Making Hay

John McCormick, James A. Young, and Wayne Burkhardt

Throughout the intermountain and mountain valley areas of the western United States, ranchers spend one-half of each year culturing, harvesting, and storing hay, and the other half feeding the hay to their wintering brood cow herds. That one ton of hay is necessary to winter each brood cow has been the generally accepted rule-of-thumb in northern Nevada. Many ranchers, who on a cold January morning were faced with a stiff north wind, frozen bales of hay, and hungry cows bawling at the fence, have envied ranchers on the desert southwest, who kept cattle on the range the year around. Always, the ultimate dread of ranchers who fed hay was that the hay supply would be exhausted before grass was ready for grazing in the spring. Range readiness to graze was determined more often by running out of hay than by application of principles of range management.

A poignant description of the consequences of running out of hay was provided by Molly Flagg Knudtsen for the Grass Valley Ranch in central Nevada. During the depression and drought years of the early 1930's, two years' hay supply was accumulated from the irrigated meadows of the ranch. The first year's supply was not fed because of disruptions of the ranching operation caused by bank failures. Hay was so scarce by the second year of the drought that many ranchers gathered their stock—about 5,000 cows—at Grass Valley for an attempt at community survival through use of the accumulated hay supply. The next spring was late and the hay supply exhausted before range feed was available. The ranchers were forced to trail their stock to their home ranches to wait for grass. Trails of dead carcasses radiated out from the Grass Valley ranch across the central Nevada landscape.

Relative Importance of Conserved Forage

In a semiarid, cold desert environment, the production of hay or conserved forage is virtually restricted to irrigated areas. Using the Lahontan Basin of northern Nevada as a statistical base, only 2 percent of the area is irrigated for crop production. This 2 percent, through hay production, grazing of crop aftermath, and irrigated pastures, produces roughly 50 percent of the forage base for the range livestock industry. There are many exceptions to this generalization, but it is a startling reality for much of the northern Great Basin.

This division of the forage base for the range livestock industry is of great consequence to range management. The irrigated lands are owned by ranchers; the other one-half of the forage base, the rangelands, is owned largely by the federal government.

The purpose of this article is to trace the development of conserved forage production in a cold desert rangeland environment, and to relate this development to range management.

Early Days

The ranges of the intermountain area were originally stocked with Spanish livestock that were herded under the Spanish open-range system. Conservation of forage for winter feeding was not part of that system.

Initially, the sagebrush-grass ranges of northern Nevada were sufficiently productive so that, for average winters, livestock could be wintered on the open range without suffering unacceptable death losses.

The severe winter of 1889-90 put an end to this practice. Overstocking and recurring droughts had greatly depleted the forage resource during the 1870's and 1880's. The native bunchgrasses were greatly depleted in density, and sagebrush density had increased.

Livestock went into the winter of 1889-90, the most severe on record for most recording stations in the intermountain West, in poor condition. Over a quarter of a million head died on the ranges of northern Nevada. Elko, Humboldt, and Washoe Counties lost an estimated 82,000 sheep and 112,000 cattle. Humboldt County ranchers reported that horses came off the range in the spring of 1890 with their manes and tails eaten off by other horses.

F.B. Poore, a northern Washoe County cattleman, was offered hay by homesteaders in the fall of 1889 for $5 a ton. He flatly refused and lost his entire herd during the winter. The homesteaders inherited the rangeland after this brutal integration of the two forage bases.

Hay Ranches

Growing of hay in a semiarid, cold desert requires irrigation.

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Editor's Note: This article covers two subjects: the role of hay in range livestock operations and the technological history of making hay in the Great Basin. In much of the sagebrush/grasslands of western North America and particularly in the Intermountain Area, one half of the forage base for range livestock operations comes from hayland; these areas represent only 3 to 5 percent of the total land area. They are, however, in private ownership while the nearby rangelands are largely public lands.

The basic purpose of the authors was to reach the public land manager who is not familiar with hay making and who does not realize the importance hay production plays in range livestock operations.

We at *Rangelands* welcome this type of article because historical articles have always been a favorite of *Rangelands* readers.

Almost every ranch in the Great Basin was located along a river or at the mouth of a canyon where diversion of water could provide sufficient moisture for increasing the size and production of native meadows. However, many of the native hay meadows were more often marshes than meadows. Irrigation called wild flooding perpetuated the wetlands and made plowing and discing most difficult.

Hay Species

Native hay species included sedges, rushes, tules, and willow sprouts, as well as grasses. At the turn of the century the most important Great Basin hay species were wire grass (*Juncus balticus*), tule (*Scirpus lacustris*), and spikerush (*Eleochris palustris*).

Alluvial fans below a mountain stream and river valley soils just above a flood plain could be plowed and seeded. It was here that seeding of alfalfa (*Medicago sativa*) was attempted. Early travelers to the California gold fields brought seed from Chile after sailing "round the horn." It was not long until alfalfa fields appeared in Utah and Nevada.

Because it was a legume and furnished its own nitrogen requirement, and because it was deliberately irrigated rather than wild flooded, alfalfa out-yielded the wild hay three to four times.

Technology

Jackson forks, buck rakes, derricks, dump rakes, and hay knives were only a few of the technological developments necessary for large-scale hay production.

To apply this technology, huge labor forces were necessary. The first source of labor was the endemic Indians whose hunter/-gatherer society was decimated by the competition with domestic livestock for grass seed production. Indian family units attached themselves to individual ranches for the transition from stone age to livestock culture. Additionally, each summer the Central Pacific Railroad freight trains would cross the Sierra Nevadas with a multitude of nonpaying passengers who had wintered in the moderate climate of California and were looking for work as hay hands. The stream was supplemented by seasonal miners, wood cutters, small farmers, and the traditional youths looking for their first work experience.

The migrants might arrive the same class of transportation, but there was a definite stratification in the hay-hand society. At the top were the artists, such as blacksmiths and wheel wrights, with the descending ranks including mower drivers, dump rakers, buckrakers, wagon teamsters, shockers, and small boys for driving the derrick horses. Often the men would return to the same ranch year after year. More than one hay hand was recruited in the front street bars of Winnemucca or Elko and sobered up in some forlorn hay camp 40 miles from town, claiming he was kidnapped.

Large crews required an excellent cook to prepare hotcakes, beans, fried steaks, potatoes, and gravy to keep the crew happy. Often the rancher's wife was faced with this herculean task. One prominent Nevada ranch lady related a terrible nightmare in which she dreamed she was in hell cooking in midsummer on a wood stove for a 40-man haying crew. She knew she was in hell because when the crew came in to sit down they all wore the uniform of one of the prominent federal land management agencies!

Mowers

Resplendent in ornate cast iron, the horse-drawn mower started the haying process. The head mower opened up the field, cut the backswath and then was followed by the lesser-skilled operators in endless swaths around the piece. One of the classic descriptions of early 20th century ranching is the tale by H.L. Davis of horse-drawn mower races in hay camps in southeastern Oregon. A 5-foot sickle bar could mow an acre in about 3.5 hours. Some wild hay meadows in the Great Basin were several hundred acres in size.

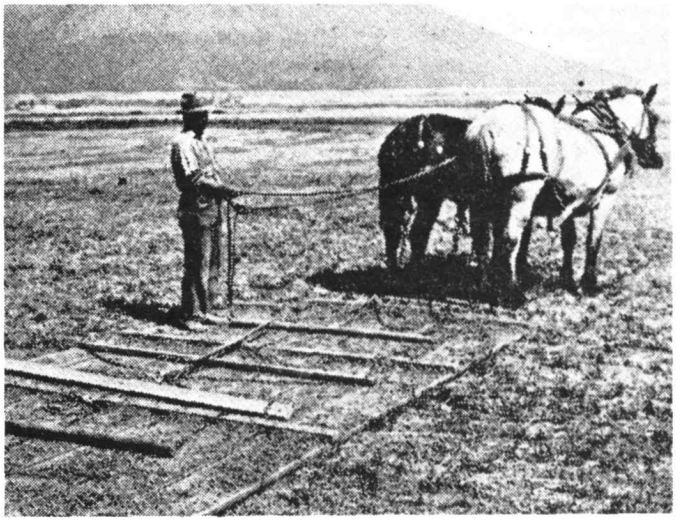
Dumprake

After the mowed hay had wilted and while the leaves were still intact, it was bunched into windrows with a dumprake. The operator tripped a lever to raise the rake tongs and dump the hay into windrows. If the hay crop was heavy, this required a strong leg. Hay could be bunched directly from the mower swath with a buckrake.

Moving Hay to Stack

After the hay was mowed and raked, there were three basic methods of transporting it to the stack yard: wagons, slips, and buckrakes. The method used generally depended on the quality of hay being harvested.

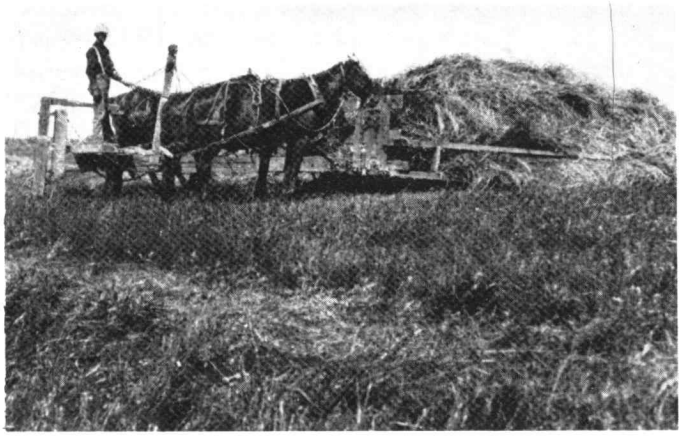
While high-quality alfalfa hay was being prepared, the raked hay was shocked in small piles for further drying. Shocking hay was a hand operation with a long line of men toiling with pitch forks. Later, the shocks were pitched onto wagons by one of two men while the teamster arranged the load.



Hayslips saved the labor of pitching hay onto high wagons. Note sling on slip.

In small fields where the hauling distance was short, slips were used instead of wagons. These were homemade contrivances consisting of eight 1 by 12-inch boards, 16 feet long, nailed together with a cross-piece at each end. A double tree at one end provided the means of attaching the team for power. Hay was pitched on the slip or slide with a great savings in labor compared to using high wagons. The slips simply slid over the hay stubble, following the team to the stack. Sometimes small iron wheels were added with a pipe axle in the middle of the slips so it would pull easier.

Buck or sweep rakes had the lowest labor requirements and, therefore provided the cheapest method of transporting hay to the stack. These consisted of several long, pointed wooden teeth lying almost flat on the ground, and fastened to a strong

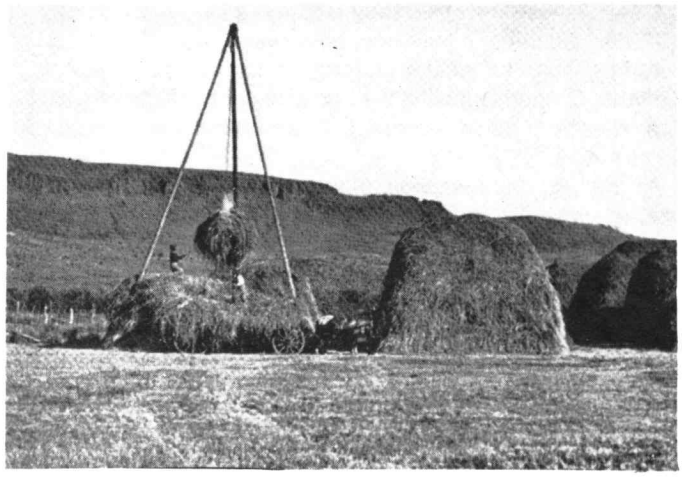


Four-horse buckrake typical of those used to put up wild hay in the Great Basin.

framework at the other end. Ordinarily, the rakes were 12 feet wide. Four-horse teams pulled larger ones. With careful attention to timing and a minimum of rolling of the hay during loading of the buckrake, high quality hay could be produced with this implement. However, it was characteristically the tool of the hay meadows of the Great Basin used for transporting low quality or wild hay. During a 10-hour day, one man with a wagon could haul the hay from two acres; with a slip, three acres; and with a buckrake, four acres.

The low annual precipitation in most valleys in the area and snow instead of rain in the winter made it possible to stack hay outdoors. This was fortunate, considering the scarcity of lumber for barns. Spoilage occurred even then under cold desert conditions, so the basic problem was to stack the hay as high as possible and to thatch the top to minimize the loss. This called for hoisting, with horses supplying the power and various types of derricks providing mechanical lift.

Homemade derrick stackers came in a great variety of designs. The most numerous derricks were the "Mormon" type, the distinctive characteristic of which was that the boom was pivoted upon the top of the mast. The second most popular type was the mast-and-boom type derrick on which the boom

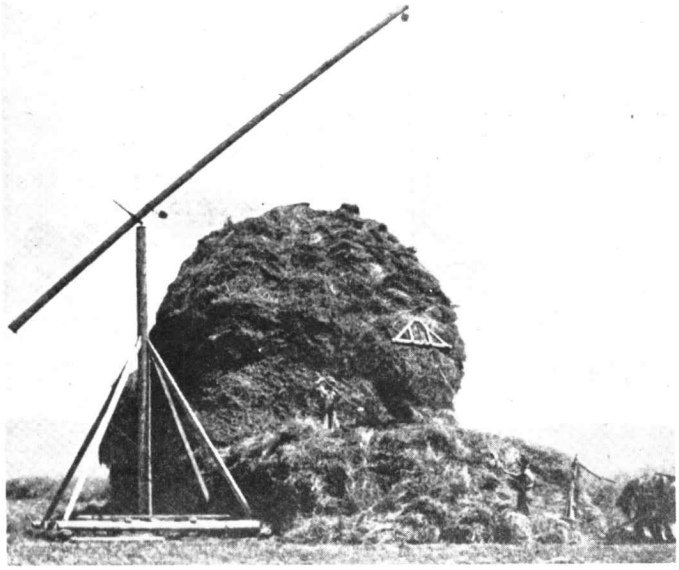


Tripod, the simplest and most primitive derrick, lifting native hay with Jackson Fork from haywagon.

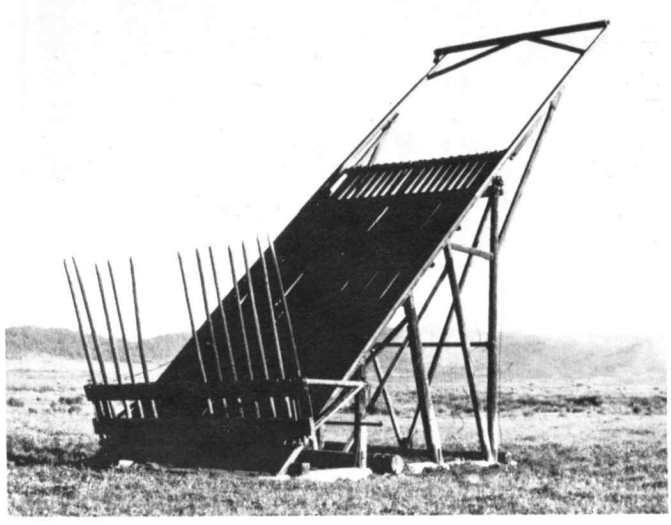
extended from the side of the mast. These two accounted for 90 percent of the derricks with cable stackers. Tripods accounted for the rest.

The hay was held during lifting by either a Jackson fork or a type of sling. Jackson forks were very popular, but if the derricks were sufficiently strong, it was more efficient to lift with a sling. The Jackson fork consisted of a triangular hardwood frame with four long, curved metal fork tongs. In an open position, the tongs were forced down into the hay load, and the frame snapped shut with a metal "ketch" where the dumping rope attached. The loader shouted, "take her away," the derrick boy walked his horse a prescribed distance, pulling the cable through a system of pulleys on the derrick frame, lifting the fork and hay. The derrick arm swung to the stack where the stackers shouted, "dumper," and the teamster tripped the dump rope opening the fork, dropping the hay. The derrick boy unhooked and returned the horse for another load. Due to the general shouting, or orders with tobacco-filled cheeks, and the short attention span of derrick boys, more than one teamster-loader lost a finger in a Jackson fork "ketch" due to an early start.

There were also numerous "patented" stackers, manufactured by small equipment firms and, generally, named for the blacksmith who had patented the design. The swinging Jenkins hay stacker and the overshot stackers by Dain or Jackson are



Mormon derrick with Jackson fork lifting hay from slip. The boom on top of mast identified this easily portable derrick.



Beaver slide for stacking hay.

typical of these designs. They required a capital investment of $200 or $300 and, if they were of eastern origin, often were not strong enough for western haying. In contrast, a blacksmith in Ontario, Oregon, supplied the iron work for derricks for $25 and the ranchers could supply and assemble the wood work themselves.

In the wild hay meadows of the Great Basin, hay was often stacked with slides, which consisted of a wooden incline where chain nets hooked to a four-horse "gin-wagon" pulled buckrake spotted loads up onto the stacks. The Beaverslide was a very popular and more complex type. Its operation consisted of gathering a load of hay from the field with a buckrake, which would then place each buck on the hay fork at the slide base.

Stackers

Often the hay stacker was the most highly paid man on the crew. He saw to it that each fork or sling of hay that reached the stack was carefully spread and interlocked lest water would spoil the hay. Just prior to World War II, stackers' wages averaged $0.53 an hour, while the other hay hands' wages averaged only $0.33 an hour.

Winter Feeding

Cattle grazed the hay meadows until the crop aftermath was exhausted or heavy snows came. Then only cows and calves were fed. Dry cows and steers were left outside the meadow fences to rustle for themselves. Riders worked the loose stock, and those that appeared in too poor condition to winter on the outside were grudgingly turned into the feed yards. Winter feeding crews were smaller in number than the summer haying crews, but the work was just as hard. In winter, hay was loaded onto wagons or sleds and spread on the feed grounds. In order to remove the hay, it often had to be cut with hay knives to break the interlocking fabric of the stack. On a cold morning with frozen hay on the top of the stack, this was a man-killing job.

A good team would follow a track around the feeding area by itself without guidance from the crew. Invariably, the team would turn inside the arc of its travel each morning, making the journey back to the barn shorter and forcing the teamsters to start the process over again. Years when the end of winter feeding was not determined by exhausting the hay supply, the cows themselves determined the turnout date for range readiness. At the first hint of green grass, the cows drifted to the hills.

Irrigation

The development of government-sponsored land reclamation projects to bring desert lands under cultivation greatly increased the total forage base of the western livestock industry. The Newlands Project at Fallon, Nev., was started in 1906 and was the first of these projects. The early homesteaders, with dreams of orchards and California crops, were soon resigned to the growing of alfalfa and grain, the two crops that could withstand the unpredictable late spring frosts. Since they grew more alfalfa than they could feed to their own stock, for the first time there was hay to ship from the region. Many large ranches with remote range operations in other locations soon relied on this source of hay for winter feeding. This surplus led to local feed yards for finishing livestock for slaughter.

Modern Hay Making

Hay making, as described, largely ended with World War II. Because of the lack of sufficient labor during the war, internal combustion engine-powered equipment was substituted for men and horses. Tractor-mounted mowers and side-delivery rakes replaced horse-drawn equipment. The hay baler became the dominant piece of forage harvesting equipment. Because compression aids in the handling of bulky, difficult-to-transport hay, presses had been a part of its processing from the earliest days of farming in the West. The first field balers were crew-served affairs with a man feeding hay to the plunger, another placing blocks, and a third pushing wire to a dexterous wire tyer and finally a block retriever. Development of automatic balers reduced this to a single-man operation. Later, balers that sliced the hay as it was compressed, increased the popularity of this haying equipment. Anyone who has loaded three-wire bales of native hay from a baler with dull knives realizes the importance of this invention. The hay baler became such a part of intermountain ranches that the size of the spread could be judged by the piles of rusting baling wire by the feed yard.

The trend toward increased mechanization continues. Self-propelled swathers cut, condition, and windrow in one operation while operators ride in air-conditioned cabs. There are plenty of dirty jobs left on ranches, so one should not begrudge the air-conditioned cabs. Recent developments in mechanized loose hay systems have proved popular with range livestock operations. The capital requirement of modern hay making equipment may exceed $50,000 for a moderate-sized livestock operation, a far cry from the $25 blacksmith's bill for a "Mormon" derrick.

Significance of Hay Making to the Range Livestock Industry

Making hay is a necessary part of range livestock operations in most of the intermountain area. Innovative livestock management schemes such as fall calving, or early weaning of spring calves, demand close coordination of the deeded land forage base and publicly owned rangeland. Without the private capital and management invested in hay production, the grazing resources of the publicly owned rangelands in the Great Basin have little value. Policies that favor integration of the management of the two halves of the forage base cannot help but make the range livestock industry more efficient. ●

August Goofs

The "Atlas of Epidermal Plant Fragments Ingested by Grazing Animals" is free at USDA, SEA-AR, High Plains Grassland Research Station, Rt. 1, Box 698, Cheyenne, Wyo. 82001, NOT at the Government Printing Office.

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John Merrill is still director of Texas Christian University Ranch Management Program, and not the FORMER director.