

Traditional
Cattle Walls
of
Kona

First Edition

Traditional Cattle Walls of Kona



Pauahi dairy established c. 1890

Look around you. Stones are everywhere—smooth, craggy black, brown and every shade in between. For hundreds of years, people in Hawai`i have been using them to build stonewalls – *pa pohaku* – and many of these are cattle walls – *pa pipi*.

The cattle walls of Kona are some of the most extensive and beautiful in the world, displaying the traditional art of “dry stack” stonewall construction.

Dry stack stonewalls – built without mortar – can be found around the world, wherever stone is plentiful. The techniques for building are similar. Each culture, however, has adapted its skills to the type of stone available, the terrain, and the climate.

Ancient Hawaiian Stonework

Before the arrival of Captain James Cook in 1779, Hawaiians used stone to fashion tools and to construct platforms for houses, ceremonial structures, and walls—usually to enclose fishponds, protect gardens and to mark land boundaries. All of these were built without mortar.

All stone in Hawai`i is volcanic in origin, what geologists call basalt. Basalt occurs in a variety of densities and grains. Although most early Hawaiian structures were built from stones found in the immediate area,

others were built with stone transported by hand over great distances. Pu`uhonua o Honaunau is a magnificent example of what ancient Hawaiians were able to accomplish using the dry stack method of construction.



Pu`uhonua o Honaunau National Park.

Ranching & Cattle Walls in Kona A Brief History

Cattle were first introduced to the islands in 1793 as a gift to Kamehameha I from the British sea captain George Vancouver and in 1803 the first horses were presented as a gift from Captain Richard Cleveland. Kamehameha I put his cattle in a large stone pen in the *mauka* elevations of central Kona on the slopes of Hualalai, and placed a *kapu*, or prohibition, on them, which protected them from being hunted for nearly thirty years. Soon, the descendants of these first longhorns were so plentiful that they began tearing up the forests and ravaging village gardens and *taro* patches.

Sometime after 1824, during the reign of Kamehameha III, the *kapu* on the hunting of cattle was lifted. Influenced by foreigners, Kamehameha III began a program to control and manage the beasts as an economic benefit to the kingdom. He recruited *vaquero* (Spanish/Indian/Mexican cowboys) from California to teach Hawaiians



Kona Cowboy, John Joseph Gouveia. c. 1917

Mitchell, Kona Historical Society Archive

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Sullivan Collection, Kona Historical Society Archive

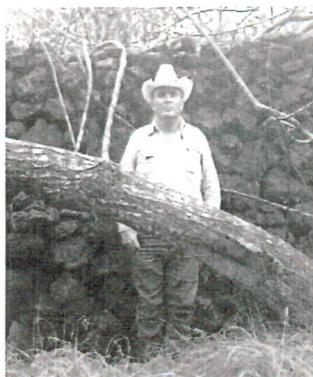
how to work the wild herds. These colorful and skilled horsemen arrived with their working gear and their cultural traditions, and over time they and others who joined them made a significant impact on ranching in Hawai`i.

“Paniolo”—the term used for cowboy in Hawai`i—is actually the Hawaiian pronunciation of the word “Español”!

The First Ranches

By 1848 the pressures of Western economics brought about a land reformation called the *Mahele*. This new system provided, for the first time, private ownership of land and, by 1850, foreigners were acquiring large tracts of land for sugar and coffee plantations, ranches, and other agricultural ventures.

The First Cattle Walls



Kona Rancher, William Paris in front of Kamehameha's cattle wall built in 1793.

Mitchell, Kona Historical Society Archive

Kona's first cattle wall was built by Kamehameha I to prevent the animals from damaging cultivated areas.

Located in the *mauka* section of the *ahupua`a* of *Lehu`ula*, it encompassed over 460 acres and averaged eight feet in height and eight feet in width.

The second cattle wall is thought to have been built around 1820 by the Hawaiian chief Kuakini, again, to protect villages and garden plots. This one stretched over five miles from Kailua to Keauhou and is known as the Kuakini Wall.

By the 1880s, cattle walls were being built for Kona ranches and dairies. A typical complex would include a large corral and a few pens for separating cattle. Many of the stone walls still standing in Kona today, were built between 1881 and 1900, in response to the Boundary Commission which began requiring formal boundaries as early as 1862. In 1929, a series of earthquakes shook the district of Kona, damaging buildings and tossing apart many walls. Much of the work to repair and rebuild the stonewalls was undertaken

by Hawaiian and Portuguese cowboys and Japanese stonewall builders.

Today, most of the cowboys who preserve the skills of stonewall building and repairing are direct descendants of these skilled and self-sufficient men who shaped the ranching heritage of Kona. The work of several men stands out and their names have become part of the folklore of the district.

Stone Masons of Kona

Charlie Mokuohai

Charlie Mokuohai was born on O`ahu in 1903 and raised in Pahoe, South Kona, by his grandfather John Mokuohai, a *taro* farmer, fisherman, canoe builder and stone mason. Charlie honed his skills as a stone wall mason



Charlie Mokuohai, inset on one of his creations, *Pu`uwa`awa`a*, North Kona. c 1950.

Kona Historical Society Archive

during the 1930s while part of road construction crew that built many of the walls still seen along Kona's roadways, including the impressive wall that borders Mamalahoa Highway (State Highway 190) between Pu`uanahulu and Kailua. In addition, Mokuohai was an entrepreneur who started a *poi* factory, operated three sampans for long-line fishing, and carved *koa* canoes for local clubs. He often built mineral troughs for Kealakekua Ranch in exchange for canoe logs. Walls constructed by Charlie Mokuohai can still be seen throughout the Kona district.

Manuel de Gouveia

Portuguese settlers to the Kona district were generally from the volcanic islands of Azores and Madeira, where many had grown up working with livestock. The men

in these families were often skilled stonemasons as well. The cattle pens that they built on Kona's dairies reflect their understanding of both the terrain and the elements needed for working cattle.

Manuel de Gouveia and his family arrived in the district in 1879. By 1881 he was working closely with H.N. Greenwell to develop Kona's first dairies on Greenwell's south Kona ranch. These included Ki`ai, Pawaina, Pauahi and Papaloa. All of these dairy sites had magnificent stone cattle pens built by de Gouveia.

Takano

A small number of Japanese men who immigrated to Hawai`i after 1885, primarily as sugar plantation laborers, found their way to the Kona district after 1900. Some took up work as sawyers and others went into coffee farming. Local ranches often hired Japanese farmers during coffee's off-season for help in repairing stonewalls and maintaining cattle paddocks.

Takano was well known in Kona during the 1920s as a skilled stonemason and ranches often hired him to build or repair stonewalls before and after the destructive earthquakes of 1929. *Takano's Pen* on Kealakekua Ranch and *Takano Paddock* on W.H. Greenwell Ranch were both named for him.

The Art of Construction

For a stonemason, making a dry stack stonewall is not just a matter of technique—it is also an art. After years of handling stones, most builders develop an intuitive ability to lock stones together in the jigsaw puzzle that is a dry stack wall.

The cattle walls of Kona were generally erected using stone found right on the dairy or ranch. Some appear to have a jagged surface and are constructed of stones of similar size and shape. These are built using `a`a lava. Other walls have a smooth surface and are constructed from stones of varying sizes; these are built using *pahoehoe* lava.



Tapering in the sides of a wall helps keep it standing.

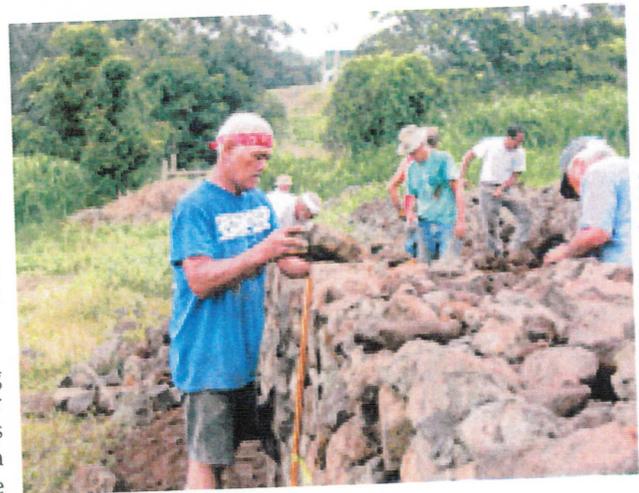
The way a dry stack stonewall looks is directly affected by the type of stone used, the terrain it is built upon, and the personal style of the mason. The strength and durability of a dry stack stonewall depends upon how well the builder understands gravity—the ultimate force that holds the wall together.

In Hawai`i, stonemasons measure the length of a wall in fathoms, a nautical measurement of six feet. Most cattle walls in Kona are four to six feet tall and two to three feet thick.

For walls over three feet high, the base is often wider than the top of the wall, tapering in slightly. Gravity keeps the wall standing by pulling rocks down as well as in toward the wall's center.

Today, Hawai`i's stonewall builders often make wooden "batter boards" out of 2 x 4 foot planks to place at either end of the wall. They serve as a guide for the taper with strings tied horizontally between them to help the mason "lay the course level" as the wall increases in height.

A stonewall's foundation is critical to stability. In the steep terrain of Kona, a builder sometimes looks for a



Kona Heritage Ranch (KHR) committee member Sonny Keakealani sets a stone in place on the Kona Heritage Ranch boundary wall.

Auld. KHS Kona Heritage Ranch 2002

Auld. KHS Kona Heritage Ranch 2002

stone outcrop to anchor the other stones to. This foundation stone is called a *niho*, Hawaiian for "tooth."

A dry stack stonewall usually has two distinct outer surfaces "faces" or *kukulu* in Hawaiian. The center of a stonewall is filled in with smaller stones built in to the wall as it increases in height. Depending upon the builder's personal style and the availability of stone, some of the fill might be medium-sized stones that are locked into place, and some might be small stone rubble—called *hakahaka* or *opu* in Hawaiian.

It is also important that the joints—the places where two stones meet—do not line up from course to course. Some stonemasons call this the "one over two and two over one" rule. Too many joints that line up from one course to another are called a "run" which is a bad thing! Stress can concentrate at these weak points and over time, gravity will pull on the wall along these lines and stones begin to fall out.

In larger walls, "tie stones" are used. These are long stones placed into the wall so that they aim into rather than along the wall—usually placed every six to eight feet along the length of the wall.

Hawaiian walls are not usually finished off with large flat capping stones, but are left with their core showing.

Unique Features

Even though a stonewall appears stable and enduring, it is constantly moving—shifting with the rise and fall of the earth as it swells with rain, and so drainage is an important concern. To prevent water from tearing apart a wall, a stonemason may build a small clear passage through the bottom of a wall to serve as a drain. Openings are also created for pigs to crawl under so they don't tear into a wall.

Gates are usually attached to the wall with wooden batter boards held in place by strong wire built into the base of the wall, usually ten to fourteen feet from where the gate will hang. In modern



A small clear passage helps drainage



Creating pig holes keeps them from tearing into a wall.

times, the ends of the wall are often reinforced with mortar in order to hold the stones in place where the gate wears on the structure.

As ranching changed over the years, additions were often made to corrals and pens, usually with whatever materials were readily available—wood rail fencing, wire, and even corrugated roof iron.

Maintenance

All dry stack stonewalls need regular repair and maintenance, especially walls that come into contact with livestock. Part of the job of a Kona cowboy is to "check fence," which usually means riding the perimeter of boundary walls and cattle pens to check for loose or pushed out stones. Once a wall loses a stone, more are sure to follow.

A well-maintained dry stack stonewall is a monument to the enduring qualities of stone and men. In the Kona district, the cattle walls around you are a testimony to the ingenuity and resourcefulness of the Kona cowboy!

	Hawaiian:	Glossary	English:
<i>ahupua`a</i>	traditional Hawaiian land division, usually pie-shaped with the apex in the mountains and the broadest section at the sea, providing for mountain, agricultural and ocean resources.	course dry stack face	a row of stones a stone wall built without mortar the side of a stone that a mason chooses to have show on the surface of the wall
<i>ho`opiha</i>	locking stones so that they fit together in a dry stack stone wall	fill	loose rubble stones used to fill in the center of a wall or to be put behind a retaining wall to aid in water drainage
<i>kapu</i>	a prohibition or restriction usually issued by the gods or the ali`i (chiefs) -- a transgression was often punishable by death.	lay up	refers to building up the courses (rows) of a stone wall
<i>kukulu</i>	outer face of a stone wall	locking stones	the placing stones in relation to one another so that their shapes fit together
<i>hakahaka</i>	loose rubble used to fill in between the two outer faces of the wall	mortar	an aggregate used to "cement" stones together like pieces of a jigsaw puzzle
<i>mauka</i>	mountain	outer face	the surface of the wall facing the outside that you see
<i>nihoho</i>	base or foundation stone (lit. tooth)	run	the placing of stones so that the joints between two stones line up for several courses—contributes to weakening a wall
<i>opu</i>	stone fill (lit. stomach)	tie stones	large stones placed with their length or axis going into the wall to "tie" one outer face of a wall to the other outer face
<i>pa</i>	fence		
<i>pa hakahaka</i>	wall using rubble fill		
<i>paniolo</i>	cowboy		
<i>pa pipi</i>	cattle wall		
<i>pa pohaku</i>	stone wall		
<i>pipi</i>	cattle		
<i>pipi`ahi</i>	the name given to the wild cattle (lit. wild cattle)		
<i>pua`a pipi</i>	name given to cattle when they were first introduced to the Hawaiian Islands		

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Jean Greenwell Collections
Photo Archive
Oral History Collection
- Resource Consultants:
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To learn more about ranching on the Island of Hawai`i contact:

Parker Ranch Museum, Waimea, Hawai`i – 808-885-7655
Kahua Ranch, North Kohala – 808-882-4646
Lyman House Memorial Museum, Hilo, Hawai`i – 808-935-5021

*Ua Ho`onoho ia
Ho`oku`u ka hana*

Only when all the stones are stacked properly,
Then the work is done



Auld. KHS Kona Heritage Ranch 2002

Kona Heritage Ranch Boundary Wall, August 2002



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