



FRANS LANTING PHOTO

**Migrating Monarch butterflies may be on the downswing to the Central Coast due to habitat destruction. Will Pacific Grove be able to maintain the title "Butterfly Town U.S.A.?" Or will the butterflies flutter-by on the breeze of progress?**

## MONARCHS MOVING OUT?

BY ERIC HOFFMAN

**I**t's hard to imagine a force that could draw together such seemingly unrelated things as the local tourist trade, a relatively new scientific concept—the micro-climate, the City of Pacific Grove's very identity, school children, the rights of a property owner, and leading scientists from across the country.

The force is a phenomenal vision of tens of thousands of Monarch butterflies that collect primarily at George Washington Park and in a stand of Monterey pines off Lighthouse Avenue near Butterfly Grove Inn. The colorful winter spectacle of trees coated in beautiful orange and black butterflies has attracted tourists to these sites and to a third Monterey Bay site at Natural Bridges State Park in Santa Cruz for years.

The coming of the butterflies has gone on so long that it would seem that in our environmentally-conscious society they'd be well protected. That's just it, they are and they aren't. It depends on whom you talk to and literally where a butterfly decides to land that determines how safe it is from the trespasses of man.

The greatest amount of controversy is now focused on the Lighthouse Avenue site because the land adjoining this site may be subdivided and developed. Scientists who know the Monarch feel that development of the 2.7-acre L-shaped parcel that surrounds the winter Monarch colony will most likely destroy it due to the extremely sensitive needs of the butterflies. What's at stake isn't the Monarch itself; it's not endangered, but the congregating phenomenon is.

Ironically, federal and state endangered species law focuses on the species, not on preserving rare behavior it may display. Consequently, for a refreshing change, local government will most likely get to exercise independent decisions that will affect the fate of the Lighthouse Avenue Monarch colony. At odds are the desires of



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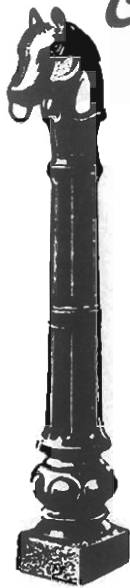
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the owner who wants to develop the property and the perceptions of scientists who intimately know the butterfly. Mayor Florus Williams, a lifetime Pacific Grove resident who remembers the winter colony off Lighthouse Avenue since his childhood, puts it this way: "I have the highest priority for maintaining our butterflies, but decisions also must accommodate the individual rights of a property owner. Often striking a balance or a compromise works." City planners will have a tough job because, though the scenario looks familiar—development interests versus the needs of a species—there are a few unfamiliar wrinkles and apparently not too much room for compromise, according to the scientists.

Historically, the Monarch story is straightforward enough. As long ago as 1914, Pacific Grove resident Lucia Shepherdson wrote about trees coated in Monarchs. Early on, the civic fathers recognized the uniqueness of the natural spectacle and created the only ordinance of its kind in the U.S.: a \$500 fine for anyone caught molesting the butterflies.

A statue was built in honor of the Monarchs, and in literature put out by the Chamber of Commerce, Pacific Grove was referred to as "The Butterfly Capital of the World." Numerous businesses took advantage of the phenomenon with names such as the Butterfly Grove Inn. Clearly Pacific Grove had gone on record as appreciating and protecting the world's best known migrating insect. This time around, the Monarch issue isn't as easy as outlawing bug tormentors. It is couched in different terms, full of misconceptions, new scientific revelations, theories, and elusive shreds of scientific evidence.

From the biological side, the reason for the Monarch behavior is in many ways still a mystery. Most scientists believe that their migration is an instinct-based survival strategy illustrating that Monarch's are among the most sensitively-tuned insects ever studied. Changes in the length of a day, temperature, humidity, amount of wind, types of nearby vegetation and the amount of carbon dioxide they produce, all play a role in why Monarchs pick a particular stand of trees to congregate.

They choose the areas for their unique micro-climates. Removing ground vegetation not even used by the Monarchs—cutting a few trees, or putting in a parking lot that radiates heat—could alter the temperature or humidity just enough to put an end to a colony. Nationally recognized Monarch expert, Santa Cruz biologist John Lane, says of the fragile mix of factors that make up a micro-climate: "It's a knife's



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edge with specific requirements, many of them extremely subtle and interrelated. Something as seemingly unobtrusive as the roof of a house radiating the sun's energy into a grove occupied by overwintering Monarchs could make the difference in the desirability of an overwintering site or not."

Where Lane may talk in general terms, Dr. Lincoln Brower, of the University of Florida and author of Monarch articles in *Natural History* and *Scientific American*, states the risk of tampering with a micro-climate more forcefully: "If anyone should be doing anything to ensure the site continues to be used, they should be thinking of planting more trees, not ways to compromise things further. If the land is developed, I would wager with 99.9 percent certainty that the Monarchs would quit coming. I've seen similar situations in overwintering sites I've studied in Mexico."

To the Monarchs, finding the right micro-climate is an essential survival strategy. Monarchs are essentially tropical, non-hibernating butterflies that have found a way to survive the winter by migrating to the coast where they won't freeze, but where their body processes slow down enough to allow them to live off stored body fat until the following spring. Their micro-climates provide the optimum conditions that

deliver them into the spring with enough energy to breed, fly away, and lay eggs before dying. Timing and climatic conditions are important and interrelated. If it's too hot, they deplete body fats before spring, possibly breed and are ready to lay eggs too early. Egg laying must coincide with Monarch caterpillars' only diet, milkweed, and the condition of the overwintering micro-climate is largely responsible for the timing.

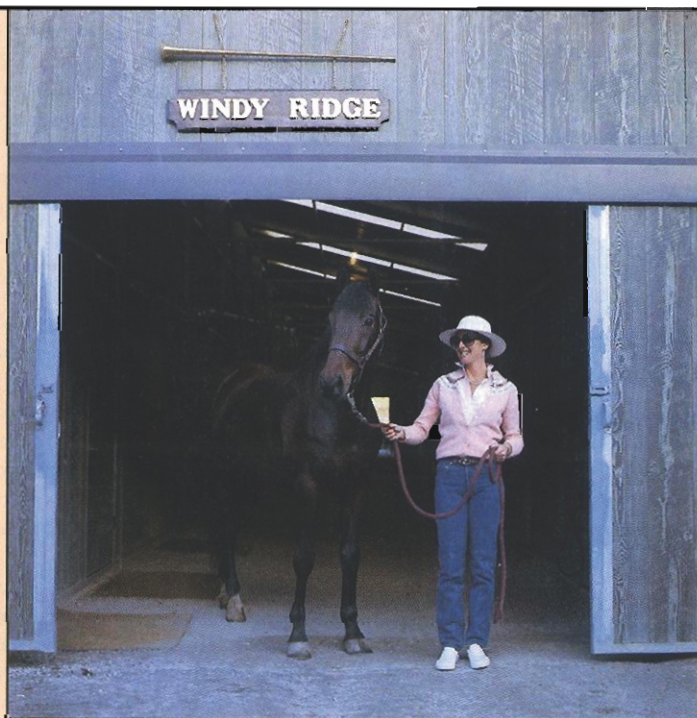
Starting in the fall, Monarchs begin appearing in coastal areas, where they remain during warm days, drinking water and lapping up nectar. Many of the butterflies congregate in what have been termed "bivouacs" because they are temporary arrival sites that are abandoned when winter arrives in full force. Many people living near temporary sites assume that what they see is just a smaller version of what goes on at the famous sites in Pacific Grove and Santa Cruz, but in reality there are far fewer permanent sites than temporary. Once winter sets in, the butterflies at the temporary sites join those at the better known permanent sites.

At the permanent overwintering sites they hunker down, occasionally take a flight to a source of nectar, drink water, but generally while away the winter living off

stored body fat. In the spring they mate, disperse to lay eggs in inland areas such as the Santa Clara Valley, and die. The emerging caterpillars munch on milkweed, become pupae, then butterflies, and travel north. In about a month's time they have mated, laid eggs, and died, possibly in the Sierra foothills. Similarly, short-lived subsequent generations repeat the cycle, all the time drifting farther north until some Monarchs are as far north as southern Canada. It is thought the Rocky Mountains are the limit of their eastern travels.

In the fall, when the daylight hours grow short, as if receiving a celestial cue, the Monarch generation that is still alive begins an arduous flutter and glide back to its ancestral micro-climate along the Pacific Coast and at the same time becomes the long-lived generation that overwinters. How they navigate is not known, but the inner alarm clock that alters their behavior and ensures their survival is a remarkable phenomenon. During their migration, they have been seen by glider pilots riding thermals 10,000 feet above the earth.

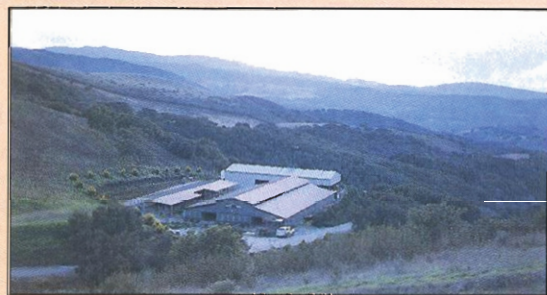
For a time the popular notion was that somehow the butterflies left a scent on their favorite trees, which more than anything else determined why their returning descendants chose a particular grove to overwinter.



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Brower, whose recent studies with eastern Monarchs overwintering in Mexico have been widely published, discounts the scent notion and says it has misleading implications that may cause a misconception about what makes up a preferred wintering area.

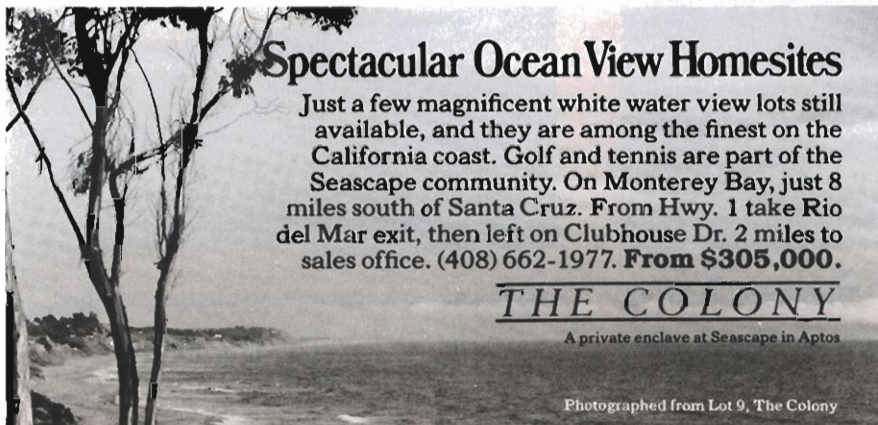
“The notion of returning to a scent is interesting, but in my 20 years of studying Monarchs, I have not found a single shred of evidence that supports it,” he says. “The problem with this notion is that it implies that as long as their trees remain standing they’ll return. This disregards the role of ground vegetation, nearby houses, air pollutants and many other factors that can adversely affect a micro-climate. Everything points to the Monarch’s ability to sense the ideal micro-climate, not a scent on a tree.”

Lane adds, “If scent were the homing mechanism, why do we find overwintering in Eucalyptus trees that have only been here 100 years? Obviously a change in conditions allowed them to pick a non-native species to establish a colony.”

While Pacific Grove’s civic leaders assess what the scientists have to say and balance it against their own values, Lane and other scientists will be starting a series of studies that may help unravel the many mysteries that still flutter around the Monarchs. For years Lane studied Monarchs using his own funding, but as his reputation has grown, so has backing from organizations who want to see the Monarchs understood and made safe.

“In our studies we want to assess what’s going on with Monarchs throughout the state. We want to locate temporary and permanent congregation sites so we can get the big picture,” says Lane. “We’ll also be setting up sensing equipment on sites so we can better understand what variables make Monarchs congregate. It’s through studying them and educating ourselves that we can understand Monarchs well enough to make decisions that might affect their environment. In the meantime, I hope we can buy time with prudent decisions that won’t end in the loss of this resource.”

A big part of Lane’s studies will depend on participation of Monterey Bay residents. “I want to hear from people who have congregations of Monarchs in their yards or know of past and present congregations. We once found, by luck, a large temporary colony that a whole neighborhood knew about for years. The residents assumed everyone knew the Monarchs were there, but we didn’t. The more communication we get from people the better job we can do.”



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