**Monarch Migration Mystery**

**By Stuart Thornton**

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It’s early November, and Pacific Grove is preparing for thousands of visitors.

Calling itself “Butterfly Town, USA,” the small community on California’s Monterey Peninsula has already held itsannual Butterfly Parade, where local schoolchildren dress up like the insect. Currently, past a sign announcing “Caution: Butterfly Zone” and adjacent to the Butterfly Grove Inn, the Monarch Grove Sanctuary is hosting approximately 1,000 monarch butterflies that have arrived early to spend their winter in this 2.4-acre site.

A volunteer butterfly docent for the Pacific Grove Museum of Natural History, Jack Beigle helps human visitors spot the monarchs clustered on a stand of nearby eucalyptus trees. “They look like dead leaves in a U-shape,” he says, as he points a spotting scopetowards the trees. “They are all butterflies.”

He’s right. Above the tree trunks is a congregation of what at first appear to be clumps of dead leaves. But then a breeze causes the monarch butterflies to flutter their wings—revealing a blast of bright orange color.

Nearby, several butterflies float up into the sky. “We have a few flying,” Beigle says. “They can’t fly if theirtemperature gets below 55 degrees.”

Warmer winter temperatures bring monarch butterflies to almost 200 overwintering sites on the California coast, including Pacific Grove’s Monarch Grove Sanctuary, Santa Cruz’s Natural Bridges State Park, and the state’s largest site for vacationing butterflies, the Pismo Beach Monarch Grove. The butterflies will stay along the coast from November through February.

As brightly colored monarchs float from the sky likeconfetti, Beigle explains the insects’ amazing journey. The monarch butterflies have chosen this small swath of land in Pacific Grove for its mix of moderate temperature, humidity, and shelter from the wind.

Beigle says that the butterflies have traveled to Pacific Grove from 100 to 1,000 miles north and east of Pacific Grove. Most monarchs fly to the coast from the foothills of the Sierra Nevada mountains on the border between California and Nevada. In early spring, the butterflies willmigrate back to their cooler homes in the Sierra Nevada.

Beigle lists a few facts about the migrating monarch that elicit gasps from the small crowd of people gathered around him. He notes that some monarchs have been clocked flying at 15 miles per hour in still air. They also have stamina: “Two hundred miles in a day is common,” he says. “It depends on the wind.”

Monarchs are also high fliers. “Pilots have even reported seeing them at 10,000 feet,” he says.

While the migration of North America’s west coast population of monarch butterflies is impressive, it’s the eastern population of the species that achieves one of nature’s greatest feats. (The two monarch populations are separated by the Rocky Mountains.)

The eastern population journeys all the way from the northeast corner of the United States and Canada to a single location in central Mexico’s Michoacán state. The migration for the insect can be up to 3,000 miles.

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One aspect of the monarch butterfly’s migration that has long puzzled scientists is how the tiny insects navigatesuch extended journeys. A neurobiologist at the University of Massachusetts Medical School, Dr. Steven Reppert, has been researching the monarch butterfly’s migration for years.

Reppert believes the insects use the sun, or rays of the sun, to determine their location. Specific chemical proteins in the butterfly’s brain help it to use the sun as acompass. Monarchs can interpret the sun’s position in the sky to help them fly from the northern United States, through Texas, and into Michoacán.

University of Minnesota professor Karen Oberhauser has studied the monarch butterfly for 25 years. Oberhauser is still amazed that an animal the weight of a single paper clip can complete such a long journey.

“I think the most impressive thing is that something that size can fly that far and find a specific spot in the mountains of Mexico, leaving this large, large area and congregating in this very small area,” she says.

Oberhauser is concerned about obstacles to the migrating monarch butterfly. “Probably the worst danger they can encounter is a lack of habitat, because they need to eat while they are migrating,” she says.

Monarchs’ favorite food is milkweed, which many farmers and homeowners consider a pest. “If all [the butterflies] are going over is agriculture fields and cities and suburbs with lawns, they are not going to find anything to eat. Probably the greatest cause of mortality during the migration is starving to death.”

The eastern population of the monarch butterfly not only travels farther than the western population, more butterflies make the trip. According to Oberhauser, an estimated half a billion monarchs spend the winter in central Mexico.

“All of the butterflies in all of the overwintering sites along the coast of California are many, many fewer than the butterflies in the Mexican overwintering sites,” Oberhauser says.

Back in Pacific Grove, Beigle impresses a small crowd with more information about the western monarch butterfly migration while being sure to mention the even larger journey occurring on the other side of the Rocky Mountains.

“We feel good when we get 40,000 to 50,000 butterflies here,” he says. “They get millions down in Mexico.”