky above, an afternoon storm cast shadows across the square, rolling over the cliffs beyond the south end of town. Suddenly, as the thunder rumbled, I recalled that legend from the Mixteca, Land of the Cloud Men.

Surprisingly, Ramirez had never heard it before. As a *gringo*, I felt strange telling a full-blooded Zapotec how the gods of his ancestors had fought in the Oaxacan highlands over the possession of an enormous nopal crop. I explained how the legacy of that bloody battle was cochineal, but Ramirez disagreed. "No it's not," he said. "The legacy of that battle," he concluded, pointing toward the southern bluffs, "is the rebel army hiding somewhere in that sierra." □



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Fellows and their Activities

Adam Smith Albion. A former research associate at the Institute for EastWest Studies at Prague in the Czech Republic, Adam is spending two years studying and writing about Turkey and Central Asia, and their importance as actors the Middle East and the former Soviet bloc. A Harvard graduate (1988; History), Adam has completed the first year of a two-year M. Litt. degree in Russian/East European history and languages at Oxford University. [EUROPE/RUSSIA]

Christopher P. Ball. An economist, Chris Ball holds a B.A. from the University of Alabama in Huntsville and attended the 1992 International Summer School at the London School of Economics. He studied Hungarian for two years in Budapest while serving as Project Director for the Hungarian Atlantic Council. As an Institute Fellow, he is studying and writing about Hungarian minorities in the former Soviet-bloc nations of East and Central Europe. [EUROPE/RUSSIA]

William F. Foote. Formerly a financial analyst with Lehman Brothers' Emerging Markets Group, Willy Foote is examining the economic substructure of Mexico and the impact of free-market reforms on Mexico's people, society and politics. Willy holds a Bachelor's degree from Yale University (history), a Master's from the London School of Economics (Development Economics; Latin America) and studied Basque history in San Sebastian, Spain. He carried out intensive Spanish-language studies in Guatemala in 1990 and then worked as a copy editor and Reporter for the *Buenos Aires Herald* from 1990 to 1992. [THE AMERICAS]

Sharon Griffin. A feature writer and contributing columnist on African affairs at the *San Diego Union-Tribune*, Sharon is spending two years in southern Africa studying Zulu and the KwaZulu kingdom and writing about the role of nongovernmental organizations as fulfillment centers for national needs in developing countries where governments are still feeling their way toward effective administration. [sub-SAHARA]

John Harris. A would-be lawyer with an undergraduate degree in History from the University of Chicago, John reverted to international studies after a year of internship in the product-liability department of a Chicago law firm and took two

years of postgraduate Russian at the University of Washington in Seattle. Based in Moscow during his fellowship, John is studying and writing about Russia's nascent political parties as they begin the difficult transition from identities based on the personalities of their leaders to positions based on national and international issues. [EUROPE/RUSSIA]

Pramila Jayapal. Born in India, Pramila left when she was four and went through primary and secondary education in Indonesia. She graduated from Georgetown University in 1986 and won an M.B.A. from the Kellogg School of Management in Evanston, Illinois in 1990. She has worked as a corporate analyst for PaineWebber, an accounts manager for the world's leading producer of cardiac defibrillators and manager of a \$7 million developing-country revolving-loan fund for the Program for Appropriate Technology in Health (PATH) in Seattle. Pramila is tracing her roots in India, and studying social issues involving religion, the status of women, population and AIDS. [SOUTH ASIA]

John B. Robinson. A 1991 Harvard graduate with a certificate of proficiency from the Institute of Kiswahili in Zanzibar, John spent two years as an English teacher in Tanzania. He received a Master's degree in Creative Writing from Brown University in 1995. He and his wife Delphine, a French oceanographer, are spending two years in Madagascar with their two young sons, Nicolas and Rowland, where he will be writing about varied aspects of the island-nation's struggle to survive industrial and natural-resource exploitation and the effects of a rapidly swelling population. [sub-SAHARA]

Teresa C. Yates. A former member of the American Civil Liberties Union's national task force on the workplace, Teresa is spending two years in South Africa observing and reporting on the efforts of the Mandela government to reform the national land-tenure system. A Vassar graduate with a *juris doctor* from the University of Cincinnati College of Law, Teresa had an internship at the Centre for Applied Legal Studies in Johannesburg in 1991 and 1992, studying the feasibility of including social and economic rights in the new South African constitution. [sub-SAHARA]

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