

Arthur Lakes – Educator, Minister, and Artist of the American West

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Arthur Lakes has a particular place in the geology of Colorado and the discovery of dinosaur bones; he captured his field experiences using watercolor or oil paints. Born on December 21, 1844, at Martok, in the County of Somerset in western England, to Rev. John and Catherine Lakes, Arthur Lakes did his early education at Queen Elizabeth College in Guernsey. He then entered Queens College of Oxford University, where he became fascinated by one of the great early collections of fossil reptiles and pursued geology as somewhat of a hobby. He left Queens College in 1865 and emigrated to the United States, probably through Canada. On December 23, 1869, the Rocky Mountain News announced his acceptance of the Assistant Teacher position at Jarvis Hall Collegiate School in Golden, Colorado, a boys prep school and college. Jarvis Hall was founded by George M. Randall, the Missionary Bishop of the Protestant Episcopal Church of Colorado. Lakes first taught English and Latin at Jarvis Hall while he was studying theology at Matthews Hall. In 1870, when a School of Mines opened as a part of Jarvis Hall, his responsibilities expanded to include writing and drawing. In 1874, Lakes was ordained a deacon in the Episcopal Church and served as an itinerant minister to a number of towns and homes in the area, such as Morrison and Idaho Springs. (Cattell, 1910; Staff Mining Science, 1913).

The Legislature established the State School of Mines on February 9, 1874. Lakes taught freehand and mechanical drawing and was Curator of the Museum which displayed his rock, mineral, and fossil collections. Many of his specimens still exist today in the Colorado School of Mines' Geology Museum.

On March 26, 1877, the Reverend Arthur Lakes and his associate, Captain H. C. Beckwith, United States Navy (retired), were studying the geological structure of the hogback, a geomorphologic structure formed by a ridge of erosion-resistant Dakota Sandstone in tilted strata. A closer examination of what was at first believed to be a large stump of petrified wood, unearthed a huge bone measuring six to seven feet in length. Lakes had seen bones similar to this, although smaller, while studying at Queen's College. Lakes' letter to Othniel Charles Marsh, a prominent paleontologist at Yale College (later Yale University), dated April 2, 1877, said:

A few days ago whilst taking a geological section and measurements – and examining the rocks of Bear Creek near the little town of Morrison about fifteen miles west of Denver, I discovered in company with a friend, a Mr. Beckwith of Connecticut, some enormous bones apparently a vertebra and a humerus bone of some gigantic

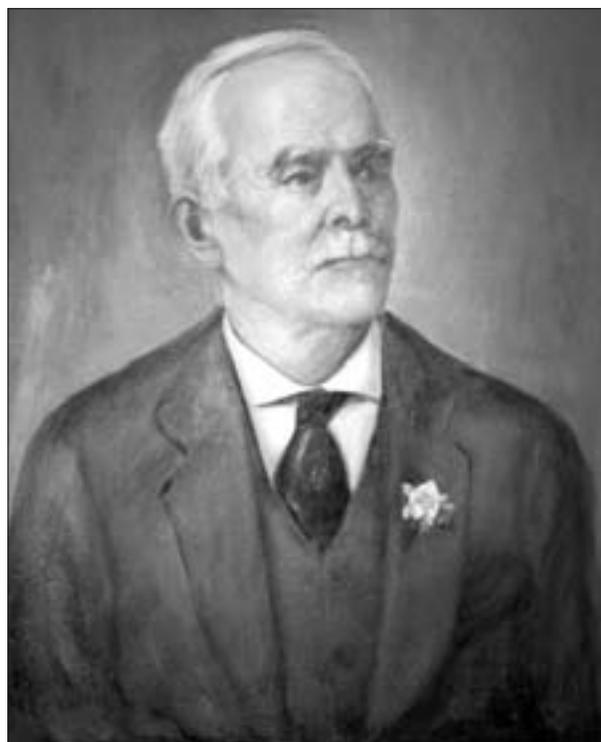


Abb. 1: Portrait of Arthur Lakes.

saurian in the Upper Jurassic or Lower Cretaceous at the base of Hayden's Cretaceous No. 1 Dakotah group. (Lakes, 1877)

Enclosed with his letter were two sketches of the bone and a stratigraphic section of the hogback indicating where the bones were found.

Lakes wrote three more letters to Marsh and shipped 2,100 pounds of bones to him. He asked Marsh for monetary assistance for continued digging and reimbursement of his expenses. His letters and shipments to Marsh went unanswered. Lakes then sent a letter to Marsh's rival, Edward Drinker Cope, another prominent paleontologist.

After a brief conversation between Marsh and Cope, Marsh asked his chief collector, Benjamin Mudge to travel to Morrison to observe the collecting, and employ Lakes. The discovery was published in the American Journal of Science, July 1, 1877, with "Notice of a new and gigantic dinosaur" filling one page. Lakes indicated the bone belonged to *Titanosaurus montanus*, later changing the species name to *atlantosaurus*. At this point, Reverend Lakes took a leave of absence from his teaching position at the State School of Mines to pursue digging full time during the week. On weekends, he continued his work as an itinerant minister to nearby mountain towns and homes.



Abb. 2: Lakes' rendition of a sauropod.



Abb. 3: Arthur Lakes' copy of Charles R. Knight's painting „Leaping Laelops“.



Abb. 4: Juxtaposition of skeleton and body of a veratopid.

Freeing the bones from the very hard Dakota Sandstone was difficult. Use of hammer and pick would frequently fragment the bones. Professor Mudge shared standard excavation techniques used at that time to remove as much bone as possible from the rock. Often a thick coat of Plaster of Paris was applied to the outside of bone for preservation while the surrounding rock was hammered away. Additionally, excavations of the quarries at Morrison were accomplished by digging underneath the Dakota caprock. One quarry had to be abandoned after the ceiling collapsed.

Professor Mudge was transferred to Garden City, Colorado, to supervise another dinosaur dig and Marsh sent Samuel W. Williston to work with Lakes. Ten quarries were dug in the area north of Morrison; however, only four of those quarries produced fossil reptiles or dinosaurs. In late 1877, Williston went to Como Bluff, Wyoming, to work another of Marsh's excavation sites, leaving Lakes to work at the Morrison quarries. On May 14, 1879, Lakes, too, was transferred to Como Bluff, Wyoming.

Marsh discontinued work at the Morrison quarries following Lakes' departure. The Como Bluff excavation

was less costly to quarry and the quantity of bones found there was exceptional. Marsh also realized the value of Lakes' abilities as an artist and asked him to prepare drawings of the work and experiences digging dinosaurs. During his quarry work, he assisted in unearthing Stegosaurus, Apatosaurus, and Allosaurus.

Returning to Golden, Colorado from Como Bluff, Wyoming in 1880, Lakes assumed the position of Professor of Geology at the State School of Mines where he taught geology and drawing and conducted Saturday morning field trips for students and interested participants. Lakes may have left Marsh's employ because of Marsh's tardiness in paying his salary and expenses or his reluctance to share in publishing the dig findings.

In late 1880, Lakes worked for the United States Geological Survey (USGS), surveying the Mosquito Mountains and Leadville District in Colorado under the supervision of Samuel Emmons. Many of the illustrations of this silver mining district in the USGS report were drawn by Arthur Lakes.

Lakes resigned from the Colorado School of Mines in 1893. He was



Abb. 4: „Starkville Coal Mines of Trinidad Coal & Coke Company“, Arthur Lakes, 1883.

western editor of Mines and Minerals from 1895-1904 and continued to publish geologic works on Colorado. Olive Jones' Bibliography of Colorado Geology and Mining from Earliest Explorations to 1912 has 259 entries attributed to Lakes.

Arthur Lakes and his wife, Edith (nee Slater of Trinidad, Colorado) had three sons, Arthur, Jr. Harold, and Walter. He retired from active work in 1905 and after the death of his wife he joined his son, Arthur, Jr., a mining engineering consultant, in British Columbia, Canada. He died there on November 21, 1917.

The Colorado School of Mines Library was named in his honor in 1959 and his portrait hangs in the main lobby. Examples of his professional work as well as watercolor and oil paintings are preserved at the Colorado School of Mines Library and Yale University's Peabody Museum. His field journals have been published by Michael F. Kohl and John S. McIntosh (editors) and present some of the daily travails of excavating bones. His discoveries and digs regarding dinosaurs were just a small portion of his life, teaching and writing that earned him the title "Father of Colorado Geology."



Abb. 5: An example of Lakes' professional work: here he used watercolors to highlight geologic features of the Ralston Creek area, Colorado, USA.

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