

FOSSIL MYSTERIES

Take a tour with Lynett Gillette, science-content specialist

By Lynett Gillette

This rich assemblage of fossils, coupled with dramatic displays, dioramas, mechanical interactives, and high-tech elements, creates a one-of-a-kind experience to connect San Diegans with their ancient heritage.

Conceived and designed by the exhibition and paleontology staff of the San Diego Natural History Museum, *FOSSIL MYSTERIES* showcases abundant regional fossils from the last 75 million years of earth history. Modern skeletons and plants for comparison, sculpted models of fossil plants and animals, interpretive illustrations, and colorful murals help bring these fossils to life.

Rocks plucked from the margins of local tectonic plates ground the exhibition in the unifying theories of Plate Tectonics. A sea-floor basalt recently erupted onto the bottom of the Gulf of California reminds visitors that southern California and Baja California, Mexico, constantly grow, shift, and transform over time. Overhead maps with a bird's eye view of the region's geography shows local sea-floor spreading in context with global tectonic activity. Twinkling LED lights highlight zones of active plate margins where earthquakes and volcanoes appear.

Regional geologic history unfolding in a landscape cut by major faults and moving plates helps explain the dearth of dinosaurs in Southern California, yet dinosaurs do exist. *FOSSIL MYSTERIES* capitalizes on these great and rare reptilian examples of Mesozoic life here 72 million years ago. From Carlsbad, San Diego, and Baja California, dinosaurs have been unearthed by local paleontologists and inquisitive teenagers. Hadrosaurs are the most commonly discovered; their scattered bones are encased in rocks formed in the ocean or nearby in coastal wetlands.

Young hadrosaur bones suggest that this region may have served as nesting grounds for these egg-laying giants. One egg in a reconstructed nest can be mechanically hatched by young-at-heart museum visitors, under the watchful eyes of a 27-foot-long-parent *Lambeosaurus*. This adult hadrosaur is displayed uniquely neither as all skeleton, or all sculpted model, but as a half-and-half. Visitors viewing one side see the animal as in life, with scaly skin (modeled from real skin impressions found with the fossils) and a colorful crest; from the other side it is a cast of a fossil skeleton of *Lambeosaurus*.

Life in the Late Cretaceous wouldn't be complete without predators. Meager dinosaur fossils from the region also represent the family of tyrannosaurs, in this case the scattered teeth of *Albertosaurus* from Baja California. This second half-and-half dinosaur presentation brings together the bones and the interpretive skin reconstruction of that active hunter.

-more-

All the region's Cretaceous dinosaurs and their habitats extending from San Diego to Baja California, from mountains to the shallow Cretaceous sea are portrayed in a sweeping mural by famed dinosaur artist William Stout. Life underwater is highlighted by a panorama of ammonites and their nautiloid cousins, and well-preserved fossil remains of many other invertebrates.

Dinosaurs became extinct 65 million years ago, and rocks from that moment in time are unfortunately missing from the region's rock record. *FOSSIL MYSTERIES* ranged to Wyoming where such rocks are preserved to obtain a coal-rich rock section that does record the exact time when a mass extinction occurred on Earth. No dinosaurs, or flying pteradactyls, or swimming mosasaurs ever appeared in the rock record after that time. Lesser known but equally significant plant fossils also end abruptly just below a visible light-colored layer in the rock. It's a zone rich in the rare element iridium, flecked with debris from the impact of an asteroid as it crashed through shallow waters onto sea bottom off the coast of the Yucatan Peninsula.

In a darkened space dominated by a charred landscape and a carcass of a small predatory Troodon, *FOSSIL MYSTERIES* recreates (next to the exhibited end-of-the-Cretaceous rock) a mini-diorama evocative of that extinction event. Dinosaur artist and author Doug Henderson's illustrations of the extinction give visitors a heightened sense of the drama of the moment.

Stepping away from the scene of mass destruction, visitors enter a brightly lit landscape diorama representing southern California 42 million years ago. It is the Eocene Period and mammals enjoy the opportunities to invade new habitats vacated by the dinosaurs. Local rocks carry a wealth of plant and animal fossils from this time. Steep mountains edged the coastal lagoons teeming with life. Visitors will encounter primates and boa constrictors in the trees, crocodiles and rays in the water, odd little goat-pigs browsing in the forest, predators in many forms with teeth unlike cats and dogs today. A bulky brontothere and its touchable young await the visitors on the edges of the forest.

Many scientific studies of Eocene plant and animal fossils and their modern counterparts anchor this diorama in accuracy. Outstanding contributions by many artists and sculptors add unique dramatic encounters between predators and prey enhanced further by original sound tracks of the possible sounds of the time. This is a place where evolution of the mammals is highlighted. Species that look odd to our eyes today are but some of the branches of the tree-of-life that had no descendants.

Visitors will be able to try their hand at reconstructing the order of the fossil record in this Eocene diorama with a micro-fossil exercise under a video microscope. It's one of the ways that local geologists and paleontologists themselves make sense of the ages of regional rocks.

Adaptations of mammals to their habitats (and vice versa) resulted in many body forms specialized for running, swimming, and climbing. Visitors can compare their own abilities with those of the predators and prey from the regional fossil record.

By three million years ago in this region an enormous bay dominated the landscape from Ensenada to north and east of San Diego. Backbone and shelled fossils are especially abundant from this time. A panoramic *FOSSIL MYSTERIES* mural by William Stout of that Pliocene Bay

-more-

evokes that ancient underwater community with some of its main players. A second mural by Stout focuses on a near-shore habitat.

Baleen whales and their young seek refuge from the rigors of the open ocean; fin whales plow into swirling balls of herring; sharks and fish are attracted by abundant smaller fish; odd “half-beaked” dolphins lurk in shallow water, their particular prey not clearly seen since scientists don’t know how they used those odd jaws. Microscopic plankton, known from fossils too, fed them all.

Even though the animals were beginning to look much like denizens of coastal California today, there are mysteries. Where did all the flightless auks find safe harbor from their predators? Why did the sea cows (exhibited here as another unique half-and-half model) lose their teeth, move north and become extinct? What does the presence of the beluga whales and the walrus suggest? Did the fossil relatives of the new species related to gray whales have the same habit of sucking the bay bottom with the sides of their jaws as do modern grays? It’s all part of *FOSSIL MYSTERIES*.

Some of the region’s most charismatic animals roamed here during the Pleistocene Period, during several episodes of recent (geologically speaking) world-wide climate fluctuations commonly called the Ice Ages. Regionally those fossils are best known from the La Brea asphalt deposits in Los Angeles but those animals ranged across the entire southern California region. Here in San Diego, with Cuyamaca Peak in the distance, several kinds of bizarre great ground sloths from South America raked plants with their oversized claws. Native camels and horses and immigrant bison mingled with tapir and capybara as sea levels came up and back down several times.

Seven murals by William Stout in a style reminiscent of the California plein-air painters recreates these times with the richness of the known fossil record. Visitors experience a sense of nostalgia for a community of creatures that became extinct, but not so long ago. No longer will our valleys host herds of mammoth and mastodon groomed by the ecosystem engineers of their time. Top predators—the sabertooth cats and great American lions—no longer cull the weak and slow. Fossils of these great Pleistocene members of the megafauna are well studied, yet the burning question remains—why did they suddenly become extinct around 13,000 years ago? *FOSSIL MYSTERIES* leaves visitors with an unanswered mystery, one that has profound implications for life on this planet today.

###