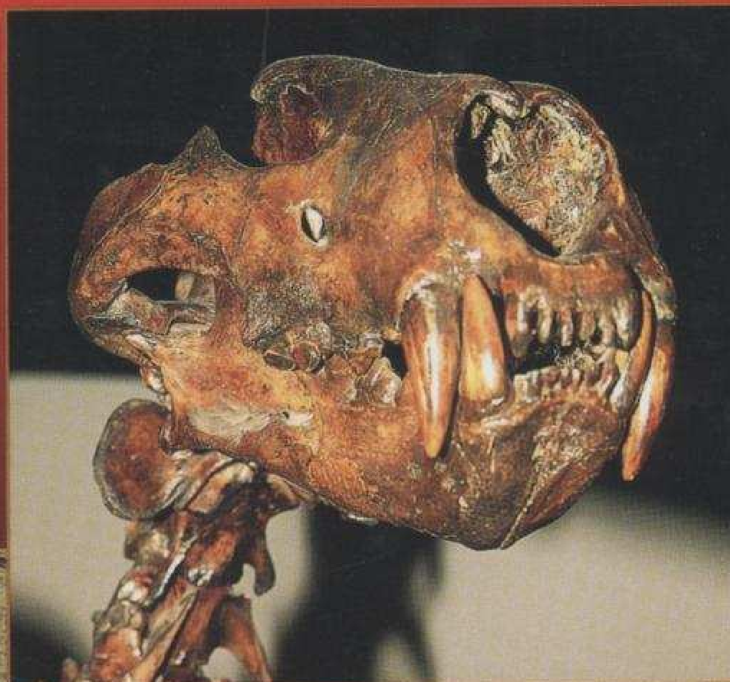
DEATH TRAP

The Story of the La Brea Tar Pits



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INTRODUCTION

Los Angeles, California, is one of the world's busiest cities, and Wilshire Boulevard is one of its busiest streets. Cars and trucks rumble along, brakes screaming, horns blaring. Smog often fills the hot air.

Located along Wilshire Boulevard is Hancock Park. On the grass, kids throw Frisbees and play touch football. Nearby, school groups visit the art museum. At one corner of the park, right next to the street and sidewalk, there is a large, shiny, black pool.

Grasses growing around the pool are smeared and stained with oil. Near the edge of the pool, chest deep in water, stands a sculpture of an ancient elephant, a Columbian mammoth. Its trunk is up. It looks as if it is screaming in terror. Bubbles rise slowly to the surface of the water and burst. It seems as if something—or someone—is trapped at the bottom of the pond.

The smell of hot asphalt rises from the pool, an aroma that seems out of place in a sunny park. But 23-acre Hancock Park is no ordinary park. It is the site of the world-famous Rancho La Brea Tar Pits. Rancho La Brea (which means "tar ranch" in Spanish) is famous because of the millions of bones of Ice Age animals that have been found there—animals that, tens of thousands of years ago, were caught in a hidden, black death trap.

Just a few of the millions of bones unearthed at La Brea

CHAPTER 1

THE MAKING OF A DEATH TRAP

Many of the bones at La Brea have lain buried in the tar pits for as long as 38,000 years. But the story of La Brea actually starts about 25 million years ago, during a time in the earth's history called the Miocene epoch. During the Miocene, conditions around what is now Hancock Park were just right for the formation of a liquid called petroleum, commonly known as oil. Asphalt, also called tar, comes from petroleum.

Petroleum is formed beneath the earth's surface by a slow, complicated process. The first ingredients in the creation of petroleum are living organisms—plants and animals.

All living things are organic—that is, they contain carbon, the same element found in charcoal and pencil leads. It is the carbon in plants and animals, primarily those that live in the ocean, that sometimes turns into oil.

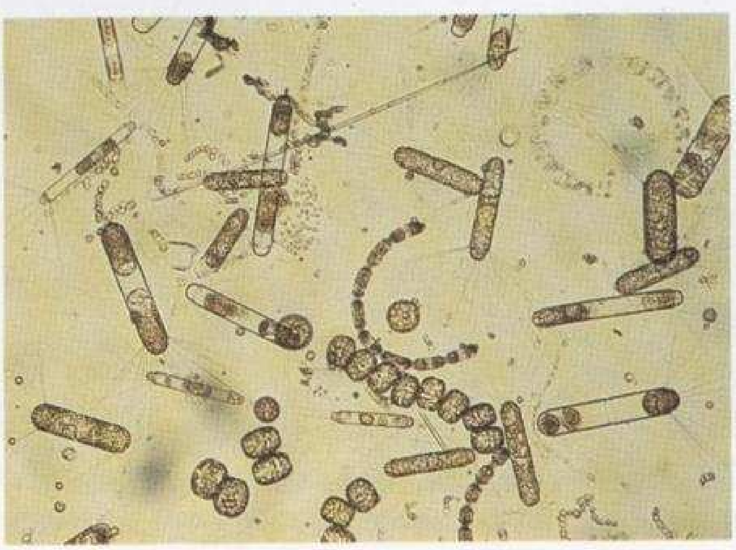
Oil still seeps to the earth's surface in Hancock Park, trapping leaves and branches—and sometimes even people!

A Recipe for Oil

The conversion of living things into oil starts when organisms die. Normally when plants and animals die, the carbon in them slowly combines with oxygen in the air or water to produce carbon dioxide gas. This action is part of the process we call decomposition, or decay.

Without enough oxygen, however, dead organisms cannot decay. Plant and animal remains may be cut off from oxygen if they are covered by mud or sand shortly after death. When this happens, the carbon in the organisms is trapped in the earth—and may eventually turn into oil.

The organisms that provided most of the carbon for oil formation at La Brea were plankton—microscopic marine (ocean-dwelling) plants and animals. When plankton die, they drift to the ocean floor, where they often decompose or are eaten by fish or other marine animals. Sometimes, however, dead plankton are covered by layers of sand and mud, or sediment. They are cut off from oxygen and don't decay.



Plankton are tiny plants and animals that live in the sea. These are phytoplankton, microscopic plants.

As more sediment washes into the sea and settles on the ocean floor, the dead plankton are buried deeper. Over time the plankton may be buried under as much as five miles of sediment.

The weight of the sediment above squeezes water out of the layers below. Particles of sand and mud become packed very closely together, and chemical processes in the sediment glue the tiny particles into one large mass of rock. Because the rock is formed from sediment, we call it sedimentary rock. Layers of dead plankton are trapped inside it.

Time and Temperature Are All It Takes

As the rock is pressed deeper into the ground by tons of new sediment filtering down through the ocean, it becomes hotter. The increase in temperature is partly due to the pressure of the overlying rock and sediment. But it is also due to heat coming from molten, or melted, rock deeper inside the earth.

When the rock and dead plankton have been pushed into the earth to a depth of more than 8,000 feet (1½ miles), temperatures are high enough (175° to 275° Fahrenheit) to begin changing the carbon in the plankton to oil. Carbon does not turn to oil overnight, however. The conversion may take from 5 million to 50 million years!

Once it forms, oil may be trapped underground by impermeable rock—rock that does not allow liquid to pass through it. The oil may eventually leak out of the ground, however, to form asphalt traps, such as those at La Brea.

La Brea during the Miocene

The conditions at Rancho La Brea during the Miocene epoch were perfect for the formation of oil. The area that is now Hancock Park was then covered by the Pacific Ocean, which was filled with

A shell turned to stone

From Animal to Fossil

Fossils are remains of or evidence of past life on earth. A fossil may be a shell that has turned to stone, a dinosaur footprint in mud that has turned to rock, or bones preserved in asphalt. Dead insects trapped in amber (the resin of ancient trees) and the frozen remains of extinct Siberian elephants are also considered fossils.

Most fossils come from the hard parts of animals, such as shells or bones. Usually, the soft parts—muscles, skin, and organs—are quickly attacked by bacteria when the animal dies, and they decay. Plant parts, such as leaves, seeds, and wood, can also become fossils.

For a plant or animal to fossilize, the organism must be buried quickly so it won't decay. The chemical conditions must also be right. Sometimes chemicals in the ground slowly dissolve buried bones, shells, or plants. Minerals then replace the dissolved organism, creating a stone duplicate of the original. Sometimes a hollow spot left when an organism dissolves is not filled. This hole in the rock, in the shape of an ancient plant or animal, is also a fossil.

Slow, Dirty Work

The techniques used at the excavation site today have changed significantly from the system designed for the excavation in 1913. The process is safer than it was 80 years ago, and the record-keeping system is much more accurate. But the work is still not very glamorous.

Pit 91 is about 28 feet square, its walls supported by steel beams and lined with tar-stained boards. A thin layer of asphalt continually covers the floor of the pit and seeps up the steel beams. Volunteers wearing tar-splattered T-shirts and jeans remove approximately 80 gallons of excess asphalt a week in a procedure they call "glopping." They use trowels, or small shovels, to scrape asphalt from the floor of the excavation. They "glop" it into buckets and haul it up to the surface. Then they dump it into another nearby asphalt deposit, "where it's probably recycled right back into the pit," jokes paleontologist Eric Scott.

The only spots of color in the oil-stained pit are the orange hard hats worn by staff and volunteers and the bright yellow nylon cord crisscrossing the bottom. The cord, just inches from the floor, divides the pit into a grid of 3-foot by 3-foot squares. Workers excavate each square to a depth of 6 inches. They finish all the squares on each 6-inch level before going on to the level below.

Before a fossil is removed from the asphalt, diggers photograph and sketch it while it is still in place. They also note each fossil's location by measuring its distance from two sides of the grid and its depth in the 6-inch level. Later, workers will enter these measurements into a computer, which will create a three-dimensional diagram showing exactly how each bone was positioned in the mass. This diagram will help scientists understand how the asphalt deposit formed.

Excavators must be careful not to damage the fossils as they're working. Having been buried for 10,000 to 40,000 years, the bones have become fragile and can easily break. Workers must also avoid scarring the surface of the fossils. Scientists will study these surfaces to learn how an animal died, how its muscles were attached to the bone, and whether or not it was the victim of disease.

To remove the fossils, excavators kneel and sit on boards laid on the asphalt. They work carefully to remove each bone from the matrix, using tools such as small chisels, dental picks, and soft brushes. Large fossils, like the skull of a saber-toothed cat, might take days to remove. Because the diggers work so carefully and

"Glopping" tar