



Carl Ethan Akeley (1864-1926), around 1910.
(Photo courtesy of the American Museum of Natural History, New York)

Carl Akeley— A Tribute to the Founder of Shotcrete

by Pietro Teichert

Only recently joined the American Shotcrete Association. But, in reading through the issues of *Shotcrete* and ASA's excellent brochure, I was struck by how little seems to be known about Carl E. Akeley, the man to whom we all owe our livelihoods. What's more, I'm told by the literature that he invented the cement gun "to apply mortar over skeletal matrices to form the shapes of prehistoric animals" (not true); that he was a Doctor (his schooling was limited to three or four years of grade school); and that the "development of the original cement gun started in 1895" (it actually started twelve years later).

Please allow me to tell you more about Carl E. Akeley and his fascinating life...

Carl Ethan Akeley was born on May 19, 1864, in the little crossroads hamlet of Clarendon, Orleans County, NY, which is located west of Rochester on Lake Ontario. His father, Webster, moved there from Vermont at the beginning of the Civil War and operated a heavily mortgaged 60-acre farm. Even as a boy, Akeley—the second oldest of three brothers—was an enthusiastic bird-watcher. He was also very interested in taxidermy, a skill he learned from Englishman David Bruce in the nearby town of Brockport. At the age of 19, Akeley embarked upon a taxidermy apprenticeship in Rochester for a wage of \$3.50 per week at the Natural Science Establishment of Professor

Henry A. Ward, a recognized authority in the field who supplied exhibits to the best American museums. Akeley seems to have learned a great deal quickly but, above all, he came to be sickened by the unfeeling way the animal skins were stuffed in those days. In 1888, he took a job at the Milwaukee Public Museum and worked there for about 7 years, but failed to find the freedom to try out his own ideas that he was seeking. So, in 1895, he was happy to accept a job offer from the Field Columbian Museum in Chicago, now the Field Museum of Natural History. Over the next 14 years, Akeley went on to develop revolutionary taxidermy methods that ultimately earned him a worldwide reputation in the field and started an entirely new movement for the lifelike presentation of animals in natural history museums all over the world.

During that period, Carl Akeley invented modern dermoplastics, or the process of building a faithful anatomic model with tubes, wire, cloth, and plaster, and then covering it with the tanned animal hide. Akeley presented groups of animals—most of which he had shot on his own expeditions—in very naturalistic surroundings, and created entire panoramas of the animals' habitats with painted background vistas. During these years, Akeley effectively revolutionized taxidermy and natural history exhibits (to this day, an

Akeley Award is presented at the World Taxidermy Championships).

At that time, the Field Columbian Museum was housed in a building that had been erected in 1892 for the World Exhibition in Jackson Park. One day, in the spring of 1907, Akeley was working together with mechanic and model-maker Clarence L. Dewey in a workshop when museum director Frederick J. V. Skiff came looking for him. Akeley was working on two African elephants, and Dewey was busy painting some imitation rocks for another group under construction. Dewey was using an enlarged atomizer built by Akeley that used compressed air to spray on colored plaster of paris. Skiff began to complain about the awful condition of the museum's facade because the trustees had been nagging him about it. Suddenly, he said to Akeley, "Ake, why can't you and Dewey make a big machine like that squirt-gun Dewey is using and paint this old shack with plaster of paris?"¹

The amazingly versatile Akeley, who loved nothing more than a technical challenge, took the bait immediately. He and Dewey got right down to work and, after a few disappointments, proudly unveiled the result on June 24, 1907—a very rudimentary machine, called a "plastergun" by Akeley, that forced dry plaster through a hose using compressed air. When it reached the nozzle, the necessary water was added from another hose. With the emerging jet of plaster, water, and compressed air, Akeley applied a ¼-inch layer to the outer wall of the museum. At least, he did so for an hour, until the hose clogged up. But the experiment had shown that the system did indeed work. The machine functioned on the double-chamber principle: the material entered the conveying hose from two chambers placed one on top of the other, and the two chambers were pressurized alternately. The double-chamber gun was born.

In fact, then, Akeley's invention resulted from the need for an efficient method of recoating building facades. In the literature, the story usually states that he designed the gun to coat animal models with plaster or to create imitation dinosaurs or artificial rocks for his animal groups. Akeley himself was amused by these stories and didn't bother to set them straight. On the other hand, there is evidence (including photographs in Gunitite Contractors Association brochure G-84) that other people used Akeley's machine years later to produce large animal sculptures. But many improvements had to be made before this became feasible. During this period, Akeley was able to count on strong support from none other than U.S. President Theodore Roosevelt. Akeley had met Roosevelt in 1906 after he returned from his second African expedition. Both men were great



The original machine used in 1907 to recoat the facade of the Field Museum of Chicago.

(Photo courtesy of J. J. Shideler, Portland Cement Association, Skokie, IL)

nature lovers with all sorts of interests. A lively correspondence ensued between them. In the fall of 1909, Akeley accompanied Roosevelt—no longer President at that time—and his son Kermit on a trip to Africa during which a close friendship developed. Apparently, it was Theodore Roosevelt who saw the commercial potential of his friend Akeley's plastergun and encouraged him to perfect it. Akeley did just that in the years 1908 and 1909.

Akeley, who had been hired by the American Museum of Natural History in New York a few months previously, applied for a patent on his machine on September 13, 1909. It appears that financial support from the McElroy Shepherd Company of New York enabled him to add 52 changes, improvements, and amendments by the time the patent was finally issued. On May 9, 1911, Patent No. 991814 was issued for an "Apparatus for mixing and applying plastic or adhesive materials." Although Akeley's name was on the patent, it seems that others were busier promoting the invention than he was. In December 1910, the "Cement Gun" was already exhibited at the Cement Show in New York's Madison Square Garden. At the 7th Annual Convention of the National Association of Cement Users held during the show, a paper delivered by G. L. Prentiss, Vice President of Parsons Manufacturing Company, NY, about the cement gun and its use—particularly in lining the Hunter's Brook Siphon of the New York Water Supply at Yorktown Heights—impressed the audience just as much as the machine itself. A civil engineer by the name

of S. W. Taylor was especially quick to appreciate the wide variety of uses to which the cement gun could be put. His engineering company in Allentown, PA, acquired the rights to the machine, and he soon renamed the firm the “Cement Gun Company.” It is not known just how much Akeley was paid for his invention. “The Cement Gun Company lined the pockets of his backers quite nicely, but never made Akeley a rich man; he had given up all financial interest in the company soon after its founding, characteristically moving on to other work.”²

Carl Ethan Akeley died of a fever on November 17, 1926, in the Belgian Congo during his fifth African expedition. Mary L. Jobe Akeley, whom he had married only two years before his death, buried him at Kabara on the saddle between the volcanoes Karisimbi and Mikeno—which Akeley himself considered “the most beautiful spot in all the world.”³ The grave is situated in territory of the Democratic Republic of Congo, the former Zaire and, in Akeley’s time, the Belgian Congo, inside the Parc National des Virungas. This is part of the former Parc National Albert, which was established by the Belgian king in 1925 at Akeley’s suggestion to protect the rare mountain gorillas. In 1978, local vandals ransacked the tomb and scattered Akeley’s bones about the meadow. Twelve years later, Akeley’s remains were secured and his grave rebuilt by Penelope Bodry-Sanders,² a member of the staff of the American Museum of Natural History in New York.

Carl Ethan Akeley, the great explorer, hunter, conservationist, taxidermist, and sculptor, rose from a poor farm boy with 3 years of schooling to a man of the highest repute through persevering self-education. An amiable, strong-willed, and exceptionally creative human being, he received a monument in his memory from the American Museum of Natural History in New York, his last and most fruitful workplace. The impressive Akeley African Hall there, containing a wonderful gorilla group with Mount Mikeno as a backdrop, evokes memories of Akeley and his wife. (A personal note: Have you ever seen Akeley’s wonderful dioramas in this marvelous museum? Go there with your children and

grandchildren, and admire what the inventor of the cement gun created eighty years ago, “what he handed on to posterity of the beauty and truth of a vanishing wildlife, with the accuracy of the scientist, completed with the imagination of the artist.”⁴)

But Carl Akeley has also gone down in history as a many-sided inventor. Besides the cement gun, for which he was awarded the Franklin Institute’s John Scott Legacy Medal for the Promotion of the Mechanical Arts on June 14, 1916, he also invented the first rotary motion-picture camera (for which he was honored again by the Franklin Institute in 1926). Another invention was a powerful searchlight used by the U.S. Army in the First World War. From 1895 to 1921, Akeley was awarded no fewer than 37 patents. “Carl Akeley was a self-made man in the fullest meaning of the word, and attained his eminent position in the world through his own efforts by dint of hard, painstaking work and an unshakable faith in his ideals. His entire career was one continuous struggle in the face of many obstacles, insurmountable except for his indomitable will.”⁵

So much for Akeley and the invention of the cement gun. Of course, there is more to be told about the story of the cement gun and gunite and their rapid and successful expansion across the U.S. and, indeed, the whole world, between 1910 and 1920. I would be happy to tell this story, too, if the editors of *Shotcrete* feel disposed to provide space in an upcoming issue.

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