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Solving the Sewage Crisis: Oaxaca City

Between High-tech Machines and Compost Latrines

OAXACA, Oaxaca **July 2, 1996**

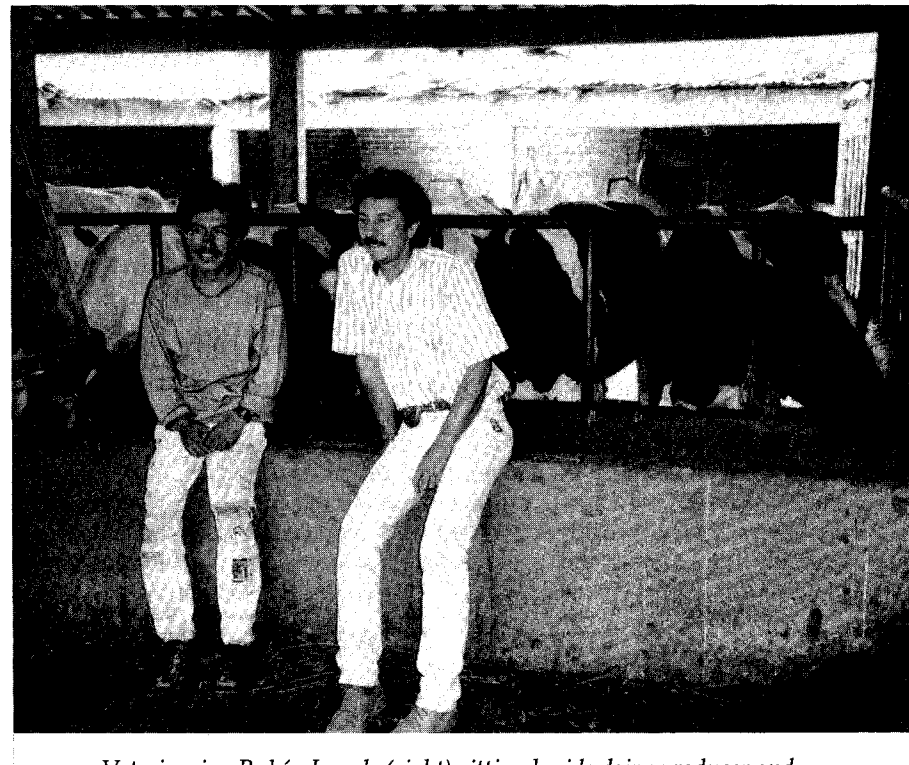
By William F. Foote

How do they make *quesillo*, that stringy cheese found in *quesadillas*? Good question. It's the best-kept secret in Etla Valley, a dairy region located just north of Oaxaca City. Not that the competition lacks the recipe for Mexico's favorite cheese, also known as *queso Oaxaca*. Indeed, 90 percent of the *quesillo* consumed here comes from the neighboring state of Puebla. No, Etla's cheese vendors are worried about local consumers, not distant competitors; and it's not their recipe, *per se*, that's secret; just one ingredient.

Until recently, the dairy producers themselves didn't even know what it was. In 1993, during an unsuccessful application for a national rule of origin (which would have made *quesillo* production exclusive to the state of Oaxaca), they found out:

"Human fecal matter," explained Rubén Langle, a local veterinarian. "The laboratory results showed significant traces of it in the cheese."

Tethered to the stables behind Langle, a half-dozen patients mooed unhappily, their udders infected from diseases spawned by summer rains and no drainage. According to the animal doctor, who treats sick beasts across the valley, the cheese makers have kept a lid on the lab results since 1993. So the secret lives on. "Dairy farmers still irrigate with contaminated water, cows still feed on fecal-laden alfalfa, and



Veterinarian Rubén Langle (right) sitting beside dairy producer and sick milk cows in Etla Valley, Oaxaca

locally-produced *quesillo* still causes diarrhea throughout Oaxaca City," said the vet.

Having suffered from stomach troubles recently, I have few qualms about squealing on the Etla farmers. To be fair, however, their problem reflects larger issues beyond local control — namely, the onset of a generalized sewage crisis in and around most of Mexico's cities.

Many blame modernization. As in most developing countries, the demand for economic development has overridden the need for natural-resources management. In the case of water, persistent population growth, chaotic urbanization and industrialization without pollution controls have choked Mexico's rivers with untreated human waste and chemical contaminants. Around here, swollen udders and belly aches are merely daily inconveniences, mild annoyances compared to the more serious consequences of a rising tide of raw sewage.

In 1994, the government officially recognized the presence of cholera — a water-borne disease — in the state of Oaxaca, following several years of denial. Last year saw at least 300 cases across the state.[1] Hardly surprising: Oaxaca City dumps a daily average of nearly 60,000 cubic meters of raw sewage into the Rio Atoyac, the state's biggest river and principal irrigation source.[2] Yet not everything flushes downstream. In recent years, toxic seepage through urban riverbanks into underground aquifers has contaminated many of the city's wells, whence more than 80 percent of the state capital's drinking water comes.

Here and elsewhere, water-related worries are keeping public officials and environmentalists awake at night. Across Mexico, a debate is raging over the best way to offset a nationwide paucity of sewage treatment programs. It began in 1993, when Congress passed tough yet toothless clean-water legislation. Today, in the aftermath of the December 1994 peso devaluation, the question remains: how can cities clean up in times of cholera and crisis?

In Oaxaca City, the opinions diverge in two general directions. On one hand, urban water authorities advocate the use of sophisticated, high-cost technology (*i.e.*, giant, centralized sewage-treatment plants). On the other, a growing number of civic groups, private businesses and some government agencies argue for simpler solutions and alternative technologies. These range from tinkering with conventional methods (*e.g.*, smaller, multiple sewage-treatment plants) to rejecting traditional "First World" treatment and instead addressing the waste-water problem at its source (*e.g.*, waterless, compost latrines).

This newsletter explores the options currently under consideration in Oaxaca. Admittedly, sewage-related problems and their solutions are long-term; during the past month I have merely splashed the surface. In doing so, however, it has become clear that, in at least one respect, Oaxaca's water experts stand on common ground: they agree that urbanization has produced a big mess. Yet, their fundamental disagreement as to the right clean-up alternatives is crippling prospects for change.

Also, given the taboo issue of city sewage, misinformation abounds. In order to move forward, local water authorities should take the toilet talks public. Put another way, the average José should participate in the process of selecting the right ingredients for sewage treatment. It *is* José's waste, after all. And, as discussed later, the advantages of a well-informed and active citizenry are already evident in successful initiatives like Oaxaca's dry-latrines program.

In the final analysis, whether big or small, high-tech or low-tech, the success of any atonement for Mexico's past indifference to sewage problems will hinge on securing community participation and, of course, sufficient funding. For now, given the country's ongoing recession, emphasis should probably fall on the former. In the meantime, for the sake of sick cows, *quesillo* consumers and cholera victims, no more sewer secrets.

TRADITIONAL TREATMENT: MEXICO EMULATES THE UNITED STATES

And why shouldn't Mexico copy its northern neighbor? After all, as late as 1940 more than two-thirds of Americans living in communities with sewers discharged raw sewage into waterways with little more than fine screening.[3] A half-century later, carefully-drawn government water regulation and citizen action have rescued rivers and streams, turning hopeless causes into resounding success stories.

Consider the Hudson River. Just thirty years ago, it was little more than a 350-mile sewer choked with untreated domestic waste, industrial pollutants and agricultural runoff. Today the river pulses with life, as stated recently by the *New York Times*:

"Fish populations are healthier than they have been in years, while cities and towns that once turned their backs on the river are realizing that they can build a new economy around tourism and recreation."[4]

What made it so? According to sewage literature, river rebirth in the U.S. can be attributed to several key factors: first, a post-World War II boom in both sewer building and sewage-treatment plant construction; sec-

1. *El Sur*, Feb. 27, 1996.
2. *El Sur*, March 2, 1996.
3. Joel A. Tarr, "The Why and Wherefrom of Sewers," in Carol Hupping Stoner (ed.), *Goodbye to the Flush Toilet*, (1987), p.18.
4. *The New York Times*, June 16, 1996.

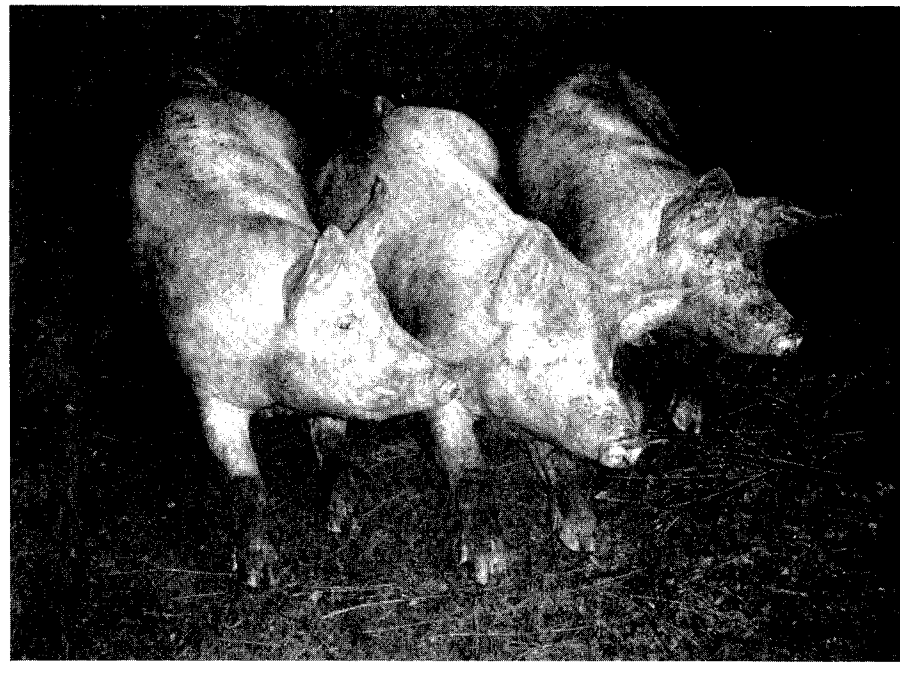
ond, the Federal Clean Water Act of 1972, which mandated tough controls on municipal and industrial waste *and* provided billions of dollars in Federal aid; and finally, credit-worthy municipalities, which are fully capable of financing the operation and maintenance of sophisticated waste-water technology.[5] As a result, about 350,000 sewage treatment plants span the U.S. today.

Impressive, but what about Mexico? Following World War II, it was too busy industrializing to worry about sewage. Unlike the U.S., in the 1960s and '70s it did not experience the birth of a powerful environmental movement dedicated to saving rivers and lobbying for related statutes. Due to Mexico's fierce fiscal centralism, moreover, its financially-weak municipalities cannot assume the high cost of building and/or operating high-tech treatment plants. Not surprisingly, by 1990 Mexico had constructed only 350 sewage-cleaning facilities, less than one percent of those existing in the U.S.[6]

It's never too late, however. Thus reasoned the administration of former President Carlos Salinas de Gortari (1989-1994), which introduced sweeping environmental regulations to help pave the way for the passage of NAFTA. In 1993, Mexico's Congress passed the new Federal Water Law, which subjects municipal governments to fines if they do not clean their raw sewage. In line with Salinas's free-market reforms, the water sector was partially opened to private investment.

Within months, foreign companies were fiercely competing to gain a hold in Mexico's water industry. By the summer of 1994, powerful European concerns — Thames, Severn Trent, North West Water, Biwater, Anglian Water of the UK; Lyonnaise des Eaux and Générale des Eaux of France — had won contracts worth over U.S.$1 billion to erect water treatment plants or to modernize municipal water systems.[7] Numerous Mexican cities — Cancún, Guadalajara, Leon, Puebla, Matamoros, Monterrey, Toluca — hired private companies to build and operate sewage-treatment plants, helping to boost the total number of facilities in Mexico today to approximately 3,000.[8]

Where was Oaxaca? In 1994, the city hired a large Spanish construction company, *Fomento de Construciones y Contratas* (FCC), to conduct a feasibility study for the modernization of its ancient water system. Together with its Mexican partner, Tribasa, FCC proposed, among other things, the construction of an enormous, centralized sewage-treatment plant.[9] At today's prices, the facility would cost about P$150 million (U.S.$20 million) to build. Approximately half that amount would finance the sinking of giant sewage



Three Oaxacans who opposed Mexico's Clean Water Act of 1993

5. Joel A. Tarr, "The Why and Wherefrom of Sewers," in Carol Hupping Stoner (ed.), *Goodbye to the Flush Toilet*, (1987), p.18

6. Figures on U.S. and Mexican sewage treatment plants provided by local water industry executive, Leopoldo Cabilleses, during an interview in Oaxaca City.

7. *The Financial Times*, June 1, 1994.

8. Interestingly enough, virtually no U.S. companies participated in this spate of water-services privatizations in Mexico. According to industry experts, this is due to the fact that 90 percent of water and waste-water treatment in the U.S is managed by municipalities or other governmental agencies with little or no incentive to export their expertise. In the United Kingdom, by contrast, water and waste-water treatment is entirely private, and in France it's 80 percent private. *International Business Magazine* 1996.

9. The proposed plant would have the capacity to treat 1,000 liters of waste water per second.

pipes alongside the city's twin rivers, thus re-routing waste water to the central plant. Despite the cost, local water authorities were allegedly excited, studying the proposal into late 1994. Then Mexico devalued the peso and everything changed.

"Privatization would be extremely difficult today," said Rubén Darío Herrera, director of Oaxaca's *Instituto Estatal del Agua* — State Water Institute (IEA). Just back from a business trip, the engineer greeted me one recent evening inside his plush office. It was pouring rain outside and I was soaked. "You wouldn't think we have water shortages here, would you?" he said, chuckling as I hung my coat.

Oaxaca's maximum water authority, Darío Herrera travels often. In the past year, in fact, he has visited most of the sewage plants built by private companies before the onset of Mexico's recession. That, he stated, was "a depressing experience."

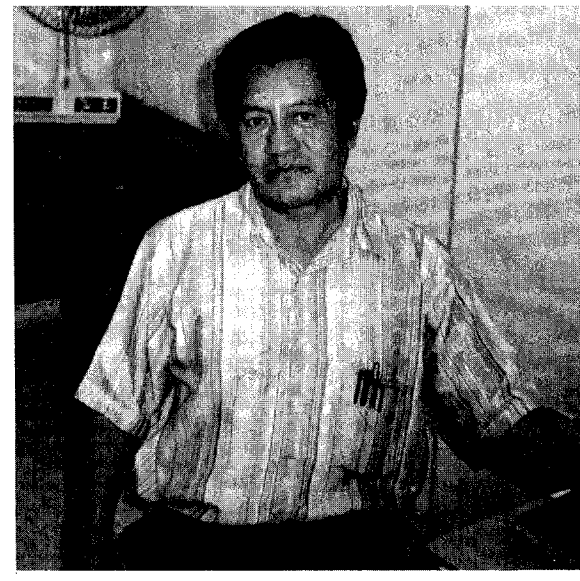
To illustrate current problems, he pointed to the city of Puebla, which, before the devaluation, agreed to pay its private concessionaire 40 pesos per cubic meter of water treated. Today, due to the costs of imported technology, which were usually indexed to foreign currencies, that price has jumped by nearly 100 percent to around 70 to 80 pesos per cubic meter. "Across Mexico, municipalities simply can't afford to pay concessionaires anymore," said Darío Herrera, adding that "virtually every plant I've seen is out of operation."

Despite such high-priced troubles, the IEA director went on to defend the single, king-size plant for Oaxaca City. Notwithstanding the crisis, his colleagues continue to study the FCC proposal for future implementation. At the same time, they are contemplating alternatives.

"Together with the University of New Mexico," said Darío Herrera, "we're experimenting with so-called constructed wetlands [reed beds]. Unfortunately, this natural sewage treatment is designed for small rural communities with ample land. As far as I know, none of the low-technology waste-water systems can handle the levels of contamination generated by a big city. Hence the need for a large conventional plant. It's really our only choice."

That, it would seem, is debatable. According to a former official of the *Comisión Nacional de Agua* — National Water Commission (CNA), a single sewage plant would be a mistake. "Frankly," said Octavio Galindo Hernandez Cruz, who now works in the irrigation sector, "I don't think Darío Herrera has any idea what he's talking about. He's a political appointee. Before this post, he had no experience whatsoever in the water sector."

Galindo Hernandez, who spent 18 years as a CNA water engineer, is currently advising the Costa Rican government on sewage policy. His waste-water treatment formula for that country's capital is the same as for Oaxaca City — namely, small conventional sewage



Sewage expert Octavio Galindo Hernandez Cruz.

plants scattered across town. "We have six sewage-discharge mains located along the river banks," he said. "Each should have its own facility."

His logic makes s[illegible]. On one hand, multiple facilities would minimize the all-or-nothing risks of a single mega-plant. After all, even well-designed and well-operated machines are not infallible. Large, highly centralized operations are subject to power failures, equipment breakdowns, employee strikes, any one of which can result in the discharge of untreated sewage.

On the other hand, Galindo Hernandez reckons that with more bite-size investments for smaller plants, the city would be freed from having to wait indefinitely for 20 million dollars of windfall financing which may never come. "Small plants are clearly the answer," he concluded, "yet the water pooh-bahs just don't want to listen."

Why? Because saving money and solving problems aren't necessarily priorities in Mexico's water sector, Galindo Hernandez suggested. "The pricier the project," he added, rubbing his fingers against an imaginary dollar, "the richer the bureaucrat."

Local businessmen think small is beautiful too. Last Saturday I had a private lesson on the advantages of mini-treatment plants from two entrepreneurs who build them for a living. One of the partners, Oscar Cácares de Ramirez, owns a yellow colonial house across from the Santo Domingo Church in Oaxaca's historic center. Its open-air courtyard bursts with color: pink-blossomed hibiscus trees, red-tiled roofs, green limestone arches; a perfect place to talk sewage.

"You'd think we were in Maoist China," quipped Leopoldo Cabilleses, Cácares's 66-year-old partner. "Ripping everything down to fix it, building mammoth collector mains for some behemoth treatment plant, it's

Sewage treatment plant builders and business partners, Leopoldo Cabilleses (left) and Oscar Cácares de Ramirez (right)

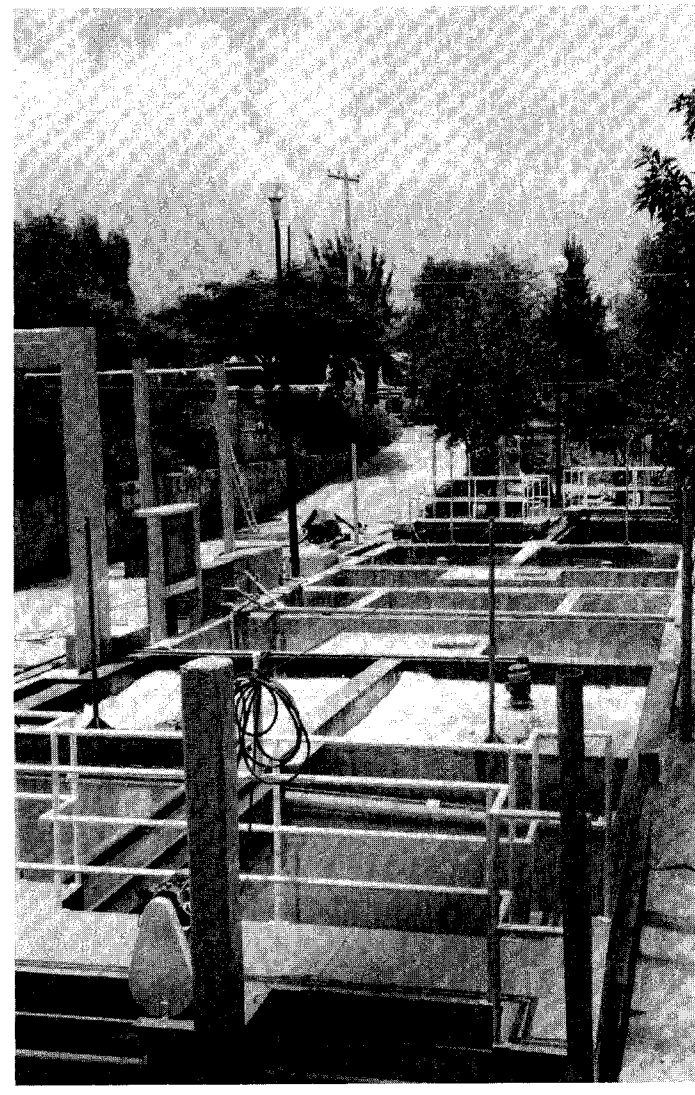
crazy... What we *should* be thinking is how to use the infrastructure already built. Clearly, little plants over the main sewage valves would achieve that objective."

Cácares demurred. Drawing on 30 years of experience as a chemical engineer, he argued pessimistically that Mexican cities will always mishandle fancy waste technology, big or small. The country, he believes, simply lacks the resources — human and financial — to operate and maintain sophisticated sewage plants. To illustrate the point, he described the wheezing units his company has been hired to resuscitate. "We find nails used to fix pumps, wire coat hangers to secure latches, everything imaginable," he said, adding that "it doesn't take long for poorly-trained operators to jerry-rig the entire place."

Some plants are handicapped from birth. In an effort to cut costs, public officials tend to whittle budgets down to the point that project designs become useless, according to Cácares. That's what happened at Flores Magón, a public housing project located on the east side of Oaxaca City. In 1990, the CNA built a diminutive sewage plant on the edge of the low-income neighborhood. Cácares attended the inauguration.

"It was pathetic," he recalled. "The plant captured only a small portion of the sewage leaving the housing project. Once treated, it was dumped right back downstream with the untreated waste water. Needless to say, when the mayor cut the ribbon, I didn't clap."

On a visit to Flores Magón, I verified that the plant, for better or for worse, *is* operational. That's more than can be said for the two other



Crippled from birth: The troubled sewage treatment plant at Flores Magón, Oaxaca City

rinky-dink plants in Oaxaca City, or for most of the 27 waste-water facilities scattered around the state.

Preliminary conclusion: machines aren't saving Mexico from its sewage problem. The foreign water companies, spooked by crisis, have gone home. The imported technology they left behind, in most cases, doesn't work. Meanwhile, as the waste waters rise, the return of cholera has made a medieval mockery of Mexico's modernization process.

In desperation, some call for extreme measures. One irrigation official suggested half jokingly that someone should organize the farmers down river, sneak them up the Rio Atoyac and plug Oaxaca City's sewage discharges with concrete. Likewise, a former director of Oaxaca's Public Works Ministry allegedly wanted to cover the city's twin rivers with cement, burying the problem once and for all.[10] In the name of all things downstream, is there no better way?

DRY LATRINES: NO MORE FLUSH AND FORGET

Do you regard human excreta as a valuable resource, or as an unpleasant and dangerous waste product?

If you subscribe to the latter concept, then any discussion of human feces probably makes you squirm. Chances are you're glad the government spends billions of tax dollars to dispose of the taboo waste. You probably have a toilet which uses about 13,000 gallons of fresh water each year to move a mere 165 gallons of body waste. But hey, that's not your concern. You flush, you forget.

If, however, you subscribe to the former concept, then you probably don't live in the Americas. Indeed, you may come from a composting country and feel comfortable discussing fecal matters. Perhaps you are Chinese, where the composting of human excreta has been practiced for thousands of years. In 1956, for example, an estimated 90 percent of all human excrement produced in that country was collected and used as fertilizer.[11]

That same year, the Vietnamese Health Ministry took it one step further, designing a waterless compost latrine. It would later be hailed as the single most important factor in the prevention of disease and the promotion of health in that country's history.[12] Built far and wide, the double-vaulted, on-the-spot composters hit the modern sewage problem at its source: through the reduction of discharges of excreta into water bodies, ground water and soil. In her book, *Health in the Third World*, Dr. Joan McMichael summarized the importance of the program:

"It strikes at the root cause of many of the most intractable diseases of the developing countries — cholera, dysentery, typhoid ... It also solves, in part at least, the problems of fertilizing the soil, since the yearly amount of sterilized organic manure that can thus be obtained is estimated at 600,000 tons."[13]

Thus the word spread. Thirty years later, half way around the world, a Mexican medical student learned of the Vietnamese experience. In 1988, Enrique Vignau attended an international conference on sanitation held in Mexico City. At the event, experts criticized Mexico's modern water carriage system (*i.e.*, drainage and sewers). How, a speaker asked, could a country with severe water shortages, where millions of people depend on public spigots, use 40 percent of its household water to flush the toilet? Condemning that cruel convenience, the panelists called the modern toilet not clean and safe, but dirty and dangerous.

From the audience, Vignau recalled the stinking

Committed to weaning Mexico off flush toilets, Enrique Vignau displays a rustic urinal inside the offices of Espacios Culturales, A.C. *in downtown Oaxaca City.*

10. Statement made during private conversation between the public official and Oscar Cácares de Ramirez in 1990.

11. Uno Winblad Wen Kilama, *Sanitation Without Water*, (WHO), 1978, p.24

12. Ibid., p.33.

13. Quoted from Ibid, p. 33.

waterways and the downstream disease he had witnessed while doing field research. Seeing the irrationality of it all, he decided right then and there to help wean Mexico off water toilets. "It was one of those defining moments, you could say," said Vignau.

The next year, he moved to Oaxaca City and founded *Espacios Culturales A.C.*, a non-governmental organization dedicated to the grass-roots application of alternative environmental technology. Since then, he has worked nearly full-time promoting a slightly-modified version of the Vietnamese dry latrine. "We chose that model over others: Hindu, Chinese, Swiss, German," Vignau explained, holding up a rustic urinal, part of the latrine building kit on display inside his office. "Our only major adjustment has been the addition of a modern toilet bowl — Mexicans don't like to squat."

The design is simple. The *sanitario seco*, as it's called in Spanish, operates on three basic principles. First, it separates urine from fecal matter. Diverted through hoses and pipes, the urine is collected, diluted with water and used for irrigation; or, it is deposited into a deep gravel pit.[14] Second, fresh fecal matter is *always* covered with a mixture of earth, ashes and lime. This accelerates decomposition while killing dangerous bacteria and eliminating odors and flies.

Third, the latrine is built entirely above ground and near the house, consisting of two vaults (made of cement, brick, clay) underneath a toilet bowl. Once the first receptacle is full, it is sealed completely for six months, shutting out all light, water and air. The toilet bowl is then positioned above the second, empty vault. Once that is full (at least six months later), the receptacle is sealed and the first chamber is then opened and emptied of fertilizer, and so on.

"If you understands these rules," said Vignau, "the latrine works perfectly: no smell, no flies, no disease and lots of safe manure."

In 1989, however, Oaxaca's public officials were unimpressed. Looking for sponsors, Vignau visited numerous government offices: the Public Works Ministry, the National Water Commission, Oaxaca's public housing department. Four years later, despite several successful pilot projects, the authorities continued to ignore his appeals. Then something happened. In a sudden turnaround, the state government built 12,000 compost latrines in 1994, followed by 15,000 in 1995! As many are budgeted for this year. What explains the change? "One person really," said Vignau. "The governor's wife."

The First Lady? "Yes," he affirmed. "She has been largely responsible for elevating our campaign from a pilot project to a state-wide program drawing on local, federal and international funding."

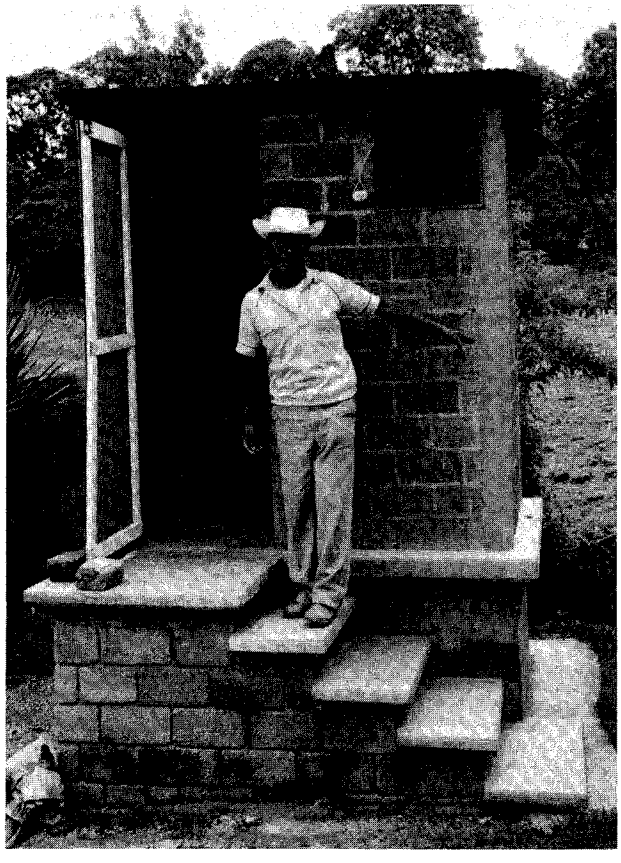
Not just any governor's wife, Clara Scherer (seen in her DIF office), fights cholera and saves lives with dry latrines.

Clara Scherer, whose husband, Diódoro Carrasco, has governed Oaxaca since 1993, had just returned from an official trip to Spain when I paid a visit in late June. Her office sits inside the state headquarters of *Desarrollo Integral de la Familia* — Family Services Agency (DIF). Lounging in the waiting room, I observed the cluttered wall photos: the governor's portrait; twirling Oaxacan dancers; dirt-poor Zapotec children studying their ABC's.

"I don't take any personal credit for the latrines," said the First Lady, leaning back in her chair, twiddling with a pencil. She was not the glamorous volunteer-type I had expected: no make-up, a white sleeveless shirt, plain silver bracelets, messy brown hair. Surrounded by hand-woven textiles on the walls, she had more the air of an anthropology professor than a politician's wife. "In 1993," she continued, "cholera had arrived, children were dying. We needed a solution and *Espacios Culturales* had it."

Actually, Scherer wasn't just being modest. The dry-latrine program forms part of an international campaign sponsored by UNICEF to reduce infant mortality. In 1990, Mexico officially signed on. Three years later, the state of Oaxaca began participating through the local DIF office. Thanks to Scherer, however, and her awareness of the plight of Mexican children, her husband's administration prioritized the latrine program.

14. For males, the dry latrine separates liquid wastes using a wall urinal attached to an outside hose. For females, the system involves a specially-molded toilet bowl featuring a division inside the basin for urine—in front—and solid waste—in back.



Jerónimo Perez standing on the steps of his dry latrine

As she avowed: "The governor is committed to providing safe means for the deposit of excreta for every Oaxacan household."

Due to limited resources, however, the campaign has targeted only those communities with between 500 to 2,500 inhabitants, or places where cholera has struck. "Wherever the latrines have been built," Scherer boasted, "cholera has disappeared. If people were skeptical of the dry latrines before, they're begging for them now."

But what about Oaxaca City? What about Vignau's successful trial runs undertaken in 1990 in the peripheral slums? With scarce drainage, dense populations and concentrated misery, shouldn't those irregular human settlements get dry latrines too? "Yes, in theory," the First Lady replied. "As I said, however, we have had to prioritize, targeting only those regions in Oaxaca with the highest levels of poverty."

That said, Scherer proceeded to offer a series of justifications for denying city residents dry latrines. Her contention that providing urban services in general is actually counterproductive caught my attention: "We're not going to reduce rural-urban migration by attending to the urban neighborhoods," she explained. "To the contrary, if we provide services in the countryside, people will stop moving to the city."

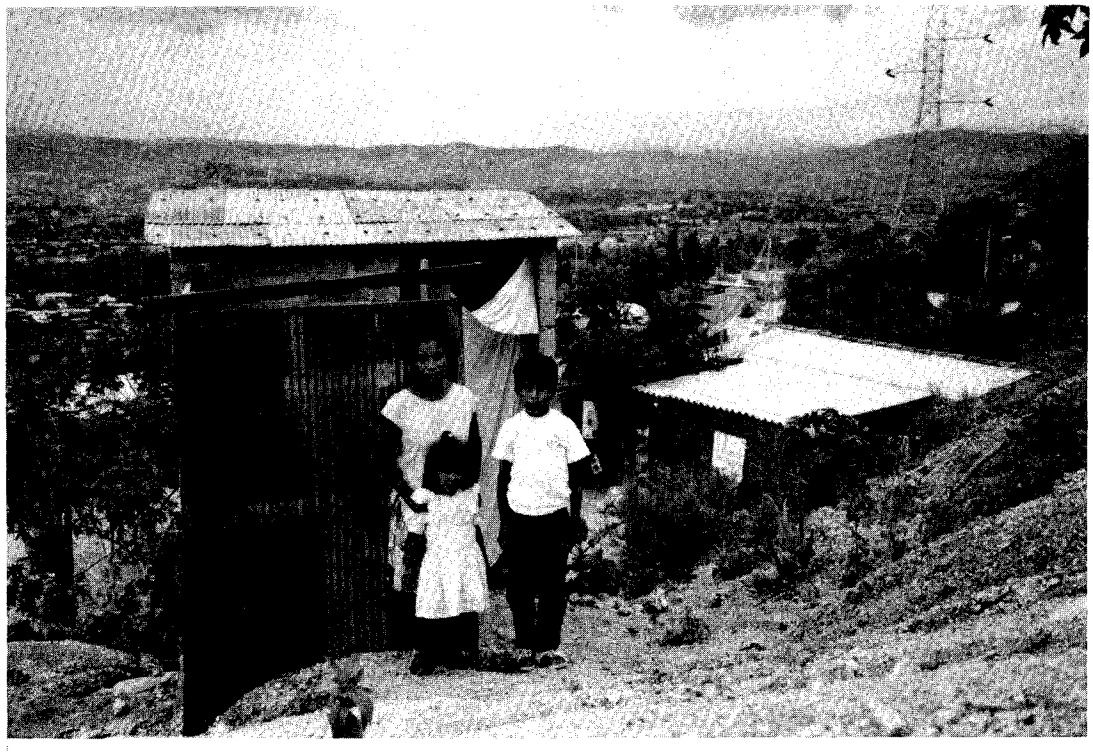
That's questionable. Yet Scherer's general message finds echo in government offices across Oaxaca City. A spokesman for the Ecological Institute of the Public Works Ministry, for example, claimed recent arrivals to Oaxaca City accept flush toilets and nothing else. "When we offer them alternative services, like dry latrines," said Cuitlahuac Hernandez, "people complain that they're being treated like second-class citizens."

Likewise, State Water Institute director Darío Herrera opposes compost latrines for urban communities. He criticized the system for failing to resolve the soapy water problem, yet acknowledged its limited benefits. "It's a start," the engineer said, "but still a half-baked solution addressing only part of the problem, perhaps the least critical one." I decided not to ask if he really believed that soap suds are more infectious than human waste.

Regarding costs, he stressed that urbanites always demand drainage — for taking showers, washing clothes, etc. — in addition to alternative technologies like dry latrines. Unfortunately, the state cannot afford such overlapping investments. "Besides," he concluded, "it's the municipality's jurisdiction anyway."

City officials bristle at such comments. "That's pure hypocrisy," blurted the director of the Municipal Ecology Office, as I recited the IEA view. Stressing the *need* for dry latrines in the state's capital, Manuel Gonzalez Zarate regretted that the city's coffers are empty due to partisan politics. According to him, since January the state government has withheld 95 percent of the municipal budget of P$200 million (U.S.$26.6 million). "The PRI [Mexico's ruling party] wants to undermine the credibility of the mayor because he belongs to the PAN [center-right opposition party]," said Gonzalez Zarate.

The abandoned sugar hacienda *in San Luis Beltrán, Oaxaca*



A view from the slopes of the jerry-built neighborhood of Vista Hermosa *in Oaxaca City: Julietta Cruz Chavez and her children stand beside their newly-built compost latrine.*

"As pocketbook prisoners, we can't even pay our rent, let alone build latrines."

Hence the question remains: Do compost latrines offer a solution, albeit partial, to the urban sewage deluge? Or, are they strictly rural remedies? Granted, wealthy urbanites won't easily forsake flush toilets. But what about the urban poor, the people who live on land no one else wants, that is too wet, too dry, too steep or too polluted for normal habitation? If they're willing to throw up makeshift hovels, made of whatever they can find — sticks, fronds, cardboard, tar-paper, gasoline tins — then why wouldn't they be receptive to dry latrines? After spending some time on their turf, one tends to think they are.

A LOO WITH A VIEW

"The government offered us drainage four years ago," said 63-year-old Jerónimo Perez, a weathered construction worker. "We said no, we're just fine with our *sanitarios secos*, thank you."

Bending beside his dry latrine, Perez scooped a cup of powder from a rusty bucket. Walking up five cement stairs, he tossed the mixture of earth, ashes and lime into the toilet bowl. "That's how it works, very simple," he explained, turning around to appreciate his loo with a view: the grandkids rolling around on the dirt driveway; the dabble of flaxen corn stalks in the yard; the loose chickens and ragtag houses across the road; the urban sprawl cramming the valley below.

A century ago, San Luis Beltrán, which has 250 inhabitants and hugs the mountain slopes in the northeast corner of Oaxaca City, was a sugar *hacienda*. In recent decades, the state capital has gobbled up the adjoining farmlands. Since 1990, in fact, three new settlements have crept up the hillside just beneath San Luis Beltrán. Peréz, whose grandfather labored on the old sugar plantation, looks down on those newcomers, literally and figuratively.

In 1992, representatives from the Public Works Ministry visited here offering to install a drainage system in exchange for a strip of the community's land on which to build a new ring road. As is often the case in the urban periphery, that tender sparked fierce protests from the settlers just down the hill. Without drainage themselves to compliment San Luis Beltrán's, the latter's sewage would have ended up in their back yards. Fortunately, the squawking ended when San Luis Beltrán declined the offer, mystifying government officials and placating the down-slope dwellers.

Peréz explained their logic. "What ruins a neighborhood?" he asked rhetorically, flipping the cup back into the bucket. "Soapy water? Shower suds? No, uncontrolled *caca* (excreta): the flies, the worms, the stench. With the *sanitarios secos*, we had already cleaned that mess, so why ask for more problems?"

According to *Espacios Culturales*, San Luis Beltrán was the first place in the entire state to build dry latrines. In 1990, Vignau arrived with minuscule public funding

Neighborhood toilet talks: Elena Hernandez (middle) discusses sewage problems with Julietta Cruz Chavez (left) and Hector Aguilar (right) in Vista Hermosa.

and built 25 waterless units, one of which was Peréz's. Most of the neighbors scoffed at the experiment, so Vignau formed a special latrine committee. As president, Peréz was put in charge of promoting the *sanitarios secos* and monitoring their use every day. "I was very diligent," he boasted. "I'd catch the little ones forgetting to cover their *caca* with the powder, and we had to fix lots of leaks."

His efforts paid off. Within six months, the people who had previously shunned what they considered to be just another outhouse, observed the odorless system, noted the lack of flies and examined the fertilizer. "Soon they were asking *me* how to build one," recalled Peréz, grinning over the appeals for his expert advice. Today, virtually everyone in this hillside community has a waterless loo.

FROM FILTH TO FLOWERS

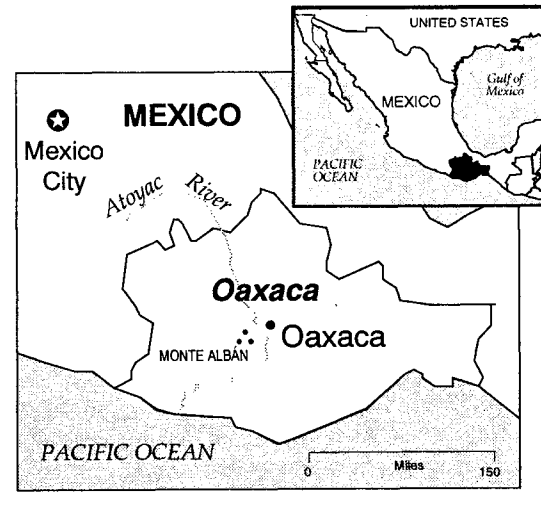
About 20 minutes' drive from Peréz's house, across town and up an even steeper mount, lies the jerry-built neighborhood of *Vista Hermosa* (Beautiful View). Looking straight across the valley from here, one can spot the soaring ruins of Monte Albán, which hark back to an age when Oaxacan Indians didn't suffer the urban ills that shape life in these surrounding shacks. Julietta Cruz Chavez, who lives in one, won't bow to circumstance, however; that's why she built a dry latrine.

"I want my children to grow up healthy," she said, as her tiny daughter darted behind her mother's skirt. Juan, 6, leaned against their one-room house, chewing on a chicken bone. "We built the *sanitario seco* just two months ago," Julietta explained, pointing down a gravel hill at the cement-block structure. "I think it's going to help."

If Jerónimo Perez's is the oldest compost latrine in Oaxaca, this must be the newest. Yet it's not the first. In fact, *Espacios Culturales* helped build 45 dry latrines here at about the same time that San Luis Beltrán did. Six years later, the construction of Julietta's attests to the importance of that organization's underlying goal: to help create a well-informed and active citizenry. Indeed, when Julietta could no longer stand the stench of her outhouse, neither public officials nor non-governmental activists offered her a solution. A neighbor did.

Elena Hernandez, 53, who taught Julietta how to make her dry latrine, lives nearby in the house her husband built 17 years ago. To get there, we followed a narrow footpath winding along a parched ravine. On the way, I lost my footing in the troubled soil where deforestation has left nary a weed growing. Hence my surprise when we opened the gate to Elena's courtyard, revealing a carnival of colors and cascading flowers beds.

"I planted everything with my compost," the woman declared, giddy with pride as she gestured toward her



Elena Hernandez shows off her compost flower garden beside Hector Aguilar of Espacios Culturales

garden. "Every blossom, every petal, grown with fertilizer from the bathroom."

Like Peréz in San Luis Belrán, Elena was one of the first people to build a *sanitario seco* in *Vista Hermosa*. As a matter of fact, I was introduced to her by the person who oversaw that construction back in 1990. Hector Aguilar, who has worked for *Espacios Culturales* since Vignau founded it in 1989, has been coming back here ever since. "We owe it all to him," asserted Elena, patting her young friend on the back. "The man who repotty trained us," she added, guffawing.

Aguilar and I drove back downtown together. On the way, he told me that he secretly dreams of opening neighborhood microenterprises across the city where people like Elena and Julietta could collectively grow and sell flowers using compost from their dry latrines. Farther down the road, he volunteered another dream: to get the governor to sign a decree declaring a moratorium on the construction of further drainage systems across the state of Oaxaca. Aguilar argued that this would require private citizens to assume responsibility for their household wastes and lead to the widescale application of cheap yet effective sewage-reduction technologies.

"Freezing the expansion of the drainage network would go a long way toward solving our sewage problem," he stated. Yet he quickly lamented that the decree will probably never come to pass. For that, he blamed the water authorities and the bureaucracy they control: "They generate a lot of revenues laying drainage pipes and selling water, and dry latrines pose a threat to that income."

How so? For starters, the *sanitarios secos* help decrease the need for drainage, the construction of which creates a chain of profits for all concerned: neighborhood leaders, contractors, water engineers, public officials.

At the same time, in low-income settlements lying outside the reach of the basic services net (e.g., *Vista Hermosa*), residents pay cash for water trucks to come and fill the communal tank each week. Since dry latrines reduce trips to the spigot, they also decrease the revenues made from water sales.

"It's a big Mafia," said Aguilar. "About 500 people currently draw salaries from the water bureaucracy. They have no interest in people like Elena and Julietta learning to help themselves."

"So there's your answer," he concluded as I dropped him off on the corner by his office. "Oaxaca City has few dry latrines, not because they're only suitable for rural villages, or anti-urban, but because they're anti-bureaucratic."

That night I went to bed early, tired from travel and feeling under the weather. As summer rains pelted the roof, I imagined Julietta and her children up in *Vista Hermosa*. Braving the thunder, her son Juan slipped outside, sliding down the wet gravel hill to relieve himself in the *sanitario seco*. As if by cue, my upset stomach rumbled and I headed for our flush toilet. Funny though, as the waste water began to swirl, I felt guilty, picturing the journey implied: past the wheezing treatment plant; into the swollen *Rio Atoyac*; onto some down river dairy farm; and up the infected udder of a poor, unsuspecting cow.

Climbing back into bed, I recalled the words of that veterinarian in Etla Valley, the one who revealed the secret about *quesillo* cheese. As he and I were leaving the stables, Rubén Langle lowered his voice and said: "I really look forward to the June showers." We stopped to kick manure off our boots. "I hate to admit it, but in my line of work, the sicker the cows, the better the money."

I watched the ceiling fan whirl, listened to the toilet bowl fill, and felt even guiltier. ❑

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Institute 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 post-graduate 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 and an accounts manager for the world's leading producer of cardiac defibrillators, but most recently managed a $7 million developing-country revolving-loan fund for the Program for Appropriate Technology in Health (PATH) in Seattle. Pramila is spending two years in India tracing her roots 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 and a Master of Fine Arts in Creative Writing from Brown University, he and his wife Delphine, a French oceanographer, are spending two years in Madagascar with their two young sons, Nicolas and Rowland. 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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