

Phenomena, comment and notes

Albert Koch could find fossils as well as any man alive, but he got a little carried away when he assembled them

Albert Koch had spent a miserable winter in 1840, racked by bouts of fever brought on by weeks of digging in mud and wading in stagnant swamps. His strength and stamina had deteriorated, yet he felt a familiar surge of energy when a messenger brought news of remarkable fossils. Giant bones had been unearthed by a farmer in Benton County, Missouri, more than 200 miles from Koch's St. Louis home.

In less than 24 hours he was aboard a Missouri River steamer, heading upstream to a rumor. The six-day river trip was agony, not so much from the discomfort of his fever as from the fear that souvenir hunters might vandalize the site before his arrival.

For years Koch, a self-taught naturalist and avid bone hunter, had searched in vain for the treasure that would transform his museum, a three-story building at the site where the Gateway Arch now stands, from a modest repository of curiosities to a natural history center of world renown. To be sure, patrons were supporting the museum's exhibits and programs. Visitors could examine live alligators and bears, stuffed birds, wax figures, historical dioramas, large fossil collections, and more. The attractions were supplemented by entertainers: magicians, ventriloquists, musicians and dancers.

All was trifling compared with the exhibit that had obsessed Koch for years. He had amassed a collection of immense fossils: dozens of leg bones as thick as tree trunks, scores of teeth

larger than a man's fist, a roomful of skulls too large for a person to lift. Koch identified these remains as belonging to the mysterious *Incognitum*, a creature unlike anything known to the Missouri settlers. Some believed the bones belonged to a race of giant men entombed by the Noachian deluge. Others repeated native-American legends of a huge carnivorous monster.

We now know that most of Koch's unidentified bones belonged to the American mastodon, an extinct cousin of today's elephants that populated much of North America for more than three million years.

The arrival of human hunters, coupled with rapid climatic change at the end of the last ice age, probably doomed the animal. The population dwindled rapidly, and the last of the species died about 11,000 years ago. In the early 1800s, Charles Wilson Peale had excavated the near-complete remains of two mastodons. Koch had several hundred fragments, but by the late 1830s no complete skeleton had been found, and the great *Incognitum* still remained a mystery.

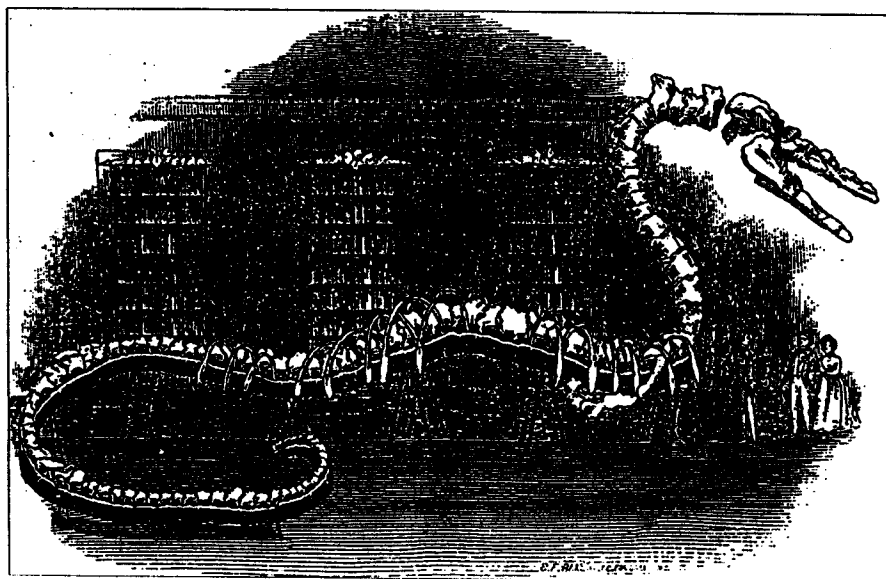
The boat carried Koch up the Missouri as far as the Osage River. Several more days of difficult travel, much of it on horseback through thick, virgin forest, led him across the Pomme de Terre River and into a secluded valley. Suddenly, there it was: a rich, untouched fossil site, strewn with bones.

Koch established a base camp at the

farmer's log cabin. The work proceeded through April and May, rewarded by a growing pile of bones but no complete animal. Then came the breakthrough: a giant skull with an extraordinary tusk, more than 15 feet long, still in its socket. A second huge tusk was unearthed, followed by dozens of other bones: ribs more than five feet long, vertebrae a foot across. Koch was amazed to discover several beautifully formed flint arrowheads among the bones—apparent proof that humans had coexisted with the creature. Two more months of careful excavation were needed to finish.

Koch had hoped to float the exhumed beast down the Pomme de Terre and thence by the Osage and Missouri rivers to his museum. By midsummer, however, the river had dried to a mere trickle. Three wagons drawn by four oxen each were enlisted. Koch modified the rough-riding wagons with an ingenious suspension system: flexible oak trees were secured to the sides of each wagon, and the carefully boxed bones were suspended from these supple, springlike supports. The improbable caravan crawled 50 miles north over the rolling hills of central Missouri to Boonville, where a steamboat down the Missouri completed the adventure.

Museum patrons did not have long to wait. In less than a month, Koch unveiled the creature that he called *Missourium*, although newspapermen, astonished by its unprecedented size, quickly adopted the name "Missouri



The 114-foot "great sea serpent" assembled by Albert Koch was actually composed of fossil bones of the whale *Basilosaurus*, which grew to 70 feet.



Leviathan." Koch had blended his love of nature with showmanship and concocted a beast of mythic proportions. The mounted skeleton, much larger than any mastodon, was 32 feet long and 15 feet high. St. Louis residents flocked to see the wonder. Koch was so encouraged that he sold the museum and started on a national tour with his fabulous fossils.

Reconstruction of extinct animals from their fossil bones is a challenging art and exacting science. Fossil skeletons almost never survive intact. The bones of one animal may be scattered far and wide by scavengers and water. Fragments of several animals may come to rest in the same streambed or sandbar. As a result, paleontologists must spend years studying the skeletons of living animals, documenting form and function and comparing anatomical details of related creatures before attempting to assemble a museum display.

Koch had no such training. His success as a collector was far greater than his skill as an anatomist, and the restored skeleton was as much a product of Koch's imagination as of nature's design. The first reaction by scientists to the Koch restoration came late in 1841, during an exhibition at Philadelphia's Masonic Hall. The experts praised Koch for his perseverance in acquiring the fossils but were quick to note "some errors in the articulation of the bones." Though not out to defraud the public, Koch had let his imagination



The Smithsonian's *Basilosaurus* was collected from Koch's Alabama site.

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run away with him. He had added at least ten extra vertebrae, as well as thick spacers next to each vertebra, thus greatly increasing the length and height of the animal. Two extra ribs were used as collarbones, and each foot had several long, slender digits, further obscuring the beast's mastodon identity. As a final touch, the two curved tusks were mounted so as to project backward over the skull, rather than forward as in most elephantine fossils.

Undaunted by the criticism, Koch took his showpiece to London and the Continent, where American curiosities were viewed with special interest. He found an eager market for his fossils at several major museums. The complete *Missourium* was bought by the British Museum for £1,300.

Koch celebrated his successes by awarding himself the title "Doctor" and returned to the United States with renewed enthusiasm. His most spectacular discovery was still to come. Fragmentary remains of a large aquatic vertebrate had been known for more than a decade from riverbanks in the southeastern United States. The exact nature

of this whalelike animal was uncertain, although the names *Basilosaurus* (emperor lizard) or *Zeuglodon* (yoke tooth) were used in the scientific literature. Koch was determined to discover a complete specimen.

In January 1845 he traveled to Mobile, Alabama, and thence up the Alabama River. He kept stumbling across evidence of truly immense animals that had inhabited the shallow seas that once covered the area. Giant fossil vertebrae weighing more than 50 pounds were common curios: one was in use as a doorstep, a pair as andirons, and yet another as a pillow for a slave. Each time he saw one, Koch would ask where it had been found. Gradually word of his search spread, and in March he was told of a 90-foot "fossil shark" in Washington County, 40 miles north of Mobile.

Koch wasted no time. He gathered his equipment, borrowed a horse and set off to the small community of Washington-Old Courthouse. Inquiries turned up nothing. The first night he slept only fitfully. The next morning two young boys presented themselves and offered to take the agitated collector to the ex-

act spot, a woodless slope near the Tombigbee River. There Koch found a colossal array of bones, mostly embedded in limestone and lying, still somewhat in order, in a great semicircle.

A month of excavation followed, and Koch was rewarded by a nearly complete skeleton of what could only be described as a sea serpent, with massive, tooth-lined upper and lower jaws, dozens of giant vertebrae and man-size ribs. To these specimens he added numerous other bones from the nearby hillsides and stream banks. A jubilant Koch crated his finds and arranged to have them transported by ship around the coast to New York, while he traveled inland. After a monthlong journey from New Orleans up the Mississippi to St. Louis and from there to the East Coast, Koch received devastating news. The cargo ship had been wrecked off the Florida coast.

For a week Koch mourned the loss of a scientific treasure—and then came astonishing news: salvagers had managed to retrieve the crates of fossils before the ship sank. And rather than selling what they had saved, they sent the fossils



ERASE THE LINE BETWEEN

on to Koch in New York at no charge.

Throughout the summer of 1845 Koch unpacked, cleaned and mounted the monster's bones. He was not one to let a good vertebra go to waste. Longer and longer his monster grew, until he had created the largest skeleton ever assembled. The composite "sea serpent," dubbed *Hydrargos* by Koch, was 114 feet long when it was unveiled in New York. Public and press were stunned; citizens flocked to examine the spectacle.

The scientific community, which had seen Koch's concoctions before, was not overly impressed. Reputable scientists noted the use of vertebrae from at least three individuals of different species and denounced Koch's interpretation of his find. They said *Hydrargos* was actually a distorted *Basilosaurus*.

Scientists today consider *Basilosaurus* a whale. Measuring more than 50 feet in length, it was probably an inshore animal. Its prominent eyes, rows of sharp teeth and powerful, streamlined body suggest a hunter that subsisted on fish and other vertebrates, much like today's killer whale. *Basilosaurus* has been much in the news lately, with the dis-

covery of remains in the Egyptian desert that offer the best evidence to date of well-formed hind limbs, complete right down to the toes. Koch's "sea serpent" thus represents a remarkable transitional form in the evolution from land mammals to modern cetaceans.

Once again Koch was unconvinced by the criticism, and once again he took his find to Europe, where the German scientific community, especially, showed enthusiastic interest. In Berlin he was honored with a yearly pension, and the great fossil was purchased by Friedrich Wilhelm IV, King of Prussia.

Inspired by more success, Koch exhumed a second complete *Hydrargos* in February 1848. This 96-foot creation, though considerably shorter than his previous one, again excited audiences, first in Europe and then in the United States. For a third time Koch achieved both public acclaim and financial reward. Only in the mid-1850s, in the sixth decade of his life, did Albert Koch give up his quests and settle down to a somewhat more sedate life of academics and business in St. Louis.

The art of collecting and preserving

fossils requires skill, perseverance, occasional hardship and more than a bit of luck. Koch was one of the most successful bone hunters of his generation. Few paleontologists have ever matched his ability to sniff out a thigh bone or a tooth, and few collectors have been so successful at supporting their passion through showmanship and sales.

But collecting skill is only half the equation. Like any other scientist, the fossil expert must analyze and interpret his data (in this case, the bones) after they are collected. The identification and display of fossils requires specialized knowledge of morphology and comparative anatomy. Koch lacked such expertise. He acted more like a P. T. Barnum than like a reputable scientist. Whether his fanciful fossils represented conscious fraud or merely misguided enthusiasm will never be known for sure. Nevertheless, he can still be esteemed as one of America's most successful collectors of extraordinary fossil treasures.

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