

# Livestock in the Land of Aloha

**Burt Smith, George Love, and Earl Spence**

"When dawn came and we could see clearly, we tightened our saddle-girths, adjusted our lariats, deadened the jingle of our spurs, mounted and stole quietly along the edge of the plain towards the cattle, and then, as soon as they discovered us and began to start for cover, there was a wild rush, and each able rider roped his bullock before the wild creature had plunged back into the forest, or down a deep valley-side." The above, written by a settler on Oahu, near the famed Waikiki Beach, in the early 1840's is a partial description of day-to-day activities in an area the world knows best for its beaches, sparkling blue water, swaying palms, and the hula.

The State of Hawaii stretches some 1,525 miles across the Mid-Pacific ocean and comprises a land area of 6,425 square miles. Eight major islands make up 99% of the State's land area with the balance scattered among 124 islands, reefs and shoals. The Big Island, Hawaii, is larger than all of the rest of the islands together, 4,038 square miles, and is the focus of the State's beef cattle industry. The other islands listed in declining order of beef cattle numbers are: Maui, Kauai, Molokai, Oahu, Niihau, Lanai, and Kahoolawa. In spite of the fact that the major islands all lie within the Tropic of Cancer,

the climate is predominantly sub-tropical along the coast. The ocean, whose temperature fluctuates from 74 to 80° F, acts as a giant thermostat and the northeasterly tradewinds keep the temperatures from soaring to the highs that the latitude would suggest. Occasional winter storms, Kona winds, disrupt the trades and allow temperatures to climb into the 90's, but soon the trades are back with their moderating effect. The highest temperature recorded is 100° F (Honolulu) and the lowest is 9° F, at the summit of Mauna Kea; elevation 13,796 ft. Four of the major islands have mountains that are above 4,000 ft., and on the Big Island skiing is a regular winter sport. The mountains of Hawaii are placed in better perspective when it is remembered that their bases lie 13,000 feet below the surface of the ocean.

**T**HE RAINFALL OVER THE OCEAN averages 25 inches per year; however, parts of the Islands may receive over 15 times this amount and others a third or less. The cause of this extreme variability are the mountains which force the moist tradewinds over them. The belt of maximum rainfall lies not at sea level, but at elevations between 1,500 and 3,000 ft. The difference in rainfall can vary dramatically over relatively short distances. For example, Waikiki Beach receives a yearly average of some 20 inches; the University of Hawaii at Manoa, three miles inland, close to 40 inches; and three miles

The authors are: Extension specialist in pasture and livestock management, Univ. of Hawaii Cooperative Extension Service, P.O. Box 237, Kamuela, Hawaii 97643; resource conservationist, Soil Conservation Service, P.O. Box 50004, Honolulu, Hawaii 96850; Agronomist, Parker Ranch, P.O. Box 458, Kameula, Hawaii 96743.



*Relic Koa tree (Acacia koa), on Parker Ranch, elevation 5500 ft, near the Waimean plateau, Kamuela, Hawaii.*

farther up the canyon, over 90 inches. On the leeward sides of the Islands, the trades having dropped their moisture on the windward sides, act similarly to the dry Santa Anna winds of Southern California, sucking up moisture and turning the lee areas into a desert. The winter Kona storms, which originate south of the Island chain, are generally the only precipitation that these areas receive. Rainfall can be very intense during Kona storms, and it is not unusual to receive over half the yearly average in an hour or less. Convective showers, during the summer months are another source of moisture, primarily on the Big Island. They are erratic, though often quite severe.

The tradewinds blow about 90% of the time in the summer and 50% of the time in the winter. When the trades are absent, the winds are usually from the south and result in typically tropical-type weather; however, this situation only lasts a week or so. In the Kohala mountains, on the northern end of the Big Island, the average yearly wind speed is 27 mph. Gusts of 40 to 50 mph are common and over 70 not unusual for this part of the Island. The wind coupled to temperature and moisture, often causes the effective temperature to dip into the low 30's, even though the ambient air temperature registers in the 60's. Wind stress of both plants and animals is common, resulting in lower digestibilities of the forage, while requiring higher energy intakes by the grazing animal.

The short difference in day length from summer to winter, 2 1/2 hours, also contributes to problems for both plants and animals. Plants that require a long day to flower, may fail to do so. Animals at the higher elevations often fail to shed their winter coats when summer arrives. On the plus side, seasonal breeding is almost eliminated.

The Islands are all volcanic in origin. The Pacific plate, as it drifts towards Japan, passes over a localized "Hot Spot" of the earth's mantle, which in turn causes volcanic activity over the "Hot Spot." As the plate moves northeast, about 10 cm per year, the volcanic activity decreases as it gets further from its energy source, eventually becoming dormant, then extinct. As time goes on, the unrelenting forces of the ocean and climatic erosion prevail and the once proud volcano is reduced to a coral atoll or shoal. The Islands are relatively young, geologically speaking. The northernmost large island, Kauai, is 4.5 million years old, while the southernmost island, Hawaii, is still forming. Two hundred acres of new land have been added to the island of Hawaii during the last 11 years as a result of lava flows. Further south, sea mounts are forming which eventually will produce new islands.

**I**N SPITE OF THE STATE'S YOUTHFUL AGE, all 10 orders of the USDA's soil classification series are represented. Soil pH runs from quite acid on the wetter windward sides to quite alkaline on the lee sides. Because of the high porosity of the volcanic rock and soils, water is only plentiful on the windward sides. Ground water is almost nonexistent on the lee sides, except at low elevations and then brackish. Further confounding the environment is the recent discovery that Hawaii is receiving acid rain, the source of which is believed to lie many thousands of miles away.

For all of the above reasons, plus a few more, Hawaii has the most diverse environments of any State in the Union. Every major life zone, except Arctic, is represented in the State; often only a mile or so apart. This unique feature poses numerous management problems for most of the major ranches in the State. On the island of Hawaii, the Parker Ranch, one of the largest individually owned ranches in the

United States, runs cattle from the tropical and sub-tropical coast to elevations of 8,000 feet where temperate grasses prevail; variation in rainfall is from well over 100 inches to less than 8 inches a year. Drought is always a problem somewhere in the State. The high porosity of most of the soils, coupled to high transpiration losses due to high incident solar radiation and winds, makes even a short break in rainfall cause for concern.

In 1777 there was not one cow, sheep, horse or goat anywhere in the area that is now the State of Hawaii. In fact, the only land mammals in the Islands were a small light weight pig, Poi Dogs (eating type), Polynesian rat, Hory bat, and Hawaiians. All this was destined to change abruptly and dramatically. Goats were introduced to some of the Islands by Captain James Cook, who rediscovered them in 1778; the Islands were initially discovered and colonized by the Polynesians around 400 AD. In two voyages, 1792 and 1793, Captain George Vancouver landed 7 cows, 1 heifer, 2 bull calves, and 1 bull on the Big Island. These animals were for the most part black longhorns, believed to be of the line that the Mexicans used for their bull-bear contest. The animals were obtained from what is now British Columbia and Monterey, Calif. In addition to the 11 longhorns, 7 rams, 9 ewes, and some goats were also presented to the ruling monarch, King Kamehameha. The King placed a kapu (taboo) against the killing of these animals, which were subsequently turned loose upon the unsuspecting vegetation. By 1830, the number of animals on the Big Island alone was estimated to be 20,000 cattle, 3,000 sheep, 1,200 horses (introduced in 1803) and numerous goats. Not a bad increase by any standard; but then they were in paradise, no natural predators and few parasites, mosquitoes didn't even arrive until 1828.

The naturalist Nelson, who accompanied Cook, surveyed the Big Island and recorded some 19 species of grass present and established. Later authorities estimated that there were perhaps 65 species present at the time of rediscovery; today, there are over 450 and still counting. Numerous native legumes were also present such as the Koa (*Acacia koa*) and Mamane (*Sophora chrysophylla*), seedlings of which were relished by the introduced livestock. The native and endemic vegetation was ill prepared for the livestock invasion and even less for the secondary invasion of introduced plants and insects. So great has been the impact of the exotic species that over 90% of the vegetational species found below 1,500 feet elevation are recent introductions; the native plants that are still holding out can be found only in relic or inaccessible areas. The vast majority of the plants that people see when they come to Hawaii were not here 200 years ago. The same can be said for the mammals, birds, reptiles, insects, and even the different races of Man.

**T**HESE CHANGES DID NOT GO UNNOTICED. As early as 1856, noted naturalists, such as Dr. William Hillerbrand and others, were warning of the continued attack against the native vegetation by both man and beast. They saw the mass removal of the forest for commercial exploitation, and the failure to reseed, caused by indiscriminate grazing, as a major cause of the dramatic climatic changes that were occurring, particularly in the Waimea and Kawaihae regions of the Big Island. The Waimea plateau lies between Mauna Kea to the south, and the Kohala Mountains to the north, on the northern end of the big Island. Kawaihae, presently a harbor which handles most of the Island livestock shipping, is about 10 miles west, on the lee side, of old Waimea. Wai-

mea was renamed Kamuela some years back; however, the plateau still bears the old name. Kawaihae, when the forest still existed, used to be frequently hit by a strong destructive wind, known locally as Mumuku. Since the forest has been removed and replaced by grass, the Mumuku is a thing of the past.

Ever since rediscovery, the Islands have been consistently rocked by repeated waves of introduced species. Hawaiian Department of Agriculture estimates that 17 species of insects are introduced to the State annually; estimates of plant introductions are not available. Most introductions do not survive, but many find a wide open niche. Free from natural predator and other constraints, they rapidly naturalize and expand throughout their area of adaptation. Kikuyu grass (*Pennisetum clandestinum*), introduced in 1924 as an improved pasture grass, presently comprises over 70% of the range grass community in its area of adaptation. Fountain grass (*Pennisetum ruppelii*) introduced as an ornamental in 1926, escaped and now makes up the bulk of the vegetation on the drier side of the Big Island. Lantana (*Lantana camara*) and Christmas berry (*Schinus terebinthifolius*), also brought in as ornamentals, are now the 2 major brush problems found Statewide. The list goes on and on.

By 1815, the depredations of the wild herds of longhorns, introduced by Vancouver, forced the natives to build rock walls to protect their gardens and themselves. Some of the animals were particularly vicious and would attack humans without provocation. The first Hawaiian monarch, King Kamehameha, died in 1819 and in the early 1820's, King Liholiho commissioned the first bullock hunters in an effort to diminish the danger to the natives, as well as their gardens and to provide export material in the form of hides and tallow.

**T**HE FIRST BULLOCK HUNTERS WERE an adventure-some and colorful lot, composed mostly of sailors that had jumped ship. Many went native and by the time the hide and tallow trade reached its peak in the late 1830's, all but a few had vanished from the scene. The early hunters worked the animals by foot, often with dogs and occasionally employing large bullock pits to trap the animals. In 1834 the Botanist David Douglas, of Douglas fir fame, met his death in one such pit, although the circumstances of his death may have been assisted by a person or persons unknown. The usual procedure for hunting was similar to that of any large animal; stealth followed by brisk musket fire. As might be expected, there were considerable casualties, as the animals were wont to charge anything that they dimly perceived as a danger. Although horses were available they were not used in the early days, due primarily to the lack of sufficient skill in horsemanship and the use of the lariat.

One of the sailors that did achieve prominence in Hawaiian affairs was John Palmer Parker. Arriving a destitute sailor in 1809, he was befriended by King Kamehameha and subsequently married a Hawaiian princess and settled down in North Kohala on the Big Island. His transformation from sailor to cattle baron went at a leisurely pace. He maintained firm roots with his family and farm in Kohala and never went to the excesses that eventually extinguished the other hunters of the era. Parker was no slouch as a hunter: one rifle which he retired from service, is claimed to have dispatched 1,200 beasts. By the late 1820's the transformation of the Waimea plateau from a forest of Mamane and Sandalwood (*Santalum* spp) to grassland was virtually complete. In spite of the hunters, the herds of wild cattle had increased immen-

sely, and so had the demand for hide, tallow, and salt beef. During the 1830's Parker aligned himself with the trader William French and began acquiring wealth that would later translate into one of the largest ranches in the United States.

The increased demand for cattle products, especially salt beef for the whaling ships that had begun to use Hawaii as a port of call, prompted a search for a better method of harvesting the wild herds. In 1832 or 33, three Mexican vaqueros arrived on the Big Island, Juan, Jose, and Joaquin, to teach the natives the art of cattle handling. These were not the first Mexicans or Spaniards with cow savvy to appear on the Hawaiian scene; two others are worthy of comment. Don Francisco de Paula Marin was an early arrival to the Islands and at various times lived on the Big Island, Maui, and Oahu. He was a friend and confidant of King Kamehameha and acted for a while as a physician for the Royal Court. He was reputed to have had a herd of cattle in the early 1800's, used primarily for milking. The other was Joaquin Armas, who was wooed off his ship by King Kamehameha in 1831 to help catch wild cattle in the Waimea area in an effort to replenish the Royal coffers. There is considerable confusion regarding these two men, primarily due to the fact that they were both referred to as "The Spaniard." The Spanish influence on the Hawaiian cattle industry was immense, even to this day. It is interesting to speculate what might have happened had those first cowboys been Texans rather than vaqueros.

**T**HE THREE VAQUEROS ARRIVED WITH BRIGHTLY COLORED ponchos, split bottom pants with buttons down the seams, high boots armed with cat claw spurs, silver inlaid saddles and bridles, and the best trained cow horses the Hawaiians had ever seen. It wasn't long before the musket gave way to rawhide and hair ropes and the natives embraced the daring-do of the vaqueros as their own. The Hawaiian word for cowboy is paniolo and was derived from the pronunciation of Español, which the natives found difficult to say; it is in common usage today. With the introduction of Latin American cattle handling methods, equipment, dress, and cow savvy, Waimea took on the appearance of a Southwestern cow town, complete with tan-pits, blacksmith and saddle shops, and also the shoe or boot maker's trade. Horsemen became a common sight, captured cattle were domesticated, corrals and cattle pens erected, and the wild herds were so decimated that in 1840 the King issued a 4-year kapu against killing any animal for just the hide and tallow. The heyday of the wild cattle herds was over. Although, wild cattle continued to be a source of income, even to this day, their importance rapidly diminished in favor of domesticated herds. Man can not long tolerate a freedom so flagrantly displayed.

During the fifth decade of the 1800's the landholding system was changed from a feudal to an alodial basis in what was called the "Great Mahele." The King divided the land among himself, 23.9%; the Government, 36.2%; the Chiefs, 39.2%; and the common people, 0.7%. While it sounds a bit lopsided, the lands given to the commoners were the irrigated taro lands in the valley bottoms, by far the most valuable at the time. However, the natives were slow in grasping the full significance of land titles. Returns from lease or sale of the land were high and life in port towns, tempting. By 1896, 57% of the taxable lands were in the hands of non-Hawaiians: operators of sugar and rice plantations and cattle ranches.

With the advent of private ownership in fee simple, or long



*Editor's Note:* Figures 1 through 5 depict the cattle loading procedure that was used at Kawaihae harbor, on the Big Island of Hawaii, until 1949.

Today, the animals are loaded at the ranch in special container trailers, trucked to the harbor, and loaded directly on barges; travel time to Honolulu remains about the same. Shrink of the animals, from the ranch to Honolulu is around 13 percent; there is no reliable estimate of the shrink that occurred under the old method.



**Fig. 1.** The animals to be shipped were trailed to the harbor and placed in a rock corral with an open side to the ocean. Paniolos then roped an animal and with assistance of another acting as hazer, led it into the harbor and swam it to an awaiting longboat. The horses used for this work were half blooded draft types, the saddles were made out of wood and iron.

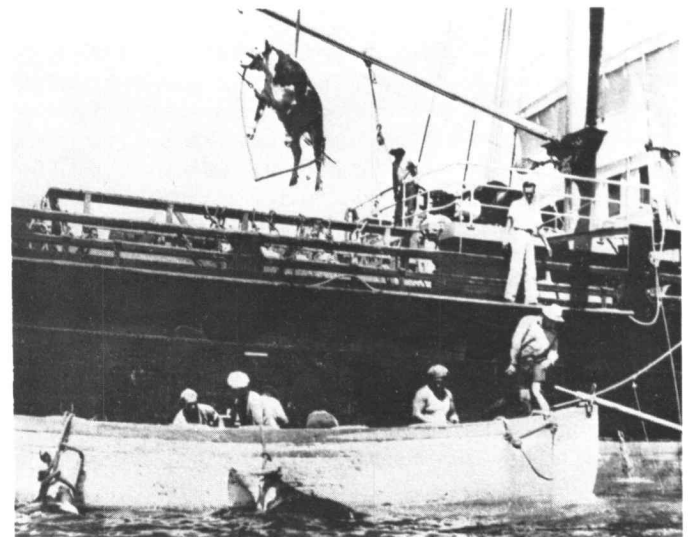


**Fig. 2.** Upon reaching the longboat, a rope-halter was placed on the animal, the lariat removed and the end of the halter passed over the gunwale and secured to a wooden brace down the center of the longboat.

term lease, cattle ranches sprang up throughout the Islands. The California gold camps increased the demand for fresh and salted beef, as did the increasingly growing market in Honolulu. The first blooded lines were brought to the Islands in 1850, a shorthorn and an angus bull. By 1900 there were 96,000 head of beef cattle and 102,000 sheep. Sheep raising became a serious enterprise in the 1850's and reached its peak in 1884 with over 122,000 head. The decline of wool prices in the 1940's removed the last of the large sheep operations from the picture. Presently, there are just a few thousand sheep, primarily on the island of Niihau, although



**Fig. 3.** With three animals secured to each side, a signal was given, and a donkey engine on the transport towed the longboat and its unwilling cargo to the ship.



**Fig. 4.** Upon reaching the transport, the longboats stood off a short distance, a sling was passed under the animal, attached to a boom and tackle and the animal hauled on board.

two ranches have recently introduced sheep on a commercial scale.

**A**LONG WITH THE DEVELOPMENT OF commercial cattle operations came the apparent need or desire for improved forages. Hitchcock, in "The Grasses of Hawaii," 1922, lists 87 introduced grasses. Some of the notable introductions were rhodes grass, guinea grass, dallas grass, orchard, brome, and kentucky bluegrass; bermudagrass was also introduced



**Fig. 5.** Once on board, the animals were tethered to the sides of the pen, until that pen was loaded; once loaded, the halters were removed. Transportation time to Honolulu was about 24 hours.

prior to 1900, but was not noted by Hitchcock. A.W. Carter, manager of the Parker Ranch during much of the first half of this century, also introduced numerous legumes and grasses to the Big Island. Paniolos would be given a sack of seed and told to scatter it on bare areas, or where feral pigs had been rooting. The result of the deliberate introductions and escapes, is a potpourri of vegetation bearing little relationship to one another, or in many cases, what is assumed to be their natural habitat.

A.W. Carter, perhaps more than any other individual, was responsible for shaping the cattle industry during the first half of this century. One year after the United States annexed Hawaii in 1898, Carter assumed the guardianship of Thelma Parker, half owner of the Parker Ranch; he also took over the responsibility of managing the entire ranch. During his early stewardship, he not only bought the remaining interest in the ranch for his ward, but along with 6 other ranchers purchased the Metropolitan Meat Co. When Carter took over the management of Parker Ranch, Metropolitan was paying 10 cents per pound for beef and dictated when and how many cattle it would take. This was annoying, but it wasn't until they unilaterally dropped the price to 9 cents that Carter acted. Since Parker Ranch supplied most of the beef to

Metropolitan, Carter simply announced that he was going to build his own slaughterhouse; a price was quickly agreed upon. A hard but fair man, he as much as John Palmer Parker was responsible for the ranch's success.

Presently, the State of Hawaii has about 80,000 beef cows, of which approximately 22,000 are on the Parker Ranch. There are about 800 ranches in the State, of which 400 have 20 head or more. Beef is the third largest source of agricultural income, behind sugar and pineapple. The industry faces numerous problems, the biggest of which is runaway land prices. Land that sold for 50 to 60 dollars an acre in the 1950's now commands upwards of \$15,000 per acre. Developers are everywhere, and the unofficial State bird, the building crane, is ever present. Marketing of animals always has been, and continues to be a major problem, even though the industry supplies less than one third of the beef consumed in the State. Market price for weaners is mainland price, less the cost of getting them there. Conversely, most ranch equipment and supplies is mainland price plus transportation; a differential each way of around 25%. Most of the steers raised are sent to a feedyard in Honolulu, even though Hawaii does not produce any feed grains of its own; there is, however, a locally active "grass fat" market. And of course there is Australian and New Zealand beef, much of which gets dumped in Hawaii, since it is the closest port of call.

In general, ranch and rangeland management has not kept pace with mainland counterparts. Continuous grazing is the rule. Animals require 32 to 36 months to reach slaughter weights of 1,050 to 1,100 pounds for the grass fat market. Kikuyu grass has taken over most of the range, but management practices on many ranches are still geared to the temperate bunch grass ranges that are no longer in existence. The vaquero heritage is still strong in the local paniolos; the art of gentle persuasion has not made many converts. On the upbeat side, the local population is increasing, as is the demand for beef. Foreign markets appear promising. High energy and transportation cost have forced ranchers to take a hard look at their operations and many have started revamping their operations. Five ranches have put in Savory Grazing cells and numerous others are expected to follow suit in the near future. However, the most promising note is that the State is realizing that if it wants to maintain Hawaii as Hawaiian, certain steps will have to be taken to protect its unique agricultural and livestock industries from irresponsible development.



## The Opportunities of Membership

Each of us has many *opportunities* during the year to share the many advantages of SRM membership with our friends and associates. Most of these people could benefit from Membership in SRM, but we pass up the *opportunity* to inform them of the many benefits of SRM membership.

Agency people have the *opportunity* to work with associates who are involved with the range resource and could gain from their SRM Membership. Those of us in industry and extension have many *opportunities* to inform ranchers of the economic benefits to be gained from SRM Membership. Those of us working with people in the reclamation area have many *opportunities* to inform people how they can gain the knowledge necessary to accomplish their work and inform them of the advantages they receive from their association with SRM and its members. Let's all take advantage of the many *opportunities* we have to acquaint others with the many benefits to be gained from SRM Membership. By doing this we can increase our *opportunity* to become acquainted with new people and new ideas that will help further the *opportunities* we each have to gain from our involvement in SRM.—Art Armbrust, SRM Membership Chairman.