THE NATURAL HISTORY OF A MOUNTAIN YEAR pdf

1: The Natural History of a Mountain Year: Four Seaso | eBay

The review of "Kitten" completely mis-characterizes this compilation of the best journal entries from Barnes' thirty years of hiking in the Wasatch Mountain Range. There is one entry for each day of the year in a Thoreau-like format.

Salmon Oncorhynchus nerka jumping a beaver dam Damaged beaver dam on Blackwood Creek. Beaver dams are easily crossed by trout and their ponds may serve as critical breaks for wildfires. The beaches of Lake Tahoe are the only known habitat for the rare Lake Tahoe yellowcress Rorippa subumbellata , a plant which grows in the wet sand between low- and high-water marks. As spawning season approaches the fish acquire a humpback and protuberant jaw. After spawning they die and their carcasses provide a feast for gatherings of mink Neovison vison , bears Ursus americanus , and bald eagles Haliaeetus leucocephalus. The non-native salmon were transplanted from the North Pacific to Lake Tahoe in Forest Service between and Descended from no more than nine individuals, beaver populations on the upper and lower Truckee River had reached a density of 0. Route 50 named Fallen Leaf Lake after his Indian guide. During the Civil War, Union advocates objected to the name, because Bigler was an ardent secessionist. Due to this, the U. Department of the Interior introduced the name Tahoe in Both names were in use: Mining era[edit] Upon discovery of gold in the South Fork of the American River in , thousands of gold seekers going west passed near the basin on their way to the gold fields. From until about , logging in the basin supplied large timbers to shore up the underground workings of the Comstock mines. The logging was so extensive that loggers cut down almost all of the native forest. The first mail delivery was via a sailboat which took a week to visit each of the lakeside communities. Lake Tahoe Railway and Transportation Company dominated the passenger and mail route after launch of their passenger steamboat Tahoe on 24 June Lake Tahoe Railway and Transportation Company purchased Tallac and rebuilt her as Nevada with length increased by 20 feet 6. Mail delivery moved ashore after Marian B was lost on 17 May with her owner and the mail clerk attempting mail delivery during a storm. The latter two lie in Glenbrook Bay, but Tahoe sank in deeper water. Tahoe City was founded in as a resort community for Virginia City. The post-World War II population and building boom, followed by construction of gambling casinos in the Nevada part of the basin during the mids, and completion of the interstate highway links for the Winter Olympics held at Squaw Valley, resulted in a dramatic increase in development within the basin. From to , the permanent residential population increased from about 10, to greater than 50,, and the summer population grew from about 10, to about 90, This boundary has been disputed since the mid-nineteenth century. This includes the section of the th meridian that is between the 42nd parallel at the Oregon border to the 39th parallel amid Lake Tahoe, and an oblique line continuing from that point southward to where the Colorado River crosses the 35th parallel. While 43 degrees of longitude west from the Washington Meridian does not really coincide with the degrees longitude west of Greenwich , the Congress was of the belief that the two lines were identical; the former was abandoned nationally in The centuries long dispute that erupted began with boundary discrepancies across many surveys within which were valuable mineral deposits; Nevada also had a wish that California would assent to cede its land east of the pacific crest as had been preauthorized by congress in Houghton and Butler Ives line. A survey of the California-Oregon border by Daniel G. Major for the General Land Office found the th meridian more than two miles west of the prior line, so it was followed by the survey by Allexey W. Against initial instructions, Von Schmidt began his survey with the California-Nevada State Boundary Marker [50] which was six-tenths of a mile east of the Houghton-Ives line. When he discovered the Colorado River had shifted at the 35th parallel, he simply changed the endpoint resulting in a survey that was neither straight nor accurate. Substantial doubts lead congress in to fund the United States Coast and Geodetic Survey to remark the oblique line. Congress does not have the constitutional power to unilaterally move state boundaries. The wealth in natural resources between the Sierra Crest and the eastern-most sections of survey lines created a powerful source for conflict. Major mining sites in the Tahoe area were in disputed territory. In a striking display of opportunism which ostensibly occurred because the boundary was still "officially" unsurveyed, settlers arrogated parts of California up to the irregular Sierra Crest tens of miles east of the boundaryâ€”defined over six years priorâ€”in an attempt to

create Nataqua Territory. An armed skirmish known as the Sagebrush War included gunshots exchanged between militia. Where a particular coordinate actually lays on the surface of the earth is dependent on the figure of the Earth. In the mid s the Bessel ellipsoid of or the Clarke ellipsoid of were widely used; the Hayford ellipsoid of may later have been used by the United States Coast and Geodetic Survey. Holding assumptions of the earth back-in-time, modern satellite assisted survey techniques can determine location and transform them onto old ellipsoids to within a centimeter. Celestial navigation [55] [56] techniques by contrast, are accurate up to two-fifths of a mile; uncertainty in the latter was known, but precision then was unobtainable. The legacy of this dispute continues. Of the three interstate streets on the south shore, the border is only tepidly labeled on U. Route 50 in small font. Unbeknownst to the negotiators,[citation needed] this compromise split Lake Tahoe: Beach ownership[edit] As Lake Tahoe is a U. Navigable Waterway , [65] [66] under federal jurisdiction , [67] [68] the public is allowed to occupy any watercraft as close to any shore as the craft is navigable. Neither state has the authority to rescind navigability along the shoreline below the highmark of the waterbody, because it has been granted under federal law through the Enumerated powers of the United States. The entire waterbody is navigable; it is common for the majority of users to be operating negligible draft one-person craft such as kayaks and standup paddleboards. The yearly maximum is commonly 0. The state of Nevada has not agreed [71] [72] to either a highwater level or datum with California and the US , [73] nor has this waterline been surveyed and marked in either stateâ€”making this interstate waterway boundary line somewhat arbitrary and disputed. To be convicted of trespassing , one must be beyond reasonable doubt above the highwater mark, which itself is an arbitrary fact to be found. Recent attempts by Lakefront Homeowners to use piers as "easement fences" to obstruct beach travel are encroaching centuries of established easement and admiralty law. In , the U. Congress and the California and Nevada State Legislatures created a unique compact to share resources and responsibilities. Congress amended the Compact with public law Schisms between both agencies and local residents have led to the formation of grass-roots organizations that hold to even stricter environmentalism. Vikingsholm was the original settlement on Emerald Bay and included an island teahouse and a room home. However, this storm drain was removed during construction. The new beach now called Lakeview Commons opened in Summer Now, after a half-century of accelerated nitrogen input much of it from direct atmospheric deposition , the lake is phosphorus-limited. Theodore Swift et al. This represented a decrease of 3. Because of the sensitivity of Truckee River water quality involving two protected species, the cui-ui [93] sucker fish and the Lahontan cutthroat trout , this drainage basin has been studied extensively. The primary investigations were stimulated by the U. Lake Tahoe never freezes. Dissolved oxygen is relatively high from top to bottom. Analysis of the temperature records in Lake Tahoe has shown that the lake warmed between and at an average rate of 0. The warming is caused primarily by increasing air temperatures, and secondarily by increasing downward long-wave radiation. The warming trend is reducing the frequency of deep mixing in the lake, and may have important effects on water clarity and nutrient cycling. In â€”65, opossum shrimp Mysis diluviana were introduced to enhance the food supply for the introduced Kokanee salmon Oncorhynchus nerka. Since the s, the cladoceran populations have somewhat recovered, but not to former levels. Since , goldfish have been observed in the lake, where they have grown to "giant size", behaving like an invasive species. They may have descended from former pets which owners dumped or escaped, when used as fishing bait.

THE NATURAL HISTORY OF A MOUNTAIN YEAR pdf

2: The Natural History of Algonquin Peak | Lake Placid, Adirondacks

Find helpful customer reviews and review ratings for The Natural History of a Mountain Year: Four Seasons in the Wasatch Range at www.enganchecubano.com Read honest and unbiased product reviews from our users.

Etymology[edit] The name of the mountains is a translation of an Amerindian name that is closely related to Algonquian ; the Cree name as-sin-wati is given as, "When seen from across the prairies, they looked like a rocky mass". The first mention of their present name by a European was in the journal of Jacques Legardeur de Saint-Pierre in , where they were called "Montagnes de Roche". The Rocky Mountains are notable for containing the highest peaks in central North America. The Great Basin and Columbia River Plateau separate these subranges from distinct ranges further to the west. In Canada, the western edge of the Rockies is formed by the huge Rocky Mountain Trench , which runs the length of British Columbia from its beginnings in the middle Flathead River valley in western Montana to the south bank of the Liard River. Other mountain ranges continue beyond the Liard River, including the Selwyn Mountains in Yukon , the Brooks Range in Alaska , but those are not part of the Rockies, though they are part of the American Cordillera. The Continental Divide of the Americas is located in the Rocky Mountains and designates the line at which waters flow either to the Atlantic or Pacific Oceans. Farther north in Alberta, the Athabasca and other rivers feed the basin of the Mackenzie River , which has its outlet on the Beaufort Sea of the Arctic Ocean. Human population is not very dense in the Rocky Mountains, with an average of four people per square kilometer and few cities with over 50, people. However, the human population grew rapidly in the Rocky Mountain states between and The populations of several mountain towns and communities have doubled in the last forty years. Geology of the Rocky Mountains The rocks in the Rocky Mountains were formed before the mountains were raised by tectonic forces. The oldest rock is Precambrian metamorphic rock that forms the core of the North American continent. There is also Precambrian sedimentary argillite , dating back to 1. During the Paleozoic , western North America lay underneath a shallow sea, which deposited many kilometers of limestone and dolomite. This mountain-building produced the Ancestral Rocky Mountains. They consisted largely of Precambrian metamorphic rock forced upward through layers of the limestone laid down in the shallow sea. Terranes began colliding with the western edge of North America in the Mississippian approximately million years ago , causing the Antler orogeny. In Canada, the terranes and subduction are the foot pushing the rug, the ancestral rocks are the rug, and the Canadian Shield in the middle of the continent is the hardwood floor. Scientists hypothesize that the shallow angle of the subducting plate increased the friction and other interactions with the thick continental mass above it. Tremendous thrusts piled sheets of crust on top of each other, building the broad, high Rocky Mountain range. Just after the Laramide orogeny, the Rockies were like Tibet: In the last sixty million years, erosion stripped away the high rocks, revealing the ancestral rocks beneath, and forming the current landscape of the Rockies. Periods of glaciation occurred from the Pleistocene Epoch 1. These ice ages left their mark on the Rockies, forming extensive glacial landforms, such as U-shaped valleys and cirques. Recent glacial episodes included the Bull Lake Glaciation , which began about , years ago, and the Pinedale Glaciation , which perhaps remained at full glaciation until 15,â€”20, years ago. For example, volcanic rock from the Paleogene and Neogene periods 66 million â€” 2. Millennia of severe erosion in the Wyoming Basin transformed intermountain basins into a relatively flat terrain. The Tetons and other north-central ranges contain folded and faulted rocks of Paleozoic and Mesozoic age draped above cores of Proterozoic and Archean igneous and metamorphic rocks ranging in age from 1. Ecology of the Rocky Mountains There are a wide range of environmental factors in the Rocky Mountains. Tundra in the Rocky Mountains of Colorado Instead, ecologists divide the Rocky Mountain into a number of biotic zones. Each zone is defined by whether it can support trees and the presence of one or more indicator species. Two zones that do not support trees are the Plains and the Alpine tundra. Near treeline, zones can consist of white pines such as whitebark pine or bristlecone pine ; or a mixture of white pine, fir, and spruce that appear as shrub-like krummholz. Finally, rivers and canyons can create a unique forest zone in more arid parts of the mountain range. The Rocky Mountains are an important habitat for a great deal of well-known wildlife, such as elk ,

moose , mule and white-tailed deer , pronghorn , mountain goats , bighorn sheep , badgers , black bears , grizzly bears , coyotes , lynxes , and wolverines. The status of most species in the Rocky Mountains is unknown, due to incomplete information. European-American settlement of the mountains has adversely impacted native species. Examples of some species that have declined include western toads , greenback cutthroat trout , white sturgeon , white-tailed ptarmigan , trumpeter swan , and bighorn sheep. In the United States portion of the mountain range, apex predators such as grizzly bears and gray wolves had been extirpated from their original ranges, but have partially recovered due to conservation measures and reintroduction. Other recovering species include the bald eagle and the peregrine falcon. Like the modern tribes that followed them, Paleo-Indians probably migrated to the plains in fall and winter for bison and to the mountains in spring and summer for fish, deer, elk, roots, and berries. In Colorado, along with the crest of the Continental Divide, rock walls that Native Americans built for driving game date back 5,â€”5, years. A growing body of scientific evidence indicates that indigenous people had significant effects on mammal populations by hunting and on vegetation patterns through deliberate burning. Native American populations were extirpated from most of their historical ranges by disease, warfare, habitat loss eradication of the bison , and continued assaults on their culture. The Lewis and Clark Expedition â€" was the first scientific reconnaissance of the Rocky Mountains. The expedition was said to have paved the way to and through the Rocky Mountains for European-Americans from the East, although Lewis and Clark met at least 11 European-American mountain men during their travels. Among the most notable are the expeditions of David Thompson explorer , who followed the Columbia River to the Pacific Ocean. Resolution of the territorial and treaty issues, the Oregon dispute , was deferred until a later time. In , Spain ceded their rights north of the 42nd Parallel to the United States, though these rights did not include possession and also included obligations to Britain and Russia concerning their claims in the same region. Settlement[edit] After , American fur traders and explorers ushered in the first widespread Caucasian presence in the Rockies south of the 49th parallel. Negotiations between the United Kingdom and the United States over the next few decades failed to settle upon a compromise boundary and the Oregon Dispute became important in geopolitical diplomacy between the British Empire and the new American Republic. Despite such efforts, in , Britain ceded all claim to Columbia District lands south of the 49th parallel to the United States; as resolution to the Oregon boundary dispute by the Oregon Treaty. The Idaho gold rush alone produced more gold than the California and Alaska gold rushes combined and was important in the financing of the Union Army during the American Civil War. Though political complications pushed its completion to , the Canadian Pacific Railway eventually followed the Kicking Horse and Rogers Passes to the Pacific Ocean. President Harrison established several forest reserves in the Rocky Mountains in â€" Economic development began to center on mining , forestry , agriculture , and recreation , as well as on the service industries that support them. Tents and camps became ranches and farms, forts and train stations became towns, and some towns became cities. Minerals found in the Rocky Mountains include significant deposits of copper , gold, lead , molybdenum , silver , tungsten , and zinc. The Wyoming Basin and several smaller areas contain significant reserves of coal , natural gas , oil shale , and petroleum. For example, the Climax mine, located near Leadville , Colorado, was the largest producer of molybdenum in the world. Molybdenum is used in heat-resistant steel in such things as cars and planes. The Climax mine employed over 3, workers. In one major example, eighty years of zinc mining profoundly polluted the river and bank near Eagle River in north-central Colorado. High concentrations of the metal carried by spring runoff harmed algae , moss , and trout populations. An economic analysis of mining effects at this site revealed declining property values, degraded water quality, and the loss of recreational opportunities. The Rocky Mountains contain several sedimentary basins that are rich in coalbed methane. Coalbed methane is natural gas that arises from coal, either through bacterial action or through exposure to high temperature. Coalbed methane supplies 7 percent of the natural gas used in the United States. These two basins are estimated to contain 38 trillion cubic feet of gas. Coalbed methane can be recovered by dewatering the coal bed, and separating the gas from the water; or injecting water to fracture the coal to release the gas so-called hydraulic fracturing. Agriculture includes dryland and irrigated farming and livestock grazing. Livestock are frequently moved between high-elevation summer pastures and low-elevation winter pastures, a practice known as transhumance.

3: Claude T. Barnes (Author of The Natural History of a Mountain Year)

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Natural History Stone Mountain Stone Mountain sits on the western edge of a large belt of Lithonia Gneiss granite although the younger intrusive granite that comprises the mountain is entirely different from Lithonia granite. Rising to a height of 1, feet above sea level roughly feet above the surrounding Georgia Piedmont, depending on where it is measured , it is visible from Kennesaw Mountain to the west, Amicalola Falls State Park to the north and Mount Yonah to the northeast. Technically known as a pluton to geologists, the mountain was formed during the complex folding and faulting that created the Blue Ridge Mountains , although Stone Mountain is not part of that range. Before the molten rock hit the air it stopped, initially forming the west side of the "pluton. Once the pluton was formed it began to cool. This occurred during the Alleghenian Orogeny, a massive collision of tectonic plates perhaps million years ago. Geologists, however, are stumped as to how this enormous rock the largest known granite formation became exposed. Some believe that the entire Georgia Piedmont region was higher than the mountain and over time, erosion simply wore the dirt and metamorphic stone surrounding the mountain away. Others believe that the area was flooded after the formation of the mountain and the water eroded the surrounding material. A third theory includes post-formation geological events primarily earthquakes. Analysis of the rock reveals that the magma that created the pluton was comprised of quartz, feldspar, microcline and muscovite with smaller amounts of biotite and tourmaline. Embedded in the granite are pieces of biotite gneiss and amphibolite. Exfoliation There are many ways that rock changes over time. The two most commonly associated with Stone Mountain are exfoliation and erosion. Granite is normally exfoliated in sheets, along the same natural lines that it is quarried. These lines, known technically as joints, run throughout Stone Mountain. They are expanded the erosive forces of heat, cold, weather mostly wind and rain , gravity and plant life or any combination of these elements. Once a sheet on the surface as been exfoliated and the sheet of rock beneath it is exposed the process begins again. The same erosive elements that open the joints in the rock work on the surface as well, but at a much slower rate. Erosion, for example, creates the vernal pools which form on level surfaces of the mountain. These pools are the indentations up to a few feet wide that fill with water during the spring vernal is another word for spring. Many will remain damp or filled with water well into the summer, especially larger pools. A little shade from a scrub pine helps the pools hold the water long as well. Vernal pools are one type of weathering pits on the mountain. Watch for larger indentations, several feet wide, where trees and schrubs have taken hold and grow, adding their pressure to the eroding mountaintop. Vernal pools play an important role in life at the top of the seemingly barren mountain. Just as in a desert, life at the top of Stone Mountains depends on the water available in the vernal pools. When the summer is wet the pools, ranging in size from several inches to several feet, may hold water most of the year. During drought years the pools can be dry from June until October. While larger mammals like squirrel and fox rely on the water for drinking other flora and fauna depend on the water for life. Two types of shrimp frequently inhabit these pools, fairy shrimp and clam shrimp, as well as a unique variety of red moss. Water that falls on the mountain that is not captured in these pools also plays a role in the evolution of the mountain. On the sides of the mountain lichen and moss come to life after a rain, but create a treacherous environment for hikers, especially on the Stone Mountain Mountaintop Trail. As the water cascades down the sides of Stone Mountain it forms small streams near the base, creating a cooler, more diverse forested environment. One overlooked species is the peregrine falcon, sometimes called a duck hawk, now off the endangered species list and an occasional visitor to the mountain. Mammals that inhabit the mountain include red fox, bobcat, grey squirrel, rabbits and deer. The plant lends its name to the Yellow Daisy Festival , one of the most popular events in the Southeast United States. Flowering yucca is also found on the mountain, as well as other flora including various species of pine tree, especially stunted loblolly, cactus, and a few small hardwoods.

THE NATURAL HISTORY OF A MOUNTAIN YEAR pdf

4: A Year In The Notch: Exploring The Natural History Of The White Mountains by William Sargent

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Starting at the Adirondak Loj , the trail begins with an easy stroll through a beautiful forest of mixed evergreens and hardwoods. Things are pleasant and calm down here, but as the path gains elevation the grade steepens and everything changes. A sure sign of a past disturbance, this species is one of the first to colonize an area after something like a wind storm, fire, or axe has its way with the forest. These evergreens, with their waxy, moisture retaining needles, rule that landscape and are therefore well-suited to thrive in the mountains here. A bedraggled, weather-ripped wooden square warns of year-round winter-like conditions in bright red letters. Welcome to mountain country: This is the gateway to an ecological zone known as "krummholz. The stunted growth affords views of the surrounding mountains and sneak peeks at the summit about to be climbed. Nothing grows tall here because the constant exposure to wind, sun, rain, snow, ice, and sleet prevent that. These are flag trees, so-called because the branches all go in one direction, like a flag caught in the wind. The "pole" side of the tree becomes denuded because the wind hits it relentlessly; drying it, pushing it, punishing it. On some mountains this causes fir waves, a situation where the outer, exposed trees on a slope perish from the elements, thus exposing a new line of trees, which also die. The dead trees eventually lose their foliage and have a silver-gray sheen when seen from afar. The mountains themselves are geologic wonders. Comprised mostly of anorthosite granite, a material formed deep underground by seriously prolonged and intense pressure, these landforms slowly heaved from the earth and reluctantly yielded to the will of passing glaciers. The result is a dramatic landscape of rocky summits railroaded by deep, trench-like water bodies that look as if they were scratched into the earth by a set of enormous, bent fingers. When the last glacier receded, the region was a much different place. Alpine plants do a similar thing. Many of them only grow a few inches tall and have a bunched-up, pincushion-shaped growth pattern. Others simply remain stunted. One low grower, bearberry willow, is a tree that can live hundreds of years with a trunk that gets no bigger than your thumb. A closer inspection reveals that many alpine plants also have waxy leaves, which protects them from the wind, helping them retain moisture. It also helps them survive the winter and make the most of spring. Today, alpine vegetation only grows in 21 places in the Adirondacks, 16 of which are summits in the High Peaks. Take care to stay on the rocks when observing these delicate plants, as a single boot step can kill them.

THE NATURAL HISTORY OF A MOUNTAIN YEAR pdf

5: Lake Tahoe - Wikipedia

Auto Suggestions are available once you type at least 3 letters. Use up arrow (for mozilla firefox browser alt+up arrow) and down arrow (for mozilla firefox browser alt+down arrow) to review and enter to select.

Ironwood Art Gallery Exhibition Dates: September 16th- December 25th Opening Reception: Along with all the lions that have followed in his paw prints over the years, George L. Mountain lions have the widest distribution of any mammal in the western hemisphere, their range extending from southeastern Alaska to southern Argentina and Chile. These American lions are chiefly nocturnal but may be abroad during daylight and are found in a variety of habitats including the desert. Also known by a variety of common names such as cougar, puma, and painter, mountain lions feed on deer and small mammals. The Arizona-Sonora Desert Museum is excited to showcase the many creative talents of our membership through this exciting component of our upcoming exhibition. Chosen artists in all categories will be displayed along with selected master works from around the globe. Open days a year, the gallery annually enjoys over 51 thousand guests who visit from 56 different countries and represent every state in the U. A panel of judges will select art work for this exhibition from the full body of eligible, competitive entriesâ€" judges will be announced this summer. Awards, such as, a purchase award and student cash award, among other honors will also be announced later this summer. Winners will be selected from the final exhibited works, and announced during the opening reception. Eligibility All artists must have a current standing membership at The Arizona-Sonora Desert Museum at the time of submission. If you are unsure of your membership status you may call to receive an update. All submitted entries must be 2-D works. Essentially, if we can hang it on a wall, we will consider your art for acceptance. All works must be submitted digitally, see Entry Procedure section below. This is an all ages exhibition. All art works must be original. Artists may submit works in one of three categories: Artist must fall in the age range of Artworks will be judged in the following age range categories: The age of the Youth artists at the time of entry must be provided. Artist is at the early stage of their career. They have training in the arts and may have created a modest body of work. These artists are still developing their artistic voice; they are not recognized as established artists by other artists, curators, critics, or art administrators. Artist who has reached a mature stage in their career and has created an extensive body of independent work. These artists have reached a level of achievement and may be recognized nationally or internationally. These individuals may promote or market their work or be represented by a dealer, publisher, or agent. Professional artists receive or have received compensation from their artistic activities; this income may be reasonably included as income of a self-employed person or business. Date of completion must be listed on the submission form. Artworks must be created within the last two years: September - September All accepted works will remain on display for the duration of the exhibit. No artwork is to be removed before the closing of the exhibition, December 25th, The Art Institute reserves the right not to display any work that does not meet all Eligibility and Identification requirements. Artworks will be judged on one or more of the following themes:

THE NATURAL HISTORY OF A MOUNTAIN YEAR pdf

6: Art Institute - A Natural History of the American Mountain Lion

Great Basin Naturalist Volume 57|Number 1 Article 15 The natural history of a mountain year: four seasons in the Wasatch Rangeby Claude T. Barnes Herbert H. Frost.

Natural History of the Rocky Mountains The Rocky Mountains The natural history of the Rocky Mountains began over million years ago and has followed a repeating cycle of land upheaval followed by thousands of years of erosion. The western United States and the Rocky Mountains took shape during three major mountain building episodes between million years ago MYA. The Rockies also pass through the states of Idaho, Montana, Wyoming, Utah and Colorado and comprise over 40 distinct mountain ranges. More information on individual ranges. The mountains pushed upwards for 70 million years and then began eroding until the landscape was relatively flat again. Around 85 MYA, seas spread across most of Colorado, forming white sandbars and beaches known today as the Dakota Sandstone layer. As the land rose, so did molten magma which formed theColorado Mineral Belt that runs from the Front Range down through the San Juan Mountains and contains almost allthe gold, silver, lead and zinc deposits that fed the voracious Colorado mining industry. This period, knownas the Laramide Orogeny, lasted until about 40 MYA and was followed by another period of erosion which lowered the mountains to hills once again. Between 35 and 26 MYA, volcanoes erupted in the San Juans throwing hundreds of cubic miles of volcanic ash into the air. When it settled, the hot ash hardened to form a light colored glassy layer known as the San Juan Tuff. The hills were thrust upwards over six thousand feet. Wind and water continued shaping the landscape, eroding away less resistant rock to form valleys and gorges. The final major mountain-shaping forces occurred during glacial episodes around , and 14, years ago. The glaciers scoured mountain valleys, carved out new ones, and left behind lakes and glacial formations like moraines and hanging valleys. Today, Colorado is topographically divided into three major geological zones: The eastern plains and western plateau are primarily made up of sedimentary rock, while the rocky mountains are comprised of igneous, metamorphic, and sedimentary rock. The Eastern Plains rise from 3, feet above sea level at the eastern border to 6, feet at the eastern foothills of the Rockies. The plains are distinguished by two shallow river valleys, the Arkansas and the South Platte, and by the rolling grasslands in between. The Rocky Mountain zone lies in the center of the state and consists of six distinct mountain ranges the Front Range, Wet Mountains, Sangre de Cristo, Park Range, Sawatch, San Juan that vary from 6, to over 14, feet above sea level. Mount Elbert in the Sawatch Range is the highest mountain in the state at 14, feet. The RockyMountains are also distinguished by the Continental Divide, which winds its way through the mountains and separates rivers that flow down to the Pacific and Atlantic Oceans. The Colorado Plateau marks the final major zone in the state and is located west of the Rocky Mountains. These plateaus and mesas decline away from the mountains with elevation variations between 11, feet down to 5, feet above sea level. Map of the major geologic regions of Colorado: But if you stare up at those mountains long enough, you might begin to ask some different questions about them thar hills. You may wonder, for instance, why are the peaks so jagged and why do they shoot up 4, feet from the valley floor like that? The Telluride region, located in the San Juan Mountain range, has been shaped over millions of years by both changes in the climate and the formation of various rock layers. Originally this region was flooded by a vast inland sea until a mountain building episode called the Laramide Orogeny began pushing up the land 70 million years ago. A period of volcanic activity followed about 5 million years later, which substantially added to the mass of these mountains. The resulting deposit is identified by the colorful purple and green fragments cemented together. The range went through another climactic change around 1. Ryan has documented evidence of at least 5 episodes of glaciation, while Rob Blair in The Western San Juan Mountains estimates that there could have been as many as 15 glacial advances in the last 2 million years. The Telluride valley shows distinct evidence of the effects of glaciation. The valley itself is a classic U-shape, indicating a glacier carved out its walls. Other visible clues to glaciation are called "moraines. After the glacierstarted melting, the valley filled up with water. The valley floor is filled with feet of lake sediment. On highway between Placerville and Telluride, several layers of rock are visible on the hillside above. According to a chart provided by Ryan, there are 19

distinct rock layers or formations around Telluride, varying in thickness from 80 to 2, feet. Between mile markers 77 and 75, excellent examples of this stratification can be seen. The most visible layer in the lower canyon is the 1,foot thick Cutler formation, which was formed around million years ago. Consisting of sandstone and shale deposited by streams, its rust-red color comes from the iron-oxide rich cement that binds the grains of sand together. Above this layer is a very distinctive and unusual black layer made of petroliferous limestone called "Pony Express. Additional rock formations are visible around Telluride. By Society Turn, people oftenpractice climbing on an outcropping of rock that is part of the Dakota formation. Formed around million years ago from sands deposited by streams, this foot thick hard and tan-looking sandstone layer is the top rock surface holding up the nearby mesas. From the top of Lawson Hill, another outcropping is visible on the opposite side of the valley. Mancos Shale, a 2,foot layer of mudstone, was formed 90 million years ago of black and gray clays. This layer generally weathers easily, forms rounded slopes and, as its contents suggest, can shrink, expand, and shift horizontally or vertically depending on its exposure to moisture. The result is an unstable surface prone to movement and mudslides like the one that occurred in near the Telluride airport. The aftermath of this mudslide still is visible from the entrance to Mountain Village. Much higher up and more difficult to see is the foot thick prominent cliff layer known asthe Telluride Conglomerate. It crops out just below the volcanic layer, and it is exposed well because the glacier eroded it. They also used geometry. If they saw a vein on one side, they would ask where it would come through on the other side. The richest mineral concentrations were where two veins intersected. A lot of times, of course, it was pure luck. Ryan suggests that not only is there still plenty of gold in the San Miguel River, but that more gold still remains in the mountains thanwas ever taken out. Nowadays, however, it is either too dangerous or too costly to get to. George Cappis, a miner in the Telluride region for over 50 years, agrees with Ryan, recounting an intriguing example of how miners left gold behind. We never went back. There was still plenty of gold down there though. Ryan lists the other major economic mineral deposits as copper, silver, lead, and zinc. And what about Telluridium, the ore that supposedly gave the town its name? Tellurium combines with other metals to form Telluride ore Telluridium ," Ryan explains. Maybe they just liked the name. For information on geology or mineral collecting trips, call Ryan at

7: Stone Mountain Natural History

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