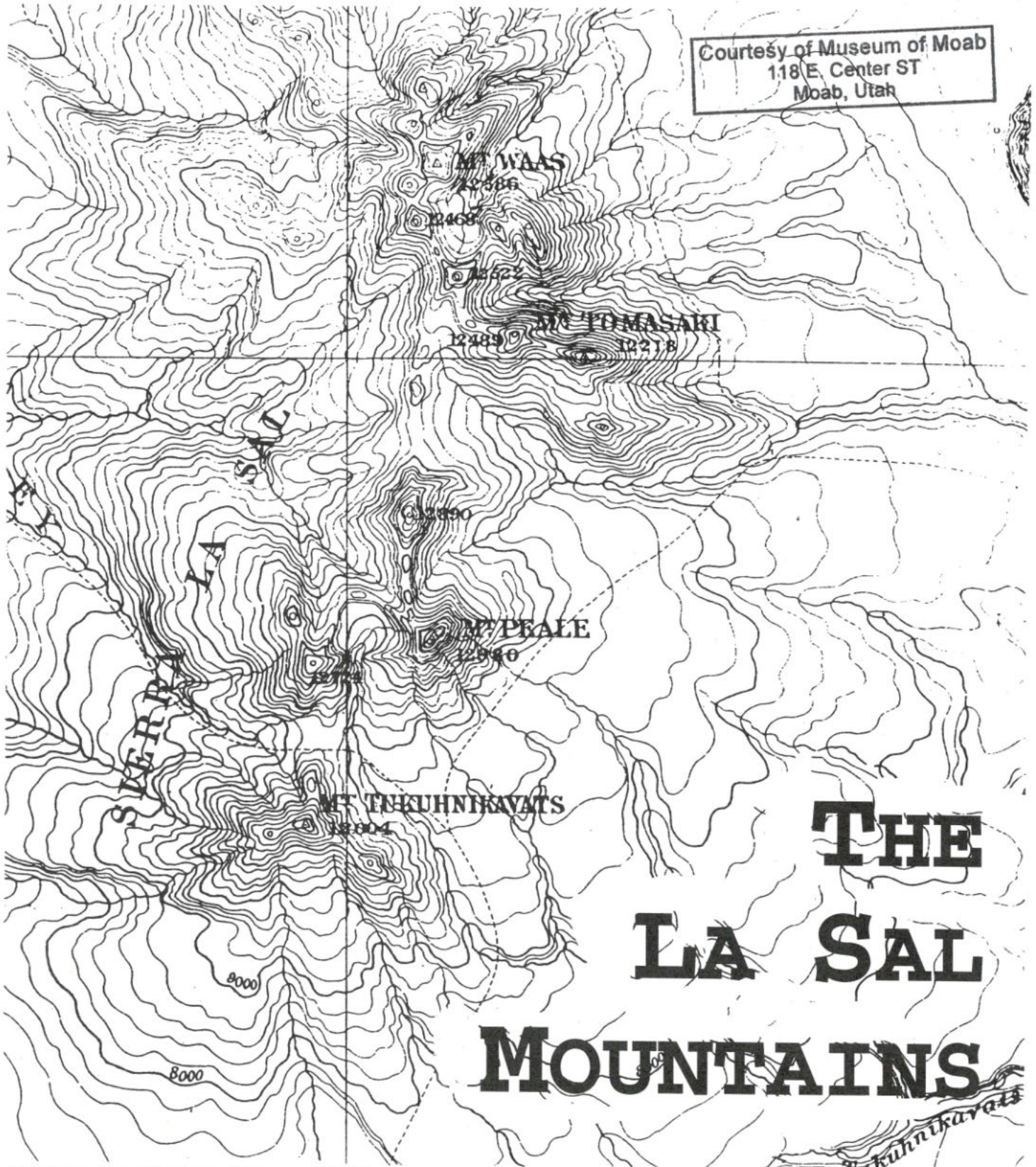


Canyon Legacy

JOURNAL OF THE DAN O'LAURIE CANYON COUNTRY MUSEUM

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DETAIL OF HAYDEN MAP, 1876



The Journal of the Dan O'Laurie Canyon Country Museum

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WITHIN...

On a hot summer day, just
looking at the La Sals can
sometimes cool me down. I
know that in one hour I can
drive up to the cool weather
and tall trees of Geysers Pass,
Miners Basin or Oowah Lake.
During the winter they can
provide a respite for our
occasional inversion.

The La Sals have provided
many things to many people
over the years. Early people
used the range for hunting
and camping; from their
earliest occupation the
mountains have offered a
refuge from the desert heat.
At the turn of the century,
miners rushed up to search

the hills for gold. Not much
was found, but it presaged the
shape of things to come in
Moab and the surrounding
region as early boosters spent
considerable money pro-
moting the resource.

More recently the range has
seen people hiking, biking,
snowmobiling, skiing, riding
horses and fishing. In what
direction will human use go
in the next century?

This issue of the Canyon
Legacy examines the history,
geology and ecology of these
mountain islands in a desert
sea.

MUSEUM MEMBERSHIP

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The purpose of the Dan O'Laurie Canyon Country Museum is to
preserve and display historical, geological, archeological and
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Canyon Legacy

Number 26

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LA SAL MOUNTAINS: UTE INDIAN NAMES

by
Lloyd M. Pierson

In the latter part of the 18th century Spanish explorers and traders named the La Sal Mountains. They apparently did not name the individual peaks. It remained for the Hayden Survey group of 1875 to start naming the individual peaks.

The U.S. Geological and Geographical Survey of the Territories, headed by F.V. Hayden, sent various parties into the field to determine the landform and its resources. The party he sent into western Colorado and eastern Utah, including the La Sal Mountains, in August 1875, was a combined group under the leadership of Henry Gannett and James T. Gardner. The group included geologist Albert Charles Peale, for whom the highest peak in the La Sals was named.

They apparently camped at a spring on the south side of South Mountain above the present town of La Sal. From here they climbed sev-

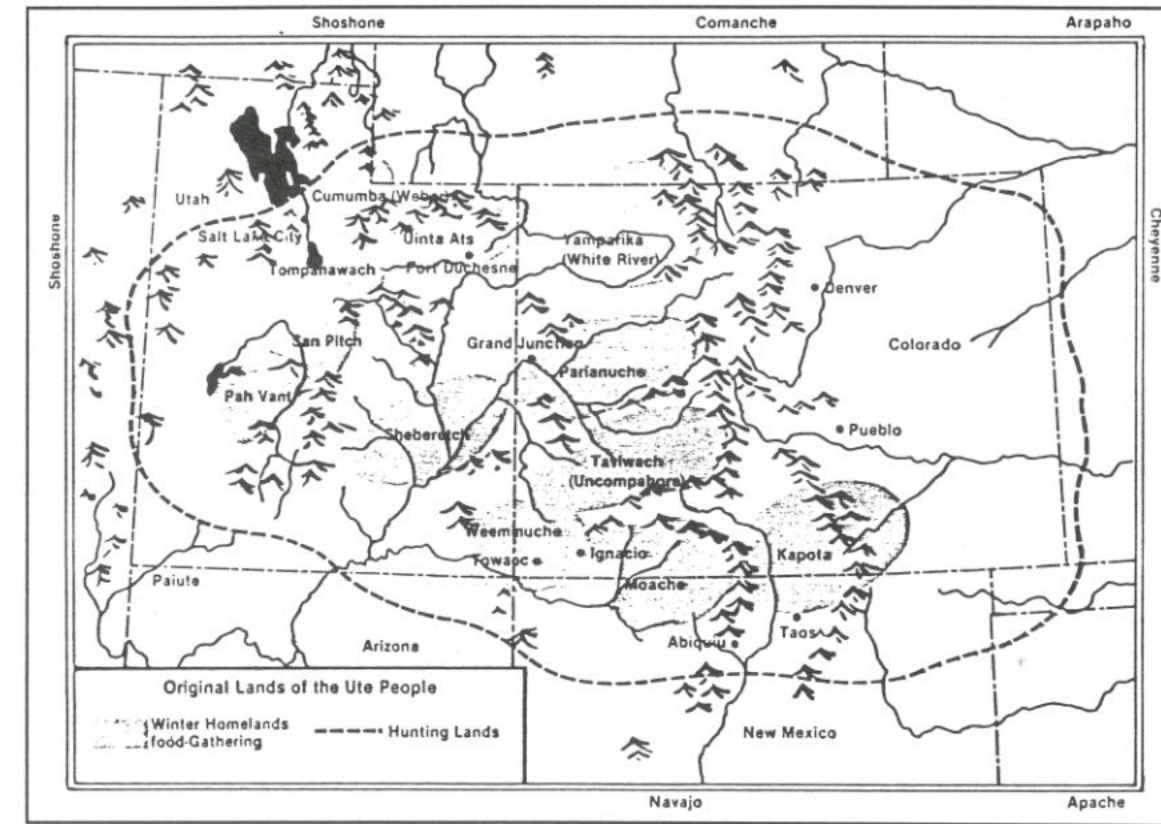
eral of the peaks in the range. Below their camp was a Ute camp with corn fields. As they left the La Sals heading south they were warned by Indians in the camp of possible troubles further south. They decided to proceed and were ambushed by Utes at the mouth of Peters Canyon. They escaped by abandoning much of their belongings and by climbing out of the canyon to the east heading for Colorado.

In spite of the problems that they had with the Utes, or perhaps because of them, they still named three of the major peaks after Ute leaders. These were Tomasaki, about whom little is known, Waas and Tukuhnivatz.

The Ute bands of the 1870s were a mixed bag as the whites pushed them on to reservations and forced them off of their traditional lands. The Ute way of life, after obtaining horses, was one of summer trips to the

mountains, winters in the sheltered valleys with occasional hunting trips to the plains plus trading with the white and Navajo neighbors. The La Sals were among the last mountain ranges in the west to be exploited by whites. Consequently several Ute groups used them at various times until late in history.

The principal group who apparently utilized the La Sals for deer hunting were the Uncompahgre, centered in western Colorado. To the south were the Weminuche, now on the Ute Mountain Reservation. Northeast of the La Sals were the Parianuche or Grand River band, east of present day Grand Junction. West of the La Sals were the Sheberetch located in the Green River, Utah area and further west. In his "Origins of Certain Place Names in the United States", Henry Gannett simply refers to Tomasaki as, "a mountain in Utah, named for a Ute Indian". The maps



Map of lands originally occupied by the Ute Peoples

made by the expedition list the mountain's elevation as being 12,489 feet. Recent USGS maps show it to be about 100 feet lower, the result of better instrumentation. As the survey party had contact with various groups of Utes in western Colorado and eastern Utah during their survey, Tomasaki was undoubtedly one of the leaders of the Utes in the area. The La Sals were known as the home of a group of Utes at times, and he was possibly a member of that group. Ute names were difficult to transcribe for most English speakers and it is possible that Tomasaki is a poor translation or he was known by another name.

Waas (sometimes spelled Wass) was also referred to by Gannett. He called him a "Ute Indian Chief". He seems to have been of some importance for he is reported to have been a member of the 1880 party of Utes who went to Washington, D.C., to meet with government leaders to sign a peace treaty. The treaty was the answer to the 1879 Meeker Massacre where Utes killed several whites and captured others. It was another attempt to control the Utes.

The group of Utes gathered in Washington in March 1880 were the leaders of all of the Ute groups in Colorado. Among them was Ouray and his wife Chipeta

of the Uncompahgre Utes, and Ignacio and Buckskin Charley of the Southern Utes. Participants in the party included individuals who had been involved in the Thornburg Battle at Milk Creek the year before.

Marshall Moody in his article in the Colorado Magazine (Vol. 30, No. 2) indicates that Waas, listed as an Uncompahgre Ute Captain, gave testimony at the special commission to investigate the Meeker Massacre convened at Los Pinos Agency November 12, 1879. No determination of guilt could be made so the Washington meeting of early 1880 was organized.

The publication, "Ute People, An Historical Study", put out by the Uintah School district and the Western History Center pictures Wass and says it is "presently" spelled Wash. They say he was one of the leading Utes expelled from Colorado after the Meeker incident. He was called an effective leader for many years in the Uintah Basin.

The Hayden Survey recorded Mount Waas as being 12,586 feet high. Recent U.S. Geological Survey maps show it as 12,331 feet.

The most distinctive peak in the La Sals, as viewed from Spanish Valley, is Tukuhnikivatz (also spelled with an "s" instead of a "z"). From the valley floor it appears to be higher than Mt. Peale, which is behind it. However, U.S. Geological Survey maps show it to be 238 feet lower at 12,483 feet in elevation. Gannett simply calls Tukuhnikivatz an Ute Indian and translates his name as "Dirt Seer". The name may reflect the possibility that the Ute village located near what is now present day La Sal was a farming village and belonged to Tukuhnikivatz.

Most interestingly the mountain now named after Tukuhnikivatz is not the one named after him by the Hayden party, as the maps produced by the expedition show that mountain was the one now called South Mountain (see cover). It is logical that the mountain close to the Ute village would be named after the head of the village and that seems to be the case.

This is especially so because of the attempts by the Utes of that village to warn the party of possible troubles, which happened to the south.

Alice Hunt's archeological survey (see Weisheit, this issue) of the La Sal Mountains found an archeological site just north of La Sal with Hopi, Navajo and Shoshonean (Ute) pottery on the surface. She recorded it as a popular site from the amount of pottery evident. Chances are good that this was the site of the Ute village mentioned by the Hayden group.



Photograph of Waas taken in Washington, 1880.
Courtesy of Smithsonian Institution

ean (Ute) pottery on the surface. She recorded it as a popular site from the amount of pottery evident. Chances are good that this was the site of the Ute village mentioned by the Hayden group.

Further evidence of the association of Tukuhnikivatz with the area is the naming of what is now called La Sal Creek after Tukuhnikivatz by the Hayden party. Just when the creek was renamed and the name switched to a different mountain is not known at present. It is remarkable that the names came down through history at all with the penchant of the early pioneers of the area to put their own names on natural features. The La Sals were called the Elk Mountains by the missionaries of 1854 and the Abajos to the south are more frequently called the Blues by locals.

In copying maps of the period, some cartographers placed the name of Tukuhnikivatz on La Sal Pass between what is now South Mountain and Tukuhnikivatz. Later map makers

thought that meant that the higher of the two mountains was Tukuhnikivatz, which was somewhat logical, as the location of the name could have referred to either mountain. Hence the confusion.

Tukuhnikivatz must have been a well known figure of the time for more is known about him than many Utes. Sidney Jocknick writes at length about him in his "Early Days on the Western Slope of Colorado". Jocknick writes of Tukuhnikivatz's visits to Ft. Crawford near present day Montrose, Colorado in 1879.

Jocknick calls him a "refractory" sub-chief and spells his name "Tah-koo-ni-ca-vats". His nickname was "Modesty" for his habit of incorrigible begging. He seems to have been a particularly irascible character as Jocknick accuses him of burning bridges on Otto Mears toll road and getting off scot-free. In addition he turned his sheep into the Indian Agency's garden when feed was scarce on the range. When some of his sheep were killed driving

them out of the garden it almost started a riot among the Utes. Only the arrival of Ouray calmed the situation, according to Jocknick. "Modesty" had to give the farm head a horse for his transgressions.

The Hayden party recorded the original Mount Tukuhnikivatz as 12,004 feet. The USGS has South Mountain at 11,798 feet. The present-day Mount Tukuhnikivatz is listed at 12,483, a much more respectable mountain than the original.

The native Utes were not always in good favor with the settlers of southeastern Utah. When they were behaving they were liked and appreciated. When they caused trouble some of them wound up dead. In spite of this love-hate relationship the local settler population kept and named geographical objects after the Indians. We are much richer for this.

Lloyd Pierson worked for the National Park Service for 18 years and was the first curator of the Moab Museum.

THE FIRST SAWMILL ON THE LA SAL MOUNTAINS

by
Billie and Harold Provonsha

Daniel Sargent McCollum owned and operated the first sawmill on the La Sal Mountains. The exact date of when he started it is not

known, but his last ledger shows it was in operation in 1889. He sawed lumber in the La Sal Pass, Old La Sal, Buckeye and Pine Flats areas.

He furnished lumber for the old water flume on the San Miguel River below the town of Uravan, Colorado. This lumber was hauled by



Dan McCollum (on white horse) at one of his sawmill sites in the La Sals, 1892-3. Courtesy Harold Provonsha

him down through Rock Creek with oxen to the San Miguel River. The lumber he delivered to his Moab customers was hauled through La Sal Pass and Pack Creek.

His last ledger, which covers part of 1889, and on through 1893, shows he took horses, mules, beef, corn, hay, loads of fire wood, even dried peaches, and sometimes cash as payment for the lumber. Some men worked at the mill to help pay for their lumber. The list of area people he sold to includes most of the "old Timers". It includes Néal and Thomas Ray, Bliss Cunningham, Sanford Stocks, Wm. Valentine, Herb Day, Philander Maxwell, Pittsburgh Cattle Company, Dick Westwood, F. M. and J. H. Shafer, O.W.

Warner, O. Newell, Lester, A.A. and Tet Taylor, M. H. Darrow, John Wilcox, H. Savage, R. H. Stewart, Grand County Jail, Moab School District, Ed Robinson, W. A. and J. H. Shafer, Mons Peterson, Amasa Larson, John Teusher, John Loveridge, S. B. Bartlett, Ed Robinson, and John D. Young.

Dan McCollum came to the Paradox - La Sal - Moab area around 1880 or shortly thereafter. He was born in Stuyvesant, New York, in 1858. As a young man, his parents sent him out west so he could be outdoors in the fresh air after three members of his family died of tuberculosis. He enjoyed perfect health all his life. Dan married Helen Melissa Grimes on December 13, 1893. He said that a sawmill was no

place for a woman, so he sold the mill to Tom Bransom, who had worked for him. After the sale, Dan went to work for the Pittsburgh Cattle Company at Old La Sal as ranch foreman, and Helen began cooking for the ranch hands. Later, they took up land of their own at La Sal. This place is now known as "the Prewer Place". Dan McCollum died on December 14, 1897, just eleven days before their daughter, Isabella was born on December 25, 1897. Later Isabella married Edd E. Provonsha.

Billie and Harold Provonsha grew up in Moab and were instrumental in getting more community involvement in the Museum. Billie was museum Curator throughout the 1960s.

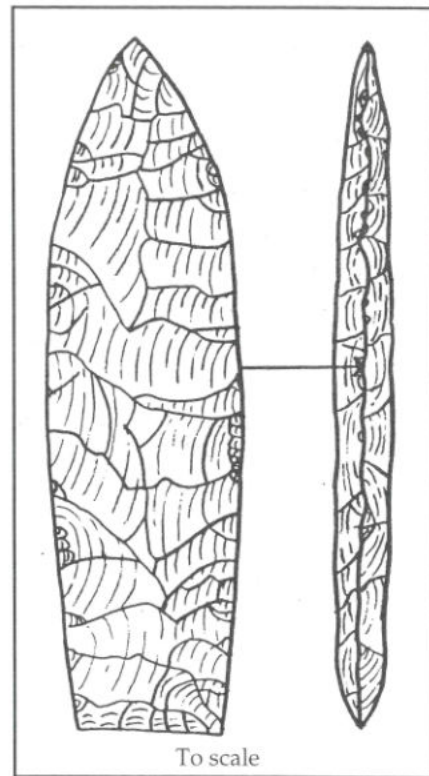
ALICE HUNT'S ARCHEOLOGICAL SURVEY OF THE LA SAL MOUNTAINS

by
John Weisheit

Drawings by Alice Hunt

In 1953 Alice Hunt submitted a professional paper to Dr. Jesse D. Jennings of the University of Utah concerning an archeological survey she conducted in the La Sal Mountains near Moab, Utah. Mrs. Hunt had been working as a departmental collaborator for both the University of Utah and the University of Denver, where her specimens are archived.

An earlier version of this report was used as a partial fulfillment of her requirements needed to attain a degree (Masters of Arts) from the University of Denver. This work was also encouraged by her husband, Charles B. Hunt, who worked for the United States Geological Survey. Since the early 1930s, Mr. Hunt had conducted extensive field work in the laccolithic mountains (e.g. the La Sal Mountains) of the Colorado Plateau. Mr. and Mrs. Hunt worked together in the La Sal Mountains from 1949 - 1952. The couple is currently



Yuma Projectile Point (Folsom)
Found at 10,500 ft. in Beaver
Creek drainage; white noviculite
nearest known quarry west Texas

in retirement and living in
Salt Lake City.

Alice Hunt's report was the
fourteenth in a series known
as the University of Utah
Anthropological Papers. Mrs.
Hunt's approach to the survey
was to collect and

catalog surface finds; no site
excavations were ever
executed. These sites were
studied with three principle
objectives in mind:

1. The relationships of these sites to the natural environment.
2. The regional affiliations of these occupations.
3. The probable chronology of these occupations.

Concerning this approach Jesse D. Jennings, the editor of her paper, said this: "The report is a model of painstaking analysis and interpretation. She has worked with a surface collection and squeezed from these surface materials some important probabilities. Her work also seems to me to be an excellent example of the direction archeological research should move in that she has integrated, even partially subordinated, archeological data to topographical and ecological factors."

Her work was pioneering because high mountain terrains were not suspected to be heavily used by the Great Basin cultures because of exposure to a harsher

An Overview

Overall analysis of the surface sites indicate that native cultures arrived into the La Sal Mountains during the

Yuma. The Formative cultures, from Basketmaker II to Pueblo III, sometimes classified as early to late Fremont by Hunt, utilized the canyons for permanent

Life Zones and sites per Zone According to Hunt		
Classification	Elevation in Feet	Number of Sites
Canyons (desert shrub)	4,000 to 6,000	151
Piñon-juniper (foothills)	6,000 to 8,000	84
Mountain (montane to alpine)	8,000 and above	119
Total		354

climate. Thus, it was somewhat of a surprise to both Mrs. Hunt and to her colleagues that the results of her study included over 350 sites in the 500 square miles of the La Sal Mountains; 119 of the sites were found higher than 8,000 feet with about half of those higher than 10,000 feet.

early Holocene Epoch, which marked the decline of glacial conditions and the extinction of the Pleistocene megafauna. Native cultures utilized all three life zones, which Hunt labeled as canyon, piñon-juniper, and mountain. The main purpose for visitation into the La Sal Mountains included

settlements. The sites located in higher elevations were temporary, which is why only campsites were found with smaller metates, used for short-term needs.

Geology and Geography of the La Sal Mountain Area

The La Sals are igneous

Zone	Artifact Types per Life Zone				
	Projectile Points	Metates	Pottery	Masonry	RockArt
Canyon	small	well used	common	common	common
P&J	large	slight use	uncommon	none	none
Mountain	large	slight use	rare	none	none

Previous Explorations

Pioneering work by archaeologists was completed by Byron Cummings in 1910 and by George and Edna Woodbury in 1932. Their work was not extensive. Mr. and Mrs. Hunt were the first scientists to spend considerable time in the La Sal Mountains.

the following: to hunt wild game, gather wild plants, and to quarry for projectile points (Some of the projectile points were imported from distant quarries found only in western Texas). The larger projectile points found in the higher elevations are indicative of the Folsom culture, which Hunt sometimes classified as

intrusive structures of Tertiary age that trend to the northwest and are located in San Juan and Grand Counties of east central Utah. Mt. Peale is the tallest mountain on the Colorado Plateau at 12,721 feet. Passes between the mountain groups lie at an altitude of about 10,500 feet. The lower canyons dissect rocks of

Permian, Triassic and Jurassic age, the foothills are of Jurassic and Cretaceous age. Massive glacial tills have accumulated in drainages of reduced gradient such as Mill Creek; this includes the Colorado and Dolores river bottoms.

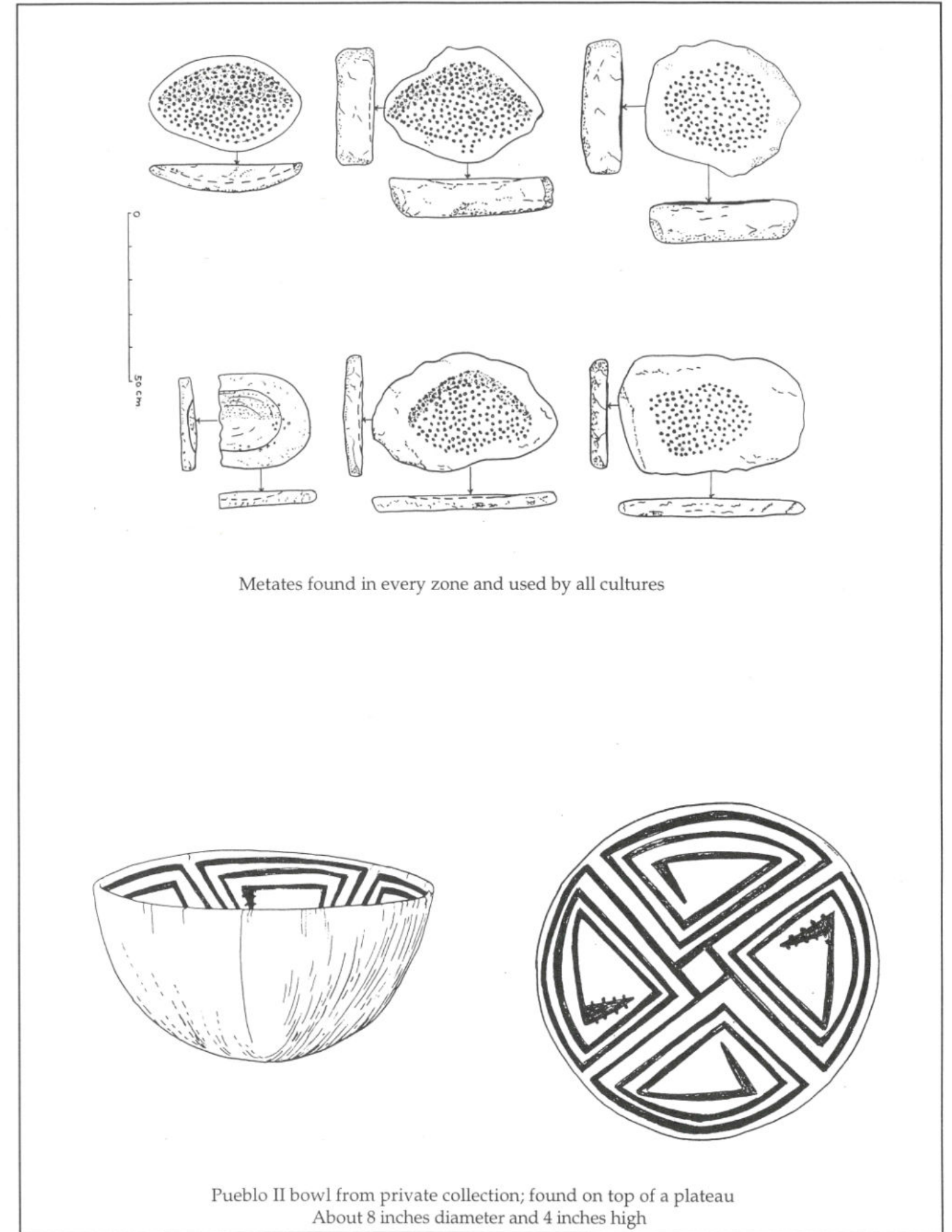
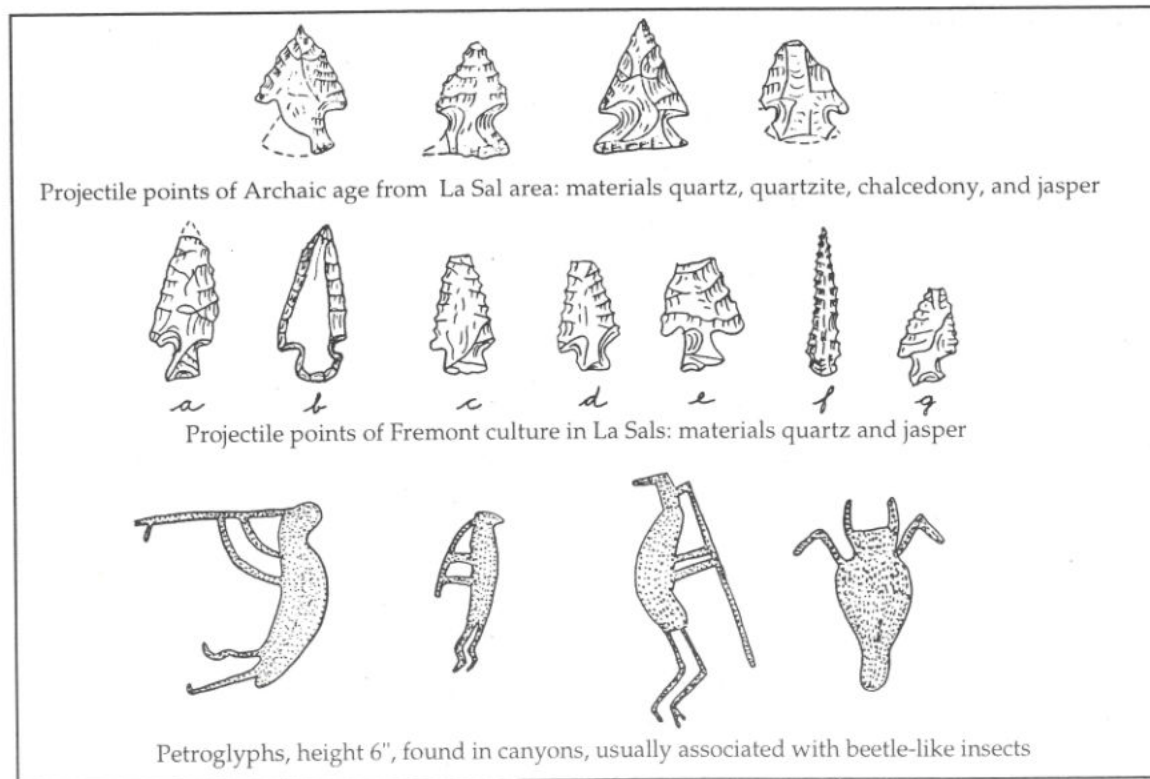
Chronology of the La Sal Mountains

Mrs. Hunt diagnosed that at least five and possibly nine different occupations are represented in the La Sal Mountains. The following table compares Hunt's chronology to one prepared

by Lloyd Pierson for the Bureau of Land Management in 1980.

John Weisheit is a co-editor of the Canyon Legacy and President of the Board of Trustees of the Dan O'Laurie Canyon Country Museum. John is also a river guide.

Hunt (1953)	Pierson (1980)	Time
Early man	Llano Complex	9500 - 9000 B.C.
	Folsom Complex	9050 - 7050 B.C.
	Plano Complex	8500 - 5500 B.C.
(?)	Early Archaic	6050 - 4550 B.C.
Amargosa II	Middle Archaic	2570 - 1120 B.C.
Late pre-pottery	Late Archaic	1500 - 450 B.C.
Early Fremont	Basketmaker II	1 - 500 A.D.
	Basketmaker III	450 - 750 A.D.
Late Fremont	Pueblo I (?)	750 - 900 A.D.
	Pueblo II	850 - 1100 A.D.
	Pueblo III	1100 - 1300 A.D.
Prehistoric Hopi	Numic	1150 - Present
Recent Shoshonean		
Navajo	Athapaskan	1500 - Present



SLOW ASCENT OF CONSERVATION: THE LA SALS IN THE CENTURY OF MODERNISM

by
Jose Knighton

When the twentieth century was still in its infancy, a cascade of circumstances began a gradual, but major, change in our relationship to the La Sal Mountains' resources. The first and most significant rollover in the natural resource crap shoot was the birth of the American conservation movement. The incremental consumption of the Nation's commons and the enlightenment of writers like Emerson and Thoreau sparked smoldering coals of public sentiment in favor of preservation.

Secondly, the country's quadrennial electoral gamble threw the leadership to a candidate sympathetic with ideas of the new conservation movement in 1901. By his second term in 1905, Republican Theodore Roosevelt was primed by the labor and convictions of the first director of the nation's new Division of Forestry, Gifford Pinchot, to initiate substantial withdrawal of public forests from unregulated overuse and damaging abuse.

The creation of the first forest reserves in 1897 was a conceptual milestone. America's public lands were no longer merely temporary possessions of the Federal Government until they could be disposed of. Some of them were finally recognized as valuable treasures, like the newly instituted national parks, or as limited resources to be protected and managed, like the forest reserves.

In 1905, following Pinchot's suggestion, President Roosevelt transferred the Forest Division from the jurisdiction of the General Land Office, which had been a clearing house for land taken by homesteaders and ranchers, to the Department of Agriculture. On January 25, 1906, President Roosevelt signed a proclamation following up on Robert R.V. Reynold's survey of 1904, creating the 158,000-acre La Sal Mountain Forest Reserve.

The third crucial tumble of the dice of fate was an economic crash in 1907 that

turned up snake-eyes for the La Sals' miners—the price of gold dropped through the stock market floor. High in Miners Basin and Bachelor Basin, booming mining communities less than twenty years old, rapidly dwindled to the ghost towns that they remain to this day.

Settlements surrounding the La Sals, like Moab, Castleton, La Sal, and Paradox, were dependent on the resources of the mountains. Though the economic crash ended marginally successful mining operations, the continued dependence and use by these communities for grazing, logging, irrigation and hunting literally consumed the range and its ecology. In addition, large areas that were once public domain had also been claimed by private ranches, further reducing public resources.

Just before the establishment of the La Sal Forest Reserve, the Federal Government granted two large blocks of trust land (totaling 28,500 acres) on the eastern slopes

and benchlands of the range to the state of Utah, for the express purpose of generating revenue for the University of Utah and Utah State University. These withdrawals also reduced resources available to surrounding communities.

Orrin C. Snow, the first supervisor of the La Sal National Forest, appointed in 1906, was a native Utahn from a family of cattle ranchers. John Riis, who replaced him in December of 1908, was a dreaded easterner whose father was a personal friend of Pinchot and Roosevelt.

In 1910, Henry A. Bergh was demoted from a more distinguished position in Idaho to the hinterlands of the La Sals, probably as an administrative punishment for his less than stellar support of game laws. His tenure as the La Sal Forest supervisor so tarnished the position with profiteering and immoral behavior that his successor, J. W. Humphrey, installed in 1914, was greeted with derision by both employees and the public at large. Humphrey and Samuel B. Locke, who replaced him within a year, struggled to return some dignity and credibility to the position. In 1918, Locke was replaced by Charles De Moisy Jr. and the trend of outsiders directing human affairs in the La Sals was broken. De Moisy and

Edmund B. Spencer, who succeeded him in 1921, were both Utah natives.

Whether these early forest supervisors were local cowboys or immigrant conservationists, they had little success in reforming habitual patterns of resource abuse. The range continued to be overgrazed, causing severe erosion problems and by the 1920s and 30s deer and elk were hunted to near extinction.

The Nation's severe losses to the Great Depression turned out to be a stroke of luck for resource conservation and management in the La Sals. In the spring of 1933, when President Franklin D. Roosevelt created the Civilian Conservation Corps, a CCC camp was established at the Warner Ranger Station, near the current campground. In one season, the nearly 200 men working from the Warner Camp completed ten years' worth of planned range improvements, overhauling trails and roads and digging lengthy water diversion ditches. During the Depression years, CCC workers developed reservoirs like Warner, Oowah, Clark and Medicine lakes. The Castleton-Wilson Mesa road, now part of the loop road, was rebuilt, as was the Geyser Pass road.

After World War II, a gradual decline in grazing eased

the burden on the La Sal's ecosystems. Though management shifted its emphasis slightly toward hunting and recreational use, consumptive use of the La Sal's resources still dominated recreational use. When the uranium jackpot was discovered near Moab in the 1950s, the abundance of desperate prospectors led to renewed interest in the La Sal's potential for gold and silver. When that jackpot played out in the 1960s and 70s, failed prospectors became even more desperate. An exploratory road was bulldozed out of Miners Basin to the summits of Pilot, Green and Mineral mountains, permanently scarring the north La Sal skyline.

In 1964, a lengthy political battle finally culminated with Congressional passage of the Wilderness Act. This new law called for an inventory of all roadless land administered by the Forest Service for possible preservation as officially designated wilderness. In this high stakes game the cards were dealt between conservationists and consumptive resource users. The wilderness inventory was repeatedly shuffled and recut. But in the end, the deck was always stacked in favor of historically entrenched use. By 1984, when the final Congressional showdown for wilderness in Utah's Na-

tional Forests culminated in the passage of the heavily compromised Utah Wilderness Act, the La Sals lost every hand, and was dealt out of this ultimate conservation gamble.

The same year that the La Sals lost their bid for wilderness, Exxon gouged a major drillsite in the heart of the range's premier candidate for such preservation. The lights from Exxon's towering rig, planted at the 10,000 foot level in Gold Basin, were visible from downtown Moab. A year later in 1985, Molycorp, a subsidiary of Union 76, reopened the bulldozer scars up to Green, Pilot and Mineral mountains. During two seasons, twelve exploratory drill pads were bulldozed across the brow of the north La Sals, leaving scars that will be visible from the desert lowlands until the next ice age erases them.

The Forest Service's environmental assessment of this project produced a "finding of no significant impact" and further determined that "...the activity and subsequent surface disturbance [would] have a short term effect only." Fortunately for the La Sals, neither of these exploratory gambles paid off, or the range's losses would have been more devastating.

Another resource management gamble in which

preservation of the La Sal's native ecosystem has suffered significant losses, is the practice of chaining. An anchor chain, as thick as a person's waist, is strung between two bulldozers, which then drag the chain across the land, uprooting everything in their path.

Chaining rids the mid-level desert woodland of its drought tolerant, old growth piñon-juniper forest, so it can produce more grass. The agency in charge of the project then seeds the area with preferred seeds, which may or may not be native grasses. The Forest Service and the Bureau of Land Management, both of which have been responsible for multiple chainings and seedings on the La Sal's benchlands in recent decades, usually insist that the treatment has been performed to enhance wildlife forage, which has allegedly been reduced by unnatural expansion of piñon-juniper forest, purportedly caused by historic overgrazing.

It is likely, however, that this alleged expansion is just part of the natural cycle of plant communities on a time scale we have not been around long enough to fully observe. The invasive procedure clearly destroys habitat and only temporarily enhances forage. The most evident beneficiary, in every instance, is the grazing permittee.

Areas where the La Sal's ecosystem has been demolished by past vegetation manipulations (a popular agency euphemism) are visible from the La Sal loop road along Dorry Ridge, north of Pack Creek and Hell Canyon, and sweeping around the flanks of South Mountain. In 1990, the Bureau of Land Management chained the plateau top of Amasa Back, south of Pack Creek, and on the west slope of South Mountain. Because this chaining occurred within a few days of Earth Day, it received a great deal of negative publicity and public protest.

Commercial logging continues, primarily on the heavily forested eastern backside of the range. Most of the trees removed each year are taken from privately owned forest or from the two vast tracts of Utah State forest. The majority of harvested trees have been selectively cut. However, a parcel of private land near Deep Creek, owned by the San Juan Lumber Company, was denuded by an aspen clear-cut to produce waferboard as recently as 1993.

Increasing recreational use of public lands surrounding Moab in the last decade may alter the fate of the La Sals, as management of the range bends slowly with that trend. Though a profusion of cattle still overrun the summer

range, trampling springs and riparian corridors, they have actually been fenced out of some high basin watersheds like Gold Basin and upper Mill Creek. Contrasting fencelines, with stubblefields on one side and chest-high wildflowers on the other, testify both to the degree of devastation from cattle grazing, and to the mountains' power of recovery.

A new effort to combine federal, state and private resource utilization into an integrated ecosystem management plan shows some promise for the future. Another glimmer of selective salvation is represented by the establishment of The Mount Peale Research Natural Area in the alpine region of the central mountain group.

A cooperative study by The Nature Conservancy and La Sal district of the Forest Service during the 1980s culminated in this administra-

tive designation, which recognized the significance of the range's isolated tundra community and placed restrictions on its use. This area, comprising the above-treeline slopes and summits of Mount Mellenthin, Mount Peale and Mount Tukuhnikivatz, as well as their connecting ridges, is protected from undue human influence and is managed for scientific research rather than resource extraction.

Even though Congressional passage of the minimal Utah Wilderness Act of 1984 egregiously deleted the La Sal proposals, the ground work of the forest service's RARE II inventory of roadless lands, completed in the early 1980s, is still valid. Three major roadless areas were identified, the 23,000 acre Horse Mountain-Manns Peak section, the 9,900 acre Mount Peale section and the 13,500 acre South Mountain section. Ironically, a majority of the dead end road spurs

cherry-stemmed into roadless area boundaries have been closed and partially reclaimed within the last few years, making the candidate wilderness areas even more worthy of such designation than they were during the initial inventory.

With increased public appreciation of the La Sals in their natural state—as feral wildlands rather than the civilized resource warehouse they have been perceived as for the past century, and a reshuffling of the political deck to one more conducive to preservation, it is still possible that remaining roadless areas in the La Sals could still be added to Utah's meager inventory of designated wilderness on forest service lands. The La Sals could still reach the pinnacle of conservation that they deserve.

Jose Knighton is the author of a guidebook about the La Sal Mountains.

THE BATTLE AT PINHOOK DRAW

The trail of a tribe is long and wide.
The tracks tell many tales.
A hunter. A fool. A man and his bride.
The times a man tries, the times that he fails.

The times, like his tribe, he just tries to survive
by whatever means he is able.
For a man and his tribe are both things alive,
and that life's at the heart of this fable.

Here is a tale of a people who tried
to stop the thieves who were stealing their ways,
and the desperate battles they fought on all sides
to persevere in those savage days.

The trail begins in the Blue Sky Land,
where mountains rise from the desert's plain,
on the banks of a river they called the Grand,
where the grass grew as thick as a horse's mane.

And the Blue Sky People, White River Utes,
hunted the canyons, roamed wide o'er the range;
danced, loved, and sang to the drum and the flutes;
and prayed to the Spirit that nothing would change.

But change it did, as the new ones closed in,
with whiskey and guns and their lust for strange metal.
Their greed fairly glowed from bright eyes and pale skin.
They gored the best land and said, "Here's where we settle."

Meeker, they called him, the worst of the lot.
He preached of a god of envy and rage;
traded cheap whiskey for what the Ute people had got,
the furs and horses that are a warrior's wage.

The details are mostly now lost in the past,
but Meeker got back just what he had taught.
The last tooth for a tooth, the last stone was cast;
Meeker was scalped where his last fight was fought.

The impoverished Blue Skies were well aware
that soldiers of vengeance would be on their way.
So, with goats, children, and old folks they chose to repair
to their kinfolks' country far, far away.

They journeyed south where cousins and friends,
they hoped, still lived in peace.
But the long journey of time, it never ends,
and the river of change does not cease.

Driven from homeland and the life that they knew,
in the winds of that change like a fallen leaf,
they took handouts from kinsmen and were just making do;
they took to rustling horses and stealing miners' beef.

In '81, near Mancos, they got off with quite a herd;
fine ponies totaling several hundred head.
Two cowboys tried to stop them, and one of them was cured
of all his earthly cares and woes; that is, he wound up dead.

The survivor found his way to town and gave a grim report.
The dead man's brother was enraged, and swore that he'd avenge
this death upon the nomads, and all their heathen sort.
He began to ride far and wide to build a posse of revenge.

He got cowboys from Cortez and Durango,
miners from Mancos, Rico, Ouray.
"We'll teach them redskins how to fandango
if we have to chase them to hell! Hip hooray!"

The tribe was warned by Mancos Jim, of the Uncompahgre Ute,
the storm would shortly break on them and put them to the test.
The whites were bragging up and down how many Indians they'd shoot;
Jim thought it best that the band should flee and suggested they go west,

where rugged canyons twist and turn,
falling steeply away from the Blues
Where the tinted rock seems to writhe and to churn,
or was it a battle with cowboys they'd choose?

The safety of their families precluded all debate,
so, they followed Mancos Jim to the wild canyonlands,
to pursue, as a people, what fate might dictate,
and deal how they could with those harsh demands.

Jim took them to a valley where cottonwoods grew wide,
and a young Paiute named Posey learned of their tale.
He offered to help them, be their mentor and guide,
for they had learned a hundred white men were hot upon their trail.

Posey led them through a high pass, then into the canyons below,
but they could not shake the dogged, armed pursuit.
The goats that gave the children's milk were tired and too slow.
It was only days away 'til they'd be overtaken on their route.

They came to the bottom of a cliff, nearly a thousand feet high,
with a crumbling trail climbing up a steep, narrow crack.
All the stock panicked and the children did cry,
'til they cleared the dread escarpment, and in relief they all looked back.

Posey wanted men to stay where the path climbed the steepest wall,
and pin the posse down as they scaled the narrow defile,
for this awful, dread ascent was the only way up at all,
and they could make good its escape and end this weary trial.

But no man would leave his family. They could not believe
that the white man's revenge would follow so long or so far.

Posy warned that their hopes had their reason deceived,
and they would rue this decision like an unlucky star.

When the cowboys and miners climbed up on the plain
and neared the La Sals, they were just days behind.
They found stragglers and ponies gone lame,
and a reckoning day they would soon, surely find.

When it reached the mountains' base, the posse decided to split.
The miners followed the fresh trail, and the cowboys went
to shortcut ahead of the Indians a bit,
for they knew by the sign that the tribe was 'most spent.

Two days later, in May meadows like heaven,
the miners saw the Utes below, crossing a flowery hill.
They pulled out their rifles and dispatched at least seven,
As they set camp that night, they celebrated the kill.

Women and children never entered their thoughts.
They had suffered for blood and would have it.
The redskins were theirs. They were nearly all caught.
They'd do all of them in, slick as skinning a rabbit.

Posey's dire warning had, too soon, come to light,
and finally the leaders all concurred.
The only choice left was to stand and to fight.
To flee any farther was completely absurd.

In the morning they set an ambush in a place called Pinhook Draw.
They waited as the miners came carefully ahead,
and passed the gory portal of annihilation's maw,
where the Reaper looks you in the eye and every hand is bloody red.

The miners walked into the ambushade, bullets buzzing overhead.
Thirteen wandering strangers said their last farewell.
Though they'd planned to shed the Indians' blood, they were the ones who bled,
pinned down in that rocky, brushy hell.

When the sun had passed the zenith of the celestial dome,
fearless Posey leapt up on a rock and began to shout,
"Go back where you come from! This is our land and our home!"
He derided the invaders while the lead whistled all about.

The cowboys had heard the miners' shots from the edge of a distant palisade.
But, sealed from the scene by a vertical drop,
they could not ride to their compadres' aid.

So, bearing a heavy burden, the whites gave up the chase.
They'd recaptured the stole stock and had their fill of action.
The Blue Skies escaped from that terrible place,
and went off to live with a reservation faction.

Posey returned where the rugged canyons snake like twisting, turning gossips' tongues,
and swore that the white men would never take his homeland away while there was breath in his lungs.

But, change is the name of the human game.
We will struggle with life and then die.
It was, and it will be, ever the same,
and the only reason to be, is to try.

Gone. All gone now. Every trail, every track,
every sign of all that fighting and crying.
And from History's mirror, it's just Change that peers back,
into this future of living and dying.

R.P. Tyler

Author's note: This poem is loosely based on accounts taken from Fawn McConkey Tanner's history of Grand County, "The Far Country". Mancos Jim and Posey were rumored to have played parts in this affair, but there is no documentation or proof.

GEOLOGY OF THE LA SAL MOUNTAINS

by
David Williams

History of Exploration

European explorers first mentioned the La Sals in 1776. Dominguez and Escalante named the range Sierra de la Sal after the salt reported to be found at the base of the range. The first mention in an official government document comes from Capt. Macomb's 1859 expedition to the junction of the Green and Grand Rivers. John Newberry, the expedition's geologist, wrote in the 1876 report, "The La Sal Mountain shows very finely from this point, distant twenty miles...[Rocks] consisted mainly of trachytes and porphyry, indicating that it is composed of eruptive rocks."

In 1875 James T. Gardner and Henry Gannett led the first formal geologic expedition of the mountains (see Pierson, this issue). The survey produced a topographic map and several cross sections. Expedition geologist

A. C. Peale concluded that, "The sedimentary strata have been lifted by eruptive rock which has broken through them in some places, and in others is seen only as the result of subsequent erosion."

Although earlier expeditions realized that the La Sal magma cooled within the earth, it was not until 1880 that Groves Karl Gilbert coined the term laccolites, later changed to laccoliths. In describing the nearby Henry Mountains he wrote, "Instead of rising through all the beds of the earth's crust, it (lava) stopped at a lower horizon, insinuated itself between two strata, and opened for itself a chamber by lifting the superior beds. In this chamber it congealed, forming a massive body..."

Subsequent studies mostly looked at mining opportunities. J. M. Hill's 1911 survey focused on the north group. B.S. Butler further elabo-

rated on the ore deposits of the entire La Sal Mountains in 1920. The first comprehensive study of the range took place in 1925 and 1926. J. M. Gould's landmark report confirmed the La Sal's laccolithic origins. Later papers by Charles Hunt and Gerald Richmond studied the structural and igneous geology and glaciation, respectively. More recent reports in the 1980s and 1990s have clarified and elaborated on these two papers.

Geology of Mountains

Formation and Structure
Laccoliths form when magma cools within the earth. As this magma reaches a zone of weakness on its upward thrust, it spreads laterally between sedimentary layers, and, its energy still not diminished, continues to push upward, forming mushroom-shaped structures. Over time, softer sediments erode away, leav-

ing behind rounded mountains, which glaciers eventually carve into jagged peaks. (A previous article in the Canyon Country Legacy discussed the formation of laccolithic mountains (Legacy, Spring 1992, pg. 18).

Rock Composition

Three separate pulses of magma, which produced the three distinct groups of mountains in the La Sals, occurred between 25 and 28 million years ago. Although the magma composition varied slightly within the intrusions, the most common material consisted of diorite porphyry with accompanying xenoliths.

A diorite is a quartz-poor, plagioclase feldspar-rich rock. A porphyritic rock includes larger crystals, known as phenocrysts, in a fine-grained matrix, the groundmass. The La Sal diorite consists of equidimensional phenocrysts of plagioclase ($\approx 30\%$), elongate crystals of hornblende ($\approx 15\%$), and a ground mass of orthoclase, albite, quartz and oligoclase ($\approx 50\%$). The phenocrysts range in size from 2 to 10mm. In the field the plagioclase crystals are whitish to grey and the hornblende is black.

The xenoliths are either chunks of sedimentary rock that fell into the magma on its upward surge or preexisting rocks that floated upward with the magma. The

dark grey xenoliths range in size from a few inches to a foot or more.

Origin of Magma

Recent theory ties the formation of the La Sals to the retreating Farallon plate. Starting about 75 mya the Farallon plate began to slide east and under (subduct) the North American plate, eventually traveling far enough inland to create the Rocky Mountains (fig. A). Like a giant spring, after reaching its farthest point of travel, the Farallon eventually reversed direction and slowly pulled back to the west. Between 40 and 27mya, this plate roll-back created a broad belt of igneous activity that spread from the San Juan volcanic field in Colorado to the Reno-Marysville volcanic field in Nevada.

As the plate rolled back hot asthenosphere rose and provided the heat necessary to create magmatism. On the edges of the Plateau, in Nevada and Colorado, magma pushed up to the surface. In the interior, the thick cratonic crust prevented the magma from piercing the surface. Instead it "insinuated itself" into sediments and bowed them upwards, creating the characteristic laccolith shape.

The Farallon plate may also play a role in the regional uplift of the Colorado

Plateau. In this model, the subducted Farallon plate split into two parts, and because it consisted of heavy oceanic crust, began to sink into the underlying lower lithosphere. As the plate subsided, hot asthenospheric material oozed up and around it, filling in the freshly created void above. Expansion of this material combined with heating of the North American plate to push the Colorado Plateau up 1.2 km. An additional .8 km of uplift had previously occurred from shearing between the Farallon and North American plates.

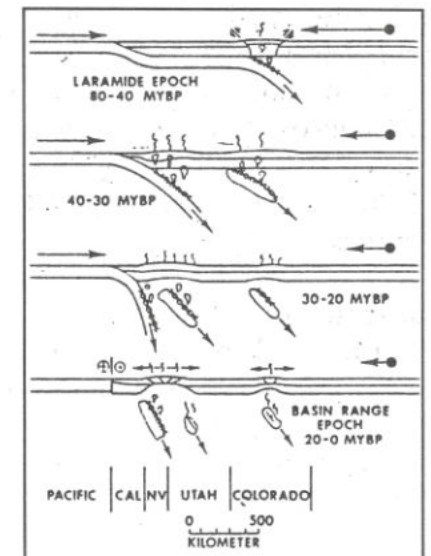


Fig. A: Laramide epoch: Low-angle subduction of Farallon plate under North American plate. 40 - 30 mybp: Retreat of Farallon with volcanism spreading from Colorado to Nevada. 30 - 0 mybp: Delamination and sinking of Farallon producing uplift of Colorado Plateau. (modified from Cross and Pilger, American Journal of Science, vol. 278, pg. 865-902.)

Mining History

Gold - The earliest discovery of minerals occurred in 1886, on the ridge between Bachelor and Miners Basin, on what is now known as the High Ore claim. Weekly reports in the Moab newspaper glowingly described the riches to be found and the boom that would soon follow: "Comparatively little work has been done in the district, but enough has been done to show that it is one of the richest in the country."

Gold seekers have sporadically dug numerous adits throughout this century. The deepest one, the Dillon, is located at the foot of Mineral Mountain. The 1,200 foot long adit passes through 200 feet of shale and several hundred feet of igneous rock, before reaching Precambrian rocks.

Despite the lack of gold found within the mountains, placer mining has also been attempted from sediments and streams washing off the mountains. Several prospects were located on the flat mesas south of Castle Valley and on Wilson Mesa.

Copper - Three copper districts were located in Utah near the La Sals: Big Indian Valley, Lisbon Valley, and Salt Wash Valley. Copper-poor sandstones produced small amounts of ore.

Radioactive minerals - Radium, uranium and vanadium minerals have been mined near the La Sals since the 1890s.

Quaternary Geology

In the last two million years the agents of erosion have become the dominant processes affecting the La Sals. Primarily three types of erosion have shaped the mountains: ice glaciers, snow avalanches, and landslips, in the form of rock glaciers and slump blocks. Long term activity of erosional processes has created complex interrelationships between glacial and non-glacial deposits. Early workers characterized numerous deposits as glacial. (see Legacy, No. 20, pg. 9) New research methods, though, point to less glaciation than previously thought.

Ice glaciers - Glaciers were active in only nine canyons in the La Sals, all during the Bull Lake (150,000 to 130,000 years ago) and Pinedale (35,000 to 12,000 years ago) glaciation periods. No strong evidence for pre-Bull Lake exists and only minimal post-Pinedale activity has been found. The dominant glacial features are U-shaped valleys, high elevation cirques and lower valley moraines. The nine canyons are Dark Canyon, Gold Basin and Horse Creek in the

middle mountain complex; and Geyser Creek, Miners Basin, Bachelor Basin, Bear Creek, Beaver Creek and Deep Creek in the north mountain group. No evidence for glaciation on South Mountain exists. Some evidence, however, has been covered by more recent events; so, the picture is not completely clear.

Beaver Creek displays the most expansive and long term glaciation, probably due to its location on the lee side of Mt. Waas. Beaver Creek has moraines of both Bull Lake and Pinedale age with a small post-Pinedale moraine in the upper part of the cirque. Geyser Creek and Miners Basin experienced limited glaciation because of southern exposure and a small and lower cirque basin, respectively.

Mass movements - A mass movement is defined as downslope movement of soil or rocks due to the force of gravity. In the La Sals large scale mass movements occur because of unstable bedrock. Incompetent shales of the Brushy Basin Member of the Morrison Formation and the Mancos Shale create zones of weakness susceptible to the agents of erosion. The longest movement (no. 5 in fig. B) is about 7 km long and 1 km wide.

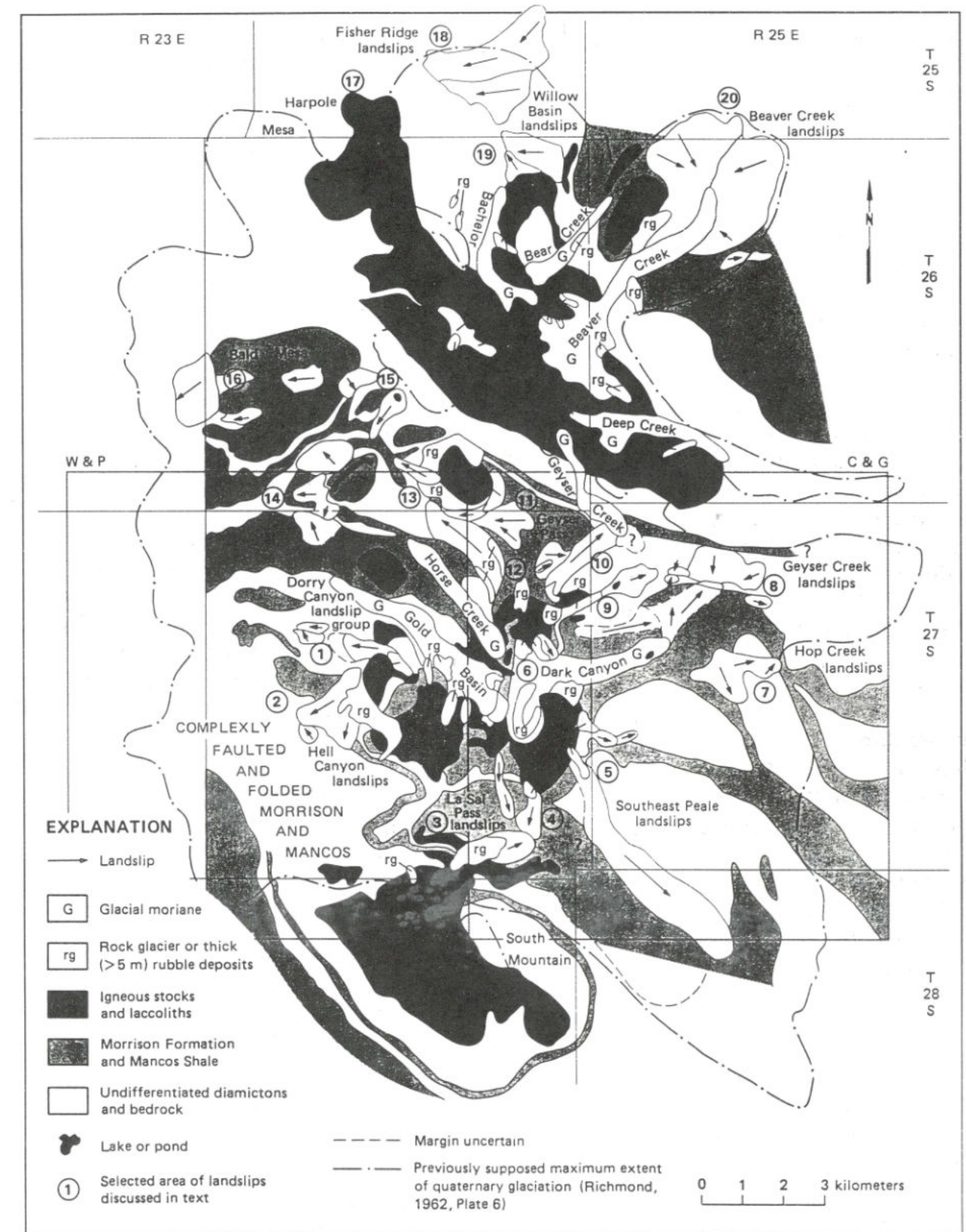


Fig B: General map of deposits produced by mass movement and glaciation in the La Sal Mountains. (from: Shroder and Sewell, pg. 56)

Numerous areas in the La Sals have modern rock glaciers covering parts of

valley and canyon floors (see above). Rock glaciers are thick rock debris deposits

with internal ice that creep downslope, much like an ice glacier. Differential move-

ment of one to two meters per year creates transverse and longitudinal ridges and furrows, accompanied by a steep front, generally at the angle of repose. In areas of sedimentary rock, however, the steep front may not be present. Cold-air drainage through the rubble and snow avalanche accumulation provide the water for internal ice.

Differential erosion of soft and hard sediments creates smaller scale landslips. Large blocks of competent sandstone either slump backward, tumble forward or slide downward on incompetent shale. These features occur throughout the range, wherever sedimentary rocks cover igneous rocks.

Snow avalanches - Avalanches are the winter equivalent of a flash flood in the desert; they cause significant erosion in a single event. Two examples in the La Sals are in the Mt. Mellenthin-Dark Canyon and Manns Peak-Beaver Basin areas. Avalanches contribute to the geomorphologic processes in three ways: (1) creating smooth U-shaped chutes (e.g. the north face of Mt. Peale); (2) erosion and transport of debris (e.g. uprooted trees in Dark Canyon); and (3) addition of water to rock glaciers. Heavy snowfall produces large avalanches; terrain characteristics are much less important. One

estimate indicates that significantly large events may only occur once or twice in a thousand years. Smaller avalanches take place whenever snowfall is great enough.

Ecological Relationships

The geology of the La Sal Mountains cannot be looked at as an isolated entity. Rock type, soils, aspect, and slope affect the distribution of plants. For example, ponderosa pines only grow on the eastern side of the mountains, on porous moisture-rich sandstone.

The La Sals also influence and are influenced by the surrounding desert. The range acts as a storm magnet during the summer, bringing in thunderstorms that spread out over the desert, providing more water to the arid lands below. Melting winter snow recharges aquifers and flows off the mountains in perennial streams.

The surrounding desert isolates the La Sals, which restricts gene flow leading to an increased potential for speciation. The endemic subspecies of pika, *Ochotone princeps lasalensis*, may be a relict from a previous ice age, when movement between the laccoliths and the Rockies was easier.

David Williams is a park ranger at Arches National Park.

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TREES IN THE LA SAL MOUNTAINS

by
Raven Tennyson

Each summer, I retreat from the desert's summer heat and return to the brotherhood of clustered evergreens in the mountains. It is a passage back to the dark wet verdant Douglas fir forests of my childhood in the Pacific Northwest. I crave the green, the moisture and the towering forest trees. Past experience promised to offer me a day of simplicity, beauty and perhaps some adventure.

Driving through miles of Gambel oak thickets, the lowest montane vegetational zone, I await expectantly for the first close glimpse of aspens. The tall lean white barked trees lure me to the distance. Arriving at the grove, I feel comfortable in the coolness of the trees, the lanky movement and the quiet rustling of the leaves.

Having no tolerance for shade, aspen aggressively pioneer the open meadows of tall grasses and many kinds

of herbaceous plants. Growing quickly the aspen reaches heights of 50-60 feet. The long clear trunk erupts skyward and is capped by a small rounded crown of numerous two to three inch long leaves. The ovoid leaves flutter gently in summer winds. This rocking movement gives the tree its common name, "quaking aspen."

Rising up in areas of destruction, aspen trees are also referred to as "phoenix" trees. Typically root systems spread 80 feet from a tree, so when destruction such as fire, avalanche or logging occurs, the network of underground root suckers erupt and shoots reinvade the disturbed area. Root suckers will also colonize an area, sending up the next generation after competition between old trees stresses and kills them. Old blown over trees will lie in the forest floor among newly emerging aspens.

Aspens will also invade rocky, wet or poor soil sites unsuitable for other seedlings. Over its range aspen is found on many soil types. In the La Sals these trees are found primarily on brown podzolic soils. Podzol is a Russian word meaning "ash beneath." Soil minerals leach from the upper organic acidic layer through rocks and gravel forming an ashy gray colored layer.

In the Rocky Mountains shade tolerant spruce-fir forests will typically replace aspens after fires or logging. Because historic destruction of aspens from fire and logging has been restricted in the La Sals, transitions of aspens forests to spruce - fir forests is controlled by climate. The lower altitude trees, under warm and dry conditions, will change eventually into ponderosa pine or scrub oak areas. At the upper end of the continuous aspen zone, aspens will evolve into

spruce-fir forests. Tongues of aspens extend on south facing slopes to 10,080 feet and drop to 6,500 feet on north facing aspects.

As I continue to drive upwards in elevation, I leave the mosaic of light, color and whiteness of the aspen forest and a dense fortress of dark green greets me. Engelmann spruce. I reminisce of a more recent adventure on a harsh wintery day.

Skiing laboriously for an entire afternoon, through 12 inches of fresh snow, made us extremely tired and caught us unexpectedly short of a cabin we were hoping to overnight in. As the sun set, we sheltered in among the dense droopy foliage of clustered evergreens. That night we huddled next to a small fire with the smell of spruce resin crackling in the air surrounded by our tent and dark silhouettes of trees. The next morning I closely investigated the shadows from the previous night - Engelmann spruce.

In the La Sals, dense stands of Engelmann spruce associate with less abundant stands of subalpine fir, establishing a zone which circles the entire mountain, from 9,500 feet to 11,500 feet, the lower limits of timberline. At present the spruce are readvancing above timberline, after a re-

gression following the most recent glacial advance.

Shade loving high elevation firs and spruces adapt to low light understory and heavy snow loads in a variety of ways. The triangular shape of these evergreens is such a response. Light filters downward through the layers of the tree. At the bottom less light is available so branches elongate to access more light near the edges. Spruce or fir needles near the trunk do not receive enough light to photosynthesize and they drop off. Under heavy snow loading the flexible branches and the triangular shape help the tree sluff snow similar to a steep metal roof on a house.

The needles on the branches contain wound healing resins which act as an antifreeze lowering the freezing point for each needle. The placement and the small size of each needle breaks up snow as it accumulates on the trees.

As a botany undergraduate, I learned to distinguish spruce from firs by the simple saying "shake hands with a spruce." The sharply pointed spruce needles bite the hand in contrast to the blunt rounded-tip fir needles. Another distinguishing character is the difference between the cones. The spruce cone hangs downward from the branch, in contrast to the

thick scaled fir cone which sits erect on the limb.

Traveling to the top of Geyser Pass, continuing over the summit and dropping down in elevation on the east side, where the forest opens, I feel exalted by the sight of the first ponderosa pine. In my mind, I travel back to summer camp in the northern Sierra Nevada the first summer I met the ponderosa pine. I remember the smell of the vanilla bark, the puzzle like nature of the bark, and the gentle warm winds through the long needles. On my first backpack, we camped on a ridge near an old large isolated gnarly ponderosa pine. In the middle of the afternoon, we suddenly smelled smoke and shortly the top of the old tree exploded skyward into brilliant flames. I stood amazed. Later we learned that the fire had originated from a distant unknown source. It had spread through the long root systems and into the trunk of the tree.

Three needled pines. Bend the central needle down and form a 'Y' for yellow pine. Ponderosa pines grow in relatively pure stands in the La Sals. Restricted to sandstone areas, where more moisture is available than the surrounding shales, these trees are found at 6,500 to 9,000 feet sandwiched be-

tween the piñon-juniper and the spruce-fir.

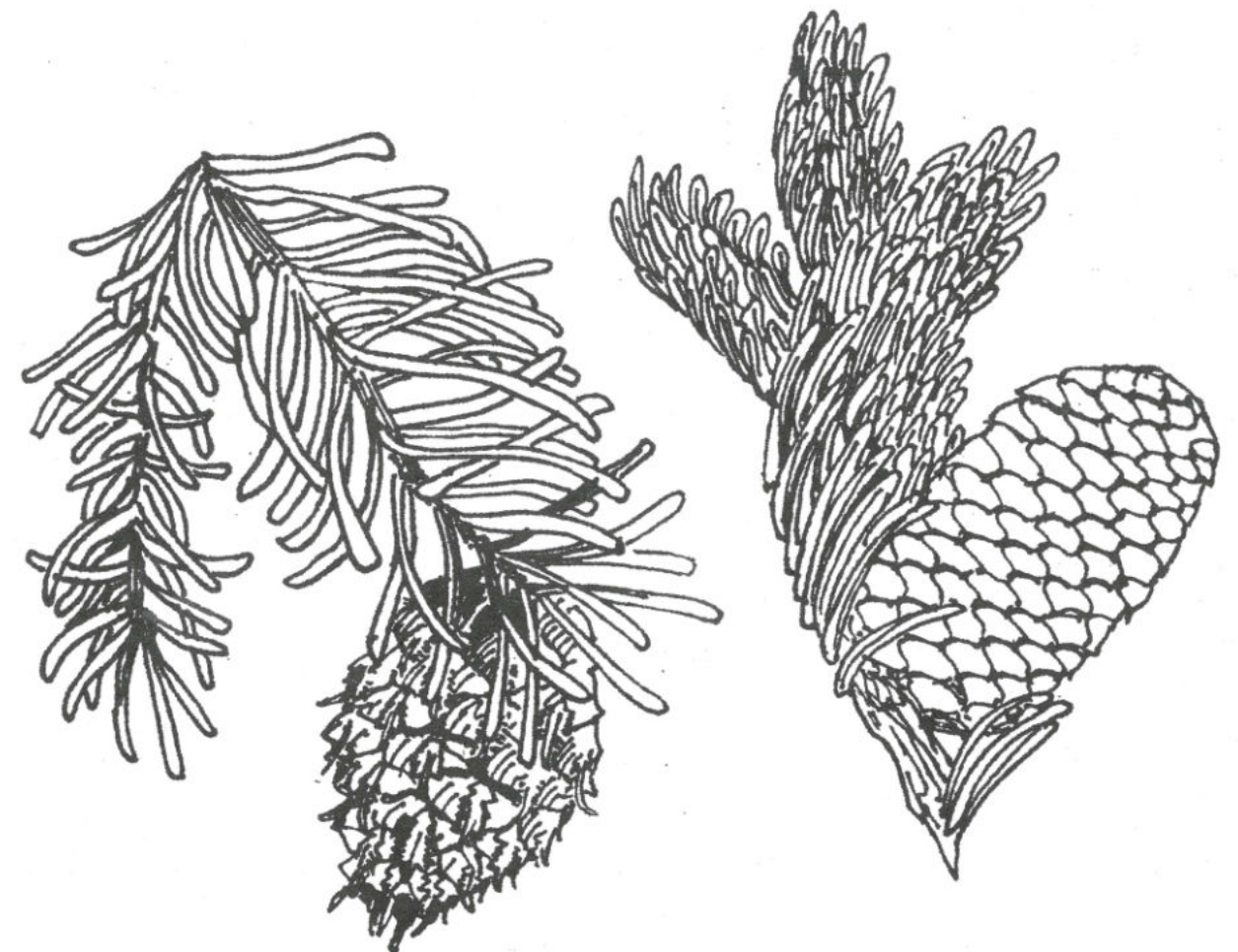
The tree is distributed in areas with lower rain fall and has acquired adaptations to ensure survival. The ponderosa pine's tap roots pierce the soil as deep as 36 feet and sprawl horizontally to 100 feet. The roots lack fine root hairs; yet, still are strongly branched to absorb moisture when it is abundant. Four year old trees have taproots four to five feet deep.

Taking advantage of night dew, ponderosa pines are able to absorb moisture through the needles and transport this water to the root system, a reversal of the normal water uptake system. The park-like nature of the ponderosa reduces competition between individual trees, maximizing mineral and nutrient uptake.

As I amble out of the ponderosa forest and back through the piñon-juniper, I linger in the memories of

evergreens and adventures of surprise and endurance. I marvel at the simplicity of adaptations to a harsh environment and grandeur in its unique expression. I return slowly to the desert heat.

Raven Tennyson indulges in the imagination creating puppets, masks, and stories inspired by the red rock country of southeast Utah.



Douglas fir and Subalpine fir
by Dan McRoberts

HABITAT AND WILDLIFE ASSOCIATIONS

by
Damian Fagan

The La Sal Mountains rise high above the canyon country of southeastern Utah. Every elevation gain of 2,500 feet equals a latitudinal change of 400 miles, thus forest types representative of the northern latitudes grow at the higher elevations in this mountain range. Correspondingly, species with wildlife characteristics of these habitat types are found from the sagebrush covered foothills around 6,500 feet to the alpine summits at 12,721 feet.

Many of the larger mammals that inhabit the La Sal Mountains use a wider range of habitat types than smaller mammals or birds. These animals -- black bear, mule deer, elk, coyote, and mountain lion -- may be found in almost all of the habitat types in the La Sals. Movement between habitats is greater during the fall and winter seasons.

Birds and small mammals generally display a narrower habitat selection. Species are often found in association

with the major tree type of the habitat because of the tree's food and nesting resources, as well as because of the other plant species found within that habitat. Often a group of birds, like the woodpeckers or jays, will separate out; a particular species will be characteristic of a particular habitat. This article will focus on some of these associations between habitats and wildlife, in the La Sal Mountains.

Foothills Zone

There are four distinct habitat types found in the foothills zone around the lower portions of the range. Elevation and aspect determine which type of community grows where.

The **piñon-juniper** habitat type generally ranges from 5,500 to 7,500 feet, on the plateaus, mesas, alluvial fans, and terraces; and up to 8,500 feet on south-facing slopes. Known as the "pygmy forest" after the small stature of the trees, this habitat type has a strong relationship with the piñon jay.

Flocks of up to 200 individuals may gather together in the fall, their raucous calls shattering the silence of the foothills. Upright piñon cones, which mature in the fall, make for easy nut collecting by the jays. Testing a shell in their beaks, the jays are able to tell, by weight, if there is a developed seed within. Jays also cache some seeds for winter consumption, but winter snows may bury the seeds and make them inaccessible. Often these seeds are buried in open areas away from other piñon trees. Those forgotten or buried by winter's snow may germinate to form future trees and food for other jay generations.

Junipers don't produce berries; the bluish colored "berry" is actually a hard shell surrounded by a waxy coating. Small rodents gnaw through the hard protective shell and eat the seed. Piles of discarded husks may be seen atop a boulder where a feeding rodent could simultaneously survey its domain and enjoy a meal.

	Life Zones		
	General	North Facing	South Facing
Foothills			
Pinyon-Juniper	5,500 to 7,500	down to 5,000 (juniper)	up to 8,500 (pinyon)
Sagebrush grassland	7,000 to 9,200	only on south and west slopes of mtns. limited to eolian sand	
Gambel Oak-Mountain mahogany		7,500 to 9,500	6,500 to 9,000
Ponderosa Pine	6,500 to 9,500	absent on west and south sides of mtns. restricted to sandstone	
Aspen	8,000 to 10,000	down to 6,500	up to 10,800
Subalpine	9,500 to 11,500	down to 8,000	
Alpine	above 11,500	down to 11,000	

The gray fox, however, consumes the entire fruit of the juniper; scats are often loaded with the undigested remains of the shell. These tree-climbing foxes eat other plants' fruits, small rodents, carrion, and insects.

A **sagebrush-grassland** habitat type is found within the altitudinal range of the piñon-juniper type and up to 9,200 feet on the south and west slopes of the mountains. This type also invades into the ponderosa pine and Gambel oak-mountain mahogany habitats.

Sagebrush is an important winter forage plant for mule deer. Dark-eyed juncos and white-crowned sparrows eat the seeds. Another denizen uses the soft soils of the grassland; fresh dirt piles may indicate the presence of pocket gophers. Underground tunnels provide

them with safe travel routes and foraging locations.

The **Gambel oak-mountain mahogany** community lies between 6,500 and 9,000 feet on north facing slopes and between 7,500 and 9,500 feet on south facing slopes. The acorn of the Gambel oak acts as a magnet for wildlife. Noisy scrub jays eat or cache the acorns for winter use, as do rock squirrels and chipmunks. Mule deer and black bears may eat more than 300 acorns a day in the fall. High in fats, the seeds provide critical winter caloric reserves for active deer or hibernating bears.

Birds such as the Virginia's and orange-crowned warblers are not attracted to the acorns; instead, they glean insects from the branches and leaves of these oaks. Both warbler species nest on the ground where the dense

leaf litter provides cryptic protection for the young.

Ponderosa pine forests wrap around the north, east and southeast side of the mountains between 6,500 and 9,500 feet. These yellow pines grow in park-like stands, with sparsely growing shrubs, forbs and grasses beneath them. The pine nut provides a protein-rich food source for the tassel eared Abert's squirrel and Stellar's Jay, both of which use the ponderosa pine for nesting locations.

Insects attract two species of nuthatches to the tree. The white-breasted nuthatch, with its slightly decurved bill, probes for insects on the main trunk, while the pygmy nuthatch, often in "piping" flocks, forages among the outer tips of the branches for insects. Both nuthatches are "secondary cavity nesters"; they utilize

Precipitation and Temperature

	Mean Jan	Mean Apr	Mean July	Mean Oct
Moab (5,000 ft)	28.9°F	53.3°F	79.5°F	54.6°F
La Sal Township (6,720 and 6,980 ft)	24.5°F	44.5°F	68.9°F	48.3°F
La Sal Mtn (8,800 ft)	22.3°F	29.7°F	50.2°F	31.8°F
	Mean Annual	Mean June-Sept	Mean Oct-May	
Moab (5,000 ft)	8.39 in	2.6 in	5.59 in	
La Sal Township (6,720 and 6,980 ft)	13.15 in	5.1 in	8.05 in	
La Sal Mtn Upper (9,850 ft:precip only)	30.76 in	8.45 in	22.31 in	

abandoned woodpecker holes for their nesting sites.

Northern goshawks build a nest in the upper portion of the tree's canopy close to the main stem. Large, conical nests are constructed of ponderosa twigs and the female may aggressively defend her nest territory against any intruder. Stories of these raptors swooping down and striking humans who are near the nest are common. Birds and small mammals, such as the Abert's squirrel, form the prey base of the goshawk.

Aspen Zone

Aspen groves generally encircle the La Sal mountains between 8,000 and 10,000 feet, but may be found both lower and higher because of favorable environment conditions. Open meadows are interspersed between dense groves.

Williamson's and red-naped sapsuckers drill horizontal rows of holes in the soft aspen bark. Insects trapped in the oozing sap are then eaten, hence their common name. Most woodpeckers have small barbs on the ends

of their tongues to help pry loose insects located beneath a tree's bark, but the tip of the sapsucker's tongue is rounded, like a straw, to help suck up insects and sap.

Known as primary cavity nesters, sapsuckers often excavate a nest site in a live tree. Females lay white colored eggs in the early summer and when the young hatch the adults make continuous forays in search of insects for their voracious young. Abandoned nest sites may be used by violet-green swallows, house wrens or mountain bluebirds.

Long-tailed weasels hunt for mice, rodents and other mammals in a frenetic-like motion. Constantly on the prowl, these creatures literally leave no tunnel unexplored. Often these predators will sleep in the burrows of their prey. Active in the winter, the weasel's coat turns white, creating better camouflage in the snowy environment.

Short-horned lizards may also be found amongst the

aspen. This cold-blooded reptile draws its body heat from the environment, which at 9,000 feet may seem like a difficult feat. When the lizard arises, it first sticks its head out of the burrow and into the sun. Both veins and arteries, located close to each other in the head, work together in rapid warming. The arteries draw some of the warmth from the blood in the veins that is returning to the heart. Once the brain is functioning well, muscles in the head are constricted so blood flows through small veins to the body until the body temperature has reached a sufficient level and the lizard can proceed with its day.

[Editor's note: Unlike other horned lizards, this species gives birth to live young, an adaptation for cold climates.]

Subalpine Zone

The subalpine zone is characterized by dark green forests of Engelmann spruce and subalpine fir. Douglas fir, white fir and scattered limber pine also are found in these high elevation forests. Red squirrels dis-

search for beetle larvae for destructive wood-boring beetles and insects.

The male woodpecker generally excavates a nest cavity in the stubs or trunks of dead spruces, with a lower "doorstep" beveled into the lower edge of the cavity opening.

Gray jays, affectionately called "camp robbers" or "whiskey jacks" because of their bold exploration of campsites and sharing a tidbit with miners, lumbermen

mantle cones scale by scale, leaving only the inner spindle still attached to the limb. Their chattering call and pile of cone scales beneath the tree may be the only indicators of their presence.

Black-backed woodpeckers, a three toed woodpecker, have historically been found in the La Sal Mountains. These birds forage on burned over or dying spruce or other coniferous trees. Unlike the sapsuckers, these woodpeckers don't drill holes, they remove patches of bark in

or prospectors, may be seen singly or in pairs in the spruce zone. Omnivorous, they consume insects, grasshoppers, mice, berries, eggs of other birds, and carrion depending upon the season.

The La Sal pika, a subspecies of pika, inhabits the rocky talus slopes in both this and above timberline habitats. Feeding on grasses and forbs in this high elevation home, the pika begins to store vegetation in small haystacks for the winter. Plants are dried

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Aerial view showing distribution of vegetation zones on the west side of the middle group of the La Sals. AT - alpine tundra. SF - spruce-fir climax, including some Douglas fir climax. AM - aspen meadow subclimax. PP - ponderosa pine, on east slopes only. OM - scrub oak-mountain mahogany. PJ - pinyon-juniper. SB - sagebrush association. Courtesy of United States Geological Survey photo by Gerald Richmond

before moving them into the protective confines between the rocks. The pika stays active during the winter, relying on its harvest and caches.

Often a sharp "peek!", a warning of an intruders presence, is the first indicator of the animal's presence. Another generic name for this animal is "whistling hare", based upon the fact that pikas are related to the rabbits and hares.

Alpine Zone

The environment above treeline represents a harsh landscape. The growing season is short and dependent upon snowpack; therefore only certain birds and small rodents or mammals breed in this locality. Larger mammals and birds of prey use the area to pass through during seasonal foraging.

Rosy finches, horned larks, rock wrens may be found in these wind swept environments, feeding upon seeds

and insects. Golden eagles and red-tailed hawks cruise along the ridges watching for small rodents moving amongst the alpine vegetation. Ravens and white-throated swifts seem to "play" in the updrafts along these ridgelines, their flights a series of acrobatic moves.

Voies inhabit these mountain meadows, feeding on grasses, sedges, roots, and bulbs of plants. Several litters may be produced each season, with one to ten young per litter. Life spans are short, generally one to two years.

Watching Wildlife

Viewing wildlife in the La Sal Mountains may present some challenges depending upon your target species, viewing location and time of year. Sometimes your only "views" are the clues of an animal's passage -- tracks, scat, claw or antler marks on trees, bird songs, or noises in the brush; then again, you may have a black bear amble

across the road in front of your vehicle.

Campgrounds, trails, roads, and areas where two habitat types meet, may provide the best opportunities for viewing wildlife. Knowing the types of habitats that certain wildlife species inhabit can help in your search for a particular species. Altering your schedule to mimic an animals; e.g. being active in the early morning and late afternoon hours or during the night, may also increase your chances of seeing wildlife. Sitting quietly in the forest or on a prominent viewpoint might allow you to hear or see wildlife that you might miss while concentrating on hiking. And as a reminder, view wildlife at a safe distance and with a minimum of disturbance for their protection as well as yours.

Damian Fagan is a freelance wildlife biologist. At present he is working on a book about the wildflowers of southern Utah.



Drawing by Dan McRoberts

NEXT ISSUE

In cooperation with The Nature Conservancy, the next issue of the **Canyon Legacy** will focus on the Scott M. Matheson Wetlands Preserve. David Williams will edit the 27th issue. He is looking for information and photos about the area also known as the Moab Sloughs. If you are interested please contact David at home. His address is 157 S. 200 E. Moab, UT 84532 and his phone number is (801) 259-5435.

UPCOMING EVENTS AT THE MUSEUM

Speaker Series

all talks at the Moab Information Center
at
7:00 PM

May 3 - **Roy Webb**, George Flavell: A Poor But Wiser Man

Look for fliers around town or contact the Moab Information Center for additional information.

Artist of the Month

April - **Teresa Guymon** - Watercolors

May - **Nicholas Brown** - Multimedia

Andrea Brand will display her jewelry in either April or May, too.

October - **Vivian Rose**- Handpainted Photography

For more information contact Dennis Gardner.

Other

Please note that we have changed our name. At the Annual Board meeting in January, the board and members of the museum decided to alter the museum's name. It was felt that the name The Dan O'Laurie Museum, by itself, did not fully reflect what the museum provided to the public; therefore, Canyon Country was added. If you have any questions about this change please feel free to call the museum for more information. The Board is excited about the new name and looks forward to moving the museum in new and exciting directions.

The Dan O'Laurie Canyon Country Museum
is open
1:00 to 8:00 p.m.
Monday through Saturday

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