

Deep Time: Sea Dragons of Nevada

Long before humans walked the Earth, Nevada was submerged beneath the waters of an ancient ocean, home to prehistoric sea creatures known as ichthyosaurs—sometimes called “sea dragons.” Ichthyosaurs were not dinosaurs, as dinosaurs only lived on land. Ichthyosaurs were marine reptiles that first appeared about 250 million years ago during the Triassic Period and became extinct around 90 million years ago. Although there were many small-to-medium-sized ichthyosaurs, scientists speculate that some giant ichthyosaur species may have been the largest animals to ever live on Earth. Still, ichthyosaurs remain among the least understood of all prehistoric animals. While their fossils are found worldwide, Nevada has long been a global epicenter for their discovery and research.

Officially designated as the Nevada State Fossil in 1977, ichthyosaurs have captivated the imaginations of artists, designers, fossil hunters, and entire communities, whose stories are told in this exhibition. Tracing the lesser-known history of ichthyosaur discovery in Nevada from 1868 to the present, this exhibition also introduces many fossils to the public for the first time. Through a unique blend of paleontology, art, history, and design, this groundbreaking exhibition explores the wide-ranging regional and global significance of these animals, deepening our understanding of the prehistoric past and life on Earth.

This exhibition is co-curated by Ann M. Wolfe, the Museum’s Andrea and John C. Deane Family Chief Curator and Associate Director, and lead paleontologist Martin Sander, Professor of Vertebrate Paleontology at the University of Bonn, Germany. The exhibition is designed by Nik Hafermaas of Berlin, Germany.

What's in a Name?

Scientific names classify living things, traditionally using Latin or Greek words. Formal species names are italicized with two parts, the first part of which is the genus name (like *Canis latrans* for the coyote). A genus is a grouping of related species—just like dogs, coyotes, and wolves are all related species in the genus *Canis*. When it comes to ichthyosaurs, there are many different genus names based on their unique characteristics, and each genus may have one or more species. Some of the ichthyosaur genus names you will see in this exhibition are: *Shonisaurus* (known for its massive size), *Ichthyosaurus* (known for its fish-like body), and *Omphalosaurus* (known for its grinding teeth). The second part of a scientific name is the species. If a fossil species is still undescribed or is incomplete and cannot be identified precisely to the species level, the abbreviation “sp.” is used.

Genus and species names often reflect the discovery location, notable features, scientists, or a special person. *Shonisaurus*, for example, is named for the Shoshone mountains in Nevada where it was first discovered. Many fossils also have nicknames. (Some to look for in this exhibition are “Jim II,” “Eva,” “Martina,” and “Ramona.”) These nicknames make fossils more relatable and engaging for the public. Both scientific and informal names help us connect with the ancient past and emphasize the importance of precise classification and storytelling.

Humboldt Range, Nevada

The Humboldt Range in northwestern Nevada is a little-known but significant paleontological site, where more than twenty-five ichthyosaurs were excavated in 1905. Fossilized bones were first discovered by miners working in the area in the early 1860s. The mountain range gained further attention in 1902 when geologist James Perrin Smith of Stanford University began studying ammonite fossils from the Triassic Period he found in limestone rock layers of the aptly named Fossil Hill. Subsequently, Nevada fossil enthusiasts and historians Percy and Agnes Train collected ammonite specimens from the Fossil Hill area in the 1920s, selling them to museums worldwide, including the British Museum of Natural History.

The most significant paleontological survey of the Humboldt Range took place around Fossil Hill in the spring of 1905, when naturalist and paleontological collector Annie Alexander underwrote and participated in an expedition she dubbed the “Saurian Expedition.” (Saurian refers to large extinct reptiles or dinosaurs.) Under the direction of University of California, Berkeley paleontologist John C. Merriam, a team of paleontologists excavated over twenty-five ichthyosaur specimens from the site. Despite challenging conditions, they used dynamite to break the rock, and transported the heavy fossils from the mountains using horse-drawn wagons. The fossils were delivered to UC Berkeley by train, where Alexander would later establish two research museums: the University of California Museum of Paleontology and the University of California Museum of Vertebrate Zoology. Although Alexander meticulously chronicled the trip to Nevada in a detailed scrapbook, and the fossils she helped find have been housed at UC Berkeley for 120 years, the story of this Nevada site has been largely overlooked by historians until now.

Berlin, Shoshone Mountains, Nevada

Located in West Union Canyon within Nevada's Shoshone Mountains lies a remarkable site containing the fossilized remains of over one hundred ichthyosaurs. This area, near the historic mining town of Berlin, is home to North America's largest number of ichthyosaur fossils from a single location and is considered one of the world's premier paleontological sites. The fossils in the Shoshone Mountains were first discovered in 1928 when Stanford University geologist Siemon W. Muller was conducting fieldwork in the area. However, it wasn't until 1952—when anthropologist Margaret Wheat of Fallon brought the fossils to the attention of UC Berkeley paleontologist Charles Camp—that extensive excavation efforts began. Over the next decade, Camp's team unearthed the fossilized bones of numerous individual ichthyosaurs in ten different quarries around the site. In one quarry, they chose to leave the skeletons of at least seven ichthyosaurs in place, allowing visitors to see the fossils as they were originally discovered.

Recognizing the scientific and cultural significance of the site, the area was designated as Ichthyosaur Paleontological State Monument in 1953. Subsequently, in 1955, Nevada Governor Charles H. Russell granted it State Park status, evolving into what is today known as Berlin-Ichthyosaur State Park. In 1963, Camp decided to excavate and transport the most complete ichthyosaur specimen to the Foresta Institute for Ocean and Mountain Studies at Washoe Pines Ranch in Washoe Valley, Nevada. There, his team meticulously prepared the fossil for study, revealing a new species: *Shonisaurus popularis*. Camp chose the genus name "*Shonisaurus*" to honor the Native American Shoshone people of the area; and named the species "*popularis*" to indicate that the fossil belongs to all people of Nevada. In 1977, this ichthyosaur species was designated as the official Nevada State Fossil, cementing its place in paleontological history. Today, the fossils are cared for by the Nevada State Museum, Las Vegas.

Today, paleontologists including Neil Patrick Kelley of Vanderbilt University in Tennessee, Randall Irmis of the Natural History Museum of Utah (at the University of Utah), and Paula Noble of the University of Nevada, Reno, continue to research and excavate fossils in this same area as they attempt to understand the mysteries of this mass graveyard. Their work is carried out on land managed by the United States Forest Service, Nevada State Parks, and the Bureau of Land Management. Their discoveries, some of which are on view in this exhibition, must be cared for by an approved repository, which in this case is the Natural History Museum of Utah.

Augusta Mountains, Nevada

Paleontologist Martin Sander, based at the University of Bonn in Germany and the Natural History Museums of Los Angeles County, made his first exploratory trip to the Augusta Mountains in 1991. Located in central Nevada, about midway between Winnemucca and Austin, this rugged mountain range is extremely remote and difficult to access. Despite these challenges, Sander and a team of scientists have visited there regularly to search for ichthyosaur fossils. Over the past thirty years, the Augusta Mountains have yielded over 120 specimens, many of which Sander has documented in scientific journals.

Notably, the fossils found in the Augusta Mountains suggest that ichthyosaurs evolved into giant animals—possibly even longer than the biggest blue whale of our time. Sander recently identified a new species of giant ichthyosaur in the Augustas, which he named *Cymbospondylus youngorum*. This scientific name honors Tom and Bonda Young, geology enthusiasts and founders of Great Basin Brewery in Sparks, Nevada. For decades, the Youngs supported Sander's expeditions to the Augusta Mountains by providing donations, transportation, food, and their famous Icky-brand IPA beer to Sander's paleontology team.

The area in the Augusta Mountains where Sander and his team work is under the jurisdiction of the U.S. Bureau of Land Management in the Department of the Interior, which means that all the fossils he finds must be sent to an approved repository for preparation and study, which since 2011 has been at the Natural History Museums of Los Angeles County.

William G. Huff: Bringing Ancient Worlds to Life

At Berlin-Ichthyosaur State Park in Nevada, visitors encounter a striking, sixty-foot-long wall sculpture of a giant ichthyosaur created by William G. Huff (1903-1991), a California-based artist and historian renowned for bringing prehistoric creatures to life. Born in Fresno, California in 1903, Huff began his formal artistic studies in 1922 at the California Guild of Arts and Crafts in Oakland. He continued his education at the California School of Fine Arts in San Francisco and the Art Students League of New York, where he honed his skills in anatomical animal studies at the Bronx Zoo.

Huff's collaboration with paleontologist Charles Camp at the University of California, Berkeley, marked a significant turning point in his career. Their friendship and professional partnership spanned forty years. Huff started making plaster models of fossils, contributing to Camp's research with reconstructions of prehistoric animals. Their collaboration led to the creation of a series of sculptural dioramas for the Golden Gate International Exposition in 1939. In 1952, Camp's book, *Earth Song: A Prologue to History*, featured over thirty original prehistoric illustrations by Huff.

Throughout his career, Huff enjoyed numerous commissions, designed many paleontology exhibitions, and sculpted historical plaques throughout the American West for the fraternal organization E Clampus Vitus, to which he and Camp belonged. Huff's work at Berlin-Ichthyosaur State Park left an indelible mark on Nevada. In 1973, Huff mounted a bronze plaque commemorating his friend Charles Camp at the entrance to the Berlin-Ichthyosaur main quarry.

Life in the Triassic Ocean

During the Triassic Period, roughly 252 to 201 million years ago, Earth's landmasses were joined together in the supercontinent Pangea, which was inhabited by dinosaurs and their early relatives. The supercontinent was surrounded by the vast global ocean Panthalassa. On the eastern side of Pangea was an enormous bay called the Tethys Ocean. The landmasses had not yet separated into the continents we know today, and ocean waters covered much of Earth. This ocean hosted an abundance of marine life and a diverse, complex ecosystem flourished.

At the apex of the food web were ichthyosaurs, marine reptiles adapted for high-speed pursuit and efficient hunting in the open ocean. They preyed on various organisms, including fish and squid-like animals with shells called ammonites (similar to today's *Nautilus*), as well younger and smaller species ichthyosaurs. Although ichthyosaurs were dominant, they shared their habitat with other animals, such as early plesiosaurs and thalattosaurs. Fish species were diverse and numerous, as were marine invertebrates like ammonites and bivalves (clams, scallops, and mussels). Together, these animals formed a dynamic and interconnected web of life.

Earth's Giants

What is the largest animal to ever live on Earth? Scientists are currently in a race to find out. Among the contenders are today's modern blue whales, a 100-million-year-old long-necked dinosaur named *Argentinosaurus*, and Triassic ichthyosaurs.

Gigantism refers to the phenomenon where certain animal species evolve to become exceptionally large. Determining the largest animal ever involves deciding how we measure size: is it length, height, or weight? Studying gigantism offers clues about the limits of biology and the environmental factors that allow such massive sizes. This, in turn, helps us better appreciate life's ability to adapt to changing environments or environmental catastrophes. One current hypothesis is that Earth's most giant creatures have typically evolved in the sea.

This digital paleoart is a collaboration between Ivan Cruz, an educator, motion designer, and creative technologist at Art Center College of Design, Pasadena, California; paleontologist Martin Sander; and designer Nik Hafermaas of Berlin, Germany. Soundscape produced by Jean-Paul Perotte, Associate Professor of Composition and Director of Electro-Acoustic Lab at the University of Nevada, Reno.

Deep Time: Earth's Vast History

Understanding “deep time” means grasping the concept of Earth's vast age—about 4.5 billion years. This immense timescale dwarfs written human history, which spans only several thousand years. Imagining hundreds of millions of years can be challenging; one way to conceptualize it is by imagining the entirety of Earth's history as a single year, where humans appear in the evening of the last day of the year, December 31st.

Paleontology, the study of ancient life through fossils, provides a window into deep time. Fossils reveal how life has evolved over millions of years, including the rise and fall of species long before humans existed. For instance, ichthyosaurs thrived during the Triassic Period (250 to 200 million years ago), the Jurassic Period (201 to 145 million years ago), and well into the Cretaceous Period before their extinction, likely caused by an environmental catastrophe around 90 million years ago. Similarly, the most famous mass extinction, which wiped out the dinosaurs 66 million years ago, paved the way for mammals and eventually humans to live on Earth.

This ties into our galaxy's timeline, which stretches even further back, to about 13.8 billion years, highlighting our place in a much larger cosmic story. Throughout Earth's history, there has been at least five major mass extinction events that drastically altered life on the planet. Now, scientists argue we are in the Anthropocene, a new epoch marked by significant human impact on Earth.

Paleoart: Artists and Scientists

Paleoart, the artistic portrayal of prehistoric life, has been a collaborative effort between artists and scientists since the early nineteenth century. As paleontologists excavate and uncover fossils, scientific illustrators and paleoartists bring these ancient creatures to life on paper, and as three-dimensional and digital sculptures. With each new fossil discovery, our scientific understanding of animal anatomy, movement, and behavior evolves. Artists talk to scientists, absorb this new information, and adapt their illustrations to help visualize new hypotheses. In the absence of a time machine, there is no foolproof way to know exactly what animals looked like millions of years ago. Viewers of paleoart must accept a level of uncertainty inherent in the work of these professional artists.

Our knowledge of ichthyosaurs, for example, is constantly changing. By looking at paleoart, we can trace how scientific theories about these marine reptiles have changed over time. For instance, when the first ichthyosaur fossils were discovered in the early 1800s, paleontologists believed that they crawled on land, and many artists portrayed them this way. Sometimes paleoartists imagined ichthyosaurs in violent clashes with plesiosaurs, mosasaurs, and other creatures. Even though some artists like to take creative liberties related to how these animals looked and interacted, paleoart remains distinctly different from fantasy art and is grounded in scientific evidence.

Fossil Hunter: Mary Anning

Mary Anning (1799-1847) was a pioneering paleontologist whose discoveries profoundly altered scientific understanding of prehistoric life. One of her most notable finds was the world's first complete ichthyosaur fossil in 1818, uncovered along the cliffs of Lyme Regis, in Dorset, England. Despite her significant contributions, Anning and her working-class family struggled financially, and her achievements were often overlooked. Because she was a woman, she was not eligible to join the professional organization of the Geological Society of London and she rarely received full credit for her work.

Anning's discovery of the ichthyosaur fossil inspired her friend, geologist Henry De la Beche, to create the famous artwork *Duria Antiquior* in 1830. This illustration, considered the first attempt at reconstructing a prehistoric scene, was based largely on fossils Anning had found. De la Beche sold prints of the artwork for Anning's benefit, providing financial support and acknowledging her contributions to paleontology.

Anning's 1818 ichthyosaur fossil was destroyed when the Royal College of Surgeons in London, where it was housed, was bombed during a Nazi air raid in 1941. Recently, three historical casts of her fossil were rediscovered, and one of them is on display in this gallery. Mary Anning's legacy continues to inspire, and she is celebrated as a remarkable paleontologist who triumphed over the limitations of her time to make extraordinary contributions to science.

Fossils to Figures: A Boy's Dinosaur Dream

In 1957, a young boy named Jack Arata traveled with his family from California to Berlin, Nevada, to visit the newly opened Berlin-Ichthyosaur State Park. His family had read about the opening of the new attraction in the March 1956 edition of *Sunset Magazine*. The visit sparked Arata's fascination with prehistoric animals and ignited a lifelong passion for dinosaurs and the ancient world.

After his visit to Nevada, Arata's enthusiasm for fossils and prehistoric animals did not diminish. He drew and sketched dinosaurs and played with small plastic dinosaur toys from the local five-and-dime. Later in life, his childhood interest evolved into a fervent hobby: collecting vintage toy dinosaurs. Over time, his collection grew to include rare pieces, ranging from models made for the 1933 Chicago World's Fair, to toys advertising early silent films and Sinclair Oil. From pewter and brass to rubber, ceramic, plaster, and plastic, each toy tells a story, reflecting the place and time of its creation. Today, the Arata collection is one of the largest vintage toy dinosaur collections in the United States.

Although Jack Arata passed away in 2014, his collection remains a tribute to the curiosity and wonder that first gripped him as a young boy who loved dinosaurs, sharing the magic of these ancient creatures with future generations.