Camels on the Western Range

James A. Young

Range managers are being called upon to play an increasingly important role in understanding the ecology and sociology of nomadic and subsistence agriculture in the broad belt of semiarid to arid lands stretching across North Africa and extending into southwestern Asia from Mauritania to Somalia and northward to Afghanistan and the trans Altai-Gobi Deserts. Some 14 million camels provide the focal point of desert grazing systems in this desert area. Similarly, in the highlands of South America the members of the camel related genus *Lama* (the wild vicuna and guanaco and the domesticated llama and alpaca) are of major concern in range management. To the majority of western range managers camels are the least familiar to most western range scientists of all the domesticated large herbivores.

During the 19th century in western North America, camels were used as pack animals in Texas, New Mexico, Arizona, California, Nevada, and British Columbia with breeding populations in California and perhaps other areas. We came very close to having a population of feral camels on the western range. What characteristics make camels such unique range animals?

Evolution of Camels

The only living species of camels are the dromedary [one-humped, or Arabian camel (*Camelus dromedarius)*] and the Bactrian [two-humped camel *(Camelus bactrianus)*]. In general, the Bactrian camel is found in mountainous, rocky terrain from Turkmenistan (USSR) eastward through Siberia east of Lake Baikal into Mongolia and northern China. The northern limit of the cold resistant Bactrian camel is about 50° north latitude. In the Tien Shan and Pamir regions of central Asia, the Bactrians exist at altitudes as high as 13,000 feet (4,000 meters). In the remote deserts of central Asia feral or truly wild populations of the Bactrian camel may still exist.

The dromedary is found in almost all the arid and semiarid regions of the Old World with the main population in North Africa. The distribution of dromedary camels nearly reaches the equator in northern Kenya. In Asia the dromedary occurs throughout the Arabian Peninsula and extends north and northeastward to Turkey, southwestern Russian, Pakistan, northwestern India and into Sinkiang (China). Because of past exportation of dromedaries, they are found in Australia and the Canary Islands. The wild populations of dromedary camels were extinct by historic times.

Like the horse, the ancestors of the camels evolved in North America. The first camels can be traced through the Tertiary Period to primitive upper Eocene ancestors not larger than rabbits. Body size increased along the main evolutionary line of the camelids during the Miocene and Pliocene epochs. The teeth and skull became more specialized and the typical, flat-spreading camelid foot came into being. Toward the end of the Tertiary, camelids emigrated via the Bering land mass to the Old World. Emigrations continued sporadically through the Pliocene, where the genus *Camelus,* to which our present day camels belong, left North America. *Camelops*, a camelid well over 6.5 feet (2 meters) high at the shoulder, existed in western North America until well into the Pleistocene. Well-preserved remains of *Camelops besternus,* Yesterday's Camel, have been found in the arid Southwest, which led workers to believe camels existed in North America until recent times. However, evidence points to a late glacial extinction some 10,800 to 12,600 years ago.

Preferred Forage

Camels can exist on poorer quality and more thorny or spiny browse than cattle, horses, sheep, or even goats. A commonly used Russian procedure for ranking forage always has winter forage for camels as the bottom category. This is how *Halogeton glomeratus* is ranked. Camels can use

Camel feeding on the spiny Astragalus spinous. *Photography from the Ecology and Utilization Desert Shrub Rangeland in Iraq. (Reproduced with permission of W. Junk, Publishers).*

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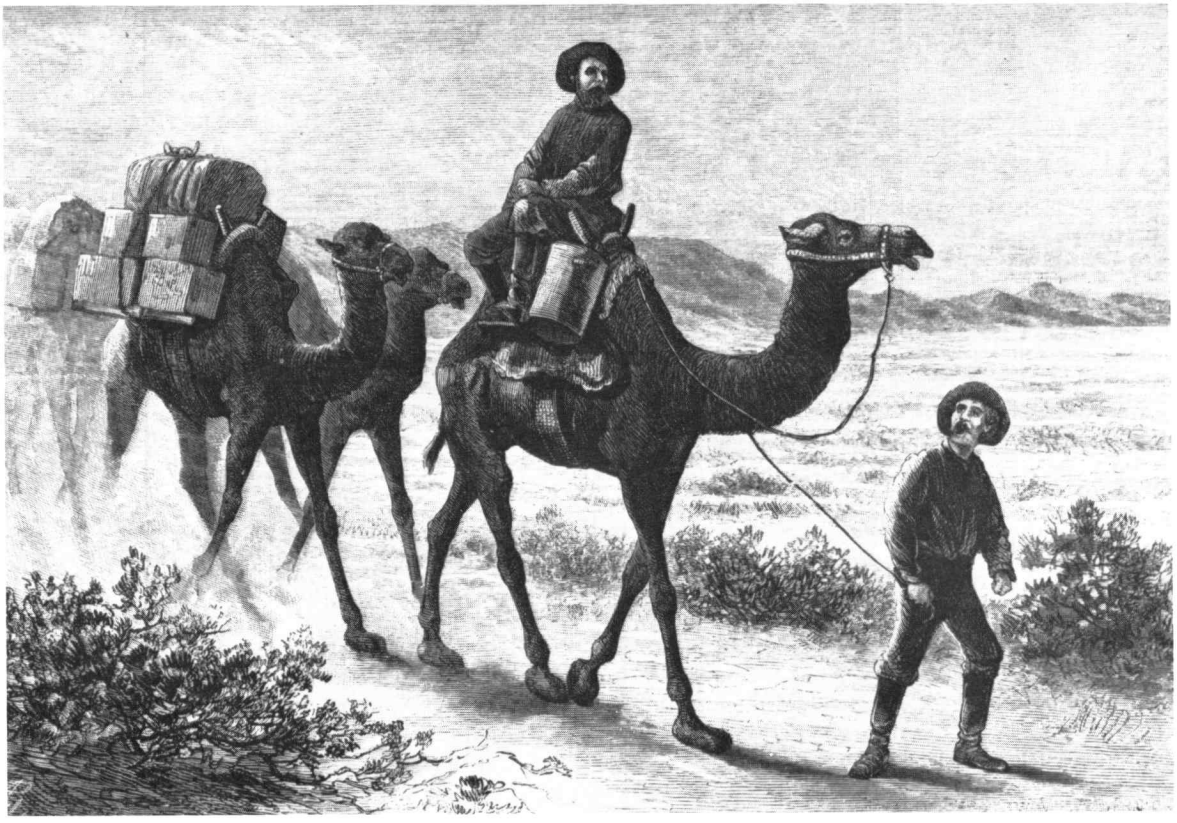


"Camel train in Nevada" drawn by Frenzeny (Photograph provided by Nevada Historical Society).

their hairy prehensile lips, the upper two halves of which are separated and move independently, to handle thorns or spines that would turn goats back. The upper palate in camels is less highly evolved than in other ruminates because the lateral incisors are still retained. The camel may draw off leaves from a branch or clip off an entire twig. By stretching its neck straight up, a camel can browse to a height of 11 feet (3.5 meters). Camels typically graze in open herds with the individual animals in nearly continual movement, often covering 1.6 miles (2.5 kilometers) per hour. During these strolling periods of grazing, camels may be quite selective in their food habits, sampling everything from grasses to trees if available. Grasses such as *Aristida pungens, A. mutabilis,* or *Panicum turgidum* are highly preferred by dromedary camels in North Africa.

Water Requirements

The water requirements of camels suffer from many popular misconceptions. The camel has a very large drinking capacity, but does not store water for future needs, but rather replenishes water already lost through evaporation, urine, and feces. Because of the camel's almost unique ability to survive for days without drinking water, even in the hottest deserts, early workers assumed that water was stored for use in the animals's body. There is no anatomical evidence that camels can store water despite the fact that a camel can drink as much as 26 gallons (100 liters) after going several days without water. The huge amounts of water consumed replace losses from dehydration that may approach 25% of the camel's body weight. With an adequate diet, tolerance of dehydration is great.

Camels have several adaptations that reduce water requirements including a fluctuating body temperature so less evaporation is required at high temperatures. Camel hair has the dual and contradictory function of simultaneously protecting against high temperatures while allowing the dissipation of body heat to the surrounding air. The net result of all these adaptations is that during the 6 or 7 cool months of the Sahara Desert, camels usually do not drink, but rather rely on obtaining water from food plants which average 50% moisture during the cool season.

Camels in the American West

The proposal that camels be tried as a substitute for horse, mules, and ox teams in transportation of supplies for the army seems to have originated with Major George Grossman, who had been quartermaster for Zachery Taylor's command during the Seminole War. In 1851, an effort was made to appropriate $30,000 to purchase 50 camels and hire 10 Arab camel drivers. It failed, but finally in March of 1855, when Jeff Davis was secretary of war, the appropriation for camels passed at Davis's personal request.

The camels purchased by the war department were dromedaries from North Africa and the Middle East. The army assembled a herd of 70 camels at Camp Val Verde, 80 miles (130 km) southwest of San Antonio, Texas. Lt. Edward R. Beale drove a camel train from Texas through what is now New Mexico and Arizona by way of the Mojave Desert. Lieutenant Beale stayed in California and developed extensive ranching properties at Tejon, near modern Bakersfield. Secretary of War John Buchanan Floyd placed 20 camels in the hands of Beale for use in surveying expeditions. By 1861, this brooding herd had increased to 28 animals.

At the time of the Civil War, there were several war department camel pack trains scattered among the various frontier

posts in the southwest. During the war the major camel camp in Texas was under control of the Confederate army and the camels were disposed of in Mexico. At many of the other western posts, the camels were turned loose during the war.

In 1864, Army Quartermaster Samuel McLauglin decided the camels were surplus and tried to round up the free remaining camels at Fort Yuma and Tejon. Most of these animals were taken to the military post at Benecia, Calif., and auctioned February 26, 1884. By this time, Beale's herd at Tejon had increased to 34 head.

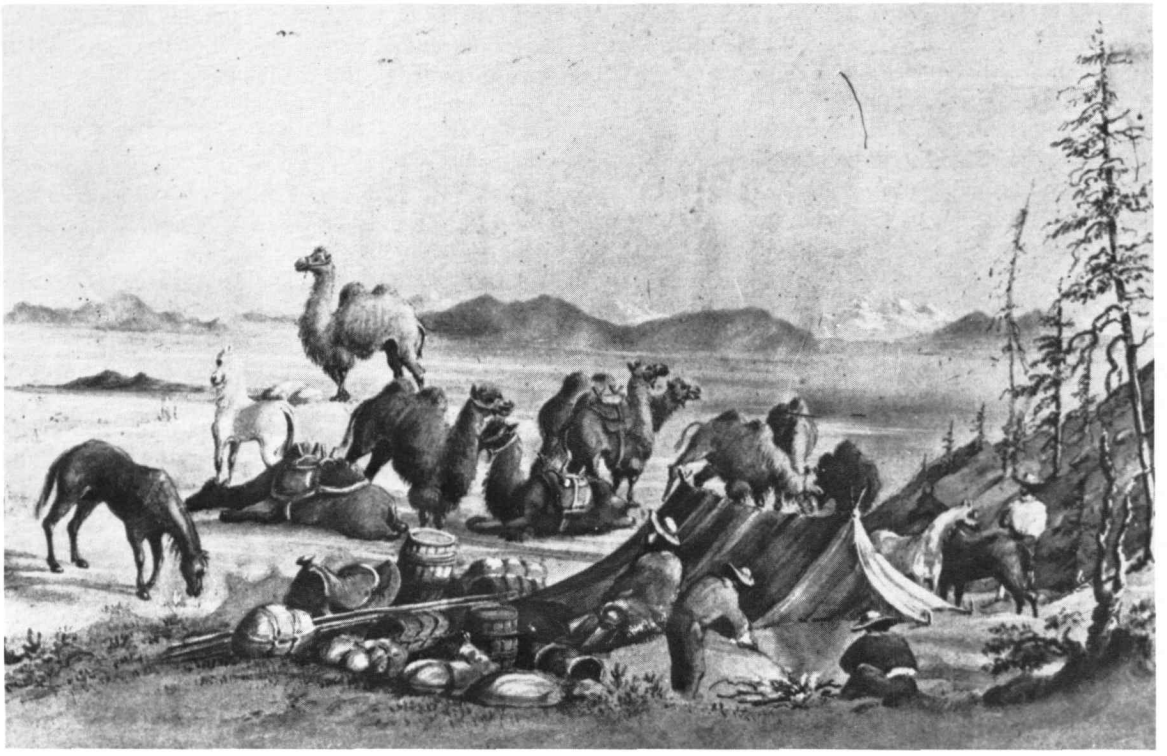
During the early 1860's, Otte Esche, a wealthy San Francisco merchant, decided that the answer to transportation problems in the "Great Sandy Desert" between the Sierra Nevada Mountains and Salt Lake City was the development of camel trains. Esche went to the Amur River area between Mongolia and Siberia and purchased Bactrian camels for use in what is now Nevada. He had a difficult time keeping the two-humped camels alive on the long voyage across the Pacific. Most of the camels that Esche purchased were sold to Julius Bandman who formed a company to transport salt from desert playas to the silver mills of the Comstock Lode. These camels crossed the Sierra Nevada Mountains by the way of the Mariposa groves of big trees or inland redwoods *(Sequoiadendron giganteum)* groves. The Bavarian artist Edward Vischer accompanied the camel train on its journey over the mountains recording through his art work "Camels in the Big Trees," "Camels in Washoe Valley," and other noted sketches. In 1864 at least 10 of the dromedary camels declared surplus by the army were also sent to the Comstock to pack salt.

The Comstock was not the only mining area to experiment with camels during the mid 19th century. On April 16, 1862, the ship Herman arrived at Victoria, British Columbia, with Bactrian camels. These camels were sent to Douglas, B.C., for pack trains on the Douglas-Lilooet Road in the Cariboo region.

A British Columbian gold miner known as Grizzly Morris had the distinction of bagging the most fantastic "grizzly bear" on record. One day when peering through the brush near Beaver Lake he saw the largest grizzly he had ever seen in his life. Taking careful aim he brought it down with one shot only to discover that his "bear" was a two-humped camel!

In Nevada the camels were used as previously mentioned to pack salt (primarily NaCl) from playas in the bottom of pluvial lake basins to the silver mills where the salt was used to treat refractory ores. For centuries camels had been used to transport salt from North Africa to the black empires below the Sahara, where salt could be traded for an equal weight in gold.

The camel trains were not successful in Nevada for two reasons. First, they did not have proper handlers. In 1865, Professor Brewer, from Yale University, described camel trains he saw near Virginia City, Nev. "Their backs had not been cared for and they had been used in packing heavy loads of salt from the deserts. Salt, water, and alkali had accumulated in the long hair of their humps, their pack saddles had galled them and great, loathsome sores nearly covered the parts touched by the saddle." The second problem was that camels, horses, and mules did not mix. Comstock horses were not accustomed to the sight of those great shaggy beasts. It would require Mark Twain to describe the effect of a camel train on a Virginia City street crowded with 20-mule-jerkline teams, rumbling ore wagons, buggies, horses and prospector's burros. Besides the physical damage from runaways, there was an underlying social fear that camels and foreign camel drivers would take business away from mule skinners, freighters, and packers. The complaints became severe and completion of the Central Pacific Railroad through Eagle Valley and its salt works lessened the demand for camel-transported salt. By the early 1870's many of Nevada camels were driven to Arizona to pack ore from the



"Descent to Carson Valley," Nevada. Painting by Edward Vischer. (Photograph provided by Nevada Historical Society).

Silver King mine to Yuma. In Arizona, the camels met the same prejudices and problems encountered in Nevada and most were turned loose in the desert. In 1875, there were many feral camels along the Gila River. Camels were found near Ajo, Ariz., as late as 1913. A similar fate befell the camels in British Columbia where the camels were turned loose on Grande Prairie (now called Westwold) about 40 miles (64 kilometers) southeast of of Kamloops. The last camel feral in British Columbia died about 1905.

In Nevada, the feral camel populations apparently were much at home on the salt desert ranges of the Carson Desert. A favorite browse of the feral camel was greasewood *(Sarcobatus vermiculatus).* Greasewood is a North American endemic, but in the salt bush *(Atriplex)* species of the Carson Desert the camels found members of a genera they were familiar with. In North Africa, *Atriplex halimus* is a preferred browse species for camels. There is conflicting evidence on whether the Carson Desert camel population ever reproduced. Some sources claim that the animals were too old to reproduce when they were released and others indicate that camels were born in the desert. Reportedly, the Nevada camels suffered from foot injuries caused by rocks. Although the camel belongs to the order Artiodactyla, whose other ruminating members all have cloven hooves, the camel's feet are not hooves, but rather large pads with two anterior toe nails. The pads are a great adaptation for travel over sand, but they crack and bleed when forced to travel over rough and stony surfaces. The camel's ability to practically exist on metabolic water made it the only large herbivore that could compete on the same level with the native jackrabbit (*Lepius* sp.) in the salt deserts of the Great Basin. Freedom from watering points allowed camels to utilize forage and browse on the desert ranges.

Some of the feral camels were distinctive and easily recognized by desert travelers. Twili was a dromedary who reportedly came from the original war department imports. Twili dominated a harem located in the Carson Sink. His reddish mane grew 4 feet (1.2 meters) in length. A vaquero from a Mason Valley ranch decided that Twili's mane would be great material from which to spin hair ropes. As soon as the vaquero's rope dropped over Twili's head, the camel charged. For the next year Twili trailed the broken lariat in his wanderings in the Carson Desert.

Camels were much more successful in Australia. Breeding programs were undertaken to produce camels adapted to Australian conditions. Today there probably are about 20,000 feral camels in the Australian deserts. Given time would the Nevada populations have expanded to similar levels?

We never had the chance to determine how successful these feral camel populations would have become because of a Nevada rancher named Hugh Earling. Mr. Earling was a state legislator and during January of 1875, he was peacefully driving from his Lyon County ranch to a legislative session in Carson City. Near the place that came to be known as the Dead Camel Mountains, a feral camel rose up from the greasewood and the buckboard team ran away. When a shaken Mr. Earling arrived in Carson City, his first action was to introduce legislation outlawing feral camels in Nevada and from allowing camels to be turned loose on the range. Eventually all the camels were shot.

Some camels persisted in Nevada until 1876, when a pack train of 8 animals were used to pack wood to the top of 9,000 foot (2770 m) Mt. Davidson to hold a great bonfire for the July 4th centennial celebration.

The Dead Camel Mountains are a somber, treeless range overlooking the southern Carson Desert which has been called the most desolate landscape in western North America. As you drive along the base of the Dead Camels in the sand dunes northeast of Mason Valley it is not difficult to visualize the great shaggy ghost of Twili rising up from the greasewood. ●

Position: Research Associate

Qualifications: M.S. degree in Range Science or closely associated discipline with experience in economics, preferably risk analysis.

Duties and Responsibilities: This person would be expected to develop appropriate models to describe ranch firms and evaluate risk. He would live in residence at the Southeastern Colorado Research Center at Springfield and be responsible for range research initiation, data analysis and reporting. The person would work with ranchers in research demonstration programs.

Salary: Commensurate with experience and qualifications. Salary range $17,000-$21,000 per year. CSU benefits are applicable.

Applications: Please send letter of application, detailed resume and names of three persons for recommendation to: *Larry R. Rittenhouse, Range Science Department, Colorado State University, Fort Collins, Colorado 80523, phone 303/491-7433.*

Deadline: *January 3, 1981*

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A symposium on the ecology and management of saltsage and closely related genera of the Chenopodiaceae will be held May 4-6, 1983, in Provo, Utah. The Symposium will be jointed sponsored by Utah State University, Brigham Young University, Intermountain Forest and Range Experiment Station, and Utah Division of Wildlife Resources. Persons interested in any other details of the symposium should contact Dr. Kendall L. Johnson, Cooperative Extension Service, Utah State University, UMC-49, Logan, Utah, 84322.