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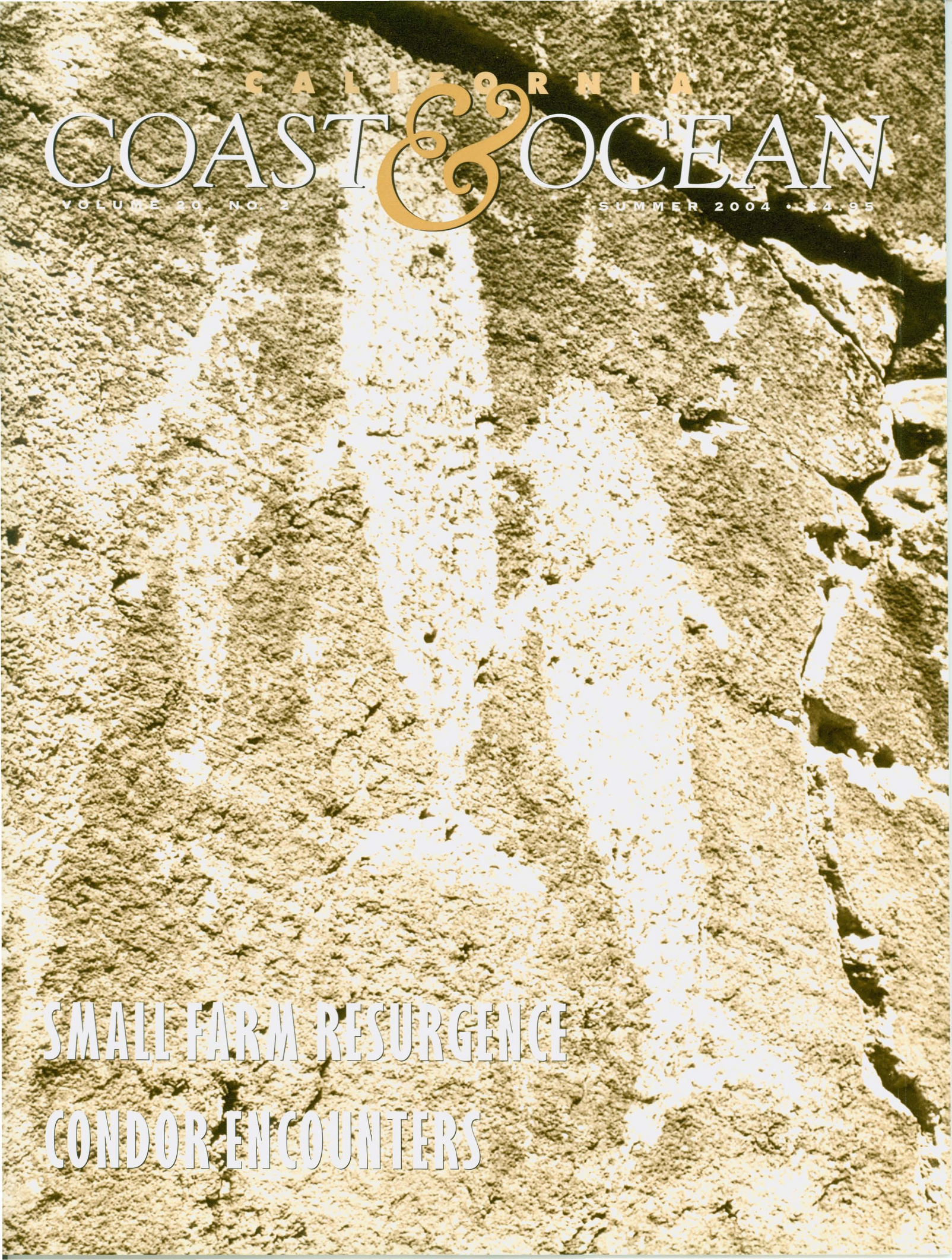

SMALL FARM RESURGENCE

CONDOR ENCOUNTERS

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Cover photos: Petroglyphs of fish forms at Piedras Pintas by Wesley Marx. "When photographing rock art on cliffs, I had to be careful to keep my balance. The rock artists had to maintain balance much longer," he says. Wes Marx writes on ocean and coastal affairs. His articles and photographs have appeared in Atlantic, Audubon, Smithsonian and other national magazines, as well as in many issues of *Coast & Ocean*.

Back cover: Adolescent male condor by Ralph W. Schardt.

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COAST & OCEAN

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RALPH W. SCHARDT

Food Security

WHILE MULTI-COLORED alarms about alleged threats from foreigners make citizens jittery, a more deeply rooted anxiety has also tightened its grip on some Americans. Is the food we eat and the water we drink safe to consume? Trace amounts of man-made chemical compounds linked to cancer and neurological damage keep being discovered in fish, meat and vegetables. Such news brings on a sense of helplessness that may be deeper than the one evoked by the spectre of potential suicide bombers.

Each scary finding tends to be followed by assurances from credentialed authorities that the noxious substances detected occur only in minuscule amounts, way below the health hazard threshold. But we also know some of them accumulate in our ecosystems and in our bodies.

An unusual study led by Mount Sinai School of Medicine in New York, published in January 2003, tested the blood and urine of nine volunteers for 210 chemicals, industrial compounds, and other pollutants that occur in consumer products and industrial emissions. None of the nine held jobs that required working with chemicals nor lived near industrial facilities. Yet researchers at two laboratories detected an average of 91 chemicals, and a total of 167. The study refers to the human-borne load of pollutants as the body burden. The Environmental Working Group and Commonweal, a Marin-based research center focused on health and the environment, collaborated on the research.

Some facts hit home, some we pass over. I can't forget reading about a dead whale that washed up on the coast in Washington State with such a high body burden that someone suggested it be buried in a toxic waste dump. Like that whale, we humans live high on the food chain. Every time we hear of someone diagnosed with cancer or some strange neurologic affliction we wonder what caused it. But proof is elusive, and debate continues on whether cancer rates are even rising.

Meanwhile, 30-year-old legislation protecting air, water and other aspects of our life-support system is now being weakened when surely it should be strengthened. The fight in Washington is to shore up what was won long ago. But close to home, where ordinary citizens can be most effective, there is some good news.

Worried about food supplies long promoted as the best in the world, many people have been turning away from supermarkets to seek out local and organic food. We buy directly from growers, usually at farmers' markets, and encourage our neighborhood food shops to carry organic items. By creating a demand for such food, we helped to fuel a resurgence of small-scale farming near urban centers throughout the country.

Farmers and ranchers who had feared they had no option but to sell their land are charting a new course, often prompted by their grown children. They are diversifying to meet the demand of a health-conscious clientele for high-value products.

In this issue we report on this phenomenon, focusing on Marin County, which has served as a model for other communities. The county took major steps 30 years ago to protect its farmlands, and has since furthered that goal by crafting an unusual alliance among groups and entities that tend to be at odds with each other. Growers, environmental groups, and county government are working together.

Among recent initiatives are the Marin Organic label and county certification of grass-fed beef—the first such certification program in the nation. You can now buy your beef directly from the rancher who raised it and even select it on the hoof.

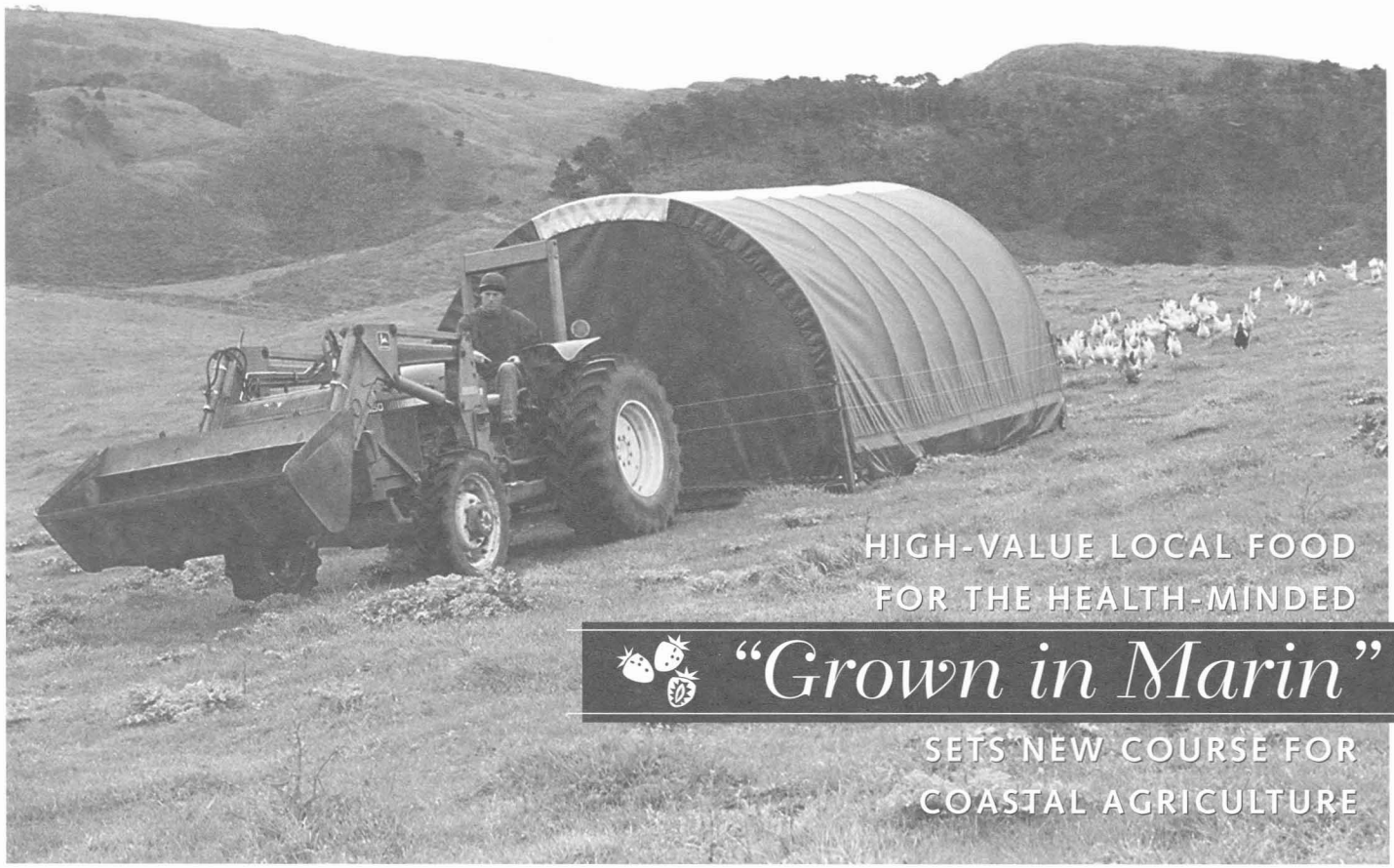
Support for a locally sustainable food system is not part of our national defense system, as is the protection of oil resources. Perhaps the importance of local agriculture is not sufficiently understood, as no war has been waged on this country's soil since the Civil War. In Europe, people survived wartimes by relying on what they grew and on relatives and friends who were farmers. How many of us know farmers we could turn to if food supply systems were to break down?

Federal agricultural policies have worked against family farmers, emptying the countryside. "A policy that destroys farmers and farmland . . . . directly contradicts our goal of national defense," Wendell Berry, Kentucky farmer and poet, wrote in a 1999 article published on the op-ed page of the New York Times. "A country that is heedlessly destroying its capacity to feed itself cannot be defended."

Citizens have lately lost, or yielded, much of their power to giant corporations. Some of that power is now being reclaimed by small personal choices—where to shop and what food to buy, for instance. The cumulative effect can be major: protection of urban edge landscapes, changes in food production, a sense of connection with the places where we live.

Farmers' markets continue to sprout. A tiny one opened recently in my neighborhood in San Francisco as a response to the sudden closing of a popular natural food store. Saturday mornings it's the place to go to meet neighbors, gossip, share news, register to vote if you still haven't, listen to live music, and pack your market basket with fresh-picked produce from Watsonville, Coyote Valley, and other places in the Bay Area and beyond. Many of us walk to the market, just as people do in Paris, Amsterdam, and other cities where such markets are common. It's delightful and easy. And hey, we're doing something for our health, for those green hills around our cities, and for our country's security too.

—*Rasa Gustaitis*



HIGH-VALUE LOCAL FOOD FOR THE HEALTH-MINDED

"Grown in Marin"

SETS NEW COURSE FOR COASTAL AGRICULTURE

ELLIE RILLA AND STEVE QUIRT / PHOTOGRAPHS BY STEVE QUIRT

MARIN COUNTY is famous for the beauty of its landscape, for affluence, experimental life-styles, and a long-standing resistance to anything that might lead to urban growth. Not many people realize that over half the land in the county is actively farmed or ranched. Still fewer are aware of the vibrant and expanding community of growers who, with support of local government and environmental organizations, have been working cooperatively for more than two decades toward a local and sustainable food system, with notable success.

Perhaps the most widely known among this community's products is the organic milk in glass bottles from the Straus Family Creamery, which since 2002 also carries the label: "Marin Organic." The late Bill and Ellen Straus, who founded the dairy farm in 1941, were pioneers in ecological land use practices long before the buzzwords arrived. Ellen also co-founded the Marin Agricultural Land Trust (MALT), the first agricultural land trust in the nation, which now protects 35,000 acres on 53 farms and ranches, and is a model nationwide.

In 1977, the Strauses' son Albert returned from California Polytechnic State University armed with a degree in dairy science, to quickly find that he would either need to break the mold or close the family business. "It was obvious to me that we couldn't succeed continuing to farm the way we had been [conventionally], and my desire to take our dairy organic became an immediate necessity," he says.

Albert converted the farm to organic production, and in 1994 founded the Straus Family Creamery to process the organic milk. Marketed in old-fashioned glass bottles, with the cream on top, it quickly caught

Top: David Evans tows his moveable chicken house to a new spot in a cow pasture, where his 150 chickens will scratch up cowpies and munch on parasites, fly larvae, and various insects. Cows will be less plagued by flies, and eggs will be higher in omega fatty acids.

Bottom: Organic heirloom tomatoes

SLOW FOOD DINNER ON A SANTA CRUZ COUNTY FARM

THE SUN WAS BEGINNING TO DROP, with cool breezes rolling in from Monterey Bay, as the Slow Food dinner on July 11 at Thomas Farm in southern Santa Cruz County reached its delectable conclusion: warm, grilled Red Haven peaches (from Thomas Farm) topped by slowly melting vanilla bean gelato and raspberry sorbet from Massimo Gelato of Watsonville.

Gathered together in the intimate courtyard behind the Thomas farmhouse, surrounded by graceful grape vines, a towering old growth redwood, and an enormous ancient avocado tree, diners at the benefit dinner for the Open Space Alliance of Santa Cruz experienced directly the joys of dining al fresco on a warm summer afternoon, treated to the best of fresh, local, organic, and sustainably grown food.

Every item on the menu, from the summer Meadows Farm goat cheese, to the High Ground Organics farm green salad, to the Hain Ranch pastured chicken, Monterey Bay salmon, Zephyr squash, and German Butterball potatoes, as well as the Gayle's baguettes, the olive oil and herbs, was either grown on the Thomas Farm or produced/obtained within a 26-mile radius and harvested within 24 hours before the meal. Prepared by Slow Food chefs Fred and Kimberly Wright, and the Thomas Farm hosts Jerry and Jean Thomas—mainly on the outdoor wood-fired grill—the extraordinary meal also benefited a local land trust, the Open Space Alliance.

PETER SCOTT

A Slow Foods event at High Ground Organics farm near Watsonville, August 2003.

The Slow Food movement was founded in Italy in 1986, and has since mushroomed into a worldwide movement with over 70,000 members in 45 countries. Slow Food USA has also blossomed to support 150 local chapters, or convivia, with more than 12,500 members. The Thomas Farm dinner was sponsored by the Monterey Bay convivium.

The Open Space Alliance, with the assistance of the California Coastal Conservancy and the Santa Cruz County Board of Supervisors, initiated the transformation of a 38-acre former dairy ranch in the Watsonville Slough Watershed into High Ground Organics, with its organic agriculture and natural resource habitat values permanently protected by conservation easements.

The Slow Food movement was founded to counteract the proliferation of fast foods. It is dedicated to sustainable agriculture and the enjoyment of regional cooking. More information on Slow Food (local and national) and the Open Space Alliance can be found at slowfoodusa.org, slowfoodmontereybay.org, and santacruzosa.org.

—Celia Scott
Board Member, Open Space Alliance

on despite its higher price. The taste was nothing like the standard homogenized product. Today the Straus Family Dairy and Creamery are cornerstones of the organic farming community in Marin. The Straus brand is nationally recognized for excellent milk, yogurt, butter, cheeses, and ice cream. Careful planning, smart business practices, and the willingness to take risks has paid off. The operation continues to grow steadily and has helped two other local dairy producers to convert to organic, as well as to bring jobs and business to the county.

The pioneering spirit and just plain hard work of Albert Straus and his family inspired other farmers to diversify and add high-value crops. What follows is the story of how one county—with the right mindset, and a perfect climate for growing high-quality products—connected with nearby health-conscious consumers willing and eager to purchase food with human beings and a particular place behind it.

Can-do Creativity

MARIN'S AGRICULTURAL community lies mostly in the western part of the county, where over 167,000 acres are actively farmed and ranched. Dairy and livestock account for 80 percent of the county's agricultural production. The average size of a farm is 588 acres, and most are third- and fourth-generation family-owned.

Like farmers elsewhere on the urban edge, they face growing pressures: Increased competition, price restrictions, uncontrolled predators, and rising operating expenses put the dairy, beef, and sheep industries at risk. The average age of the landowner is 55—who'll take over next is a constant worry. Continued decreases in profitability are forcing long-established dairy and livestock operations to consider other options, including selling land for non-farm use (usually for estate-type development) and diversification (adding organic or other high-value crops).

A recent survey of Marin producers indicates that 63 percent of the 95 respondents consider their operations unprofitable or marginally profitable (*Status of Marin County Agriculture*, February 2003, E. Rilla and L. Bush, UC Cooperative Extension). According to MALT executive director Bob Berner, "Ranchers also face strong economic pressures to consider selling land for development. Even in cases where development rights have been sold, the new

landowners may have difficulty keeping their lands in active agriculture." Yet the same study showed that only two percent of the responding farmers do not intend to keep farming.

Bob Giacomini, a Point Reyes dairy operator, tells how his four daughters responded when he asked whether they would take over the family's 500-cow operation: "No way!" Like other ranchers' children returning home after college, they saw their opportunities for entering the family business as limited.

Bob Giacomini wanted the ranch to continue, despite its diminished prospects. He therefore asked his daughters to tell him what they enjoyed, and again heard a unanimous answer: "Food." So the family searched for a way to combine the successful Giacomini dairy operation with artisan culinary production. Two years' research and careful consideration paid off. The Point Reyes Blue Cheese phenomenon was born from Bob Giacomini's desire to keep his kids on the farm. The family now produces 3,000 wheels of cheese a week and plans to expand soon. The cheese has been received enthusiastically nationwide, and sales grow daily. Karen, Diana, Lynn, and Jill handle the sales, marketing, and administration. Bob says he does a little bit of everything—at least two full-time jobs.

The Giacomini story is typical of the can-do creativity that typifies many Marin agricultural operators and their allies. That's the good news, and it's really encouraging.

Why in Marin?

SINCE 2002, a diverse and seemingly incongruous coalition of farmers, local government, educators, nonprofit organizations, and environmental groups have come together, creating a mutual support system. With financial support from local and state foundations they are taking charge of what they hope their future will be.

At the hub of this coalition is the local county University of California Cooperative Extension (UCCE) office. There, the "Grown in Marin" program, staffed by Steve Quirt and student interns, assists farmers and ranchers with diversification, so as to strengthen the viability and long-term success of agriculture in the county. It offers information about new and profitable marketing opportunities, individual field trials assistance, and the production of a web-based directory that connects farmers and consumers. Funding has come from the County, the Clarence E. Heller Foundation, the University of California Sustainable Agriculture Research and Education Program, and Marin Organic, a producer association organized to foster organic practices, bring organic foods to a wider public, and create a label to identify Marin products.

"The effort by the UCCE office, and especially Steve's energy, has done more to give all of us hope that we have a future farming and ranching here in Marin than ever before," says Marin Organic's president Warren Weber. "They give us different ideas, and connect us with other ranchers; and this mixing of the old and new, the conventional and organic, so to speak, is creating new possibilities." Weber's 40-acre row crop operation, Star Route Farms, in the coastal town of Bolinas, has been continuously farmed organically longer than any other farm in California. He started with five acres in 1974, after earning a doctorate in English literature. In 1979 he worked on the state's first organic food law, which was succeeded by the Organic Foods Act of 1990, and also played a role in creating a county organic certification program—the first in the nation (followed shortly by Monterey County's). Its popularity, with over 30 registrants and a queue of interested applicants in less than two years, overstressed the resources of its manager, Anita Sauber. She says: "It wasn't long before we realized that the demand for organic certification would be more than our staff could handle. We were considering closing the door to new applicants."

Marin Organic got wind of the situation and raised sufficient private funds to establish a position within the county office for a full-time organic inspector.

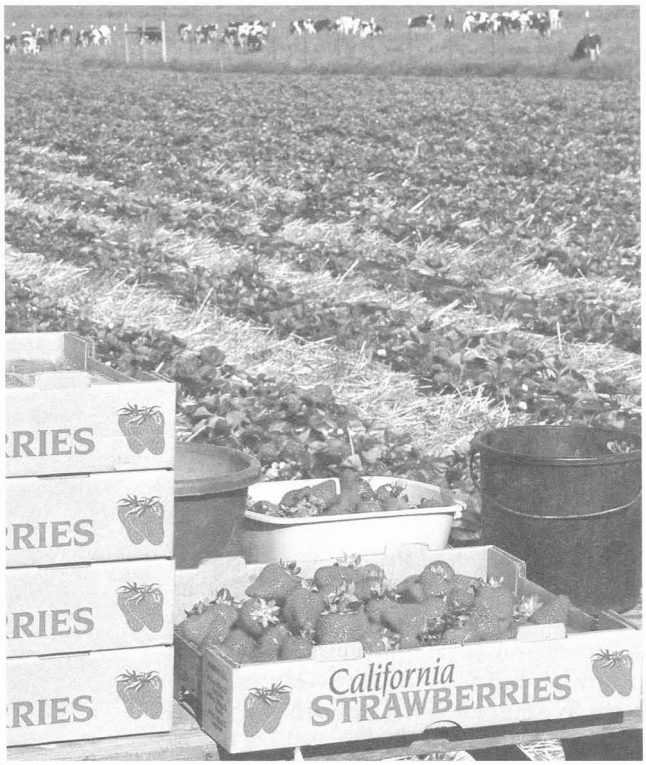
TAKING CHARGE OF THE FUTURE

MANY PROMISING YOUNG FARMERS and ranchers love what they do and want to continue in agriculture. For them, a day-long event is being organized for October 9 at Walker Creek Ranch in Marshall. Speakers and workshops will explore ways for young people to remain connected to their agricultural heritage while offering ideas and options for expanding interests and horizons in farming and ranching in Marin and Sonoma counties.

The day will kick off with Neil Koenig, author of *You Can't Fire Me, I'm Your Father*, speaking about challenges and opportunities for those who inherit agricultural operations and businesses. His talk will be followed by a fast-paced mix of concurrent workshops in dairy and livestock opportunities and vertically integrated processing and added value. For more information, e-mail your name and address to Julie Evans, Project Coordinator, University of California Cooperative Extension: jevans@malt.org, or call (415) 499-4204.

Below: Steve and Sharon Doughty have diversified their dairy farm to include a vineyard and a bed and breakfast inn.

Bottom: Organic vegetables grown by Steve Quirt



Top: Nicasio Valley Farms u-pick patch

Right: Russell Sartori's strawberries are picked ripe for four farmers' markets.

"We recognized that the future of organic agriculture in Marin depends on everybody," Weber explained. "We need to be able to work together and get things accomplished. The funding of an additional inspector was critical to the success of our mission to have an all-organic Marin." In 2002 the county had 810 acres certified organic. Today there are 2,586.

Why is all this happening in Marin? What's so special about this county? And can the successes here be emulated in other coastal counties?

Some of the key elements crucial to the Marin community's success also exist in other counties, especially along the coast: a climate perfect for high-quality, high-value crops, proximity to large urban areas, and creative farmers. Marin, however, is benefiting from an unusually harmonious collaboration between the agricultural and environmental communities—which tend to view each other with suspicion elsewhere—and the willingness of local government to go the extra mile to help farming and ranching survive in the county.

For example, the county board of supervisors helped beef ranchers David Evans and Mike and Sally Gale to develop financially promising alternatives to the commodity beef industry. After graduating from Cal Poly with a degree in agricultural business, Evans returned to the family ranch charged with new ideas. His family supported his ideas and he started Marin Sun Farms, offering beef free of antibiotics and hormones, raised on grass, and marketed locally. The Gales, meanwhile, had restored Sally's family's old Victorian farmhouse as a bed and breakfast catering to tourists who enjoy the owls in the barn, the birds in the willow thickets by the creek, and the beef cattle in the pastures.

With urging from Evans and the Gales, a working group was established to see what it would take to create a grass-fed beef certification program. Interested ranchers, County Agricultural Commissioner Stacy Carlsen, U.C. livestock and range advisor Stephanie Larson, and others studied the question for two years. In the end, the county board of supervisors unanimously agreed to assure that anyone who buys a Marin certified grass-fed beef product could be confident of its purity, origin, and animal care. Supervisor Steve Kinsey explained: "Our agricultural lands are an essential part of our heritage, our quality of life, and an important part of our future. This grass-fed ordinance is one way we can encourage and support our agricultural operators."

Inspired Collaboration

BY DIVERSIFYING with the addition of organic or other high-value crops, ranchers and farmers can begin to reclaim control of their futures. Most dairy farms and cattle ranches are "price takers" rather than "price makers." They are compelled to accept prices set by the industry. When they sell directly to local residents, farmers can decide what to charge, after looking over the competition nearby—perhaps as near as the next stand in a farmers' market.

In San Francisco, high-quality organic

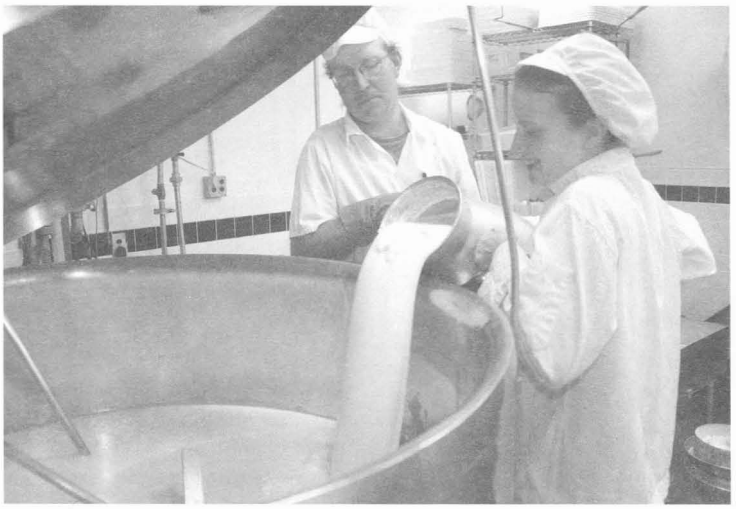
Marin products are prominent in the Ferry Plaza Farmers Market. (See page 10.) At Point Reyes Station (population 967) on Tomales Bay, gateway to the Point Reyes National Seashore, the Saturday farmers' market is a showcase for organic products such as Russell Sartori's vine-ripened, sweet strawberries from his ranch in Tomales. Russell and his family operated a dairy established by his grandfather until 1998, when Romeo, his father, retired and Russell decided to sell the herd: "Twenty-seven years of milking cows every day without a break was enough. We have done a great job, but it's time to move on." Like most dairy operators who stop milking, Russell now uses his pasture for dairy replacement heifers. But he got the itch to farm again, and soon two acres of immaculately groomed organic strawberries bloomed in the Sartori pasture along Tomales Road. Russell's success comes from his talent as a farmer and his good-natured presence at the farmers' market. "I like taking them fresh berries that taste good and are safe to eat," he says.

A trip to Point Reyes is not complete without stopping at Cowgirl Creamery and Tomales Bay Foods, run by Sue Conley and Peggy Smith. Cowgirl produces award-winning cheeses with milk from the Straus Family Creamery just up Tomales Bay. With a "Best of Show" award under their belts from the 2003 American Cheese Society show for their now-famous "Redhawk" triple cream soft cheese, Sue and Peggy personify an "attitude" held by farmers and ranchers here. "We want to produce the best quality possible here in Marin. Some day we will be known as 'Normandy north of the Golden Gate,'" they predict.

Most of the producers in this agricultural community are actively involved with local government and community nonprofit groups in the county-wide collaborative effort to promote sustainable agriculture and develop a locally centered food system. Some are also working with Point Reyes National Seashore staff to improve fish habitat along Pine Gulch Creek, which lies inside the boundaries of the Seashore. "We want a healthy, sustainable watershed. This fits right in with what we do, what we're all about," said Bolinas farmer Dennis Dierks. Together, farmers and National Park Service staff came up with a long-range plan to reduce drawing water from the creek during the low water season. The Park Service is helping to find funding for research, design, and construction of storage ponds that will hold winter storm water for use on crops during dry seasons. "The collaboration to protect fisheries and farms with interested, receptive farmers like Dennis and Sandy Dierks is all part of keeping the watershed healthy," commented Brannon Ketcham, a fisheries biologist with the National Seashore. (See *Coast & Ocean*, Spring 2004, "Coastside Water Crisis: Can both farms and fish survive?")

Not everyone in Marin is aligned with the "organic" vision. Differences of opinion do exist. Yet the political and organizational will to move forward and solve problems continues to prevail against formidable odds. So far, working collectively has netted positive results, so that agricultural land is not lost to residential and other non-agricultural development and that it continues to be fundamental to this county's traditions.

A shift similar to that in Marin is becoming visible in some other coastal counties. Humboldt and Ventura Counties are developing countywide programs to support sustainable and organic agriculture. Thirteen of



VANCE JACOBS

Top: Fifth-generation dairy farmer Jolynn Mendoza

Above: Workers at Cowgirl Creamery pour milk into a vat.

Top: Summer 2003 interns at Paradise Valley Farm worked for low wages while learning about organic farming.

Above: A school tour at Paradise Valley Farm during potato season

Humboldt County's 100 dairies have been certified organic. (See page 13.) In San Luis Obispo County, producers joined together last year, with support from the Central Coast Resource Conservation and Development Council, to create Ag Adventures, which promotes local produce. (See www.agadventures.org.) Buoyed by its initial success, the same group is working with area beef producers to develop a mobile slaughter facility that might make it possible to sell directly to local markets, rather than to Midwest processors. Such efforts become models of innovation for farmers on the urban edge, showing that agriculture can be sustained as an essential part of local communities. ■

Ellie Rilla is the director and advisor of the Marin County Office of the University of California Cooperative Extension, where Steve Quirt is Organic and Sustainable Agriculture Coordinator.

For more details on the farms and ranches of Marin, how to find and purchase their products, and Grown in Marin activities, go to www.growninmarin.org or the UCCE web site: www.cemarin.ucdavis.edu.

The Greenbelt Alliance offers farm tours in several Bay Area Counties. MALT's tours of Marin farms always fill up rapidly. To learn more about agricultural easements and farm tours, see the web sites of MALT: www.malt.org, and the Greenbelt Alliance: www.greenbelt.org.

In Sonoma County, LandPaths offers tours of county farms. See www.landpaths.org.

The Shopper's Role

DO URBAN DWELLERS and suburban residents have a role in preserving the family farm? You bet! We play an enormous and, to most, an unknown role in keeping local farms that produce fresh, tasty, and chemically free produce in business. So, what is this role and how can we be sure these farms will be part of our future?

Years of efforts by the agricultural and environmental communities in Marin County have created an exciting potential for the family farm. In the 1970s the county supervisors zoned the land to help agriculture stave off development. The 1976 Coastal Act furthered this effort. In 1980, the Marin Agricultural Land Trust (MALT) was formed to create greater certainty for ranchers and farmers and to reduce the potential for land subdivision. The ranchers and farmers themselves looked into the future and took wonderfully innovative steps. Warren Weber grows tiny lettuces and has changed the way people eat salad. Albert Straus produces organic milk and milk products, and has led the way for producing value-added organic products. Sue Conley has won national recognition for producing fine cheeses. The University of California's very effective Agricultural Extension program supports farmers with educational programs that help them with diversification and with improving the care and management of their land. The agricultural community is investing its resources and fostering creativity to help keep agriculture alive and well in Marin.

So what can urbanites and suburbanites do to help assure the future of local family farms? First and foremost we can buy their products. These farms that add so much to our quality of life are businesses and need to remain profitable. We can insist that the stores where we shop carry local products for us to buy. Or, if they don't, we can shop where there is more enlightened management. Why not ask your grocer where things are grown? Why not insist that local products be stocked in your store? Stores could place labels on bins to help shoppers become aware of currently available locally grown produce, and to advertise their own support of local growers. We, dear readers, together can insist on support from our local stores to maintain sustainable agriculture on our neighboring farmlands. Let's each do our share to keep our farms producing their high quality foods.

Farmers' markets have become wonderfully popular and are a great way to learn about local farmers and to get fresh, healthy food for our families. These markets shorten the distance between the farm and your table. They also provide a great way to participate in your community. Farmers readily adapt to changing tastes and demands. They are the first to notice changes in buying habits and to adapt what they grow to the urban palate. Alice Waters in Berkeley has taught both farmers and consumers to treasure fresh seasonal foods that not only increase our pleasure in eating but also improve and support our health. It has been exciting and truly amazing to see the changes on the farms and in the produce over the past 20 years. Get to know the growers. Visit their farms. Let them know of things you like to eat. Take the opportunities offered to you, a shopper, to be a part of the rural life.

We happily appear to be leaving the fast-food era which has left many overweight and health-compromised. Wouldn't it be wonderful if our children knew where their food was grown, how good fresh, healthy food can taste, and how they can learn to make good food choices over unhealthy ones? Trips to the farm can be eye-opening experiences for an urban child. Several organizations offer tours of farms (see page 8). What a great way for a family to spend a day and invest in the future as well. In the fall, a few Marin farmers invite children to come out to glean the last of crops—tomatoes from Janet Brown and Randy LaFranchi, greens from Warren Weber and Dennis Dierks—to donate to the St. Anthony Dining Room.

PHOTOS THIS PAGE: DAN ROBBIN

Scenes from the San Francisco Ferry Plaza Farmers' Market

And why shouldn't our children have fresh organic food for lunch in our schools? Don't they deserve the best available food? Some from the agricultural and urban sectors are working hard to get schools to offer locally grown food for lunch. Each of us with children or grandchildren in urban or suburban schools could help this new idea take hold. Teachers, parents, administrators, and children all need to get behind the novel idea of having the best healthy food for our children rather than the cheapest. Let's celebrate local farmers and give our young a healthier future.

So it turns out, dear shopper, there is a lot each of us can do. It turns out we do have an essential part to play in keeping family farms alive and well, in keeping fresh local produce in our markets, in providing healthy food for our children. We can vote with our money at the store or farmers' market; we can vote at the polls for supportive public officials; we can vote for ballot measures that help agriculture; we can give charitable gifts to organizations that support local agriculture. We really are amazingly important to the long-term sustainability of a family farm.

Phyllis M. Faber is a co-founder and board member of MALT.

An Artisan Food Market

THE $4.00 BRANDY WINE tomato bulging like a small, red planet in the woman's shopping bag suggested the fulfillment of a quiet passion. What had moved her to make such a purchase? Was it the seductive taste of the monster tomato itself? Or the prospect of awing her dinner guests? Or was it just knowing she had done her bit to help the hard-working farmers? I had to ask. Politely of course.

"It's really nice to buy your food from the people who have something to do with it," she said, sunglasses glinting.

Oh. What an idea. I stared at the over-grown tomato. Surely this couldn't beat the joy of watching your Safeway card magically slice $3.80 off your food bill? Could it?

On a sunny Saturday morning there are all sorts at the San Francisco Ferry Plaza Farmers' Market. The fruit and vegetable stalls fill the sidewalk before and behind the 106-year-old Ferry Building, and the waterside becomes a circus of bicycles, shoppers, and dogs. This is the high-end farmers' market of San Francisco, more lavish in its quality and prices than the San Francisco Farmers' Market on Alemany Boulevard, which the City started during World War II, or the Heart of the City Farmers' Market at U.N. Plaza in the Civic Center. Those two markets draw crowds that reflect San Francisco's varied and multi-ethnic population, while the Ferry Building tends to attract shoppers for whom the organic label means more than the price. Jennifer Redmond says she shops here because the "produce is delicious." David Bass, a software salesman, buys his organics here every week for "health reasons." Others come just to look or to show visitors the Ferry Building, with its 660-foot-long skylight, Romanesque arches, and clock tower modeled on Spain's Seville Cathedral.

The building's rebirth as an artisan food market in April 2003 followed a rocky history. A century ago it was the gateway to San Francisco for thousands of gold-hungry immigrants who traveled by rail to Oakland and ferried across the Bay. The steel-framed structure survived the 1906 and 1989 earthquakes. But in the 1930s, passenger traffic dwindled as the new Bay bridges and elevated freeways went up. In the 1950s, the Embarcadero Freeway shut off the waterfront and the Ferry Building from the city's view. The vista reopened only after the 1989 earthquake severely damaged the freeway and it was demolished.

The Ferry Plaza Farmers' Market began in 1992 across the Embarcadero, in Justin Herman Plaza, and soon became weekly. In 1998, the Port of San Francisco chose a $100-million restoration plan for the Ferry Building that included food shops indoors and the farmers' market outdoors. Developer Christopher Meany drew inspiration from the International Food Hall at Harrod's—London's showcase for fine foods. Today, up to 20,000 people stream through the market on Saturdays. Many of the 50 to 100 outdoor stalls offer organic or "sustainable" produce. At the Moua Farm stall, the tables are filled with red chard, summer squash, English peas, and purple beans. All ten members of the Her family—aged four to 70—help on the 13-acre farm at Clovis, near Fresno. This Hmong family spent 13 years in a Vietnam War refugee camp before getting U.S. government help to come to this country and lease land in California. Twice a week now, they rise at 3 a.m. to drive to San Francisco's market. Ge Her, head of the family, says business is good.

However, farmers' markets are proliferating, and that is making things tougher for the sellers. Ten years ago David Winsberg, who runs Happy Quail Farms, an indoor operation in East Palo Alto, made a living selling his peppers, rhubarb, and horseradish at four markets. Today his family covers nine markets a week. Even so, he says, he has "trouble keeping up with what we used to make" in sales.

Eva Bruins, who grows beefsteak and heirloom tomatoes in greenhouses west of Davis, says she is seeing a "dilution" of customers after 27 years in business. The Ferry

Top: The San Francisco Ferry Building and Justin Herman Plaza

Above: Eva Bruins shows off her heirloom tomatoes.

PHOTOS THIS PAGE: SHIRLEY SKEEL

Plaza, for example, has extended its market from two days a week to four: Saturday, Sunday, Tuesday, and Thursday. Bruins says she doesn't have the manpower to cover so many market days. She expects her San Francisco sales to drop a third this year from last year.

Lisa Capozzi, executive director of the Center for Urban Education about Sustainable Agriculture, says the new markets will help farmers in the long term by educating more people about the benefits of fresh-picked produce. She finds farmers are glad to pay $45 a day for a stall and keep 90 percent or more of the sale price. A supermarket might give them 30 percent, she says.

The Ferry Plaza Farmers' Market is the third to open in the city. It's also the city's only boutique market (you might say). The biggest and oldest—in California as well as the city—is the San Francisco Farmers' Market, started in 1943. Prices tend to be much lower, fruit and vegetables fresh but not necessarily organic or photogenic.

The Heart of the City Farmers' Market, opened in 1981, serves many people who live in single room occupancy hotels or other downtown housing, as well as workers in offices nearby. All three markets have steady customers. Some growers sell at more than one of them.

Inside, the Ferry Building is a different kind of showcase of delights. Products sold there do not have to come straight from the grower as they do in the outside stands, although many do. The offerings include organic steaks, wine, cheese, bread, and flowers. Retail establishments include restaurants, delicatessens, coffee shops, and a bookstore. Far West Fungi manager Ian Garrone says the location works well. City workers drop in at lunchtime to pick up shiitake mushrooms, while local chefs stop by for truffle oil.

At Capay Organic, Martin Barnes is handing out strawberries. He says he broke ground for his family's farm in Yolo County 25 years ago, with a roto-tiller in his hands and a child on his back. The Saturday outdoor stall is thriving, but a lack of serious shoppers on weekdays has left the indoor store "teetering in the red," Barnes says. It does, however, give Capay a showcase for the Community Supported Agriculture (CPA) boxes of seasonal produce they deliver to customers' doors at prices many can afford.

The I Preferiti di Boriana stall makes it clear that the market's driving force—satisfying the needs of farmers and city folk—is not limited by geography. Owner Boriana Stoilova, a Bulgarian-Italian with an evangelical devotion to good food, imports olive oils, sauces, and pastas from the Montepulciano region in Tuscany. A former wine manager, Stoilova says she is inspired by the simple but rich lives of the Tuscan farmers, who provide her with handcrafted pastas, sauces made over open fires, and sheep's-milk cheeses aged under the leaves of nut trees.

"This is every day life in Italy," she says, gesturing, "A good life."

Indeed. It is a feeling that emanates from the whole of the marketplace. The fact that good living comes at a ripe price—$6 a pound for cherries, $5 for a bag of pasta, and $22 a pound for some cheeses—seems to make few shoppers flinch. Farmers insist the prices are justified. They say small, organic farms, paying California wages and taxes, cannot compete with commercial farms or foreign importers who pay workers a pittance. But they need not protest too much. For many San Franciscans, daunting prices—whether for a house or a ham steak—are a way of life.

"It's all part of the experience," says customer Jennifer Redmond, cheerfully. She sweeps away with yet another of those giant tomatoes. I finger my Safeway card. Do I burn it? Make the conversion to "Bay Area foodie?" No. Instead, I stop on the way home and save 49 cents on a frozen macaroni dinner. We all have our passions, after all.

Shirley Skeel's last article for Coast & Ocean *was on sheep shearing.*

For more information see www.ferryplazafarmersmarket.com. For information on farmers' markets statewide, see: www.cafarmersmarkets.com.

PHOTOS THIS PAGE: SHIRLEY SKEEL

Top: Ben Westheimer buys tomatoes from Eva Bruins's stall.

Middle: Sarah Davidson samples honey from Helene Marshall's Napa Valley farm.

Above: Boriana Stoilova of I Preferiti di Boriana promotes simple foods of Tuscany.

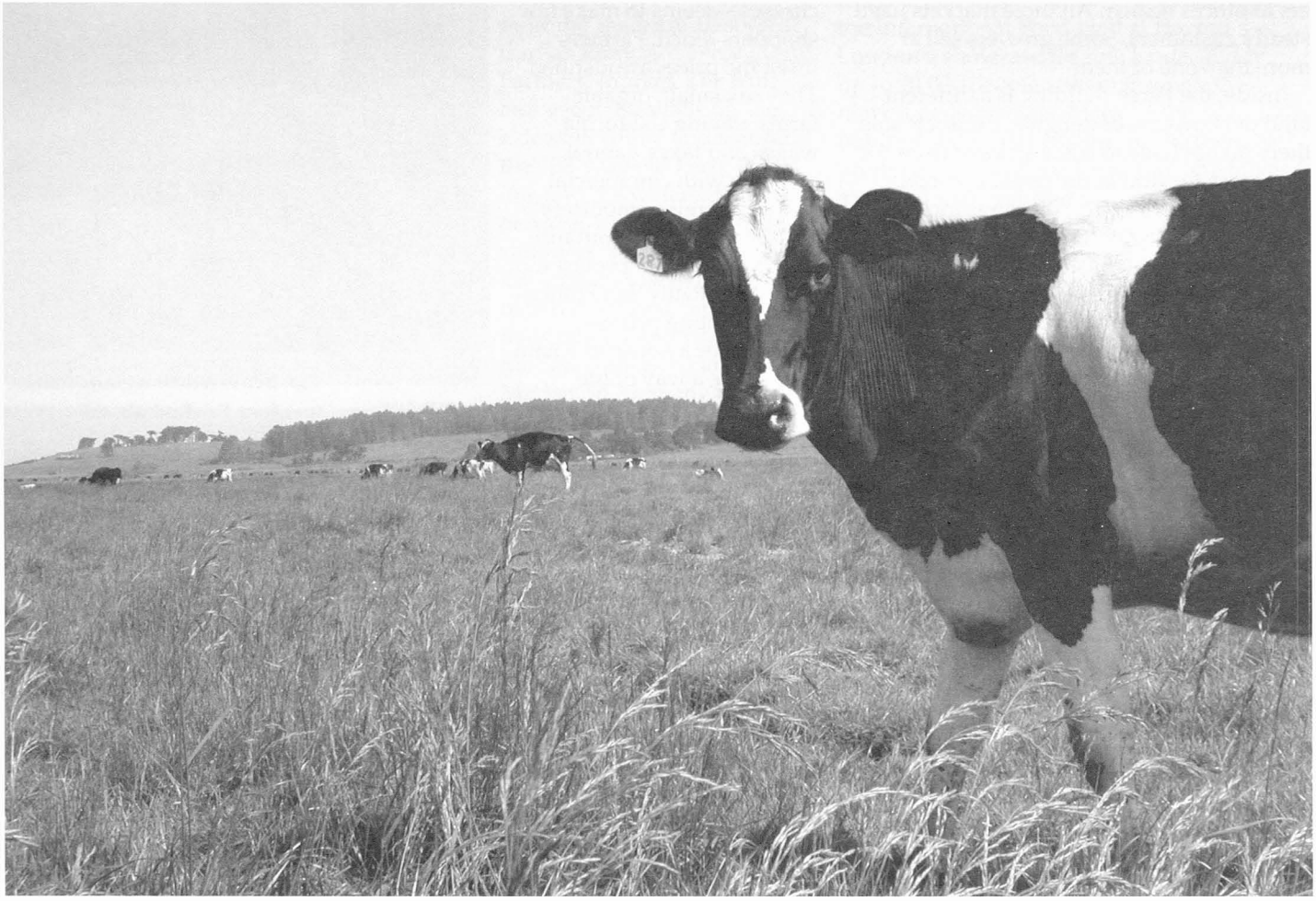
North Coast Dairies Go Organic

MORE THAN 130 YEARS AGO, Danish immigrants established the first commercial dairies in Humboldt County. The bottomland pastures and cool coastal weather were so favorable that by 1900 the region had become an important supplier of cheese and butter for San Francisco and other coastal towns. North Coast dairies' reputation for high-quality butter reached as far as Washington, D.C., where the U.S. Navy contracted for shipments in 1917.

After World War II, as the California dairy business moved toward large-scale production in the Central Valley, the dairies in Humboldt and Del Norte counties stayed small and their role in the dairy industry shrank. Now they are once again a major force, thanks to the growing demand for organic milk and the North Coast dairies' unique capacity to meet that demand. Although this region accounts for only one percent of California's milk, it is "by far the largest organic milk-producing area in California," according to Rich Ghilarducci, president of Humboldt Creamery, the largest local producer.

The trend toward organic production started about five years ago, when Humboldt Creamery got together with Petaluma-based Clover Stornetta to hold a forum on organic certification and markets. Clover Stornetta was seeking more organic milk to meet the growing demand. The company had set its sights on Humboldt and Del Norte Counties' dairies because most of them already met two key criteria for organic certification: they grazed their cows on pastures instead of confining them in pens and buildings, and they didn't use the synthetic growth hormone BST.

Humboldt Creamery saw organic certification as an opportunity for some of its 70 or so member-owners. Dave and Cynthia Petersen were first to make the transition with their 120-cow operation near Loleta. The main changes required were farming their pastures 100 percent organically, using only certified organic feed, which is significantly more expensive, and either foregoing antibiotics



BOB DORAN

when treating sick animals, or selling off any animals treated with antibiotics.

For Dave's father Robert Petersen, 85, going organic was in some ways a return to the dairy methods of his youth. "We didn't have penicillin. We didn't use commercial fertilizer," he said. "Back then, everything was organic. It didn't mean anything special."

But certified organic does mean something special today—so special that people worried about chemicals in milk will pay an extra $1.50 or more per half-gallon for organic milk. That retail premium translates into higher raw milk prices for the dairies—as much as double the conventional price, depending on market conditions.

These economic benefits enticed not only the Petersens, but two other dairy operators to make the transition. "We didn't have to give up using a lot of pesticides and herbicides because we weren't using them anyhow," said Blake Alexandre of Alexandre Dairies, the largest Humboldt–Del Norte dairy operation, with 2,500 cows on three ranches.

Tim and Dorice Miranda of Ferndale, who shifted their 500-cow dairy to organic status, were helped to do so with low-interest financing from Humboldt County. "We saw organic as a potential market that related to the natural assets of Humboldt County," explained Jacqueline Debets, the County's economic development coordinator. "We provided financing [to the Mirandas] that had terms tailored for the [three-year organic] transition."

In 2002, the Petersens, Mirandas, and Alexandres began shipping milk in Humboldt Creamery trucks to Clover Stornetta. Since then, eight more dairies in the region have transitioned to organic, and two more are planning to become certified this year.

In the last four years, Humboldt Creamery's annual organic sales have grown from zero to $15 million, 21 percent of total sales, according to Ghilarducci. The Creamery makes organic milk powder for candy and yogurt manufacturers worldwide, as well as providing milk for national organic manufacturers Horizon Organic and Organic Valley.

The future of organic dairies in Humboldt and Del Norte Counties appears bright, and that's good news for people who appreciate how deeply dairies are etched into the North Coast's cultural and aesthetic landscape.

Jim Hight wrote about the shift to organic milk for The North Coast Journal.

BOB DORAN

Robert, Cynthia, and Dave Petersen at their organic dairy farm

School Gardens Nurture Knowledge and Healthy Habits

TO THE MEMBERS of an older generation, the phrase "school garden" may conjure up an image of a small patch of dirt where students planted a few radishes and green beans that may or may not have survived until harvest time. But many of today's school gardens are much larger and more elaborate—small farms almost—where students learn about biology, ecology, agriculture, nutrition, and healthy eating habits.

One of the most famous of these gardens is the "Edible Schoolyard" at Berkeley's Martin Luther King Jr. Middle School, launched in 1995 with the help of chef Alice Waters. Students there tend an acre of organically grown vegetables, fruit, and herbs. The school hopes to add a new cafeteria and dining commons where students will be able to eat what they have grown.

There are, however, many other equally worthy but less publicized school garden projects. Dozens of them are in California, which benefits from a climate conducive to gardening during the months that schools are in session, but they are springing up in other states as well. At Berkeley's Willard Middle School, across town from the Edible Schoolyard, garden teacher Matt Tsang supervises 3,500 square feet of carrots, potatoes, greens, strawberries, sunflowers, and more, growing in neat rows of raised beds. The school started its garden in 1991 with a tiny patch of ground near the library, and gradually expanded, Tsang says. As the garden grew in size, so did the program. At first just a few students were involved; now every sixth grader takes gardening, together with cooking and nutrition classes.

Down south, meanwhile, at Thomas Jefferson Elementary School in Burbank, fifth graders tend cool weather crops like spinach, peas, lettuce, beans, and broccoli, with the help of garden coordinator Kristine Chinn. This school also has a small citrus orchard and two native plant gardens.

Tsang and Chinn both say that having children work outside provides them with a way to reach out. "Maybe a kid who's not doing well in a mainstream class can come out here and be a success," said Tsang, who has taught gardening at Willard since 1997.

Gardening also helps urban and suburban children get acquainted with the world outside their home environments. Many of Chinn's students live in apartments with no back yards. Seeing the plants growing at school can be a revelation to them. "They don't know where zucchini comes from, literally," she said. "They don't know corn grows on stalks."

"I was surprised at their level of disconnect with where our food comes from," Tsang added. Willard's pupils use organic and biointensive growing methods, and the yields are surprisingly high. He pointed to a 25-by-4-foot raised bed which he expects to produce between 50 and 100 pounds of potatoes to be roasted and offered as snacks. One year, pupils harvested 17 pounds of lettuce a week from a single bed.

Nutrition plays a major part in both schools' programs. Jefferson's fifth graders have a harvest party every year where they can enjoy the fruits of their labor. They also get to

Matt Tsang (hat) works with students in the Willard Middle School garden.

take home some of the food they grow. The rest is donated to local homeless shelters.

At Willard, students are encouraged in cooking classes to sample unusual foodstuffs such as arugula and tomatoes of various hues—things that sixth graders might regard as weird or even gross. After planting them, watching them grow, and harvesting them, they are at least willing to give them a try. "By the end of the year, a kid who wouldn't eat anything will go through the garden pulling off flowers and eating them," Tsang says, laughing. Chinn's students are quite taken with ears of baby corn that can be eaten whole—"the kind you have to spend lots of money for at a restaurant," she noted.

Produce grown by the Willard students is used for snacks, offered regularly in the garden. The school cafeteria used to use some of the school-grown food for its salad bar, but that space was lost when the school was remodeled last year, Tsang said. Even so, "everything in the garden gets to the kids one way or another."

Any way to get kids to eat more vegetables can only be a good thing. The number of obese children in the U.S. has doubled since the 1960s, and at least 15 percent of children between six and 19 are overweight. Not coincidentally, their diet has deteriorated as well. One recent survey estimated that up to half the calories consumed by young people come from junk food.

"School gardens are seen as an antidote to that," said Travis Smith, program supervisor for the Berkeley School District's Nutritional Network. "Just talking about the food pyramid doesn't grab these kids."

It would be nice if schools could begin by replacing standard cafeteria fare with veggies from their school gardens and other locally grown organic fare, some have suggested, but much would have to change for that to happen, especially in big districts that supply all schools from a single vendor. Smith points out that few schools could grow enough to meet the cafeteria's needs on a daily basis. And it would cost more—school cafeterias are set up to serve meals that require little or no advance preparation. Working in a school garden isn't going to instantly convert a sixth grader from fries to steamed parsley potatoes. But "We're giving them choices," said Tsang. "My hope is that we've planted a seed." ■

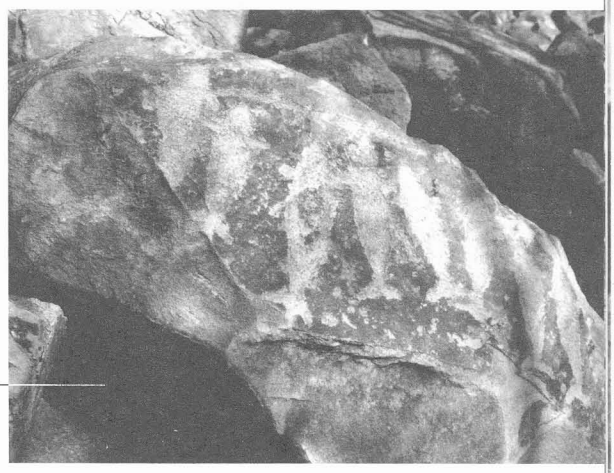
Bill O'Brien is an independent reporter based in Oakland.

PHOTOS THIS SPREAD: DAN ROBBIN

Stone Aquarium in the Desert

WESLEY MARX

PHOTOS THIS SPREAD: WESLEY MARX



Petroglyphs of fish forms at Piedras Pintas

I was surrounded by fish. There were fish above me, fish below me, and fish to either side. It was a bewildering sight. So was my vantage point. Instead of looking down at a marine reef, I was halfway up a rocky bluff that rises sheer from a desert floor studded with large cardon cactus. Ten miles from the Gulf of California shore, the fish had been pecked or incised into the sun-warmed volcanic rock by a determined person wielding another rock. Art by percussion, peck by pounding peck! And these artists did not stint on size. One ray had a wing span of three and a half feet.

Rock art is the term applied to all images created by native people on stone, be they painted (pictographs) or incised (petroglyphs). Piedras Pintas, near Mulegé in central Baja California, Mexico, is unique in the global annals of rock art. Nowhere else has such a large and varied encyclopedia of marine life imagery been discovered. Along with dolphinlike figures and marine turtles, nearly 1,500 fish images adorn the fractured rocks and boulders that comprise the bluff. And these are not just generic fish forms; many are detailed down to the family and species level. I see hammerhead sharks, bat rays, and sailfish. This is a stone aquarium surrounded by a sea of sand. Obviously the people who created these images had a thing about marine animals. But who carved these petroglyphs, when, and why?

This mystery set me on a search that led to many interesting discoveries about rock art elsewhere, but not, ironically, to answers to my basic questions.

I was first introduced to this marine menagerie in 1992 while attending a meeting of Baja California historians in Santa

VISITING ROCK ART SITES

TO PROTECT PETROGLYPHS and pictographs in Baja California, the National Institute of Anthropology and History (INAH) regulates visitation and works with ranchers whose property contains important sites. In central Baja California, visitors must register at INAH offices in San Ignacio and Mulegé before going to a site, and must be accompanied by a licensed guide during their visit. A camera permit is required and flash photography is prohibited, as is outlining images in water or chalk to highlight them, as well as the making of molds or rubbings.

To visit Chumash Painted Cave State Historical Park, in the Santa Ynez Mountains above Santa Barbara, call the Channel Coast District of California State Parks: (805) 968-1033. The Chumash Interpretive Center, in Oakbrook Regional Park, Thousand Oaks, Ventura County, conducts Saturday nature walks that include the swordfish and other pictographs: (805) 492-8076 or www.chumashinterpretive center.org. The Santa Barbara Museum of Natural History has a Chumash exhibit, including a replica of a rock art panel.

Among other rock art sites open to visitors, 38 are listed in *A Guide to Rock Art Sites: Southern California and Southern Nevada* by David S. Whitley (Mountain Press, Missoula, Montana). The author advises that "Any behavior that would be inappropriate in a church or at a cemetery should not be practiced at the sites." It is illegal to collect rock art from public lands or to vandalize sites. Such activity should be reported to local law enforcement or to nearby state or national parks.

—*WM*

PHOTOS THIS SPREAD: WESLEY MARX

"Mother Sea Goddess," a female form at Piedras Pintas

Rosalía, some 45 miles to the north. John Hendricks, director of the Sherman Library in Corona del Mar and an organizer of the conference, arranged a visit to Piedras Pintas. (The name means "painted rocks" in Spanish, despite the fact that the images are incised rather than painted.) After a hot, bumpy ride over desert roads, our four-wheel-drive caravan came to a stop at a nondescript bluff.

Only as I reached the base of the bluff did images of fish begin to materialize under the relentless light of the desert sun. As I ascended, rock by jagged rock, more emerged, like stars slowly appearing in a darkening sky. We didn't stay long, and I did not realize how extensive and detailed these images were. I did notice and was intrigued by the fact that most of the fish were in a vertical position. I knew I wanted to return. This place was so strange—a desert celebration of the living seas.

Searching for Tracks

In the interim, I resolved to learn more about the site. While a considerable literature exists on rock art, I could find only two sources that dealt specifically with Piedras Pintas. In 1992, O. Winston Hampton, a rock art researcher with the University of Colorado Museum in Boulder, delivered a paper on the site at the annual Rock Art Symposium in San Diego sponsored by the San Diego Museum of Man. In an observation that I could relate to, Hampton noted that climbing around Piedras Pintas "gives one the feeling of being inside a prehistoric saltwater aquarium or the sea itself." Hampton was also impressed by a large female human form "dripping with ecstatic energy." He named her Mother Sea Goddess and went on to observe that, throughout prehistoric time, images resembling this one were "used to symbolize, in some fashion, regenerative power and fertility." The figure has six digits on each hand and a six-sided ray on her navel. I would find out later that these features were symbols of supernatural powers.

As to the numerous fish images, Hampton pointed out that they differed significantly from petroglyphs found a mere ten miles away, along the shore of the Gulf of California. The shoreside glyphs were much simpler, smaller, and fewer in number. Without going into the possible meaning of the images at Piedras Pintas, he concluded that the place "was a major reli-

gious center, or at least a shrine" for maritime people who lived along the Gulf shore and others who traveled there from the desert.

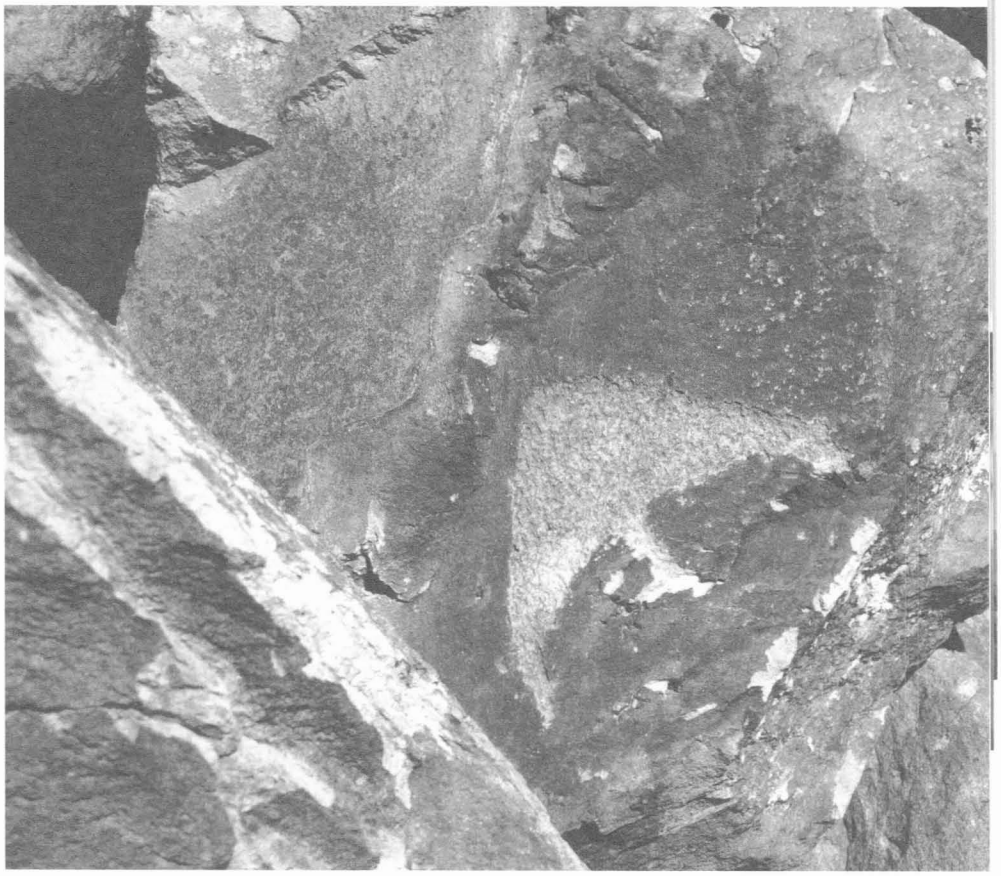
Hampton did not attempt to identify the native people who lived in this region. I later learned from a paper Kay Sanger presented to the International Rock Art Association in 1994 that they likely were the Cochimí, who inhabited central Baja California when the Jesuit missionaries arrived there in 1697. Marine animals were a prominent part of the Cochimí diet, more so than land animals. They fished from rafts made of bound-up tule reeds, using cactus thorns as hooks. To catch one prized animal, the green sea turtle, they needed no hook. When they spied one at the sea surface they would slide off the raft, flip the turtle on its back, and push it onto the raft.

Sanger, a rock art researcher with Fowler Museum of Cultural History at the University of California, Los Angeles, determined that some 46 of these images were detailed enough to be identified by species or family. With their intimate knowledge of marine life, the Cochimí certainly had the background to create what amounts to one of the world's first marine guides, albeit one that was not very portable.

However, when Jesuit missionaries asked their Cochimí converts about the pictures, and about other engraved and painted images throughout central Baja California, they were told that the images were the work of a race of giants who had come from the north long ago. Although the Jesuits were skeptical about the giants, they accepted the disclaimer, for they had a low opinion of the local culture; in the view of the Jesuits, whoever had made these images "had more application, more talent and more understanding" than the Cochimí. Some scholars have suggested that the Cochimí refused to take artistic credit out of concern that the Jesuits would destroy the images as competing icons.

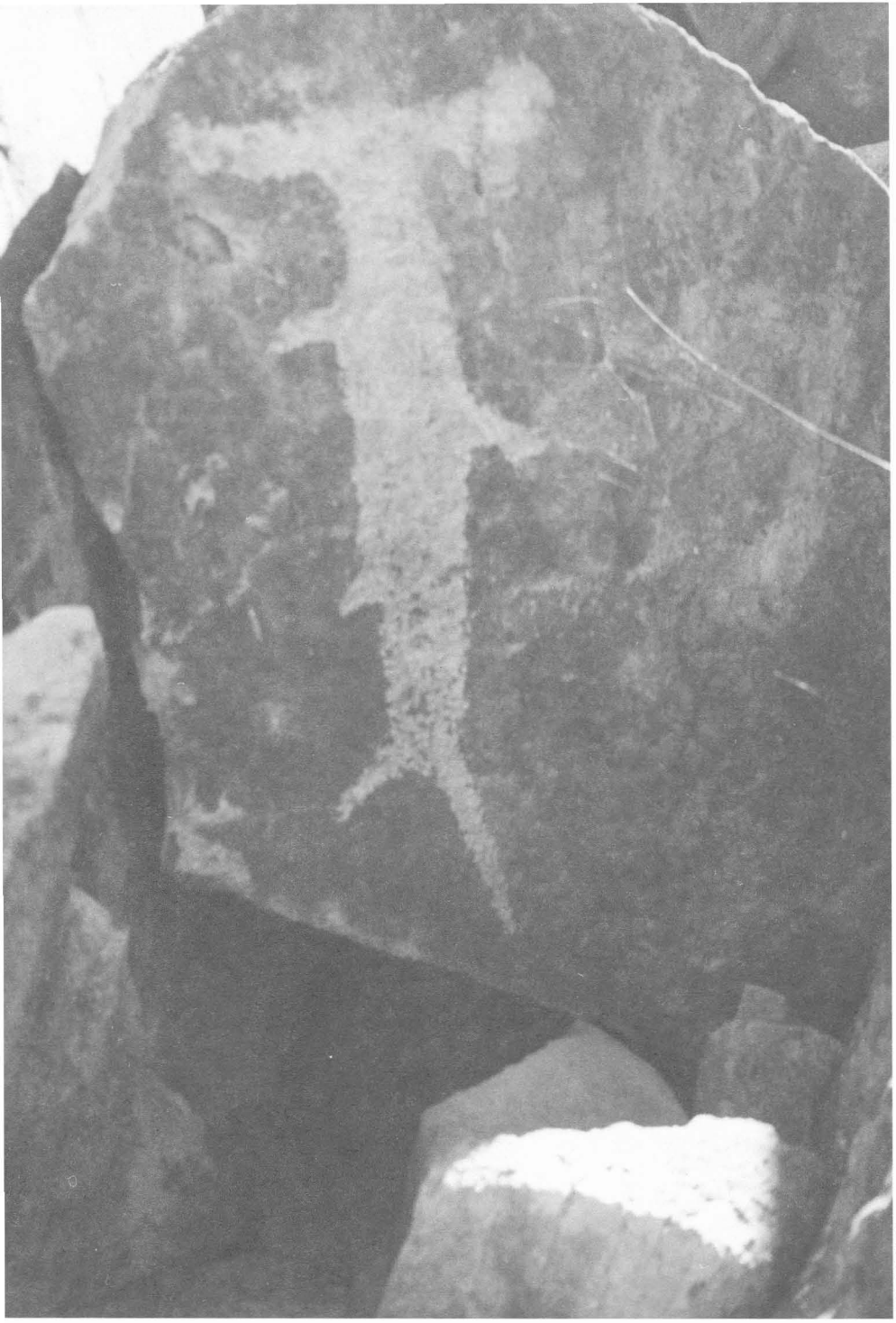
Dating might reveal if the creators were of a more recent or distant past, but reliable dating of rock art is in its infancy. Experts estimate that most Baja rock art is 500 to 1,500 years old. That leaves room for the Cochimí, their ancestors, or an entirely different tribe.

What is sure is that these image makers, whoever they were, made the momentous leap from seeing three-dimensional images in the real world to picturing two-dimensional images in the mind's eye and trans-



Top: The "fishman"

Bottom: A stingray



WESLEY MARX

A hammerhead shark

ferring this vision to stone. Given the sheer number of images at Piedras Pintas and the fact that some images were superimposed on older ones, I sensed that the act of making images may have been as important as the finished products themselves.

I wondered whether information about the religious beliefs, mythology, or rituals of the Cochimí or their ancestors might shed light on the carvings. But such information is "scant," according to Sanger. The Cochimí, despite having survived for centuries in this harsh desert, had great difficulty surviving the intentions of the dedicated Jesuits. Mission life exposed them to disease and a drastic change in diet, with less fish and more meat, grain, and sugar. A century and a half after the missionaries arrived, the Cochimí "were gone, their cultures forgotten, their eyes closed, and their faces shrouded," as historian Harry Crosby observed in *Antigua California* (1994). By the time the archeologists and anthropologists reached their ancestral land, there were no Cochimí left to interview.

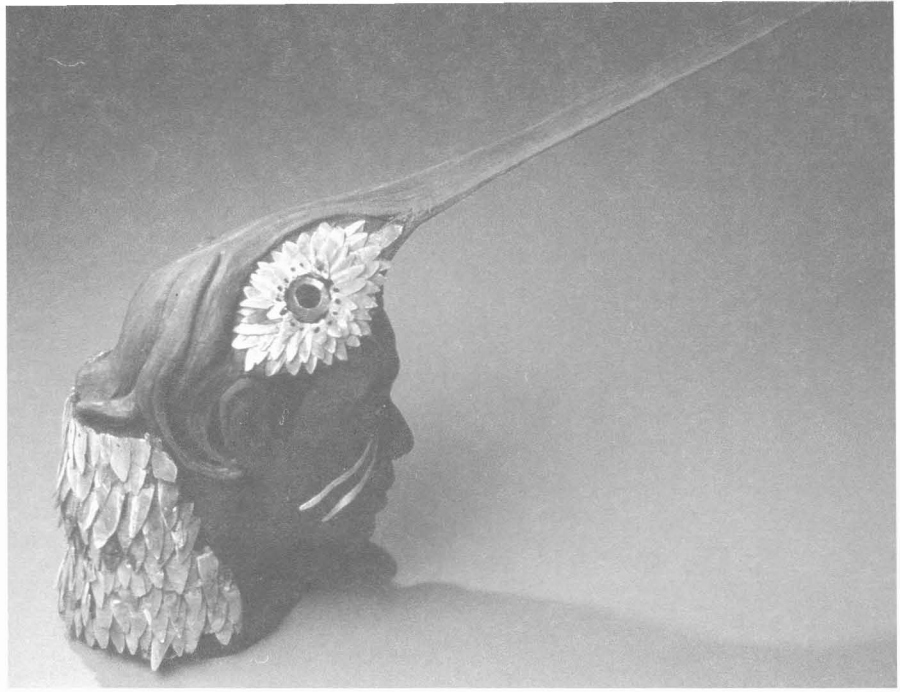
What we now know about them is based largely on Jesuit accounts and archeological digs. This information base, however, sheds little light on the stone images or their creators. As Sanger concluded, "The meaning of the realistic images and symbolic communication at Piedras Pintas remains an enigma."

As it turns out, the decoding of rock art is a source of continuing and heated debate worldwide. Some scholars have argued that rock art served a decorative function, or that it was art for art's sake. Critics counter that this perspective reduces native people to prehistoric dilettantes. Indeed, I could not visualize the carvers at Piedras Pintas as simply doodling to pass the time. Others have argued that rock art was intended to ensure the killing of prey—that is, it was hunting magic. It's worth noting that common, easily caught prey such as rabbits are rare in rock art generally, while dangerous animals such as rattlesnakes and grizzly bears appear more frequently. The carvers at Piedras Pintas made room for hammerhead sharks but not for easily harvested prey such as clams and scallops. Hunting magic, however, fails to explain the presence of "fishmen"—fishlike bodies with human legs and arms.

More recently, it has been argued that rock art represents vision quests undertaken by individuals seeking special powers, shamans in particular. The shaman seeks contact with a spirit helper to assist him in curing people and otherwise serving his community. To reach the supernatural realm, the shaman enters an altered state of consciousness—a trance induced by fasting, isolation, or the taking of hallucinogens. The trance induces visions of semi-abstract forms—grids, wavy lines, dot patterns—that gradually morph into power-bestowing animals such as bears or snakes. Sometimes the shaman and the power-bestowing animal fuse into one. After the trance, the shaman carves or paints his visions on stone as a sign of having received supernatural power. The images,

as well as the rock art site itself, become sacred in the eyes of the community. This perspective has support in ethnographic accounts.

Piedras Pintas is not the only place in the Californias where rock art stands in silent witness to an interrupted story now lost to us. Some 10 miles to the south, a rock surface teems with images of turtles, sailfish, and semi-abstract forms, all painted in bold red strokes. Another nearby site, La Trinidad, features a painted fish with bone-like lines across its body, pierced by an arrow. A symbol for success in hunting, perhaps, or a symbol of death itself? Nearby, the elegant red outline of an antlered deer graces the pink bedrock. Could this be a shaman's spirit helper?



COURTESY SANTA BARBARA MUSEUM OF NATURAL HISTORY

A Chumash shaman dancer's swordfish headdress

Master of Animals

While pictographs and petroglyphs in central Baja California are largely "representational," depicting animals and human forms we can recognize, elsewhere in Baja and in southern California pictographs and petroglyphs tend to be semi-abstract or geometric in style. There are exceptions, however. In Thousand Oaks, Ventura County, for example, I encountered a small red pictograph of a swordfish that was entirely realistic. It was in Oakbrook Regional Park, on a sandstone boulder shaded by oak trees, and it had been created by the Chumash. (Another similar pictograph is located in a cave on Vandenberg Air Force Base.) I wondered why they had taken pains to render such recognizable detail.

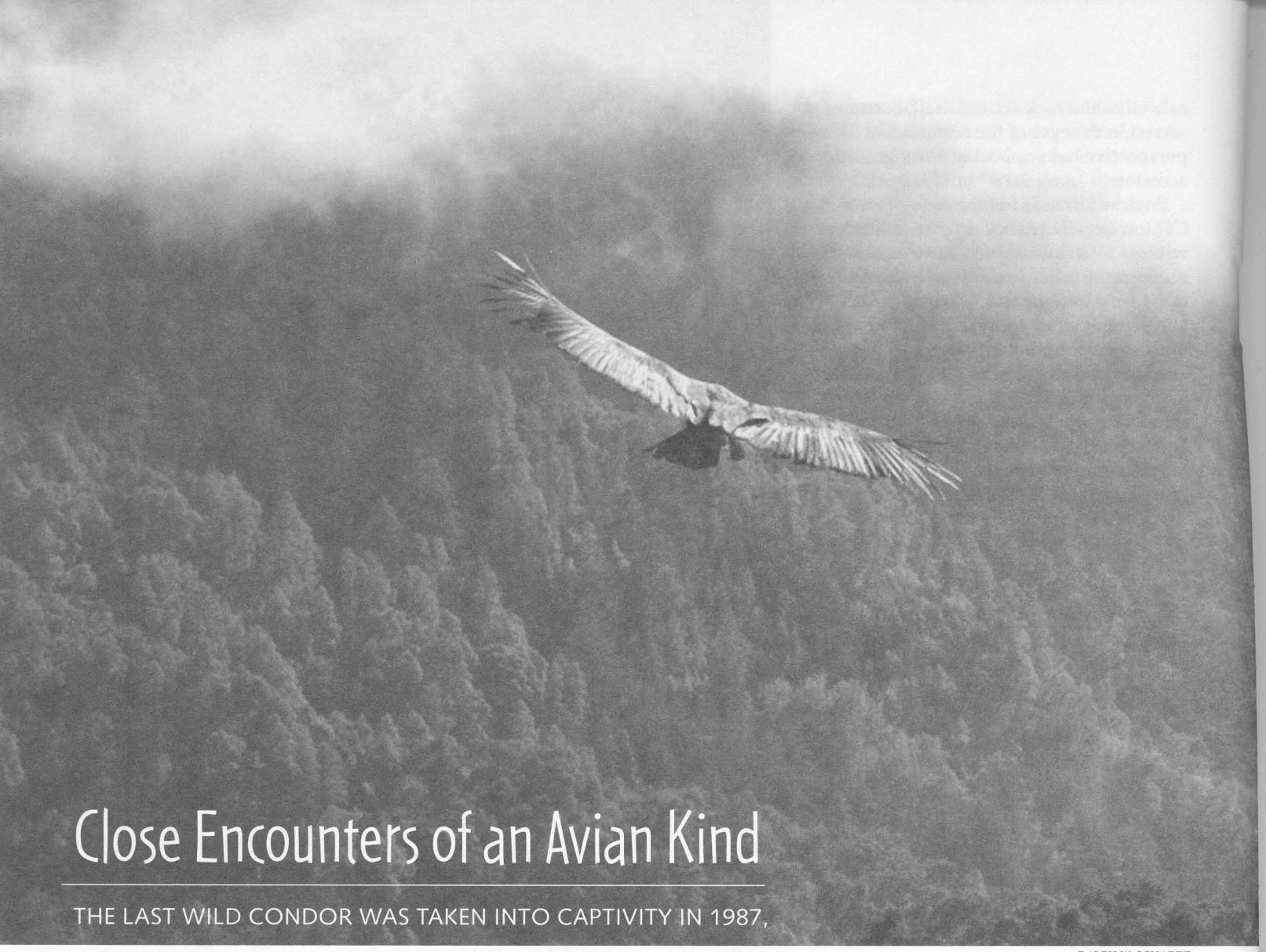
The Chumash inhabited a region that extended from Malibu north to Morro Bay and included the northern Channel Islands. Some Chumash survived the Mission era and subsequent political upheavals. (Today, the Santa Ynez band of Chumash Mission Indians owns the flourishing Chumash Casino in Santa Ynez.) We know that they pursued fish in lightweight but seaworthy plank canoes (*tomols*) rather than in reed rafts, and that swordfish not only was food to them but also played a prominent role in their rituals. Indeed, no other marine animal—not sharks, elephant seals, or whales—was considered such a valuable spirit helper.

The Chumash revered the swordfish as a "master of animals," with the power to drive whales ashore, and thus provide food, according to an article by Demorest Davenport, a biologist at the University of California, Santa Barbara, and John Johnson and Jan Timbrook of the Department of Anthropology at the Santa Barbara Museum of Natural History, published in 1993 in the archeological journal, *Antiquity*.

In ceremonies to honor this master of animals and gain its favor, a shaman garbed in an iridescent cape made of abalone shell pieces and wearing a headdress with a swordfish bill would perform a whirling dance. The Chumash hoped that this great fish would "make available a California gray whale while the animals were moving en masse to the north," the *Antiquity* article suggested.

The Chumash relationship with one particular fish indicates the richness and complexity of their culture. They, like all aboriginal peoples, lived not apart from, but in intimate relationship with life around them. When I visited Piedras Pintas again and gazed up at the stone aquarium, I knew little more about the carvings than I did the first time I set eyes on them. What I did know was that they were made by people sustained by myth, natural observation, and ritual. The material world of these hunter-gatherers may have been "simple" by our standards, but their mental world was as complex and searching as our own. When I see the shark at Piedras Pintas or the deer at La Trinidad, I feel I am in the presence of an alert and questing mind that dared to envision in stone the hopes, the fears, and the cosmic beliefs of a people deeply attuned to the rhythms of the living world. ■

Wesley Marx, author of The Frail Ocean, *writes frequently on ocean issues. E-mail him at wmarx@globalcrossing.net.*



Close Encounters of an Avian Kind

THE LAST WILD CONDOR WAS TAKEN INTO CAPTIVITY IN 1987, JOINING THE 26 OTHERS STILL IN EXISTENCE. SINCE THAT TIME, CAPTIVE BREEDING EFFORTS HAVE LED TO A POPULATION OF 232 INDIVIDUALS, 97 OF WHICH, AS OF MAY 1, ARE FLYING FREE OVER THE GRAND CANYON, IN VENTURA COUNTY, IN BAJA CALIFORNIA, AND ON CALIFORNIA'S CENTRAL COAST.

RALPH W. SCHARDT

ANNE CANRIGHT

Top: A condor takes flight after being released in Big Sur.

BACK IN FEBRUARY, my friend Joan and I were doing an easy rock climb at Pinnacles National Monument in the Gabilan Mountains, east of Soledad in the Salinas Valley. She was obscured from view as I belayed her across a low peak, when I heard a screech: "A giant bird landed right *here*. What do I do? It looks like it wants to peck me!"

It was all I could do to keep from dropping the rope and dashing over, because as soon as I heard the words "giant bird," I knew: Joan was having a close encounter with a California condor (*Gymnogyps californianus*). Six young condors had been released at Pinnacles in January, part of the expanding reintroduction program for this highly endangered species; surely, this "giant bird" was one of them. However, I maintained my cool and waited until she anchored herself and set up my belay. *Then* I dashed.

Sure enough, she was being inspected by not just one but two of the most hideously handsome birds I'd ever seen. They were mere feet away. On their wings were large black patches with prominent white numbers, patagial or wing tags, to which miniature radio transmitters were attached. Our friends were numbers 265 and 266, and they seemed completely unfazed by our

presence. Indeed, they—especially 265—seemed fascinated. As were we.

These were adolescents, with naked black heads (adults have orange-pink heads), elegant feathery ruffs around their necks, huge pale blue feet, and watchful brown eyes—not to mention viciously hooked black beaks, perfect for ripping away at carrion. Hunkered there on the rock, they stood almost waist high.

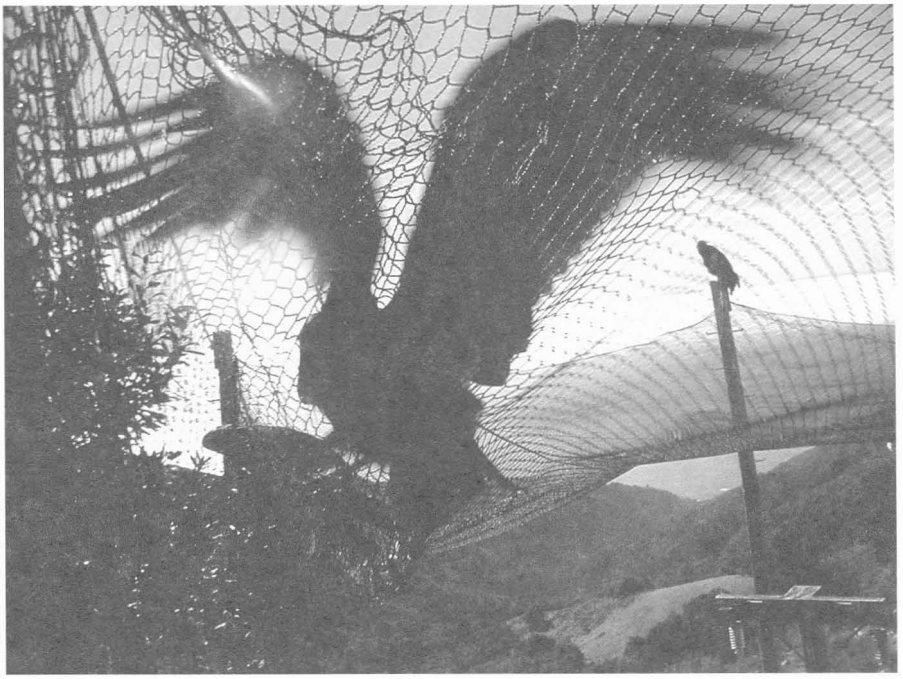
Since they showed no signs of moving, we sidestepped around them. They extended their enormous wings and hopped away a bit, eyeing us watchfully. Whenever we got a ways away, they'd lift into the air and swoop down again onto a nearby rock for another close look.

This went on for a couple of hours as we picked our way through the climb. Eventually a third bird (286) joined the party, though he remained aloof. Once Joan and I settled down for lunch, the three of them picked up and soared into the air. A bunch of crows were circling a little higher up. The contrast in size between crows and condors, with their nine-foot-plus wingspan, was breathtaking.

Pecking Order

A COUPLE OF MONTHS after this incident, I went for a hike at Pinnacles. Now on the general-information bulletin board is a prominent warning telling climbers to stay at least 100 feet away from any condor that approaches. And this statement was posted on the Friends of Pinnacles web site on March 23: "According to recent information coming from the condor project director, climbers should NOT 'haze' (try to scare off) the condors in any way. Climbers are advised: if you are approached, simply ignore the birds until they are done checking you out."

That got me to wondering about "our birds," especially 265, who was so boldly curious. Was he in danger of being stripped of his wild status? The National Park Service web site gave me a preliminary answer. In early April, the condor log (www.nps.gov/pinn/condor/release.htm) reported, this bird was recaptured because of his close approaches to climbers on at least five occasions, a behavior he had "shown no tendency towards ceasing. . . . The hope is that by holding him for a while, he will be taken out of the social interactions of the other free-ranging birds and lose his high-ranking status in the overall condor pecking order. When released, he will have to spend more time and work harder to maintain his place in the dominance hierarchy and have less time and/or inclination to approach humans."



VENTANA WILDERNESS SOCIETY

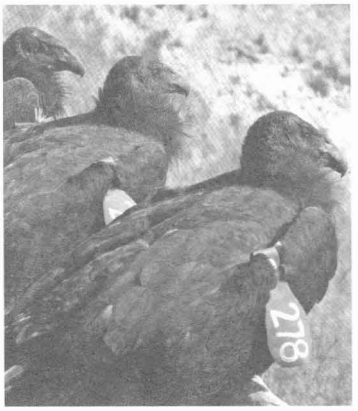
The recapture itself should have helped, too. Sheila Foster, outreach coordinator of the Ventana Wilderness Society (VWS), told me: "Hey, it was a human who caught him and stuck him in this big cage." That sort of manhandling might go a long way toward teaching him to avoid people. The nonprofit VWS is coordinating the Pinnacles condor program.

A second condor, 278, was recaptured at the same time, I learned, but for very different reasons. That bird, one of the first to be released, was not competing well with the others for food and was taking unacceptable chances with predators. He started off by roosting not in a tree but on the ground. In coyote country, that's not a good idea, so he was removed to the nearby flight pen. On this second go-round in captivity, he had regained weight and appeared to be thriving.

It turned out that 278 had three damaged shafts in his tail, limiting his ability to maneuver, according to Kelly Sorenson, executive director of the VWS. A little time will help him recover. The fact that he is consorting now with five young females and a young male, all recently arrived at Pinnacles from San Diego Wild Animal Park and Los Angeles Zoo and scheduled for release in October, may also improve his status in the flock, placing him higher on

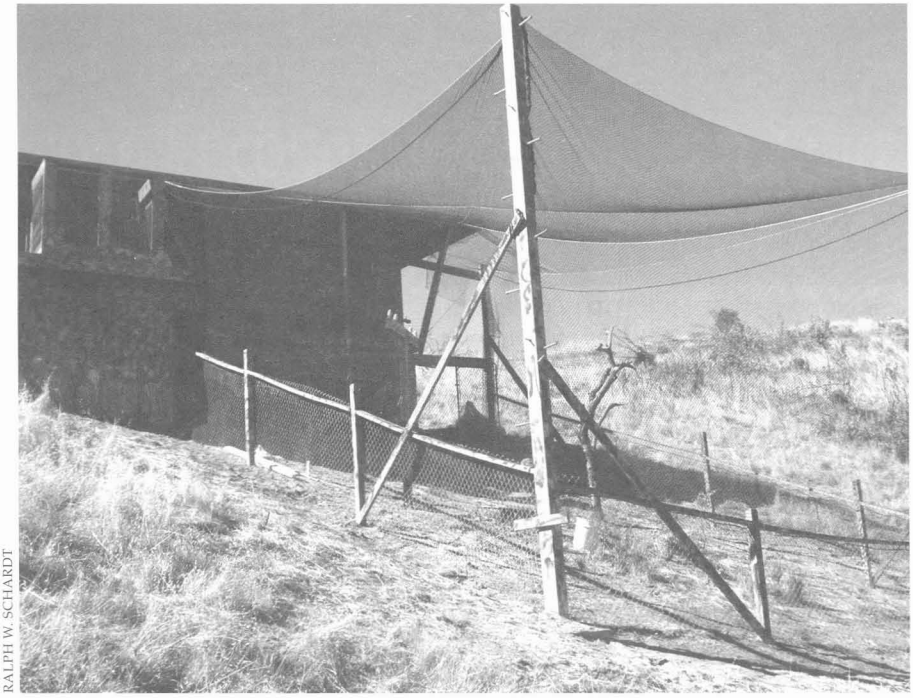
Top: Wild condors come to visit the flight cage.

Bottom: Three young condors with wing tags



RALPH W. SCHARDT

VENTANA WILDERNESS SOCIETY



RALPH W. SCHARDT

Top: Condors are serious bathers. The bird facing the camera is Hoinewut, the condor mentor.

Above: Pinnacles release facility

the pecking order, a potential boon at mealtime. Although no plans are yet in place for re-releasing 265 and 278, Sorensen stressed that "They're intended to be in the wild," and every effort *will* be made to see that they fly free again.

The other four free-flying birds, happily, are feeding well, roaming widely, and not approaching people or buildings. One bird, 287—identified from the start as the strongest flyer of the six—is outfitted with a lightweight GPS (global positioning system) transmitter, which allows biologists to track his movements. (The radio transmitters on the other birds are not very reliable in the rugged terrain of the Gabilans.) Since his first short free flight on December 20, 2003, he has expanded his range to encompass almost 300 square miles in and adjacent to Pinnacles.

Condor Socialization

THE STORY OF THESE SIX birds began in the spring of 2002, when they hatched at San Diego Wild Animal Park's condor breeding facility. (Other such facilities exist at the Los Angeles Zoo and the World Center for Birds of Prey in Boise, Idaho; a fourth facility will soon open at the Oregon Zoo.) As soon as they emerged from their eggs, after 56 days of incubation, the hatchlings were taken under the wing of an adult mentor condor to learn natural behaviors—eating, cleaning, roosting—in a social context. Some interaction with humans was necessary in the feeding process, though an effort was made to minimize positive human associations through the use of "condor puppets."

A year later, the juveniles were transferred north to the VWS's Big Sur Condor Reintroduction Project site. There our birds were introduced to their 12-year-old mentor Hoinewut (a Chumash word; he's called Hoi—pronounced as two syllables, *ho-ee*—for short), who would accompany them to Pinnacles. The VWS field notes for that April report: "Condor mentor R63, as always, received the new batch of condors with the ease and discipline of an adult. He quickly established the dominant presence over the flock and has set the pace for the new group."

"Hoi is the leader, the chief," explained Sorenson. "He's a really experienced, wise, and strong bird. If any of the birds get out of line and disrespect his authority, he'll put them in their place, gently but firmly." Hoi's duties go beyond discipline, however. "If anything happens around him—for example if a coyote or a golden eagle comes around the pen—he's not going to like it at all. And the young birds are going to watch him carefully." It's a delicate balance, being a good mentor, and I wondered if Hoi's excellent job performance was not preventing his release into the wild. "The biologists would like to see that," said Sorenson. "But it won't happen in the fore-

seeable future. There are so few good mentors, and right now that's clearly his job."

As bonding continued, the birds had opportunities to observe and interact with seasoned, free-flying condors—former residents of the Big Sur condor facility who often stop by for a visit when they are in the area. (They are allowed free access into and out of the flight cage.)

Transfer to the Pinnacles release facility occurred in early September 2003. The biologists, said former VWS field coordinator Joe Burnett, were "in complete awe" as they released the birds into their new enclosure one by one.

The flight cage, designed for 10 or 11 birds, is 40 by 25 feet, by 24 feet high. It is built on a slope and completely covered with nylon netting. Inside, there are a number of snags to roost on, and at the top a wooden hutchlike structure gives the birds a sheltered place to retire into. All around the hutch, a ledge provides additional roosting opportunities, and a nearby pool allows them to drink and bathe. (Condors are serious bathers—and given their reliance on carrion, that's a good thing.) Food—usually stillborn calves, with rats and rabbits added for spice—is provided via a pulley system, so the birds don't see the people feeding them and associate carrion with people. The pen is monitored continuously by an observer.

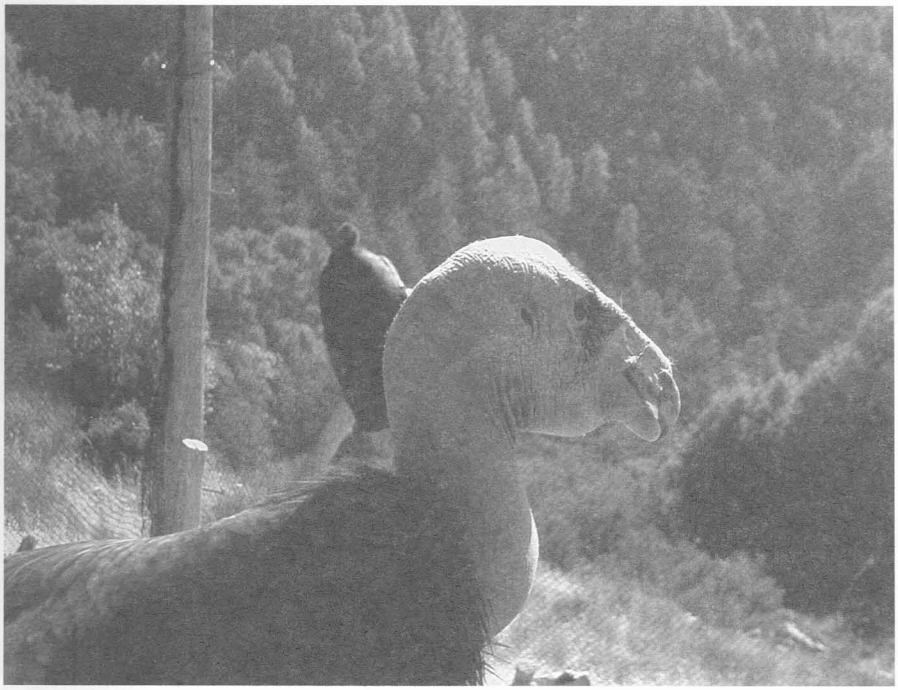
The first field notes on the newly resettled condors remind me of the Three Stooges. This from October 2003: "The rambunctious group of young males getting ready for release at Pinnacles . . . is giving the new release facility a thorough workover. They managed to break both perch scales inside the release pen with their moderate physical antics. An electric perch scale has managed to withstand their fury, but it's still too early to tell if it will outlast them. The adult mentor has a full plate trying to keep the upper hand in all the action, but he always has a way of bringing these boys back to reality."

Just as they had been introduced into the holding facility one by one, beginning on December 20, 2003, they were released into the wild: this time two by two. Taking flight, they became the first California condors to soar above Pinnacles in almost 100 years. (The last wild breeding pair was recorded in 1898, said Sorenson, and by 1920 no more were seen. Most were probably shot, poisoned, or killed by lead poisoning from bullets.)

As of January 24, 2004, all six were flying free. They continue to do so, with the hopefully temporary exceptions of 265 and 278. After release, the transition to full-fledged wild status involved a few steps, explained Sorenson. "First they had to learn how to roost off the ground. Coupled with that first step, they had to be able to find the food we put out for them and successfully feed as a group. Then the next step was for them to navigate the surrounding area and get to the high rocky area—which, as you personally know, they did fairly quickly. After that, their next big feat is to expand their range and navigate more of the region," ultimately traveling up to 150 miles away. "Some will breed away," as two females from the Big Sur colony are now doing (they've set up nests in Ventura County); "some will stay in their home range."

RALPH W. SCHARDT

In the meantime, another half dozen young birds have arrived to begin their period of socialization with Hoi. By the end of the year, 12 of these majestic birds may be keeping watch over their ancestral territory. That will depend on their good behavior, their ability to survive the many



VENTANA WILDERNESS SOCIETY

RALPH W. SCHARDT

Top: Hoinewut, the adult condor mentor

Above: An impressive feather

hazards they will face, and on human efforts as well.

Constant Vigilance

BIOLOGISTS WORKING with condors have their hands full. Very full. If they're not out implementing a hazing protocol—using water guns to squirt condors perching near trails or benches, trying to convince them humans aren't fun to interact with—they may be carting calf carcasses to the feeding area or watching birds socialize in the flight cage via one-way mirrors.

In the early years of the reintroduction program, five condors died when they collided with power lines. Experts assessed the situation and instituted various changes in rearing methods, including power pole aversion training. This technique involves the placement of a mock power pole in the young birds' flight pen that emits a small electrical charge whenever a condor attempts to land on it. Condor mortalities from power line collisions have been greatly reduced as a result of this training.

One reason Pinnacles was deemed a desirable release site was its remoteness: there are few power lines to tempt the birds. However, with a potential daily range of 150 miles, a condor can easily fly into areas where the hazard exists. Power pole aversion training has become a standard practice. Indeed, a mock power pole is a prominent structure in the Pinnacles flight pen.

Lead poisoning is a more pervasive problem. Condors are scavengers—there's no getting around that. And they can't be trained to check carrion for lead pellets. As a result, hunters are being asked to assist in the California condor recovery effort. In 2003, the National Forest Service began offering some financial motivation. "We understand that non-lead ammunition performs every bit as well, if not better, than traditional rifle bullets, but it is more expensive," explained Maeton Freel, wildlife biologist for the Los Padres National Forest. "We thought a rebate to cover the added cost might be a good incentive to try the lead-free bullets."

Hunters are also being asked to retrieve or to bury the remains of animals killed with lead shot. A multiagency California Condor Lead Exposure Reduction Steering Committee (a subcommittee of the California Condor Recovery Team, which serves in an advisory capacity to the U.S. Fish and Wildlife Service) is working to educate hunters on the impacts of lead, and on alternatives. One outgrowth of this effort is Project Gutpile (see http://projectgutpile.org). Despite its colorful name, it is a repository of solid information about lead ammunition and condor recovery.

"To monitor lead exposure in the Big Sur flock," explained Burnett, "we recapture the condors twice a year, once in the spring and once in the fall. If we're lucky, we'll catch a condor before the lead level in its blood becomes lethal. We can also conduct general physicals and change radio tags

that have expired during these recaptures." The Pinnacle condors will join this routine sometime within the next few months. If a bird is found to have a high level of lead in its blood, it must undergo at least one round of chelation therapy. A facility at the Monterey County SPCA exists for this purpose, though lately, according to Foster, no birds have had to be subjected to this painful procedure: their lead levels haven't been dangerously high.

Back to the Wild

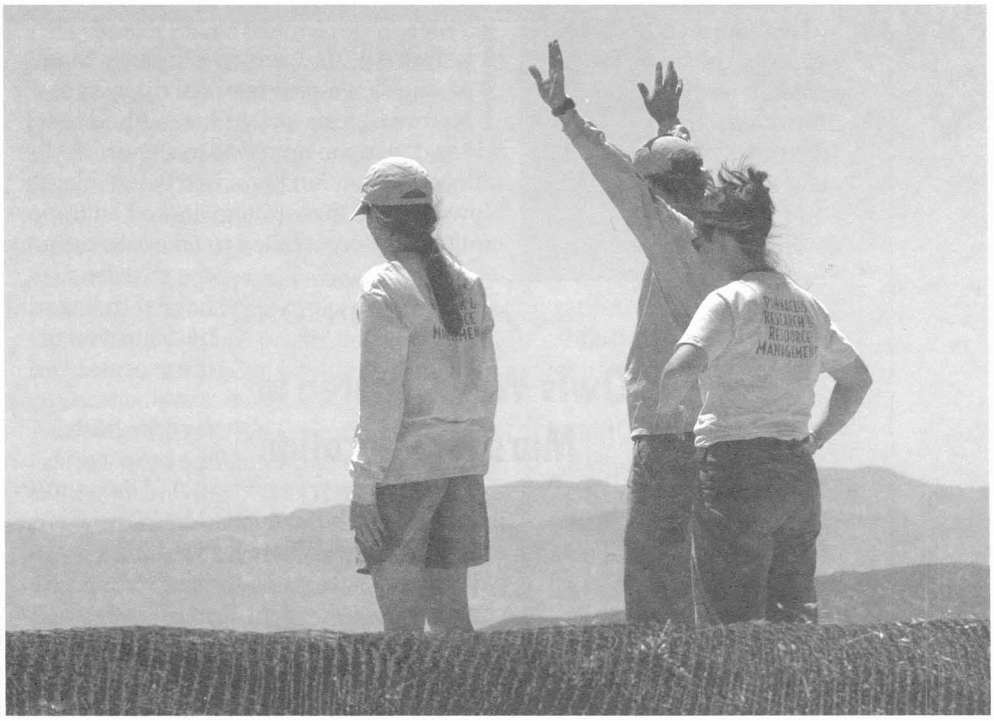
ALTHOUGH EVERY CONDOR will have to be recaptured twice a year for the foreseeable future, says Sorenson, the long-term goal of the condor recovery program is to have two wild populations—one in California, the other in Arizona, each comprising 150 free-flying birds and having about 15 breeding pairs—as well as approximately 150 birds in captive breeding. Breeding within the wild populations began last year, which "is just a function of how long we've been at it." It takes six to eight years for a condor to become reproductive, and the reintroduction program is only a little older than that. In 2003, one chick fledged in Arizona, and biologists are now anxiously watching two chicks that hatched this spring in southern California.

As for my problem friend, 265, I wanted to know what his chances really are for regaining his wild status. It's a two-step process, said Sorenson. "The first step is to temporarily hold and evaluate whether the bird is not doing what it needs to be doing, which you can tell by seeing how well it interacts with the other birds of similar age and with the adult mentor. Does the bird in question respect the adult mentor? And how does it react with humans who must occasionally enter the cage, for example to take a blood panel?" In the presence of a human a condor is "supposed to do whatever it can to get away. It's even supposed to vomit" out of sheer distress, says Sorenson. "If it just sits there and looks at you, then it's not doing what it's supposed to do." In that case, it will be taken back to a reproduction facility. There have been cases of birds not making it their first time out, but working out their problems during their extended time-out back in captivity. "It's often a matter of maturity."

In the long run, everything possible is done to keep them in the wild. "That's the ultimate goal," Sorenson reiterated. "That's what this whole effort is about." So far, all the hard work, on both sides of the species divide, seems to be paying off, as we learn more and more about these awesome birds and what they need to survive, and as the birds learn to reclaim the skies and, yes, stay out of trouble. ■

Anne Canright often goes rock climbing in Pinnacles.

VENTANA WILDERNESS SOCIETY



RALPH W. SCHARDT

Top: Tracking condors

Above: Happy soaring!

Why Are We Losing the Burrowing Owl?

HUEY JOHNSON

Owls Were Ignored in Marsh Restoration

IN THE 1970S I was employed in land saving as western regional director of the Nature Conservancy. One method that I advocated at the time was to acquire and reflood former San Francisco Bay wetlands. Now I realize that strategy lacked an important dimension: it failed to take into account the grassland habitat that would be destroyed in the process. As a result, one of my favorite birds, the burrowing owl (*Athene cunicularia*), has all but vanished from some areas around the Bay. What I learned from that experience leads me to suggest that as we continue the important work of restoring Bay wetlands, some of the land we acquire for this purpose be left dry.

One of the areas I viewed back then as a priority for tidal wetland restoration, Tubbs Island, belonged to a hunting club where I once had hunted. It had been artificially severed from tidal action. Left as dry weed fields with a small freshwater pond, it swarmed with diverse species of hawks and songbirds. Our effort to return the land to marsh was successful. Today the area is mostly a saltwater lake near the juncture of highways 37 and 121 south of Napa and westerly to the Bay. Much of the success of my effort to raise funds for nonprofit purchase of the area for this restoration project was due to the burrowing owl. I would simply drive with potential donors to the site and along the levee road. Pocking the levee were owl holes, beside which the little birds stood like vigilant sentries. I would stop the car a few yards from a burrow and we would watch. Anyone who cared at all about nature fell in love with the miniature owls, and large financial gifts often came our way as a result.

I was stunned, therefore, to learn recently that the owls are gone from the area. After a walk there, studying their absence, I concluded that we had been short-sighted 30-some years ago in our conviction that we had to return those hayfields to wetlands. Although draining the historic marshes for agriculture had created dry land artificially, we overlooked the fact that a new habitat had been created in the process, habitat that was now home to all kinds of organisms—hawks and wintering flocks of meadowlarks and nesting songbirds, not to mention the little burrowing owls.

Although I'm a trained biologist, I'd forgotten that diversity of habitat is the key to species preservation. Now I believe that our policy of total reflooding was in error; it was too simple a solution for a complex

PETER LA TOURETTE

problem. In essence, the land reclamation that had gone on at mid-century had created a rare habitat, a sort of island within thousands of acres of salt marsh. To flood it was bound to change the ability of land-based species to live there—species that had found a safe haven there as housing developments crowded them out of nearby grasslands. Certainly, it appears to have nearly eradicated burrowing owls from much of the edge of San Francisco Bay. Had we left even 10 percent of those lands dry, in my opinion we could have saved the owls and other resident dry-land refugees. That small amount of dry land would, I believe, have provided enough habitat for the birds to hunt in. Given that one of the principles guiding Bay restoration goals was that plans should be modified to reflect improved scientific understanding and practical experience, I hope that in the future, restoration practices will be adjusted to ease the plight of the burrowing owl. ■

Huey D. Johnson was western regional director of the Nature Conservancy, founded and ran the Trust for Public Land, was Secretary of the Resources Agency for Governor Jerry Brown, and currently is president of Defense of Place, an arm of Resources Renewal Institute. See http://HDJ.rri.org.

JULES EVENS

Core Habitat Destroyed

BURROWING OWLS are primarily birds of arid grasslands, especially low-lying, open prairie or shrub-steppe in California's inland areas. They commonly associate with ground squirrel colonies, nesting in abandoned burrows. Among the most charismatic of California birds, the burrowing owl sadly has declined dramatically over the last 50 years, coincident with the conversion of the Great Central Valley grasslands and the arid foothills to urban environments. A statewide study by the Institute of Bird Populations found that nearly 60 percent of the breeding groups of owls known to have existed during the 1980s had disappeared by the early 1990s. Primary threats include habitat loss from land conversions for agricultural and urban development and the concurrent loss of ground squirrel colonies on which owls depend for nesting burrows. Additional threats include habitat fragmentation, predation, illegal shooting, and pesticide contamination.

The owls have been virtually extirpated from coastal counties and reduced to a remnant in the Sacramento Valley; San Joaquin Valley numbers are somewhat more encouraging, and Imperial County remains a stonghold. However, as the core population is decimated, there are simply not enough owls reproducing to replenish whatever habitat remains.

The owl's reliance on grassland prey species has a carryover to ongoing marshland restoration efforts in California. According to a 2000

(continued on page 30)

LYNNE TRULIO

A Message from the Burrowing Owl

I SHARE HUEY JOHNSON'S DEEP concern that humans are driving burrowing owls to extinction in our state. He is right that human actions are responsible for the fact that owl numbers dropped by about 50 percent in the 10 years from the early 1980s to the early 1990s in California. However, wetland restoration projects are not the culprits.

The major blame for owl population losses, at least in urban areas around the San Francisco Bay, is rampant development and inadequate protection of species or their habitats. Burrowing owl populations plummeted as their open grassland habitat was paved over for huge commercial developments, subdivisions, and highways. Fewer than 10 percent of the state's owls live on protected land, and no specific law stops the destruction of owl habitat. A recent petition by the Santa Clara Valley Audubon Society, the Center for Biological Diversity, and other organizations to list the burrowing owl as threatened in California would have provided essential protection. Unfortunately, the Fish and Game Commission turned down the petition, despite a recommendation from Department of Fish and Game staff that the bird be listed. Continuing urban growth puts the burrowing owl in peril.

But this said, Mr. Johnson has learned a very important lesson from the burrowing owl: positive actions such as restoring native habitats can have negative consequences, such as destroying habitat for other native species. This fact by no means diminishes the critical need and value of tidal restoration. It simply points to a need to think more broadly about the cascade of consequences these

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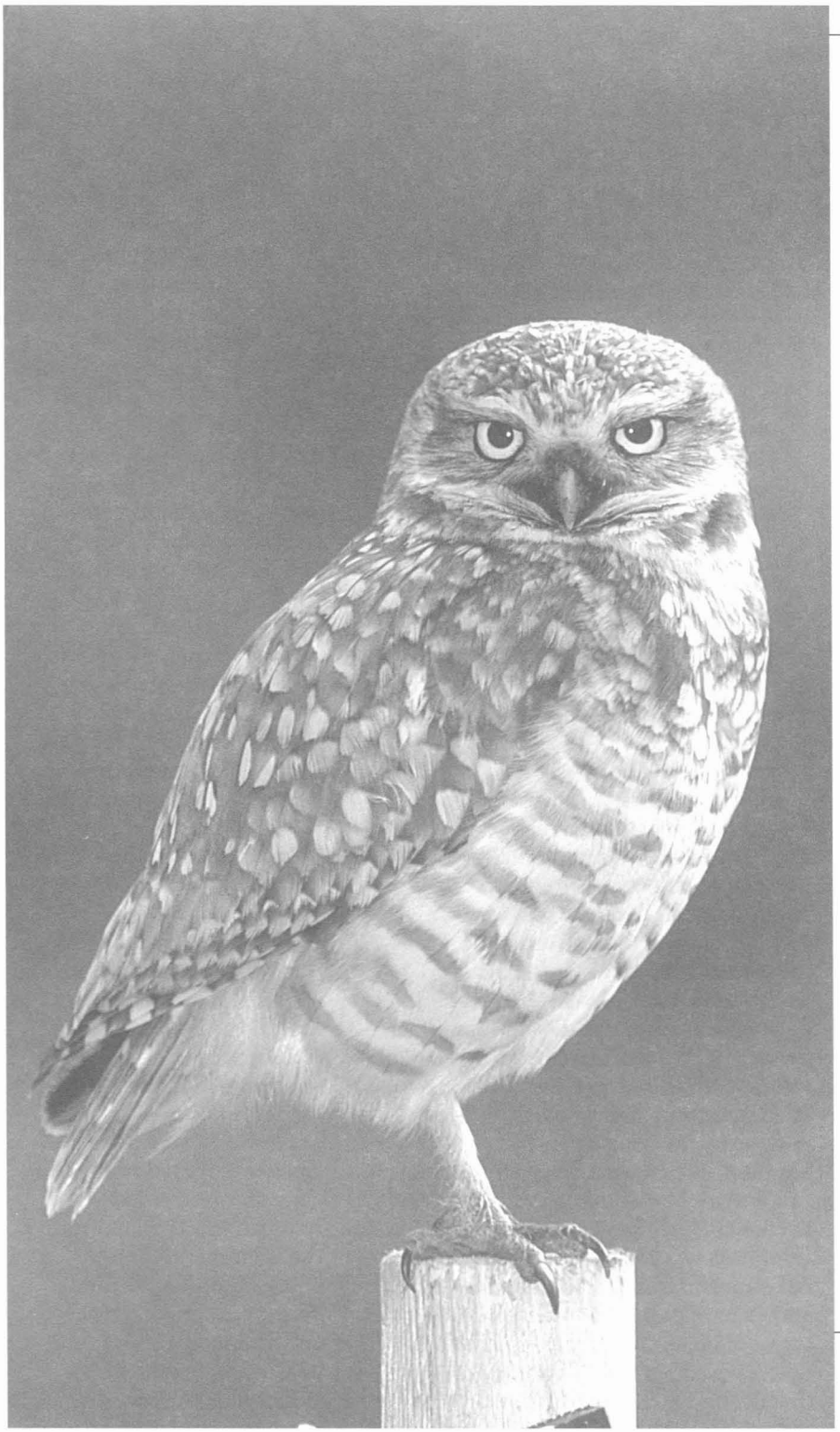
PETER LA TOURETTE



Lynne Trulio, continued

restoration projects entail. Because about 90 percent of California's wetlands have been destroyed, many wetland-dependent species are now endangered. However, a number of native species, including the burrowing owl, have adapted to the landscape created by the diking and filling of baylands for agriculture and other human uses. Therefore, every restoration project must include protection of sensitive species that live on the land that will undergo restoration.

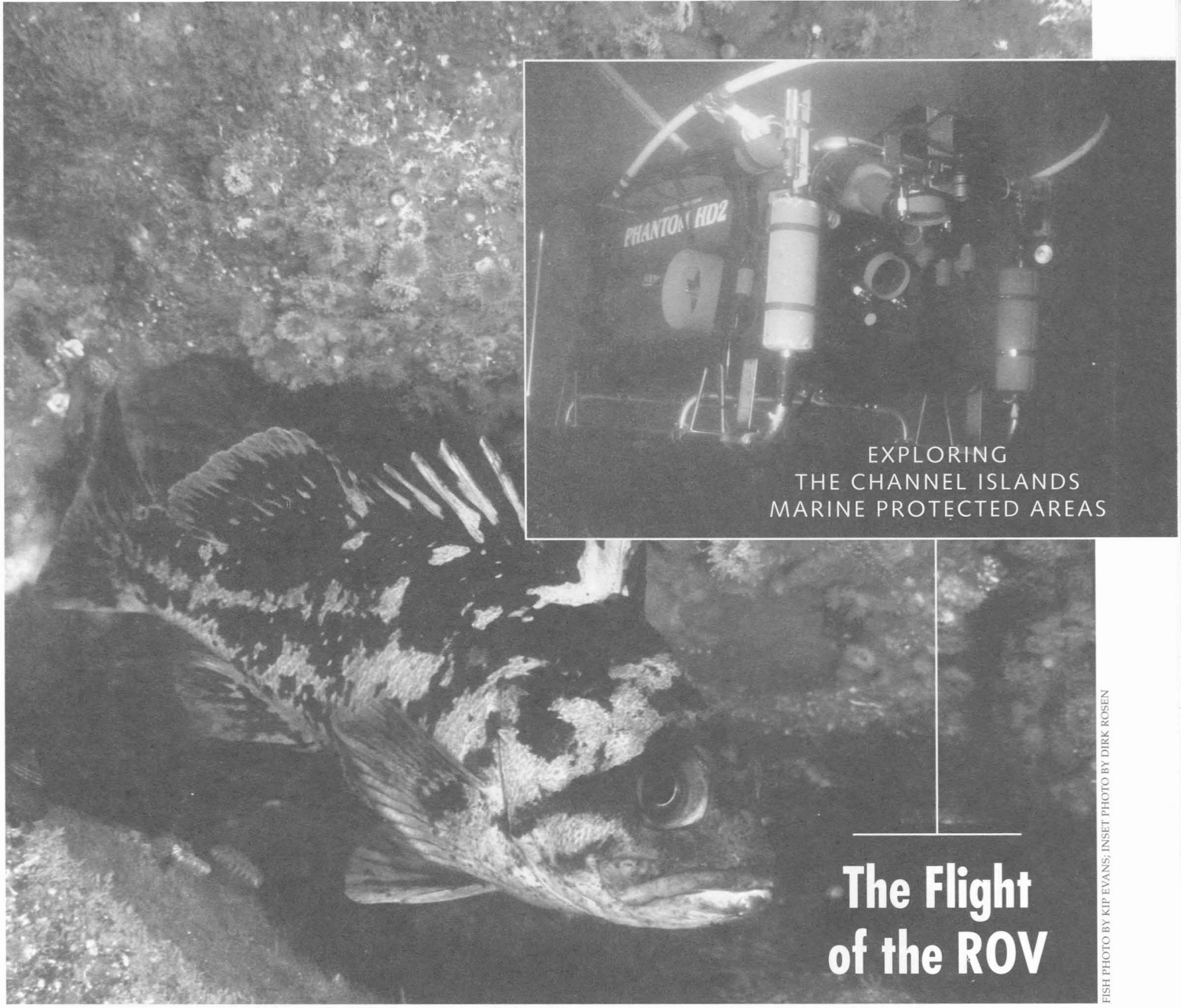
In the South Bay Salt Pond Restoration Project, a huge restoration effort now in the planning stage, habitat restoration includes protection for species using the current landscape. This 15,000-acre ecosystem project will help a number of rare species, including the California clapper rail and salt marsh harvest mouse, by restoring tidal marsh habitat that was lost when salt marshes were converted to ponds for salt production. However, because many species have adapted to salt pond habitats, including a number of resident and migratory bird species, tidal marsh restoration will be balanced with pond management. In addition, for the burrowing owl and other species that require high marsh and grassland habitat, wetland-upland transition zones will be included whenever possible. We have learned that, while restoration can bring back species that have lost their habitats, we must also use the restoration process to protect the species that are here now.

Lynne Trulio is an associate professor and is chair of the Department of Environmental Studies at San Jose State University. She is also the Lead Scientist for the South Bay Salt Pond Restoration Project. She has studied the ecology of burrowing owls and the restoration of wetland habitats in the Bay Area since 1988.

Jules Evens, continued

report by Lynne Trulio, burrowing owl habitat could be increased simply by adding upland transition, or "buffer," zones between high marsh and lands converted to human uses. In other words, it is not wetland restoration per se, but failure to incorporate a buffer zone, coupled with a region-wide decline in the population that has led to the disappearance of these charismatic and engaging birds.

Jules Evens is a wildlife biologist who works with Avocet Research Associates in Point Reyes.



EXPLORING
THE CHANNEL ISLANDS
MARINE PROTECTED AREAS

The Flight of the ROV

FISH PHOTO BY KIP EVANS; INSET PHOTO BY DIRK ROSEN

ANNE CANRIGHT

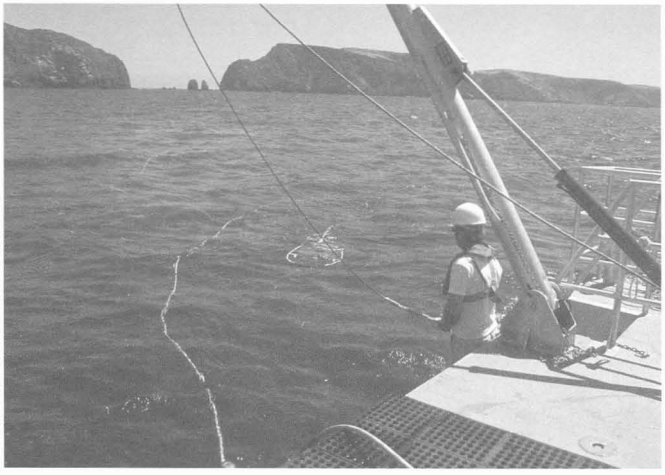
IMAGINE YOU'RE a foot-long vermilion rockfish hovering a few inches above a big invertebrate-covered rock at 45 meters' depth—just hanging out, minding your own business. All of a sudden, a huge boxlike thing looms up over the top of your safe haven: its bright white lights flood the familiar darkness; red and green laser beams pierce the water. With a loud whirring noise, the unwholesome thing thrusts up and over the rock, heading right toward you. Do you flee, as fast as your fins can carry you? Or do you sit there and simply watch as this strange beast passes overhead—and allow yourself, calmly, to become part of a census operation that might help to protect your habitat?

One day in May, I saw several vermilion rockfish and many other kinds of fin fish in a Marine Protected Area (MPA) off Anacapa Island that, perhaps, were grappling with this very dilemma. I was watching a video monitor being fed by the cameras of an ROV (remotely operated vehicle); one camera looked straight ahead, the other looked straight down. By the time the fish were in our ROV's forward-looking sights, they might as well have stayed put: they were immediately counted, their presence entered by keypad into a computer, their GPS (global positioning system) location automatically noted.

I did wonder how many fish we didn't see, though. In rocky areas, we often had the

Top: Black and yellow rockfish

Inset: Remotely operated vehicle at work



PHOTOS THIS PAGE: ANNE CANRIGHT

Top to bottom: Retrieving the ROV; Dirk Rosen at the helm of the *Shearwater*; the ROV at the surface—note the "umbilical."

element of surprise in our favor. But in flatter spots, where our lights and the sound of our thrusters signaled our approach well in advance, did they simply say, "Adios, I'm out of here," and skedaddle?

It's impossible to know. But we definitely were counting fish, and the scientists operating the controls were delighted.

Quantification Is Key

A PRIMARY PURPOSE of this survey—one of five conducted the week of May 12–17—as of a similar survey conducted in November 2003, was to cross-train scientists in ROV operations; a secondary purpose was to collect archival georeferenced digital video. An important ultimate goal, however—and one that scientists hope to focus on more thoroughly this coming September—is to provide accurate counts and densities of fish in the Channel Islands MPAs. This quantitative information will lay the groundwork for a survey and monitoring program that, it is hoped, will provide a scientific answer to a hotly debated question: Will fish stocks improve in and around MPAs? The future of these and other reserves may hinge on the answer.

"Quantitative" is the key word here. This survey differed from other, outwardly similar surveys (see p. 35) in that the ROV was set up to record, specifically, the number and size of selected species of fish. The two sets of lasers are a precise distance apart, 11 and 13 centimeters, respectively, and the position of the ROV relative to the substrate is always known, as are the tilt angle of the forward-looking camera and the viewing angle of the horizontal and vertical video images. Scientists are therefore able to determine the volume of sea they are observing at any moment. Knowing that, they can determine absolute population densities of any creatures on their hit lists and, with the aid of the calibrated lasers, accurate sizes of animals.

As with many scientific explorations, this cruise was collaborative, with people from all over coming together to learn more about one thing: in this case, the biological character of the Channel Islands MPAs. Working together were scientists from academia, public agencies, nonprofit organizations, and a for-profit company, all determined to make this survey a go. During my day aboard the NOAA Fisheries Research Vessel *Shearwater*, their teamwork was flawless.

Heading the project was Konstantin ("Kon") Karpov, senior biologist at the Department of Fish and Game (DFG), who this afternoon was piloting the ROV, his hands manipulating a couple of joysticks, some switches, and a dial or two on a small console held on his lap. Arrayed before him were video monitors and laptops, and at his side was his navigator, Andy Lauermann, who softly uttered commands. Lauermann was keeping his eye on a screen displaying a crude map created using sidescan sonar, which indicated the survey transect line and the constantly changing positions of the ROV and mother ship. Every so often, too, he would check in by walkie-talkie with

DFG biologist–*cum*–heavy-equipment operator Steve Holtz, on the back deck minding the ROV's umbilical—a thick cord providing power to the ROV and streaming information back to the ship. Attached to the umbilical, and requiring constant manual adjustment, were a second cable and a "clump weight" (essentially a lead-filled scuba tank), which helped keep the lightweight ROV from getting driven off course by currents.

As he steered the ROV, Karpov intently studied two monitors showing real-time images from the ROV's cameras: a rapidly moving three-dimensional landscape tracked by two red dots and one green dot from the lasers. The top monitor showed what was directly beneath the little submersible; the bottom one revealed what was ahead. Karpov used these images for piloting: whenever a rock loomed up in the lower monitor, he pulled back on the joystick and the little ROV whirred up and over the obstruction. An experienced air pilot, Karpov commented that flying the ROV is similar to flying a small plane—but more harrowing: it's a little "like flying a jet 10 meters above the ground."

Across the gangway were two biologists, Christine Pattison, also of the DFG, and Emma Hickerson, a research coordinator from Flower Garden Banks National Marine Sanctuary (off Texas and Louisiana) collecting information that will help her team improve their ROV survey techniques. They were watching the same two images as Karpov and entering select species into a computer as they spotted them. This real-time marking of individual animals at known locations will be valuable for scientists studying aggregations and changing species distributions. Post-processing (viewing the dozens of hours of video imagery later on) will allow the data to be further fine-tuned.

As they worked, the scientists talked.

"Getting into a little more rugosity now," observed Karpov, referring to the wrinkles on the ocean bottom. "ROV speed's about one knot," Lauermann said into his walkie-talkie.

"Really good sea cucumber habitat." Karpov again.

"Wow, look at that ray!" Pattison and Hickerson exclaimed in unison.

Among the animals being enumerated were five target species of commercial value—copper and vermilion rockfish, ocean whitefish, California sheephead, and lingcod—as well as numerous indicator species. For example, why count the red gorgonian, a colonial cnidarian and a relative of corals? Pattison explained, "It's indicative of an area with good currents and good water, healthy water." They were also marking debris—anchor chains, abandoned traps, and other leftovers of humankind.

A sand dab darted out into the middle of the path, apparently tackling a piece of prey. "They think the green light is something good to eat," said Sarah Fangman, research coordinator for Channel Islands National Marine Sanctuary, with a laugh.

On the ship's stern, Mike Prall, a DFG biologist from Eureka, assisted Steve Holtz in tending the umbilical. Prall began his career in marine biology and taxonomy, but gradually moved more into the technological end of things. He described an early cruise when he had to hold on to the umbilical with his hands straight off the deck—"it was like a tug of war." Having the pulley-mounted clump weight is a big improvement, he said. The weight is winched up and down as the terrain below grows shallower or deeper, helping to stabilize the ROV.

Holtz started out as a fisherman in northern California, spending over 12 years working the waters. "I saw the writing on the wall," he said, and decided to become a marine biologist, to better understand habitats and fisheries and try to save what was left. For him, it was an easy decision, though he said he knows a lot of fishermen who are "digging in their heels," unable to accept that their way of life is rapidly fading.

All these people wear at least two hats. On the second transect of the afternoon, Prall came inside to navigate while Karpov went out to work the umbilical. Prall and Holtz also do the fish counts. And when it comes to putting the ROV into the water and taking it out again, Pattison dons her hard hat and turns heavy-equipment operator.

A Key Player

A key player in all this isn't affiliated with any government agency, but without him this cruise might never have come together. Dirk Rosen, vice president of special projects at Deep Ocean Engineering (DOE) and founder of the new nonprofit MARE (Marine Applied Research and Exploration, pronounced *MAH-ray*), has a passion for the ocean, unbridled curiosity, and energy to

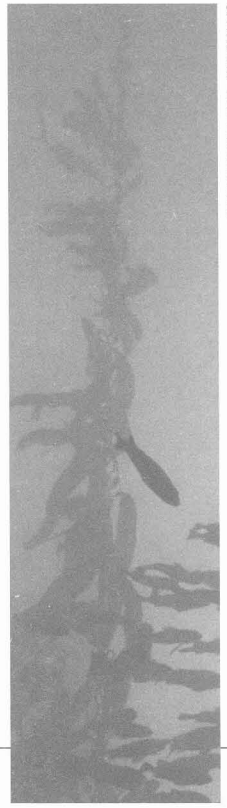


PHOTO THIS PAGE: KIP EVANS

The twelve Channel Islands MPAs form a network covering about 142 square nautical miles within the Channel Islands National Marine Sanctuary. Together, they cover the full span of the three biogeographic zones of the islands. Ten are no-take "marine reserves," with no fish or kelp harvesting allowed; the other two are "conservation areas" where limited recreational fishing and lobster harvesting are permitted. Non-consumptive activities such as diving, swimming, and boating are allowed. The 12 Channel Islands MPAs make up a full 71 percent by area of all California Marine Protected Areas, of which 62 exist, covering 198 square nautical miles (4.9 percent of state waters).

KIP EVANS

spare. He also knows a heck of a lot about ROVs, seeing as how DOE builds them.

About seven years ago, Rosen and Karpov met when Karpov needed an ROV for some research he was doing. The two men hit it off, and have continued collaborating. "We're sort of the Rodgers and Hammerstein of marine research," Karpov said—not scientist and engineer working on separate but related problems, but interdependent, and providing mutual inspiration. One evening in 2001, Rosen and Karpov were musing over drinks about the possibility of conducting quantitative research using an ROV, something that had not been seriously tried—something, in fact, that many scientists consider impractical, saying that reliable data collection is possible only with trained research divers.

Data collection, however, can never be 100 percent reliable. Every type of survey currently in use has certain advantages and certain disadvantages. SCUBA surveys are excellent for relatively shallow habitat (down to 100 feet or so) such as kelp beds, where fish are concentrated and can be easily counted. ROVs, in contrast, are able to cover the vast expanse of deeper habitat where fish aggregations are more patchy. Manned submersibles can go deeper still, taking experts to places where they can make direct observations, yet such surveys remain largely qualitative, and that technology is very expensive.

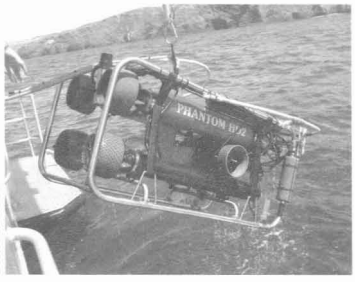
Rosen's idea of quantification using ROVs, combined with his ready access to both the equipment and the engineering expertise, got him working on a plan. The Channel Islands MPAs seemed like the logical sites to test the technology. As he explained, "When the Channel Islands MPAs were originally proposed, the debates were in large part emotional, especially in these depths [those unsurveyable by SCUBA], due to a gap in data. My hope is to bring the data to the table and monitor and evaluate MPAs by real results instead of emotion or idealism." The goal, everyone from scientists to fishers agrees, should be hard, quantitative data, leading ultimately to sustainable fisheries.

But getting data requires investment of time, money, and equipment. After considerable legwork, Rosen gained the cooperation of NOAA Fisheries, which donated the *Shearwater* and crew for a week; and DFG, which supplied personnel. Karpov and DOE contributed the little DOE-built Phantom HD2+2 ROV and half of Rosen's time. Additional funding for the first and second cruises came from the Nature Conservancy. The overall cost of each weeklong survey, including the acquisition of habitat maps and postprocessing to place five key species on species maps, was approximately $125,000. Following the second cruise, Rosen said, "We've basically run out of money."

One final cruise is scheduled for September. Although NOAA Fisheries has committed its boat for two weeks and Fish and Game has assured scientific support, $110,000 in hard cash is needed.

Top: Black rockfish

Bottom: The ROV is hauled out of the water.



DIRK ROSEN

Science in Action

THE SCIENTIFIC LOGISTICS of the surveys was more straightforward than fundraising will ever be. Karpov's science team selected transect paths on the basis of three main criteria. First, they wanted sites that lay both within MPAs (areas now closed to fishing) and outside them, the latter to serve as control sites. Second, they wanted sites that had already been mapped—otherwise they'd be dealing with a blank

slate. Fortunately, much of this area had recently been mapped using sidescan sonar, giving a relatively intuitive, aerial view–like representation of the sea bottom but without any bottom topography, and by multibeam sonar, which results in a more spatially accurate shaded-relief representation—where, for example, rough rocky areas *look* like rough rocky areas, and are actually located where they appear to be. Third, they wanted the reserve and control sites to be comparable in size—approximately 500 meters across and two kilometers long, giving a survey path of about 3.5 kilometers as the ROV zigzags back and forth—and to have similar habitat: hard substrate, or a mixture of sandy and rocky substrates, extending from approximately 25 meters to 80 meters in depth.

The run I observed was the second of the day. That morning, the biologists had seen several large halibut, a few "absolutely huge black sea bass," and squid eggs galore. As we started our run, I was amazed to see brittle stars littering the sandy bottom, occasionally piled deep atop a rock. The occasional bat star and sea cucumber decorated this frilly scene, and now and then a fish—a señorita or a small school of blacksmiths—would dart past. It was exhilarating to fly over the sand and witness this whole other world.

Then we got into an area of sizable boulders and rocky reefs—good habitat for fin fish. We started seeing more rockfish: congregations of halfbandeds punctuated by handsome vermilions, gophers, olives, and coppers; also little kelp greenlings curled on the rocks. The keying in of species was going fast and furious. Gradually, the sea got shallower and shallower—something the sonar imagery couldn't warn about—until we were in only 17 meters of water. "These rocks are really treacherous," Karpov said, "they could catch the umbilical." Lauermann suggested that they fly the ROV out in front of the mother ship (it was usually underneath), which would tighten up the connecting ROV tether. Karpov followed his advice, and everyone breathed a bit easier, though Karpov had stopped his usual banter and was still concentrating hard. Soon the depths indicated on the screen started to drop: 18, 20, 23, 30. Karpov relaxed now, saying with a chuckle, "Flying an ROV is 99 percent delightful, and one percent pure hell. It can be a bit spooky."

Safely back over sand we encountered squid eggs by the mound: finger-length white packages of incipient squidlets, laid in clusters. The female squid dies after laying her eggs and is immediately eaten, a delectable taste treat to many sea creatures; the same apparently cannot be said for her eggs, because nothing, but nothing, seems to touch them.

At the end of the day, everyone was very pleased with what they'd accomplished. All the target species had been spotted and counted. The team had synched impeccably, the flight of the ROV had gone perfectly. Karpov raved about the ease of control. The man largely responsible for the programming and electronics of the little ROV, David Jeffrey, was on board, and had done some tweaking the day before. He said, "A lot of what we're seeing today—the data overlay, the autopilot—I worked on, and it's really satisfying to see it all working so well, and to see people so happy using it."

Happy indeed. If this cruise was any indication, no obvious technical kinks lie in the way of a formal and focused census. Now to see if funding will come through for the September cruise—which will be the payoff for all this exploratory work, the real thing. Perhaps the answer to that burning question—Do MPAs actually enhance fishing resources?—will soon be at hand, thanks in part to the efforts of this team and its diligent ROV.

"We're putting together a five-year plan," Rosen said. "After we finish the baseline, if we go out twice a year and monitor all the good locations that have been mapped, then we should see change—in fish size, density of population, and habitat too." These studies (assuming they are funded) may determine the future of these and other MPAs. And they may well be the start of a new approach to quantitative marine surveys that will improve our understanding of the nation's precious resources by opening another window into the mysterious depths of the ocean. ■

ANOTHER SURVEY, WITH OTHER GOALS AND TOOLS

FROM APRIL 1 TO APRIL 21, 2004, another survey was conducted in three National Marine Sanctuaries to the north of the Channel Islands: Monterey Bay, Cordell Bank, and Gulf of the Farallones. It, too, involved carefully selected transects and video coverage. The camera, however, was mounted on a towed sled, rather than on an ROV piloted by a researcher, and no lasers or other quantifying tools were used.

The goals of this survey, undertaken by NOAA, the U.S. Geological Survey, the Monterey Bay National Marine Sanctuary, and six other research agencies, were different from those of the Channel Island survey. The primary aim was to map the seafloor, verify existing habitat maps, and characterize unmapped habitats as to their assemblages of benthic macroinvertebrates and fishes.

The depths of the ocean are just coming to light—there is a tremendous amount we do not know about the seafloor and its denizens, and masses of questions are being asked about what's down there. The Channel Islands survey was designed to provide some answers to certain questions: what lives over "typical" substrates both within and outside Marine Protected Areas, how big are these creatures, and in what densities do they congregate? By asking these same questions over time—going back every year or two and resurveying the same transects, seeing if numbers change—we will learn more about the MPAs and their viability as havens for valuable fish species.

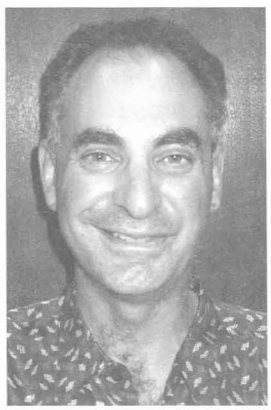
The goals of the Monterey/Cordell/Farallones survey were not quantitative, but more generally "qualitative," so the sled-borne camera sufficed: not numbers of animals, but their simple presence, was sufficient information. Two hundred hours of color video will provide a world of data answering—at least in part—the simple question, "What's down there?"

—*AC*

RESTORATION LESSONS

HUEY JOHNSON'S ESSAY on owls and good intentions (see page 28) aptly describes two of the perennial conundrums created by restoration projects. First, what are we restoring to? Second, what are the consequences, intended and otherwise, of our good intentions?

These are not idle or academic questions. Right now the Coastal Conservancy, our partners at the California Department of Fish and Game, the United States Fish and Wildlife Service, NOAA Fisheries, and others are engaged in a gargantuan effort all over California to restore damaged or destroyed natural areas. These include nearly 40,000 acres of wetland restoration in the San Francisco Bay, nearly 10,000 acres in Southern California, the removal or control of invasive species (*Arundo donax*, *Caulerpa taxifolia*, and *Spartina*, to name a few), and the restoration of scores of rivers and creeks up and down the coast, critical habitat for anadromous fishes.



You can't be engaged in restoration work very long without starting to wonder what exactly we are restoring to, and for whom. If ducks are living happily in a man-made salt pond, to what extent should we convert their habitat to a tidal environment more suited for salt marsh–dependent clapper rails? Having restored the habitat for clapper rails, to what extent can we safely allow human recreational access? How do we know what is safe, anyway?

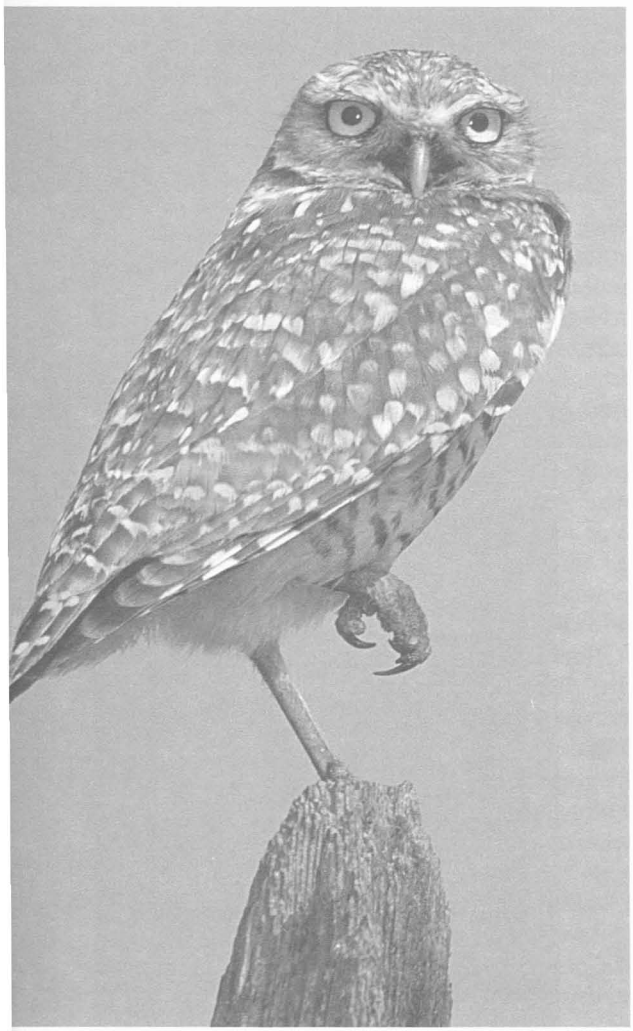


PHOTO: PETER LATOURETTE

It is easy to imagine restoration as simply "turning back the clock" to a particular era in time, usually pre-European settlement. But how far back do we go? California is filled with non-native plants and animals—some deliberately imported for economic or aesthetic reasons, others accidentally released. Eucalyptus trees, wild turkeys, bass, most trout in our Sierra Lakes, and pampas grass are not natives. They and others have flourished in California for a century or more, and they all have fans who will rise up in anger when anyone suggests that "restoration" might involve removal.

Then there is the law of unintended consequences, nicely illustrated in Huey Johnson's essay. Ecology is a relatively young discipline, restoration ecology even more so, and the simple fact is that our knowledge of nature is vastly exceeded by our ignorance. To compensate, we have invented "adaptive management," a fancy name for carefully observing the progress of our restoration efforts and changing course when necessary.

My column this month has more questions than answers, but before the reader despairs, I should describe some of the tools we use in addition to adaptive management to plan and carry out restoration projects successfully. To strike a balance between human needs and natural imperatives we consult with stakeholders to hash out plans that balance competing interests. There are often as many or more conflicts among human user groups as there are between people and critters. To access the best possible scientific thinking, we assemble teams of scientists to guide our work. In very large or complicated projects, we can assemble additional panels of experts from all over the country and the world to advise our local science teams. And just like any developer, we are subject to review by the full panoply of regulatory agencies in state and federal government, including the Coastal Commission, the Regional Water Quality Control Boards, and the U.S. Fish and Wildlife Service, to name a few.

Despite all these precautions, we inevitably fall short of some restoration objectives or overlook the need to include others, and it is often impossible to satisfy every constituency. These are not reasons to shy away from the task of undoing some of the damage we have caused nature. It just means we have to be very, very, careful, and mindful of the obligation to continue to learn. ■

—Sam Schuchat

COASTAL CONSERVANCY NEWS

THANKS TO BOND ACTS approved by voters for parks and natural resource conservation in 2000 and 2002, the Coastal Conservancy in May funded several projects along the coast and in San Francisco Bay counties to improve public access, preserve open space, restore wildlife habitat, and support environmental education. Some of these projects are described below. Use of bond funds ensures no direct effect on the current state budget crisis.

MORE RESTORATION ON SAN DIEGUITO LAGOON

THE SAN DIEGUITO River Park Joint Powers Authority (JPA) has acquired a 73-acre property on San Dieguito Lagoon, east of Interstate 5, for the purpose of expanding a 400-acre wetland restoration project it is undertaking with Southern California Edison. The purchase of the Boudreau property secures in public ownership almost the entire lagoon and river floodplain from El Camino Real to the ocean.

The Conservancy's approval of $1.5 million, added to $2.75 million from the Wildlife Conservation Board, enabled the Trust for Public Land to purchase the Boudreau property for $4.25 million and convey it to the JPA. The acreage acquired borders the San Dieguito River channel on the south, just west of El Camino Real, and contains grasslands and saltmarsh.

The Conservancy has been working since 1979 with the City of Del Mar and many other partners to restore San Dieguito Lagoon, and has assisted in planning for the current restoration. The San Dieguito River Park JPA is a local government agency established in 1989 to acquire natural open space, restore habitat, and provide recreation and educational interpretation in the San Dieguito River Valley. The JPA owns and manages 1,200 acres of open space and 22 miles of valley trails.

CALIFORNIA COASTAL RECORDS PROJECT

Stearns Wharf, Santa Barbara, will have a new Sea Center.

NEW SEA CENTER AND TIDAL MARSH PROJECT IN SANTA BARBARA

THE CONSERVANCY'S approval of $350,000 has enabled the Santa Barbara Museum of Natural History to proceed toward the construction of the $8.5-million Sea Center on Stearns Wharf. The new structure, designed to be more than twice the size of the existing marine research and education facility, will be open to the public and is expected to provide programs for more than 15,000 K–12th-grade students annually.

The Conservancy also approved $250,000 to the City of Santa Barbara for a demonstration project at Goleta Slough, designed to resolve the question of whether restoration of tidal circulation in the slough might result in more birds colliding with airplanes. Several federal, state, and local government agencies are involved in this project.

MORE TRAILS AND WILDLIFE HABITAT FOR SAN LUIS OBISPO COUNTY

THE CONSERVANCY approved a total of $1.2 million for access, habitat, and open space improvements in San Luis Obispo County. The funds, available through Proposition 12, will help build a boardwalk on the Morro Bay waterfront, improve over a mile of the Coastal Trail at East West Ranch in Cambria, and help the City of San Luis Obispo to purchase and protect a portion of the Ahearn Ranch along San Luis Obispo Creek.

The City of Morro Bay will use $500,000 to build a one-mile pedestrian and wheelchair-accessible boardwalk along the Morro Bay waterfront, from the city's commercial district and fishing harbor to Morro Rock and Morro Strand State Beach. The boardwalk will offer visitors several vantage points for viewing Morro Bay, as well as dockside activities including fish offloading and processing. Caltrans is expected to provide an additional $657,000 in federal funding for the project.

The Cambria Community Services District will use $300,000 to improve the 1.2-mile Bluff Trail on the East West Ranch. This trail, a segment of the California Coastal Trail, currently consists of informal dirt tracks that thousands of visitors have worn into the ocean bluff. The new trail will be located far

STORNETTA BROTHERS RANCH PROTECTED

AFTER NEARLY A DECADE of effort by the Coastal Conservancy and others, a magnificent stretch of coastline in Mendocino County has been protected against development. More than 1,700 acres of the Stornetta Brothers Ranch, next to the historic Point Arena Lighthouse at the mouth of the Garcia River, will be maintained for wildlife habitat, public access, and agriculture.

More than 1,100 acres of the ranch were acquired by the Bureau of Land Management (BLM) for $7.69 million with funds from the Coastal Conservancy, U.S. Fish and Wildlife Service, Wildlife Conservation Board, and Audubon Society, with the help of the Nature Conservancy. The remaining 600 acres remain in Stornetta Ranch ownership under an agricultural conservation easement. Members of the Stornetta family will continue farming and ranching as they have since 1917. They have a ten-year lease on the land now owned by BLM.

DAVID TORRES

Charles (left) and Larry Stornetta

As of July 15, the public can hike, ride horses, picnic, and watch wildlife on part of the property. BLM will be working with the public in developing a long-range management plan, beginning with a public meeting later this summer, according to BLM Ukiah Field Manager Rich Burns.

Larry Stornetta, 55, who with his brother Charles, 48, raises beef cattle and grows vegetables, said "time will tell" how the arrangement will work, but added, "I don't see a lot of problems." He is somewhat concerned, however, about how public access to the coast might impact resources such as abalone. "We have always protected the coastline," he said, making sure, for example, that not too much abalone was taken. The Department of Fish and Game was pleased when they did an abalone count, he added. "Hopefully that will continue."

enough from the bluff edge for public safety and to prevent erosion. New boardwalk crossings will prevent damage to wetlands along the trail route, and damage to the land from earlier public use will be repaired.

The City of San Luis Obispo will use $400,000 to acquire 270 acres of the 610-acre Ahearn Ranch, along Highway 101 at the headwaters of San Luis Obispo Creek. The land to be purchased includes over a mile of a creek that supports endangered steelhead trout, as well as wetlands, woodlands, grasslands, and chapparal.

The remaining 320 acres of the ranch will be purchased by the U.S. Forest Service and added to Los Padres National Forest. The purchase will retire development rights on five of the six parcels on the ranch. The current landowner will retain 20 acres where he resides, and will be permitted to lease land for continued cattle grazing.

The ranch offers excellent opportunities, including existing fire roads, for developing a system of public trails that would link to trail networks on adjacent public lands. A large culvert under Highway 101, which passes through the ranch, will enable visitors to reach Forest Service properties that are currently separated by the highway corridor.

BETTER TRAVEL CONDITIONS FOR STEELHEAD IN SAN PEDRO CREEK

SAN PEDRO CREEK is one of the few San Mateo County streams supporting steelhead trout. During the annual spring spawning run, City of Pacifica staff and San Pedro Creek Watershed Coalition volunteers have counted thousands of juveniles and nearly 300 adults.

To ease the steelheads' journey to upstream spawning beds, the Conservancy approved $545,000 to the City toward a $1.4-million multi-partner habitat restoration project in the creek's middle section, where commercial and industrial development is close to the banks.

A failed fish ladder under the Capistrano Bridge will be replaced by a series of "step pools" that will gradually rise in elevation from just below the bridge to about 100 feet upstream. These step pools will allow fish to rest between jumps, enabling them to swim upstream more easily. In addition, 2,000 linear feet of creekside habitat will be restored. About 670 feet of concrete channel will be removed and replaced with native vegetation. Later, the City hopes to remove three culverts above the project area. Most of the land upstream from this area is publicly owned and protected, providing excellent habitat for spawning and rearing young fish.

The City expects to complete the construction and restoration by the end of 2004, and will monitor the results for five years. Also contributing to the project are the Department of Water Resources, $400,000; Department of Fish and Game, $250,000; City of Pacifica, $200,000; and the American Rivers Foundation, $30,000.

These improvements are part of a larger effort to improve creek habitat while providing flood control for neighboring property owners. During the past four years, wetlands at the creek's mouth and just east of Highway 1 have been restored in a collaboration

between the Conservancy, the U.S. Army Corps of Engineers, and the Pacifica Land Trust.

IMPROVEMENTS FOR OAKLAND'S TIDEWATER PARK

TO IMPROVE Tidewater Park in Oakland's Martin Luther King, Jr. Regional Shoreline, the Conservancy approved a grant of over $437,000 to the East Bay Regional Park District. A portion of the grant funds, $186,381, came from a previous Conservancy block grant to the Bay Trail Project, while $250,880 came directly from the Conservancy. The funds will help pay for improvements for about half a mile of the San Francisco Bay Trail along the Oakland waterfront, new picnic areas, restrooms, an improved entry road, and a 65-car parking lot.

Additional funds are being contributed by the Land and Water Conservation Fund, California State Parks, and Oakland Strokes, a nonprofit rowing club, which is working with the park district to establish a rowing facility that would offer public boat rentals, boat storage, and a dock just north of the park.

Tidewater Park is at the northern end of the Regional Shoreline, in a mixed industrial and commercial area near the Oakland International Airport. Most of the shoreline's recreational facilities are in its southern part. The park district recently constructed a bridge over Damon Slough, connecting Tidewater Park to the rest of the regional shoreline and closing a gap in the Bay Trail. The park district expects to complete the trail improvements by year's end, and the remainder of the project soon afterward. This project is part of a larger effort to complete the Bay Trail from Jack London Square to the Martin Luther King, Jr. Regional Shoreline. The City of Oakland, with grant funds from the Conservancy and the Bay Trail Project, has recently completed the Oakland Waterfront Pathway Study to assess the feasibility and cost of completing the trail.

RIVER PROJECT

The Great Toad Gate stands at the entrance to the Valleyheart Greenway on the Los Angeles River in Studio City. With funding from the Coastal Conservancy, the nonprofit River Project worked with elementary school students on a watershed education program which culminated in their participation in the design. The quarter-mile greenway is planted with indigenous species and includes a butterfly maze, a rattlesnake seating wall, a story fence, and the toad gate, all inspired by the children.

ALVISO MARINA COUNTY PARK TO BE IMPROVED

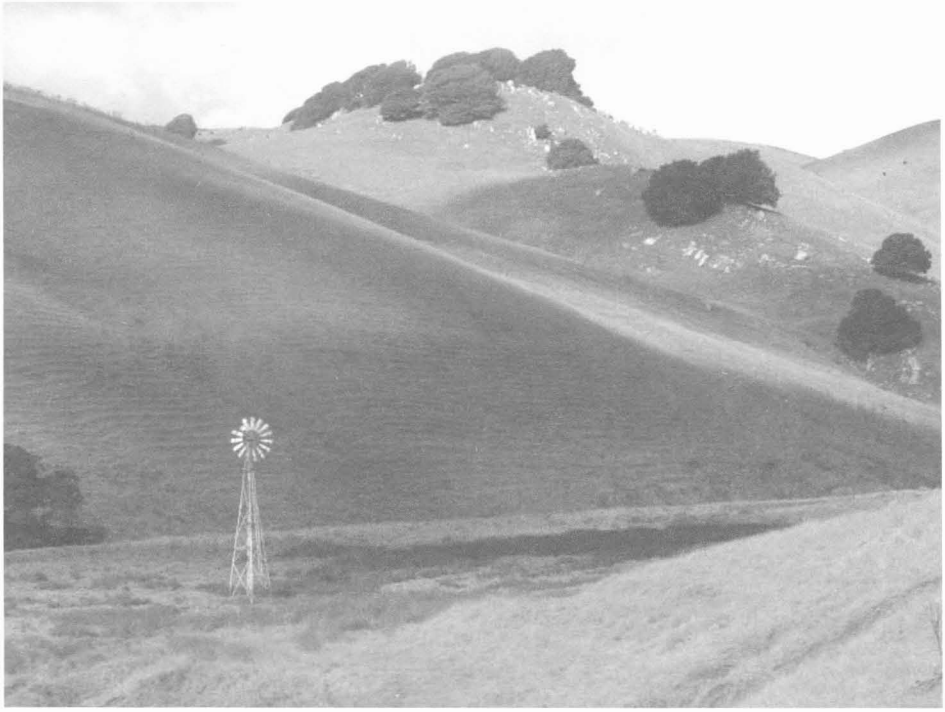
ONE OF THE FEW places on south San Francisco Bay where the public has access to the shoreline from land and water is Alviso Marina County Park. The marina was built in 1968 by Santa Clara County, but silted in and was abandoned in 1997. Its boat ramp—the only public boat ramp south of Redwood City—had also become useless. Excessive groundwater withdrawals in the South Bay led to severe subsidence, which resulted in heavy sedimentation in the marina and boat launch.

Now the park is about to be improved for land-based use and enjoyment. The Conservancy allocated $500,000 to the Santa Clara County Parks and Recreation Department for a 2,500-square-foot boardwalk over marshland, a wildlife observation platform with seating areas, and a reconfigured parking area which will allow for new picnic areas. The funds will also help pay for new trails that will connect this park to regional trail systems, residential neighborhoods, and commercial areas. A second phase of improvements, to be funded primarily by the Department of Boating and Waterways, will provide a new boat-launch ramp on the adjacent Alviso Slough, which has deeper water than the original boat launch.

This Conservancy grant follows two others for Alviso Marina Park: $150,000 in 1999 to the County to plan improvements, and $150,000 in 2000 from the San Francisco Bay Trail Project (from a block grant from the Conservancy) for trail construction.

MORE THAN 1,400 ACRES OF OPEN SPACE PROTECTED NEAR VALLEJO

SINCE THE EARLY 1990s, the Solano Land Trust has been working to acquire from Pacific Gas & Electric Company 3,800 acres of contiguous open space bounded by the cities of Vallejo, Fairfield, and Benicia. The



S. P. METCALF

Above: Eastern Swett Ranch

Below: Carrington Ranch south of Coleman Valley Road

Coastal Conservancy helped the land trust move closer to its goal by approving $575,000 toward the $2.1-million purchase of the 1,408-acre Eastern Swett Ranch.

The Wildlife Conservation Board is contributing $1 million, Solano County and the City of Benicia are chipping in $290,000, the City of Fairfield $100,000, Greater Vallejo Recreation District $110,000, and the Tri-City and County Joint Powers Authority $75,000.

The land trust expects to complete the purchase by autumn, begin docent-led hikes within a year, and develop a plan for more expansive public access by late 2005. Limited cattle grazing will continue on the property, which contains habitat for the threatened California red-legged frog, and nesting and foraging habitat for a wide variety of birds, including golden eagles, hawks, and falcons.

CALIFORNIA COASTAL RECORDS PROJECT

In 2002, the Solano Land Trust succeeded in purchasing 1,575 acres that included the King Ranch, for which the Conservancy provided $3 million. It hopes to assemble the funding required to purchase the 905-acre Vallejo Swett Ranch by 2006.

The Solano Land Trust owns or manages more than 11,000 acres, including Rush Ranch in Suisun Marsh, Lynch Canyon on the Napa County border, and the Jepson Prairie Preserve in the Sacramento–San Joaquin River Delta.

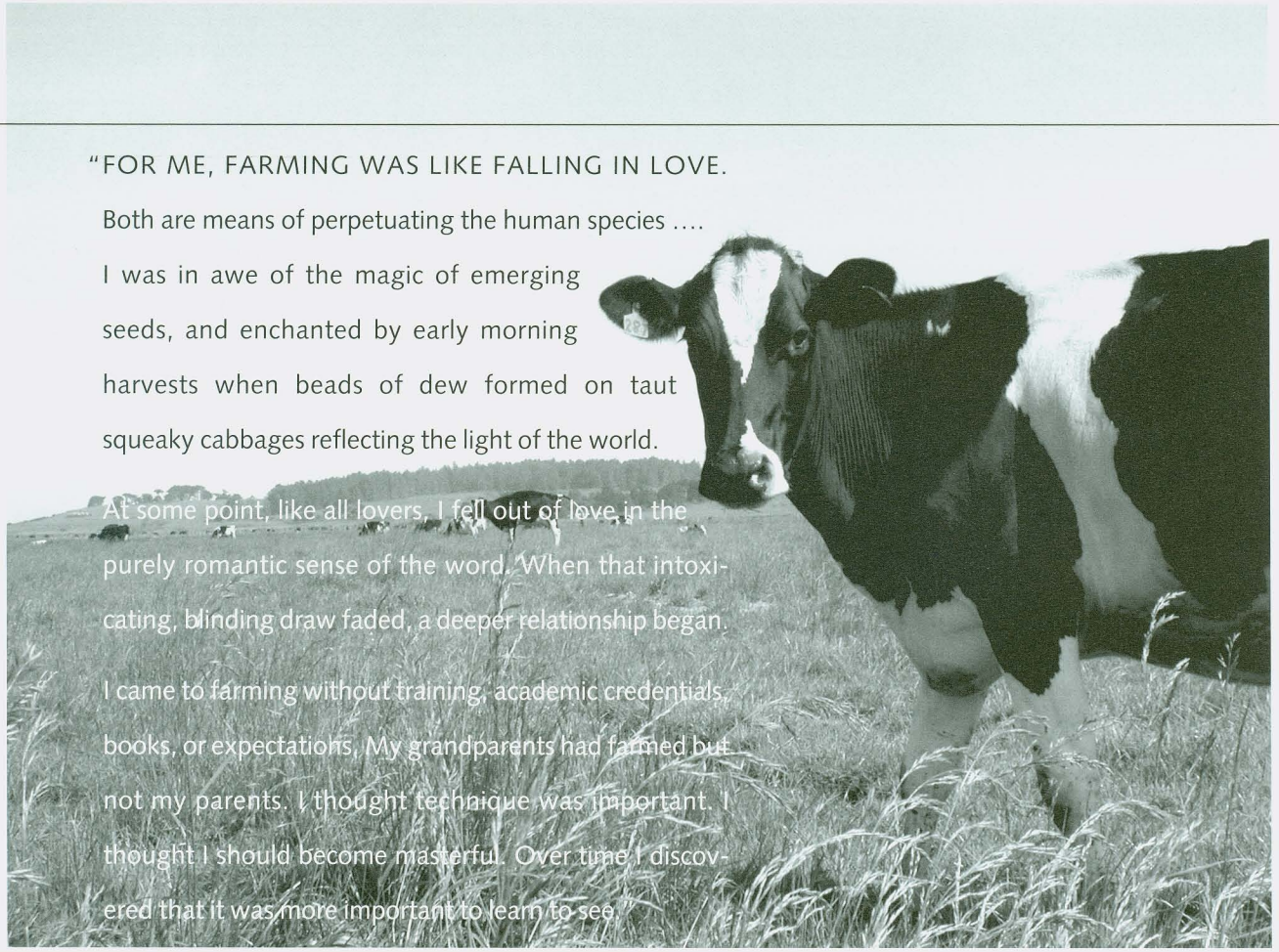
SONOMA COAST STATE BEACH TO GROW BY 344 ACRES

CARRINGTON RANCH is about two miles north of Bodega Bay and eight miles south of the Russian River. It slopes gently upward from a broad coastal terrace to elevations of about 1,200 feet, offering spectacular ocean views and excellent opportunities for hiking trails.

The Sonoma County Agricultural Preservation and Open Space District purchased the 344-acre ranch in May 2003 for $4.8 million, intending to convey it to the State Parks Department, so it can be added to Sonoma Coast State Beach. State Parks, however, lacks the funds for the planning and site development necessary to open the ranch to the public.

To resolve this impasse, the Coastal Conservancy approved $260,000 to State Parks to be used for cleanup, demolition of structures not deemed historic or suitable for public use, and planning to ensure that public uses will be compatible with the natural environment. State Parks expects to be able to acquire the property later this year, and then to begin construction of trails and other improvements.

LandPaths, a nonprofit organization based in Santa Rosa, is assisting the open space district with its stewardship of the ranch. Upcoming LandPaths events include Farmhand Day at Santa Rosa Junior College's Shone Farm, where hikers can assist with farm work and learn about how the farm relates to the natural environment. Coastwalk, also a nonprofit organization, is helping to determine the route for a new segment of the California Coastal Trail on the property.



"FOR ME, FARMING WAS LIKE FALLING IN LOVE. Both are means of perpetuating the human species .... I was in awe of the magic of emerging seeds, and enchanted by early morning harvests when beads of dew formed on taut squeaky cabbages reflecting the light of the world. At some point, like all lovers, I fell out of love in the purely romantic sense of the word. When that intoxicating, blinding draw faded, a deeper relationship began. I came to farming without training, academic credentials, books, or expectations. My grandparents had farmed but not my parents. I thought technique was important. I thought I should become masterful. Over time I discovered that it was more important to learn to see."

—On Good Land, The Autobiography of An Urban Farm,
by Michael Ableman, Chronicle Books, 1998

"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the corn field."

—Dwight D. Eisenhower (1890-1969),
speech, September 25, 1956, Peoria, IL

"Little ol' boy in the Panhandle told me the other day you can still make a small fortune in agriculture. Problem is, you got to start with a large one."

—Jim Hightower, Texas Agricultural Commissioner,
speech to the Dallas, Texas Chamber of Commerce,
as reported in the New York Times, March 9, 1986

"Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous, and they are tied to their country, and wedded to its liberty and interests, by the most lasting bonds."

—Thomas Jefferson (1743-1826),
letter to John Jay, 1785

COMING UP

The Restoration Economy.

New jobs and careers have evolved from the need to restore damaged rivers, wetlands, the nearshore ocean, and polluted land. In our autumn issue, we introduce you to people who make their living in fields that only recently have come into existence. We also look at the economic value of restoration projects for entrepreneurs and communities.

Coastal Conservancy

CALIFORNIA COASTAL CONSERVANCY
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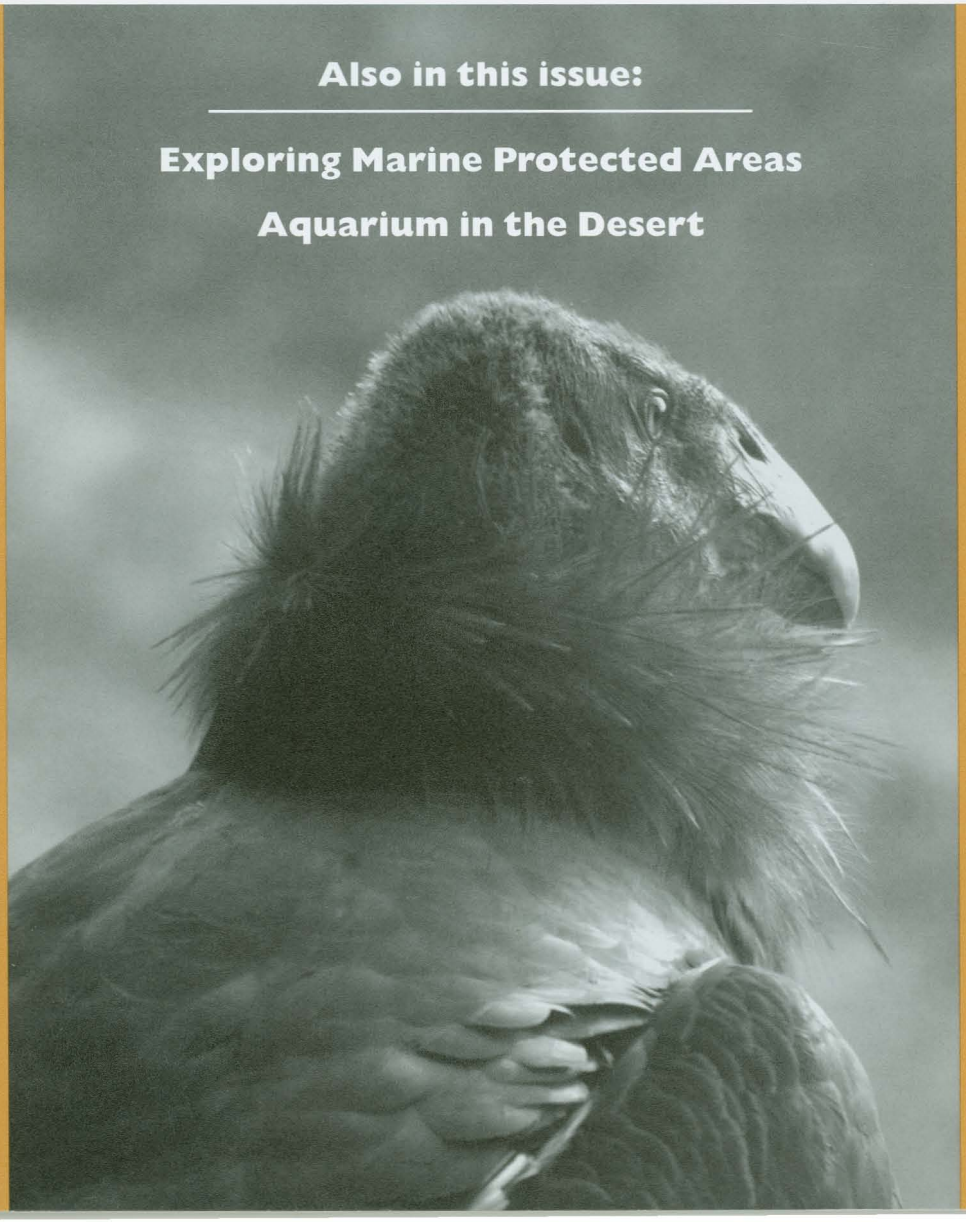
Aquarium in the Desert