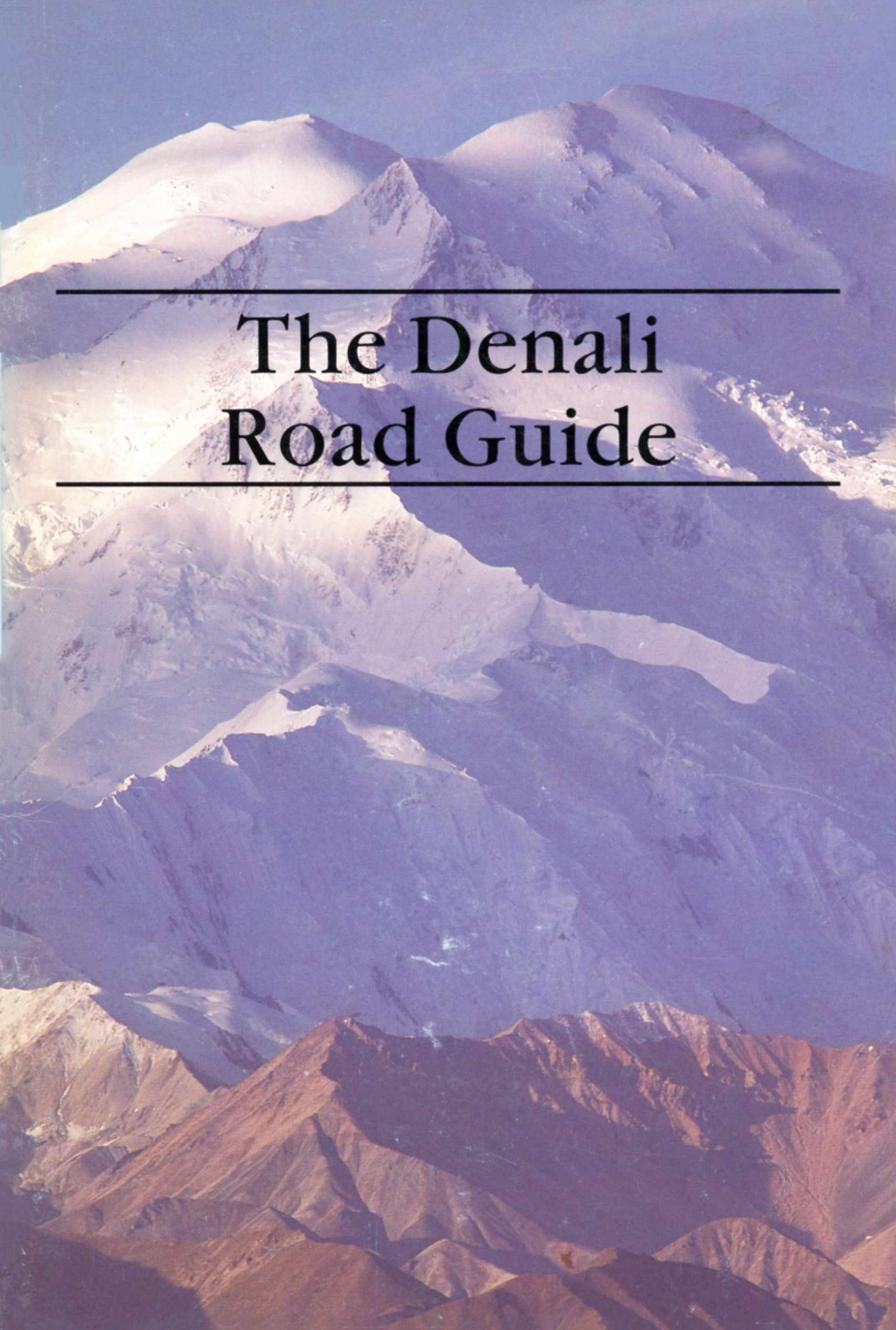




The Denali Road Guide

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A Roadside Natural History of
Denali National Park

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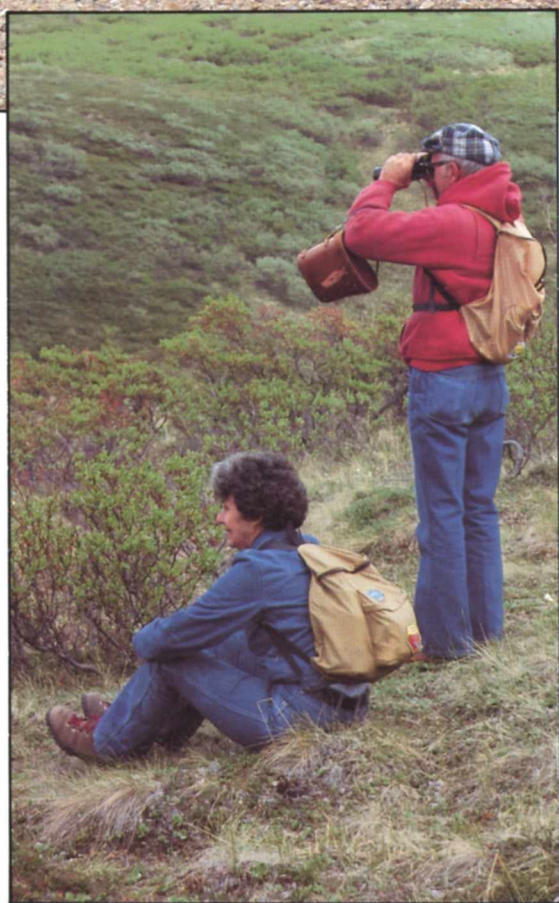
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This publication is dedicated to George C. Fleharty, who encouraged the establishment of Denali's public transportation system, and to the first shuttle bus drivers who ensured its success. Their actions helped preserve one of the best wildlife viewing opportunities in the world.

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Introduction

Denali National Park and Preserve is one of the world's most celebrated subarctic sanctuaries — a place people do not just happen to pass through, but arrive at by choice. They come to see the vast expanse of the land, the taiga and the tundra, the mountains and “the mountain,” the miniature plants and the magnificent animals. All who come bring great expectations into a great land.

This is not a zoo, nor a garden, but a complex place where tenacious beings live among cold air, frozen ground, and hard rock. Most visitors see Denali during warm, long summer days, when the landscape breathes again after months of continuous cold. Winter sits down like iron here, cold enough to make teeth ache, and every organism's summer strategy is a response to winter's cold.

We can sense the struggles of earlier people in this place where the first North Americans traversed mountains, valleys, and rivers. They came and they went, owning little, sharing everything. Behind them remains a landscape of hope. Wilderness is the purest index by which mankind can measure where we have come from and where we are going. As the nation's finest subarctic wilderness, Denali National Park is not merely desirable, but necessary.

Visits to the park are but brief passages, and as memories fade and les-

sons grow faint, we are left with bare impressions. This book aims to keep those memories and lessons clear. It is not meant to be a field guide and mentions only a small fraction of the 155 species of birds, 37 species of mammals, and approximately 450 species of plants found in Denali National Park. The book presents ideas more than facts. Although natural and human history are discussed, each specific site only suggests these topics. For example: The Igloo Mountain section discusses Dall sheep, but this doesn't mean Igloo Mountain is the only site in the park, nor the best, where you might find Dall sheep. There are many other such places. The park is an integrated whole. No single element stands alone. Also, because the book discusses grizzly bears and surfbirds, and fails to mention chestnut-cheeked voles and ruby-crowned kinglets does not mean one is any more important than the other. Indeed, they all play vital roles in the Denali ecosystem.

Most importantly, enjoy the park. Learn the look, feel, and scent of the land. Absorb its unique qualities. And remember, the journey isn't over when the bus or car turns around. The land has a new look on the way back. Eyes are now educated, and there is more to see. Keep looking. Keep listening. Discover Denali with open senses.

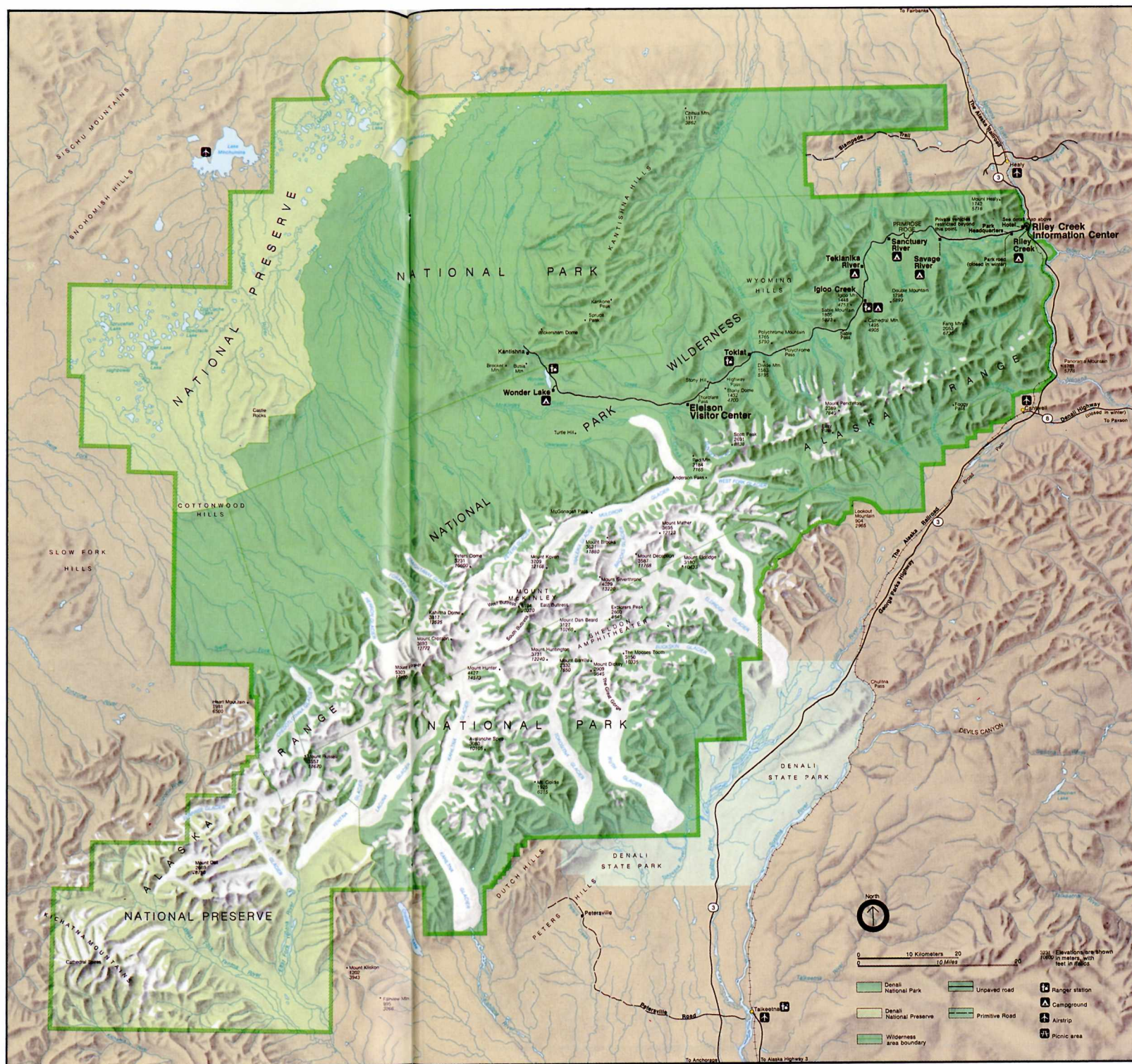
HOW TO USE THIS BOOK

As you journey, look for milepost markers. They are not placed every mile, but are keyed only to the points in this book. Most journeys into the Denali Wilderness begin and end with a ride on a park shuttle bus. Buses provide the advantages of more eyes to spot wildlife and the added height for a better field of view.

The park road lies nearly due east and west. Directions for points of interest will be given north or south of the park road rather than right or left. For example, for visitors traveling into the park toward Wonder Lake, north will always be on the right hand, south on the left. The reverse will be true on the return trip. Mileposts will always be on the north side of the park road. Watch for them, or ask a driver if you think you've missed one along the way.

Few park points of interest coincide exactly with even mileages. This book uses tenths of a mile to further pinpoint sites, thus giving you a general feeling of the location before or after a specific milepost.

Careful observation and sharing discoveries with neighbors are the ingredients of a memorable journey into the heart of Denali. Let the book be a guide, not a distraction. There is always time to read on the way back.



Travel into the park

The park road is 89 miles long, mostly gravel, and buses move at a leisurely pace. It is your choice to decide how far into the park you want to travel. Eielson Visitor Center, an eight-hour round trip, is the most common turnaround point. At Eielson, on clear days, views of Mt. McKinley are breathtaking. Here, restrooms, drinking water, film and book sales, and interpretive programs are available; however, there are no food services. Wonder Lake campground is one hour further beyond Eielson.

The delight of the shuttle bus system is that you can get off and on when you wish, and you are encouraged to do so. Changing buses is subject to available seating, but just ask the driver to help you arrange transfer. If time is limited, plan shorter excursions. Within three hours you can see the sweeping view from Polychrome Pass; in two hours, watch cavorting Dall sheep in Igloo Canyon. Take advantage of the bus system. One of the greatest wildlife and scenic displays in the world is but a short ride away.

What To Bring

A few items will make your shuttle bus excursion into the park more pleasurable:

Binoculars

Food

Cameras

Warm Clothing

Raingear

Warm Beverage



0.0 mi./1590 ft.

Junction of the park road
with Alaska Highway #3.



0.2 mi.

Entrance to Riley Creek Information Center, Campground and Trailer Dump Station. All visitors must check in at the Center for all campgrounds, backcountry camping per-



mits, and access to the park interior. Information on camping in the entire park, tours, shuttle buses, and interpretive programs is available, and books and maps about the park are for sale from the Alaska Natural History Association. The road is a one-way loop.

0.4 mi.



Riley Creek Campground Exit.

1.2 mi.



Mainline of the Alaska Railroad. On the north side of the tracks is the head of the Horseshoe Lake Nature Trail, which leads one-half mile downhill to an old oxbow of the Nenana River. Trail guides are available at the trailhead. Moose, migrating waterfowl, beaver, and muskrats are highlights of this popular area.

1.4 mi.



McKinley Mercantile. This is the last chance for gas, groceries, and propane. There is a pay phone outside and coin-operated showers in back of the building. There are no laundry services in the park.

1.5 mi./1730 ft.



A four-way junction. Turn south for the Denali Park rail-

road station and post office. The Park Hotel is located to the north.

The train stops daily during the summer at the old railroad station, built in 1921, the year the Alaska Railroad was completed from Seward to Fairbanks. The office of Denali Wilderness Air, a park concession offering flightseeing tours, is located inside. Pay phones are available. South of the train station is the Youth Hostel, in two Alaska Railroad cars. Trails from the depot lead to Riley Creek Campground, Morino Campground, and Triple Lakes trail.

Across the road is the Denali Park Hotel. The original building burned in the fall of 1972, and the current modular structure was built during the following severe winter. The newest addition is a 300-seat auditorium where naturalist and other programs are held. Inside the hotel are a snack bar, restaurant, gift shop, and ticket sales for concession-operated bus tours. A trail behind the hotel leads to Horseshoe Lake, Rock Creek, or Mt. Healy Overlook trails.



Denali Park Train Depot 1920 and today



1.7 mi.

Entrance to Morino Backpackers Campground. This small, walk-in campground is only for visitors on foot.



Glacial Erratics

2.0 mi.



As you climb this steep hill, notice that many of the aspen trees bend haphazardly. This was caused by a heavy summer snow storm on June 18, 1980. Snow can fall at any time in the subarctic. Across the valley to the south there are several immense boulders on the ridge top. These are "erratics" left by a glacier thousands of years ago.

3.0 mi.



C-Camp Entrance. The park hires more than 100 temporary employees during the summer months, and many of them live here. The "C" stands for the Civilian Conservation Corps, a federal youth program which built several park structures during the Great Depression of the 1930's.

3.3 mi.



Rock Creek Bridge. The Rock Creek hiking trail exits just east of the bridge. Follow it for two miles back to the park hotel.

3.4 mi./2055 ft.



Park Headquarters and Employee Residential Area. The first road leads to park permanent employee housing. About 15 families make this their year-round home, others live outside the park.

Park Headquarters is next. About 30 permanent rangers, maintenance workers, and administrative staff run the park. Most of the buildings were built by rangers in the 1930's and this area will soon become a National Historic District. The sled-dog kennel is located behind the Park Headquarters, down the trail that leads from the parking lot.

The developed portion, from the Hotel to Park Headquarters is less than .00001 of the total area of Denali National Park and Preserve. With just over six million acres, the park is larger than Massachusetts. From a different perspective, if you explored 1,000 acres a day of Denali it would take more than 16 years to finish.

During the winter months, from late September to mid-May, the park road may be closed at this point. Only dog mushers and skiers venture beyond into a world of ice, snow, and solitude.



5.0 mi.

Two Russian words describe Denali vegetation — taiga and tundra. You are traveling through the taiga forest.



6.2 mi.

Just south of the road are several light-colored glacial erratics deposited many miles from their origins.



Cow Moose in the Taiga Forest

THE TAIGA

Across Alaska, Canada, Scandinavia, and Siberia grows the spruce forest that people of these northlands call "taiga," a Russian word meaning "land of little sticks." The Denali Park taiga consists primarily of two species of trees. White spruce is the most common and prefers dry soils. Black spruce, on the other hand, favors moist sites and has a thinner, almost sickly-looking profile. In protected valley bottoms the spruce can grow to 80 feet high. On exposed ridges, however, a decades-old tree may be no higher than a small child.

Aspen, paper birch, balsam poplar, and tamarack sometimes grow interspersed with the spruce, especially where the soil has been disturbed by fire or erosion.

Great horned owls live in the taiga, nesting in the tall spruce, and incubating their eggs in the sub-zero temperatures of March and April.

Hawk owls are here, too, their numbers rising and falling in response to the supply of forest-dwelling mice, shrews, and voles. They may be common one year, rare the next.

The most renowned wildlife relationship in the taiga is between the snowshoe hare and its chief predator, the lynx. In prosperous times the hares may number 2,500 per square mile. Within a few years, however, after exhausting the food resources, the hare population can crash to less than 50 per square mile, making hard years for the lynx.

Red squirrels fatten on spruce cone seeds and build middens, refuse heaps of cones, sometimes over a foot high at the bases of the trees. In summer the songs of thrushes, sparrows, and chickadees, and even raucous ravens, gray jays, and black-billed magpies add charm to the taiga. When sunlight spills through the rain soaked branches of the spruce, each water droplet shines, and the taiga glows.

7.0 mi.



The Taiga/Tundra Ecotone. At higher altitude, the taiga forest gives way to a transition zone of treeless tundra, called an "ecotone," which is home for much of the park's wildlife.

THE TAIGA/TUNDRA ECOTONE

Timberline — the elevation above which trees cease to grow — ranges from 2,000 feet on wind-scoured slopes to 3,800 feet in protected areas in Denali Park. This sometimes abrupt but often slow gradation between the taiga and the tundra is not

so much a boundary, as a transition area. Biologists call it an "ecotone."

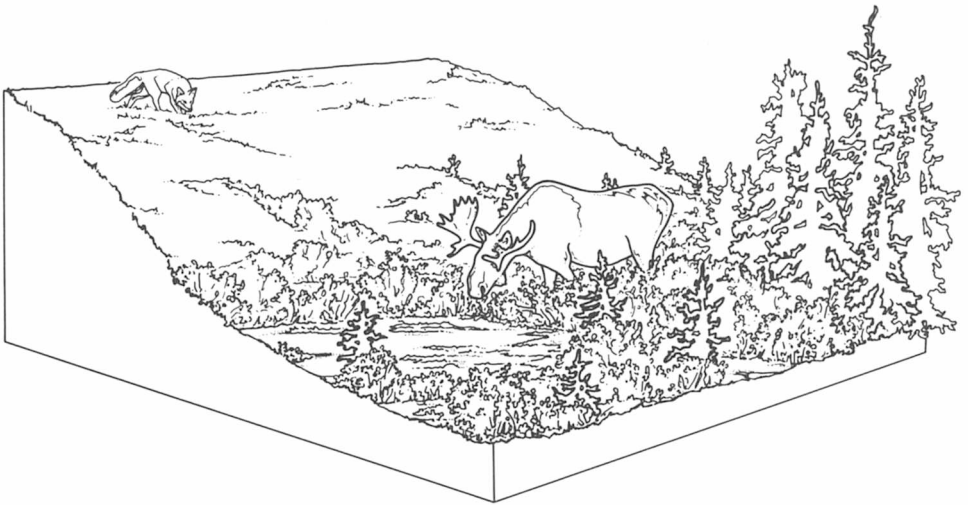
Many variables contribute to the change: soil development, temperature, nutrients, and acidity. With increasing elevation come changes in precipitation, wind, air temperature, and slope conditions, too. Because of their size, shape, and metabolic demands, spruce cannot survive the physical conditions tolerated by tundra vegetation. However, due to a phenomenon called the edge effect, some plants fare best in an ecotone. Here they have an optimum chance to compete in a habitat which is marginal for those species that specialize in either the taiga or the tundra. In some areas, the edge effect can produce a surprisingly rich array of plant and animal life.

As one might expect, the transition from taiga to tundra dictates changes in the species of wildlife. For instance the ratchety calls of red squirrels, harvesting spruce cones for the winter, give way to the yelps of arctic ground squirrels, standing

at attention on their hind legs above tundra heaths. The hoots of great-horned owls end where those of short-eared owls begin. And the melodies of thrushes surrender to the cackles of ptarmigan.

Many animals migrate between the taiga and the tundra. Moose, for example, seek the protection of the spruce forest in spring when giving birth and raising their young. Grizzly bears, looking for easy prey, follow them. And the omnivorous red fox, its ears and nose reading the air, is equally at home in forested and open country.

For humans too, the timberline has significance. Summer visitors break out of the forest and see the tundra before them, enticing and inviting. On the other hand, winter dog mushers, cold, tired, and wind-beaten from the tundra, see the taiga ahead and are gladdened. The forest offers them protection from the wind and, most important, it means they are almost home.



Taiga and Tundra transition zone

8.4 mi.



Permafrost. To the south, on the ridge, are circular patterns of low vegetation surrounded by spruce trees. One theory suggests that these are "ice lenses" or circular areas of permafrost.

9.4 mi.



On a clear day, this is the first point on the park road you can see the north peak of Mt. McKinley, to the right of Double Mountain.

9.6 mi.



The south peak of Mt. McKinley comes into view.

10.6 mi.



At this point, both peaks of Mt. McKinley are flanked by Double Mountain and Sable Mountain.

THE TUNDRA

From afar it looks invariable, like a uniform expanse of shrubs and small plants hugging the cold earth. But up close the tundra is rich, changing appearance and composition with each nuance in the land.

There are two main types of tundra: moist and dry. Within and between these exist many fine variations. Like the taiga and especially the ecotones, the tundra is a continuum of plant communities, responding subtly to their environment. Indeed, change is the only constant.

Moist tundra is characterized by several plant communities. Waist-high thickets of willow and birch



often thrive in wet soil near patches of spruce. Blueberries grow here, too. Associated with ponds and standing water, where foot travel becomes a mucky enterprise, are hummocks of grasses and sedges mixed with lichens, mosses, and horsetails.

The moist tundra grades into dry or alpine tundra, upslope, where winds increase, temperatures drop, soils become thin. Plants here seldom grow above ankle height. While still beneath a mantle of late spring snow, they awaken from dormancy and begin to process sunlight. Colorful blossoms explode in June and July when day's length peaks at 19 hours. Berries sweeten in August. Even the rockiest slopes support scattered wildflowers with some species, such as the purple mountain saxifrage, ranging up to 7,500 feet. Only sparingly, amid boulders and

hillside rubble, do even hardy and tough plants find success here.

As abruptly as it begins, summer ends. The green tundra turns yellow, orange, red, and finally brown. Leafy branches become gray twigs. After having opened their metabolisms full throttle, the tundra plants shut down completely. Pollination is over, but the ceaseless winds have dispersed seeds near and far.

Denali's austere physical elements limit plant success much more than competition between or among species, which is minimal. The individual plants that compose the wet and dry tundra are success stories. By genetic strength or by mere chance they have beat the odds against wind, water, cold, heat, rock, rain, snow, and ice.

However, for each species that made it, many did not.

12.8 mi./2780 ft.



Savage River Check Station and Campground. All private vehicles are restricted beyond this point. Because human impact is kept to a minimum, Denali National Park is one of the world's best wildlife viewing areas. Buses reduce traffic and give the advantage of height for improved viewing. The earliest park tourist facilities were located near here.

THE SAVAGE ROAD CAMP

In 1922, five years after the establishment of Mt. McKinley National Park, a horse trail was pioneered from the McKinley railroad station west to the Muldrow Glacier terminus. Makeshift shelters and stoves were constructed at 10-mile intervals, and commercial visitation in the park began.

A year later Congress appropriated \$5,000 for construction of a road, but not until 1938 was it completed to Wonder Lake, a distance of 85 miles. In the meantime, horse-drawn stage coaches carried visitors 12 miles out to the Savage Road Camp where they could stay overnight on wooden cots beneath canvas tents. The Road Camp was located just south of the present campground. Horse trails had also been established north through the Savage River canyon to the park boundary and beyond and south to the headwaters. The Road Camp remained active from 1927 until shortly before World War II, and the stage route was last used in 1941.

A sharp eye can scan the tundra today and find the faded evidence of these bygone times.



Savage River Tourist Camp early 1930's

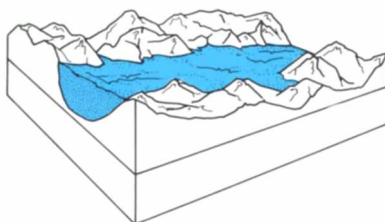


14.8 mi.

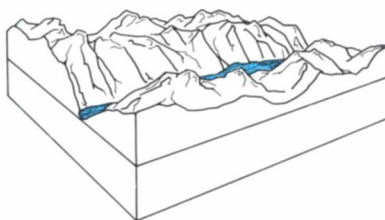
Savage Bridge. This is the last of the paved road. Up river, to the south, in the distance, is Fang Mtn. 6,740 ft.

SAVAGE RIVER

North of the bridge the Savage River canyon has a classic water-cut V-shape. Although glacial meltwater once filled the canyon, glaciers themselves never did. However, the topography is much different south of the road. The land is smoother, having been scoured by glaciers. In fact, about 10,000 years ago the terminus of a massive glacier rested very near where the road now crosses the river. It was the most recent of at least four separate glacial ebbs and flows that reached from the heart of the Alaska Range to the edge of the Outer Range. As a result, here at the Savage Bridge a glacier-carved U-shaped valley meets a water-cut V-shaped valley — two erosion patterns formed by the same molecule, but ice the solid and water the liquid are different architects.



Glacier formed U-shaped canyon



River formed V-shaped canyon



16.0 mi.

The ridge to the north is Primrose Ridge. It is a popular area for day hiking, photographing wildflowers, and viewing the Alaska Range.

PRIMROSE RIDGE

Primrose Ridge rises north of the road between the Savage and Sanctuary Rivers. Walking is easy on most ridges in the Outer Range, especially upslope where woody plants give way to wildflowers. The constella-

tions of floral colors and designs are rich and bright.

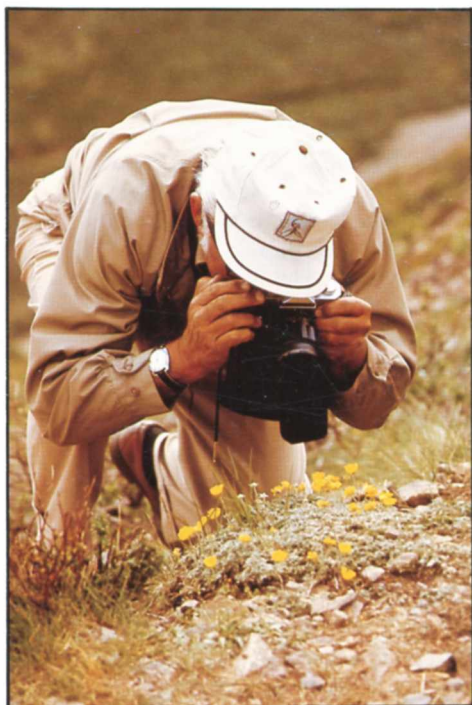
What grows on the ridge? Alpine azalea, arctic bell heather, monkshood, red rosebay, yellow cinquefoil, blue forget-me-not (the Alaska State Flower), pink moss campion, purple mountain saxifrage, Labrador tea, bearberry, crowberry, cranberry, lupines, louseworts, wild geraniums, and harebells. Most of them hug the ground, and each other, because of the harsh growing conditions. Such poetic names are as pleasant to pronounce as the plants are to discover.

Close to the earth and to one another these plants create a separate microclimate far more livable than that of the cold dry air just inches above. They grow in button and rosette shapes, minimizing surface areas without greatly compromising their abilities to gather light and

manufacture energy. An unforgiving wind may kill the exposed side of a prostrate heath but the leeward side survives, sending out new shoots in a more hospitable direction. The tundra community thus shifts and adapts like one huge organism, a living skin on the hard rock of the subarctic.

The plant life in the subarctic at 3,500 to 4,500 feet above sea level, atop Primrose Ridge for example, is comparable to communities at about 10,000 feet in the temperate-zone Colorado Rockies. High elevation and high latitude apply similar pressures: a short growing season, reduced winter light, intense cold, thin air and thinner soil. For all its resilience and tenacity, the tundra is a fragile environment, and every human step is a heavy tread on the land.

Arctic Poppy





17.3 mi./3125 ft.

Crest of Pass. This is the last view of Mt. McKinley for the next 20 miles.

THE ALASKA RANGE

The Alaska Range was formed through incomprehensibly huge shifts in the earth and over vast periods of time. A half billion years ago, Alaska was covered by water stretching as a shelf beneath the sea and probably attached to a single large land mass. Over the millennia, large accumulations of sediments settled and cemented into sandstone, limestone, and shale. The land was eventually exposed above the water and slowly heat and pressure changed the rocks into quartzite, marble, and schist.

Later, the land mass split into smaller separate continents, and North America began to drift northwestward. At the leading edge of the young continent was Alaska. The tremendous stress of the continental plate moving over the heavier ocean floor caused the land to fracture along what is today the largest crustal break on North America: the 600 mile-long Denali Fault.

The immense pressures along this fault caused the land to buckle and rise about 60 million years ago. Earthquakes opened fissures into the flanks of the growing mountains and the nearby plains. Volcanic lava poured forth and covered low-land sediments. The underlying gravel, sand, silt, and clay hardened into conglomerate, and the lava into rhyolite and basalt. All this young rock slowly lifted as part of the Alaska Range, fracturing and folding.

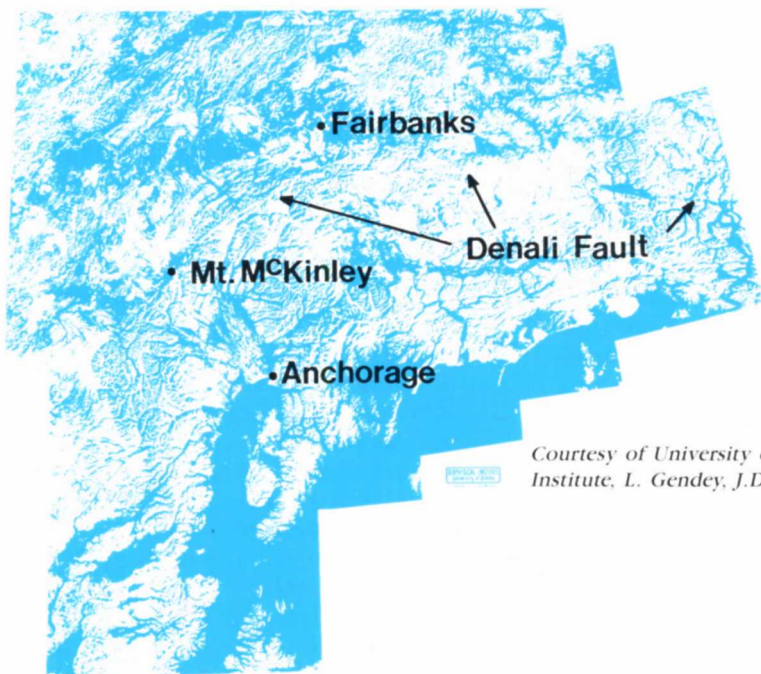
However, a large body of magma remained deep below the surface



where it slowly cooled into hard crystalline granite, its hardness thwarting erosion. The granite was pushed upward, higher and higher, until Mt. McKinley crowned North America.

Much later, after the Alaska Range had lost its youth and the rivers flowed strongly to the north, a second backbone of mountains climbed upward and crosscut the rivers' paths. This is the Outer Range, the mountains along which the road winds through Denali National Park.

Heavy with sediment and flowing hard, the rivers cut at rates faster than the mountains lifted. From the Nenana to the Toklat, the rivers thus maintained their channels, slicing through the ancient metamorphic rocks of the Outer Range. All these processes continue. North America drifts, the Denali Fault rumbles and the mountains rise. And the faster they rise, the faster ice and water cut



Courtesy of University of Alaska Geophysical Institute, L. Gendey, J.D. Van Wormer.

them down.

The distinction between the age of a landform and the age of its rocks is a valuable lesson in geology. The Alaska and Outer Ranges provide good examples. The Outer Range is much younger than the Alaska Range, yet it contains metamorphic rocks over eight times older than the neighboring rhyolite and basalt. The younger mountains have older rocks.

The rivers off the Alaska Range chew away at the Outer Range's resistant metamorphic rocks. The sediments flush to the Yukon River and eventually to the Bering Sea where, in more quiet waters, the silts and clays settle into fine layers and begin to cement. Thus, one of nature's slowest but most enduring cycles comes full circle. It's a long, long process from sediment to metamorphic rock and back, but one which has occurred countless times in the

course of the earth's history and will continue as long as water and rock come into contact.

21.2 mi.



Hogan Creek Bridge. The north side of this clearwater stream is an excellent area for viewing moose. Mt. Wright is straight ahead, elev. 4275 ft.

22.7 mi.



Sanctuary Campground. This small campground has seven sites. The ranger cabin on the south just before the bridge is typical of the many ranger patrol cabins built in the 1920's and 30's. They were spaced a good day's dog sled patrol apart.

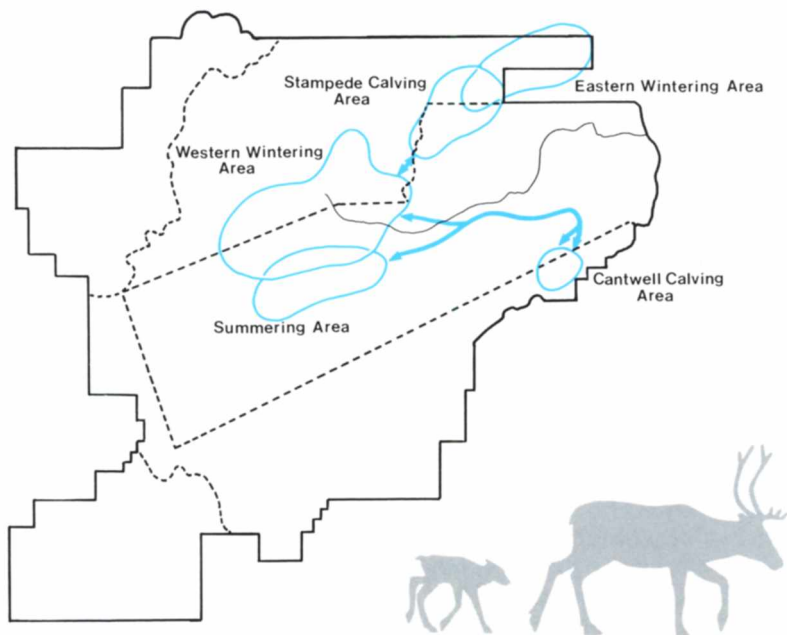
SANCTUARY RIVER

High up past the headwaters of the Sanctuary River and beyond Foggy Pass in the Alaska Range, the Denali Park caribou bear their young. Within an hour after birth the calves can walk, and two days later they can run and swim. Their weight doubles in two weeks. After about a month in the high country, the calves and cows begin their migration to summer and fall grounds in the far west and northwest additions of the park, and by late October to wintering grounds.

It is a long hard walk. Packs of wolves single out the young, sick, injured and, at times, even healthy bulls and cows. Grizzly bears — master opportunists — will attack a solitary caribou strayed from the herd. Warble flies and nose flies infest the caribou, often stampeding

them to cool, insect-free winds on snowfields or ridgetops. Mosquitoes, it has been estimated, may take up to a quart of blood per week from an injured or dying caribou.

Throughout the summer the caribou tread westward, paralleling the road between the Sanctuary River and Wonder Lake. They graze on the move, preferring sedges, forbs, and grasses. Lichens of the genus *Cladonia* are primarily winter fare. It is imperative that caribou move, lest they overgraze and denude the tundra necessary to support them on a return trek next year. As the autumn rut or breeding season approaches, the bulls develop handsome antlers and a striking brown and white hair. The cows and calves grow antlers too, although small, a trait found in no other species in the deer family.



The populations of caribou have fluctuated drastically over the years. The herd that numbered close to 30,000 several decades ago now teeters around 2,000. Why? This is a baffling question to park biologists and managers. For reasons unknown, the Denali caribou herd has collapsed.

Nature tends to cycle, and the caribou populations have no doubt ebbed and flowed before. Perhaps the Denali Park herd will increase according to laws not yet fathomed by us. Perhaps not. The 1980 Alaska National Interest Lands Conservation Act transformed the 1.9 million acre

Mt. McKinley National Park into the 6 million acre Denali National Park and Preserve. This enlargement now affords the Denali caribou herd protection in most of their wintering and calving grounds.

Alaska supports close to 400,000 caribou, roughly distributed into 13 herds. Human encroachment, however, steals more of their critical habitat each year. The prognosis is not certain, and the caribou could go the way of the American bison. If so, a careful balance will be irreversibly upset and a grand element of the north forever lost.

23.7 mi.

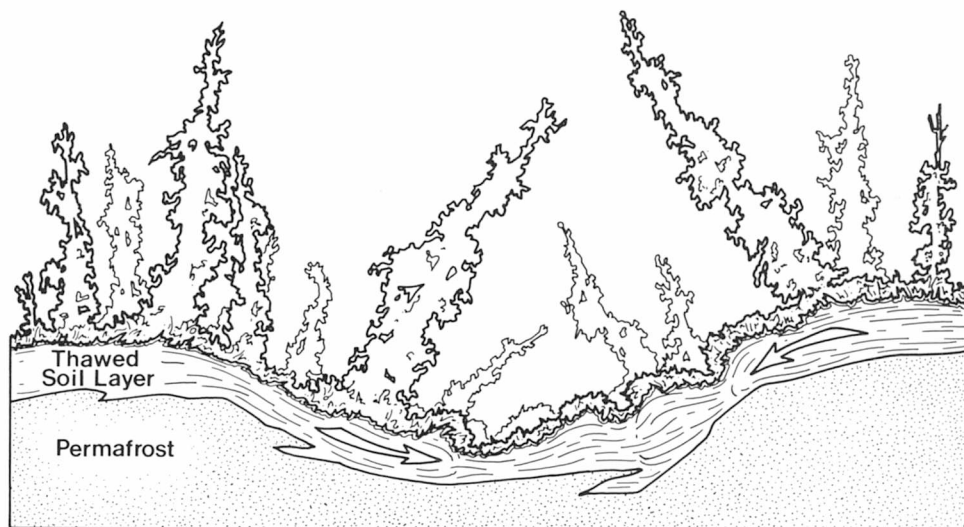


Down in the marshy flats to the south, spruce trees lean in all directions. This is known as a drunken forest.

THE DRUNKEN FOREST

Permafrost lies like a cold secret below this land — a solid matrix of ice and rock, often mentioned but seldom seen. It can begin only inches below the surface and meas-

A cross sectional view showing how solifluction creates a drunken forest.



ure thousands of feet deep. Or it might begin much deeper and form a narrower band.

In other parts of Alaska where permafrost is found, scientists have discovered the preserved remains of mastodons, woolly mammoths, saber-toothed tigers, giant ground sloths, and other large mammals that became extinct during the Ice Age. Between the ribs of some of the skeletons are spear points.

Permafrost is continuous in the arctic. In the subarctic of Denali National Park, however, it exists only in

certain areas. Forested, north-facing slopes almost always contain permafrost. In summer, the upper layer thaws, saturating the soil. The land responds by sliding suddenly or, more often, slipping gradually downslope. This slippage can involve great lobes of land, a phenomenon called "solifluction." The slow-growing spruce are unable to straighten themselves as they are carried along. They lean haphazardly in every direction, thus creating a "drunken" forest.



24.4 mi./2640 ft.

Crest of Pass.



29.1 mi./2580 ft.

Teklanika Campground. This is the second largest campground in the park with 50 sites plus a group area. Large motor homes, pickup campers over a certain size, and vehicles with trailers cannot travel beyond this point.

Smaller vehicles with valid camping permits for campgrounds deeper into the park must use their headlights and must pull over for all oncoming buses or trucks.



30.3 mi.

Teklanika Rest Stop. This is the last rest stop and restroom facility for the next 15 miles or about one hour driving time.

31.3 mi.



Teklanika Bridge. The Teklanika River is a classic example of a braided river.

TEKLANIKA RIVER

The Athabascan name Teklanika means, appropriately, “much gravel, little water.”

Braided rivers are surprising and baffling. Their story began 10,000 years ago when ice retreated from the valleys and into the mountains. During a great melting, water shaped the land with an almost incomprehensible speed and volume. Maybe 30, 50 or 100 times more water than flows today surged out of the mountains then, carving and filling the massive channels that dwarf the modern braided rivers. The retreat of the ice has long since subsided, and so too has the meltwater.

The rivers braid for several reasons, most of them acting in concert. Ice jams in the spring and autumn often block the channels and detour water into new braids. Where permafrost is continuous and near the surface it can encourage the rivers to braid since the underlying mixture of solid ice and rock inhibits channel deepening. Also, the volume of water in the rivers fluctuates dramatically with the erratic weather. An ankle-deep channel in the morning can swell thigh-high by evening after a prolonged rainfall or a sunny day. When a trickle becomes a torrent and new braids run seemingly everywhere, the strongest animals and the wisest hikers elect not to cross. A wrong choice could be fatal.



A close-up of a braided river



32.0 mi.

This spruce forest is another prime viewing area for moose.



33.0 mi.

Igloo Mountain on the north, elev. 4751 ft. Cathedral Mountain on the south, elev. 4800 ft. Both mountains are excellent habitat for Dall sheep, seen as white dots high on the slopes.

IGLOO MOUNTAIN

Patches of late summer snow seem to dot the upper rocky slopes of Igloo and Cathedral Mountains. But, on second look, they move. The white dots may be Dall sheep, dwellers of the Alaskan high country.

About 70,000 Dall sheep live in Alaska, 2,500 in Denali National Park and Preserve. They are the only species of wild white sheep in the world. Smaller than their southern cousins, the big horn sheep of the Rocky Mountains, mature Dall sheep rams weigh about 150 to 160 pounds. Ewes average 110 pounds.

Only during the autumn breeding season and winter do the rams, ewes, and lambs band together. In summer, they segregate themselves with bachelor herds of rams inhabiting higher slopes.

Dall sheep prefer to feed in high alpine pastures with rugged terrain nearby. This affords them adequate food and quick access to protective cliffs. Wolves are their chief predators. Bears, wolverines, lynx, and even golden eagles may, on a rare occasion, kill a sick or unwary sheep. Weather, however, takes the greatest



Dall sheep rams

toll. A heavy snow followed by thawing, freezing rain, and cold temperatures can build thick ice over the sheep's forage. Unable to dig through and feed, the sheep starve. Snow avalanches and rock slides can sweep away the most sure-footed. Parasites and diseases prey on the sickly.

Wildlife photographers have a keen interest in Dall sheep, especial-

ly mature rams with their long curling horns that lengthen each year. An ethical photographer, respectful of the sheep, will go slowly, go alone, take plenty of time, remain visible, and be careful. National Park Service regulations legally protect all wildlife from harassment, as well as hunting. The welfare of the photographic subject is more important than the photograph itself.



Caribou antlers; Dall sheep horns

34.1 mi./2940 ft.



Igloo Campground. The campground to the south has seven sites for tents only. Igloo Ranger Station is on the north side of the road.

37.5 mi.



Tattler Creek. This creek was named for the wandering tattler, a large shorebird about the size of a killdeer. The first nest discovered by a scientist was found in 1923 along the Savage River.

37.6 mi.



The road begins the steep climb to Sable Pass. On the slopes on the south side of the canyon a sheep path comes down to Igloo Creek. Sheep often cross the road at this point.

38.3 mi.



Sable Pass Critical Habitat Wildlife Closure. The next five miles are in prime grizzly bear habitat. For this reason no one is allowed to leave the park road.

SABLE PASS

Mention Sable Pass to long-time Denali Park visitors and one animal immediately comes to mind: the grizzly bear. A strong diversity of habitats — due primarily to topography and snowmelt patterns — provides a rich abundance of food at Sable Pass. Grizzly bears concentrate here, feeding and raising their young. They roam the tundra, the berry patches, the rocky slopes and the snow fields, river bars, and ridgetops.

The Toklat grizzly — common to Denali Park — is a light-colored bear, sometimes pure blond. Although a member of the same species, Toklat grizzlies weigh and measure about one-third less than their coastal cousins, Alaska brown bears. A diet low in meat probably accounts for this.

On occasion the bears dig for arctic ground squirrels, partake of carrion and, as recent research shows,



can capture a suprisingly high number of moose and caribou calves. But for the most part they eat berries, flowers, roots, horsetails, and other vegetation. This omnivorous diet and opportunistic feeding behavior probably preserved the grizzly bear through the Ice Age. Most other large mammal species living then in North America were either strict herbivores or carnivores, and they perished, paying the price of specialism. The grizzly bear remains a generalist, and individuals in the wild may live to be 20 years old.

To minimize human-bear problems, the Sable Pass area (excluding the road) has been permanently closed to recreational use since 1955. Backcountry units elsewhere in Denali Park have been closed temporarily for similar reasons.

Researchers in the Sable Pass area aim to learn more about the Toklat grizzly. For example, most grizzly bear sows in the lower 48 states have two cubs, raise them for two years,

and then have a new family. Toklat sows, on the other hand, often have three cubs and keep them for three years. Why this seemingly superfluous pattern? The answers to such questions could greatly enhance scientists' knowledge of the bears' population dynamics and contribute to better resource management strategies.

It is important to preserve the grizzly bear, which disappeared in Europe around 800 A.D. Grizzlies were shot and poisoned to extinction in California less than a century ago. Today, probably fewer than 1,000 live in the contiguous United States, most of them in the Northern Rockies, and each year several are poached.

Alaska is last refuge for the grizzly bear. To lose this magnificent animal that survived the Ice Age would do a major injustice to future generations and the diversity of the planet. Areas such as Sable Pass are a beginning.

39.1 mi./3900 ft.



Sable Pass. Mt. McKinley comes into view again, about 55 miles away.

42.9 mi.



End Critical Habitat Wildlife Closure. South of the road and down into the valley are two cabins. One is the East Fork Ranger Station, used in the 1930's by eminent biologist Adolf Murie during his famous wolf study. The other cabin houses researchers studying grizzly bears and other park natural history.



43.4 mi./3040 ft.

East Fork of the Toklat River. This bridge begins the climb to Polychrome Pass noted for its many colors and sweeping views.

EAST FORK RIVER

"The wolf takes your stare and turns it back on you," writes Barry Lopez. Indeed, anyone who has seen a wolf face to face in the wild can verify this.

For centuries, the image of a wolf has evoked human fear, distrust, and hate. Modern writers and researchers have, however, laid to rest many of the unfounded myths and inaccuracies about wolves, some of them bordering on superstition. Mature understanding of the wolf has been a long, slow process but some due respect is finally emerging, and it began in part here on the East Fork River.

Wolves were blamed throughout the 1930's for a decline in the park's Dall sheep populations. In 1939, the National Park Service assigned biologist Adolf Murie to determine the role of the wolf in the park's ecosystem. Murie's three-year study focused primarily on one wolf den in the park. His book, based on these studies, *The Wolves of Mount McKinley*, is a classic among wildlife biologists.

Murie was a tireless observer. With notepad, binoculars, and bedroll he perched on a rise above the den, watching the wolves come and go, learning their habits and customs. He often worked around the clock and once logged 33 hours straight. His young daughter sometimes accompanied him.

Murie gradually came to recognize each individual wolf and discovered

its place in the pack structure. He estimated the wolves home range at about 50 miles, mindful that other wolf families lived near the Toklat and Sanctuary Rivers. To determine diet, Murie analyzed 1,174 wolf feces. The wolves' principal prey, he discovered, were Dall sheep and caribou, with marmots, mice, and ground squirrels of secondary importance. He catalogued the skulls of wolf-killed sheep and calculated their age from annual rings on the curled horns. The large majority of skulls belonged to either old or first-year sheep. Very few prime sheep, two to eight years old, were killed. Murie concluded that "wolf predation probably has a salutary effect on the sheep as a species."

Biologists have since verified the important ecological niche occupied by wolves. Yes, they kill and eat numerous species of mammals, and with the drop of caribou in Denali Park the wolves seem to prey more heavily now on moose. In so doing, however, the prey population grows stronger as the animals with weaker genes are culled out. The dynamics apply to populations, not individuals. There is little room for sentimentality in this cycle. The pendulum swings, and as long as the wolf, the sheep, the caribou and the others are left alone, the balance will continue.





45.9 mi./3700 ft.

Polychrome Pass. The next rest stop is at Eielson Visitor Center about one hour away. With the aid of binoculars, caribou may be seen in the valley below.

POLYCHROME PASS

Polychrome Pass epitomizes Alaska's scenic beauty, rendering even the fanciest adjectives pale, dry, and inadequate.

Polychrome Pass was formed during the Ice Age. About 10,000 years ago, the glaciers retreated higher into the mountains, and in their wake stretched a chaotic wasteland of rock and rubble. Chocolate-brown meltwater flowed everywhere, and Polychrome Pass thundered with sounds of breaking ice, crashing boulders, and falling water.

On the valley floor, the shrinking glaciers stranded boulders that had earlier been carried from the mountain crests. These boulders are called "erratics" because they sit as big, solitary misfits on the open plains. Erratics may be over 50 feet high and weigh hundreds or thousands of tons, and they can be traced to their parent rock types high in the Alaska Range, thus divulging the routes of the glaciers that carried them.

The glaciers also abandoned massive blocks of ice that later melted, leaving deep depressions in the raw land. Slowly these pockets filled with water to form kettle ponds.

The broad alluvial terraces across the Plains of Murie are products of water, a much different builder than the ice responsible for erratics and kettle ponds. Ice indiscriminately carries and dumps sediment of all sizes, shapes, and weights. Water and

gravity, on the other hand, sort particles and deposit them neatly in stratified layers. The particle size and the thickness of each layer thus record the speed, volume, and duration of water flow at the time of deposition. Still water signs its name with clay; slow water with silt and sand; fast water with gravel and cobbles.

The top of each alluvial terrace records the level of meltwater lakes that probably formed across the Plains of Murie behind large ice dams in the Outer Range. After the lake sediments had filtered and settled into broad basins, the dams broke and the lakes drained. Fast running water washed away the middle of the exposed plains and created at their margins the evenly matched and sometimes tiered terraces. Vacillating between deposition and erosion, water has the curious habit of slicing channels into outwash sediments it deposited previously.

Today, caribou migrate across the terraced plains and golden eagles ride the thermals off Polychrome Mountain. Storms brew in the mountains, and ceaseless wind blows over the Alaska Range. In the deep mountain clefts wait the glaciers that need only a slight shift in the world's climate to break this reprieve in an Ice Age we refer to in the past tense.



46.5 mi.



Hoary marmots, a rodent similar to a woodchuck, are often seen in this area.



51.8 mi.

Porcupine Forest. During the 1950's, a particularly severe winter trapped a number of porcupine in this small forest. They consumed so much tree bark that they killed most of the trees.

When the soapberries ripen in August, the flat area to the south is visited daily by bears.



53.1 mi./3090 ft.

Toklat Bridge. To the north, just before crossing the bridge, are two small metal plaques attached to the rock wall. They commemorate Charles Sheldon, the person responsible for the establishment of the park, and Harry Karstens, the park's first superintendent and the second person to stand on Mt. McKinley's summit.



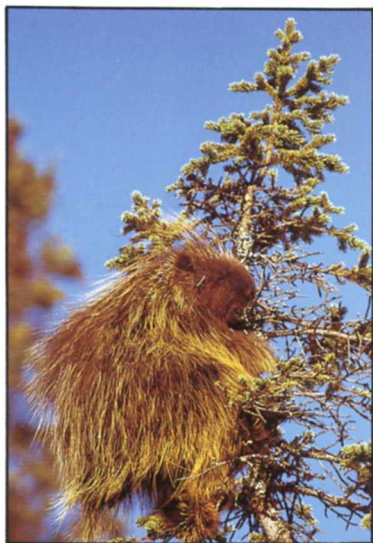
53.5 mi.

Toklat Road Camp. Across the river to the north there are several buildings, where park employees who work in the west end of the park live during the summer.

TOKLAT RIVER

"He sought simplicity, solitude, the feel of the weather, and a close acquaintance with animals in the remote mountains of the Alaska Range," is biologist Adolf Murie's description of Charles Sheldon, the father of Denali National Park.

After a 45 day-long wildlife survey in the Denali region during the sum-



Porcupine in Spruce tree



Charles Sheldon and ruins of his cabin

mer of 1906, Sheldon vowed to return to experience the full gamut of Denali's seasons and scenery. In 1907-08 he built a log cabin and wintered on the Toklat River. Harry Karstens signed up as his guide, and together they trekked and mushed over the winter tundra.

Sheldon was the first naturalist to study this land. He possessed "great physical strength, keen powers of observation and an excellent backwoods sense." He kept accurate field notes and set a high standard for the scientists that followed: Adolf and Olaus Murie, Joseph Dixon, George Wright, Inez Mexia, Frances Payne,

Bradford Washburn, and many others.

Most importantly, Charles Sheldon harbored a singular great resolve: to preserve the beloved wilderness he called Denali. He returned to New York, and as chairman of the influential Boone & Crockett Club, Sheldon spearheaded a political struggle that pooled the efforts of Dr. E.W. Nelson of the U.S. Biological Survey, Judge James Wickersham, Alaska's first territorial delegate to Congress, and Stephen T. Mather, the first director of the National Park Service. Congress finally approved a bill in February of 1917 that Charles Sheldon personally delivered for signature to President Woodrow Wilson. After nine years his dream had come true. Mt. McKinley National Park was established.

Charles Sheldon lived on the Toklat River decades before the words, "conservation, preservation and environment" entered our common vocabulary. Yet he persisted in his wilderness convictions, born on the banks of the Toklat, and he won. His victory preserved a special part of this nation's natural heritage.

Aware of this, Adolf Murie wrote in his journal: "During various trips down the Toklat in the course of my field work, I usually stopped at the cabin, lingered to examine the walls, the shelves, the wooden pegs used for nails. I would stand before the cabin and look across the gravel bars to the mountains, a scene Sheldon must have enjoyed. Although the cabin is deteriorating, and a swing of the river may destroy it suddenly, I have a feeling it should be left alone. I think that Sheldon, with his love for wild places, would like to have his cabin crumble to earth with age."

So it has.





58.3 mi./3980 ft.

Highway Pass. This is the highest point on the park road.

HIGHWAY PASS

An important part of Denali Park history is re-enacted each winter when teams of rangers travel across the white landscape by dog sled, bound from headquarters to the Wonder Lake Ranger Station. The National Park Service winter dog sled patrol, an annual highlight for the dogs and rangers alike, takes about three weeks for the round trip.

The sled teams descend with their flexible birchwood sleds into valleys where the cold air settles. They sometimes break through thin river ice and often plow through deep snow drifts. In good weather — cold and clear — and on packed trails the dogs can average 35 miles per day, observed only by ptarmigan, moose and wolves.

Long ago, the Denali Park patrol cabins were specifically spaced one day's travel apart by sled team. As in the past, the rangers today conduct poaching and boundary patrols, do cabin maintenance, haul out trash, share stories and watch the northern lights. They proudly perpetuate a tradition of sledding in Denali Park, initiated primarily by Harry Karstens, who was the first to establish a sled route from Fairbanks to Valdez. He first mushed mail to the Kantishna miners, and he was a member of the first successful summit attempt on Mt. McKinley, using dog teams up to 11,000 feet. Karstens became the park's first superintendent, patrolling 300 to 400 miles a month by winter dog teams.

To see sled dogs panting through



The tradition continues - a dog patrol



Harry Karstens

Denali Park and over Highway Pass today would surely gladden Karstens' spirit.



Bergh Lake

60.6 mi.



Stony Creek Bridge. There is a glimpse of Bergh Lake down the canyon to the north. In the summer of 1953, a massive landslide swept downslope, dammed Stony Creek, and created Bergh Lake, a young, sterile body of water, with little aquatic life. Waterfowl stop here briefly and then move on to more suitable habitat. Mammals sometimes pause to drink or rest. Bergh Lake initially measured a half-mile long and 75 feet deep. The avalanche dam grows slowly smaller, as the creek slowly cuts it away, and in a few decades the lake will probably be drained.

STONY DOME STONY HILL

Climbing west above Bergh Lake, the road crests between Stony Dome to the south and Stony Hill to the north. Framed between them on a clear day is Mt. McKinley, 40 miles away.

Stony Dome's name is self-descriptive. Subtle patterns of tundra cover its relatively gentle and stable slopes. Stony Hill, on the other hand, rises more abruptly to a rocky ridge that crumbles into talus below. To the small mammals of Denali, these two landforms represent completely different worlds.

Common to the dry tundra of Stony Dome is the arctic ground squirrel, often heard before seen,

popping to attention on its hind legs and surveying the world like a little Napoleon. Estimates from scats and field observations indicate the arctic ground squirrel supplies 90 percent of the golden eagle's diet and 50 percent of the red fox's diet. And when other prey species are rare, it may be the chief food of the gyrfalcon and the wolf. The grizzly bear often digs massive pits in the tundra to retrieve an arctic ground squirrel, the bear's most dependable source of meat. The squirrel's fate is as important as its life in the larger scheme. Without arctic ground squirrels to fill a specific niche, the Denali Park ecosystem would collapse.

Each animal's niche is defined by its relationships with all aspects of its environment: how it lives, breeds, interacts, and dies. A habitat, by contrast, is comparable to an address, and specifically describes where an animal lives. The arctic ground squirrel's habitat, and the marmot's too, is the tundra beneath which it burrows and hibernates.

Just next door in the Stony Hill rockslide lives the pika — not a member of the rodent or squirrel

families but actually a close relative of rabbits and hares. In the course of a short summer this five-ounce ball of fur will cut and cure upwards of 50 pounds of tundra plants and store the mold-free hay in the deep rock crevices where it lives. The pika does not hibernate and must therefore dedicate summer to the harvest of winter's food supply. Adolf Murie wrote fondly of this hay maker at work: "A pretty picture is a pika carrying a bouquet of flowers, neatly arranged, as though he were going a-courting."

The busy pika does not spend the winter alone. Recent research indicates that most of the nine species of shrews, mice, and voles in Denali National Park are also non-hibernators. These minute mammals, including some that would starve in a matter of hours without food, pass the winter beneath the snow and tundra, ex-

Ground squirrel (left) and pika (right) in their summer habitats.



cavating tunnels and feeding on plants and on each other. Without the insulating snow they would quickly die. Naturalists call these animals "subnivean," meaning below-the-snow.

Why do some mammals hibernate while others do not? When did these two strategies evolve, so different and yet equally successful? Entire ecologies change between a tundra slope and a talus slope, and beneath them both live the survivors of long, cold winters.

62.0 mi./3900 ft.



Stony Hill Overlook. Mt. McKinley is about 36 miles away. Many caribou trails in the tundra may be seen while descending the hill.

64.5 mi./3950 ft.



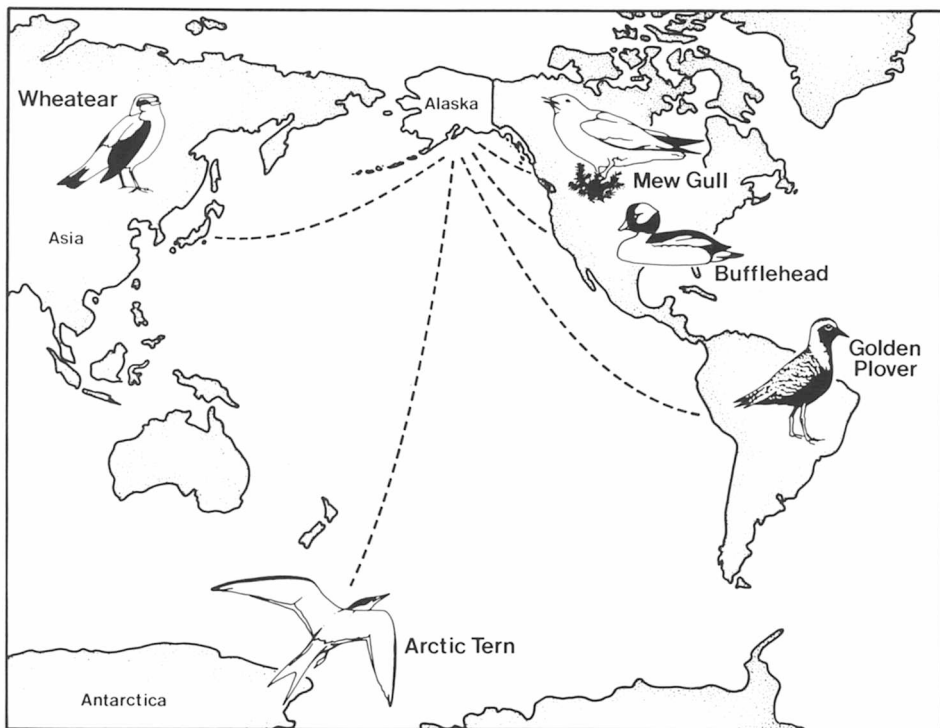
Thorofare Pass.

THOROFARE PASS

If the routes from winter feeding grounds to Alaska nesting sites of all the 155 species of birds that summer in Denali Park were traced on a globe, a giant web would encase the world from pole to pole. At its center would be Denali National Park.

For example, the golden plover flies here annually from South America. The wheatear and the arctic warbler arrive from Asia and Japan. Some species of swallows and thrushes journey from the jungles of Latin America. And the arctic tern, champion of long-distance fliers, can migrate up to 22,000 miles annually between Alaska and Antarctica, living an endless summer at the price of incessant commuting.

The mew gull moves inland from



Flight paths of some Denali birds

the Alaska coast during summer and often perches atop spruce trees. Buffleheads and goldeneyes, having arrived from southern ocean shores and lakes, raise their young in tree cavities drilled by woodpeckers.

These migrators come and go each year, guided by polarized vision, star maps, ultrasound (inaudible to the human ear), geographic landmarks, and even by sensing the earth's magnetic field from flecks of magnetite in their brains. Many species, such as loons, grebes, ducks, geese, and cranes, nest north of Denali Park and even in Siberia and stop here only to catch their breath. The summer nesting season is short, and several species court enroute to save precious time.

Not all Denali birds migrate, however. Ravens, ptarmigan, owls, and many others live year round in the park. Products of natural selection, these birds have honed the art of camouflage and the skill of being inconspicuous.

In May 1926, George M. Wright was conducting field studies in Mt. McKinley National Park and happened upon a surfbird nest, the first ever found and documented: "The nest was 1,000 feet above timberline, on a rocky ridge, with a south exposure . . . placed in a slight depression entirely out in the open without the least concealment. It was within 12 inches of a well traveled trail of the Alaska mountain sheep." Olaus

Murie, Adolf's older brother, made a similar scientific discovery, the nest of a wandering tattler on a barren gravel bar along the Savage River in July 1923.

On the tundra and in the taiga, the nesting birds of Denali raise their young, and by nature's mandate, they either remain during winter or they fly east, west, or south to distant lands and shores. In so doing they accord a global significance to Denali National Park. This land is to them an ecological refuge, an island amid civilization's growing pressures. Only with equal protection abroad will they continue to return.

66.0 mi.

Eielson Visitor Center. The summit of Mt. McKinley is 33 miles away. Inside the Center are restrooms, water fountain, book sales, information desk, and exhibits. Check at the desk for transportation back to Riley Creek or on to Wonder Lake; changing buses requires a sign in. Take the time to join a naturalist on a tundra walk.

Eielson Visitor Center was named in honor of the first Alaskan bush pilot Carl Ben Eielson.

MT. MCKINLEY

The Athabascans called it Denali, "the high one." Its sheer bulk seems to shove the horizon out of the way. This mass of granite, ice, and snow fills the sky and overshadows neighboring peaks. Elsewhere in the world, the nearby mountains would be considered big, yet McKinley dwarfs them.

Permanent snow fields blanket the top half of Mt. McKinley year round, giving birth to the 17 glaciers that spill down its slopes. A single precipice, the Wickersham Wall, rises 14,000 feet straight up the north face. Two peaks cap McKinley, separated by two miles and an 800-foot elevation difference. With its base beginning at 2,000 feet and its summit at 20,320 feet, Mt. McKinley has the greatest vertical relief of any mountain in the world.

In 1910, four Fairbanks miners — the Sourdough Party — reached the north peak. It was an amazing accomplishment. With hot chocolate and donuts in their packs, they climbed from 11,000 feet to the top and back in one day. Furthermore, for proof they planted a 14-foot spruce pole on the peak. While on the north peak, however, the Sourdoughs looked across to the south peak and realized it was higher. One member of the party tried to reach the true summit but the weather worsened and he turned back, broken-hearted. Adding insult to injury, no one with telescopes could see the spruce pole from Fairbanks. The Sourdoughs were discredited.

Subsequently, the 1912 eruption of Mt. Katmai (hundreds of miles to the southwest) shook Mt. McKinley, deformed its slopes and closed the Sourdoughs' climbing route. That same year, survey geologists deter-

mined that the south peak was the true summit and the undisputed top of North America, 20,320 feet above sea level. Mountaineers around the world took notice.

In 1913, Episcopal Archdeacon Hudson Stuck organized an expedition up Mt. McKinley. He needed a good climbing leader and found one: Harry Karstens. Robert Tatum and Walter Harper joined them. Early in the climb the Archdeacon found time to marry a young Athabaskan couple in the southern foothills of the Alaska Range. His duties done, Stuck and party pushed on. The weather was good, the route was open and they reached the summit on June 7. Elated with their own determination and good fortune, the four victors found another reward. Looking across to the north peak

they saw the spruce pole planted three years earlier. The Sourdoughs' claims were vindicated.

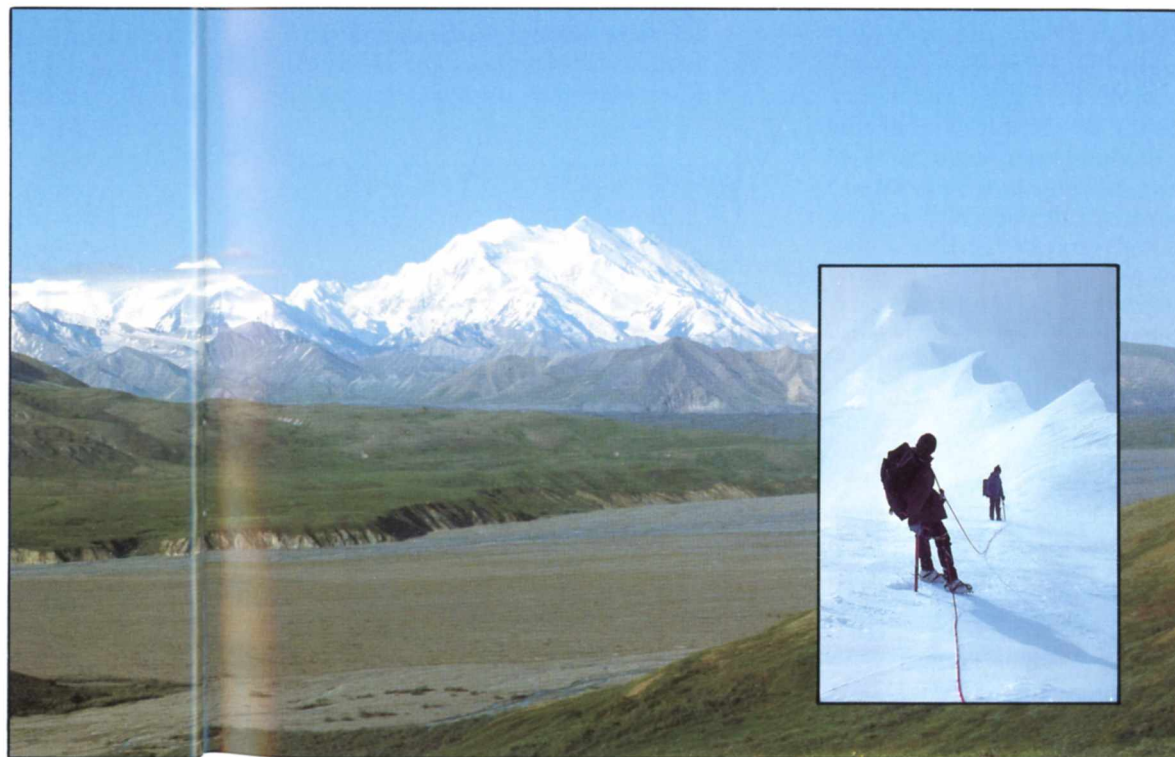
Named in honor of Senator William McKinley, later the 25th president of the United States, North America's tallest mountain has become an international focal point for serious mountaineers. Several thousand people have stood on the summit, most having started at about 8,000 feet where a ski plane lands them on the Kahiltna Glacier. The climb up standard routes is a long, hard walk, and success is largely at the whim of the weather. Climbers risk high-altitude pulmonary edema, cerebral edema, hypoxia, nausea, dehydration, diarrhea, frostbite, hypothermia, and acute psychological stress. Triumph can become tragedy with a turn of the wind, a misjudged route, or a lapse into

fatigue.

Over 42 climbers have died on Mt. McKinley, and more than 150 have been involved in serious accidents. Yet hundreds reach the summit every summer. A 14 year-old boy and a 69 year-old man have successfully climbed Mt. McKinley. In good years, the success rate among climbers is around 50 percent, and half of those might be from foreign countries. Because of its high altitude and high latitude, Mt. McKinley offers extreme physical challenges to even the hardest of mountaineers.

People come to see the mountain, to photograph it, climb it, to know it. Even when masked in clouds, it is an overwhelming presence. It is there, somewhere, making weather and ice in the white-gray sky, inspiring our reverence.

*Mt. McKinley from Eielson
Visitor Center*



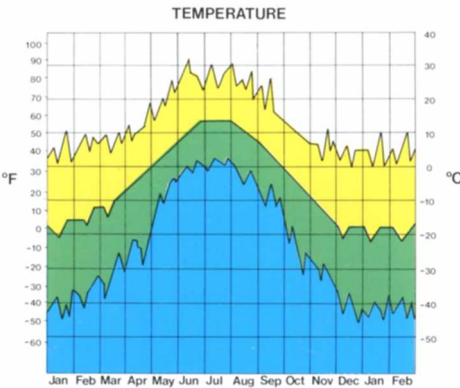
WEATHER AND CLIMATE

Lightning snaps out of summer convection storms. Double rainbows often arch over the tundra. The sky in June is filled with rich midnight light — gold, orange, lavender, and cinnabar, hues special to northern skies. Snow may fall ankle deep in July, knee deep in August. Fox tracks are nicely preserved on any summer morning's frost. Temperatures can plummet tens of degrees in less than an hour and sink below freezing every month of the year. Autumn seems to arrive twice as fast as spring, and last only half as long. Winter is never far away.

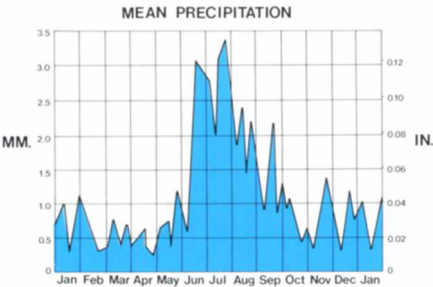
Rain falls on about half the days each summer and accounts for most of the 15 inches average annual precipitation in Denali National Park. Up to three feet of snow may blanket the winter lowlands. For the most part, winter has the most constant weather patterns: clear and cold. Ice usually caps rivers from late October to late April. Winter temper-

atures may drop to 40 degrees below zero Fahrenheit and stay there for weeks. However, in January temperatures may climb to 40 degrees above zero as well. A thermometer abandoned by a climbing party high on Mt. McKinley and recovered many years later recorded a low temperature of minus 93 degrees. The cold is chronic, and in January, darkness prevails 20 hours a day.

Mt. McKinley is most easily observed in winter. During summer, the chances of seeing the summit from Eielson Visitor Center are approximately 35 percent. Gray, brooding skies can mask the mountain for weeks on end. The clouds may suddenly part for an instant, reveal the peak always higher than expected, then close again without opening for several more days. Summer here belongs to the clouds. Indeed, clear days are like precious gifts — few and unforgotten.



Yellow: Extreme Highs
Green: Average Temp.
Blue: Extreme Lows



Adapted from Sue Ann Bowling,
University of Alaska Geophysical
Institute.

67.3 mi.



Muldrow Glacier. This is the longest glacier on this side of the Alaska Range. It is visible for the next several miles. Below, the bar of the Thorofare River is nearly one mile wide.

MULDROW GLACIER

The largest glaciers in Denali National Park and Preserve are on the south side of the Alaska Range where moisture-laden winds blow inland off the Gulf of Alaska, hit the mountains, and drop snow every month of the year. The snow accumulates, layer upon layer, compresses into granular form and eventually into dense glacial ice. Under the influence of gravity and topography, the ice flows downslope as a glacier.

The Muldrow is the largest glacier on the north side of the Range. It begins pure white beneath an 800-foot icefall high on the east flank of Mt. McKinley and ends 32 miles later looking more like jumbled green tundra than a glacier. Its terminus lies less than a mile from the road between Eielson Visitor Center and Wonder Lake. Twice in the last 100 years the Muldrow has surged forward at tremendous rates, most recently in the winter of 1956-57. Middle sections of the glacier sank 180 feet, leaving an ice ring high on the granite canyon walls, and flowed five miles over lower stagnant ice. This accounts for the jumbled ice towers and ice blocks on the glacial surface.

While grinding downslope the glacier undercuts and erodes mountain slopes. Rock and sediment avalanche onto the ice and, as is the case with the Muldrow, can completely cover the glacier's lower



sections.

Why does the Muldrow Glacier surge? No one is certain, but glaciologists suspect that water may accumulate underneath the glacier, lubricating the ice-rock interface and provoking surges. Also, halfway downstream the Muldrow straddles the Denali Fault and turns an abrupt 90 degrees. This topographical reversal is a peculiar feature, especially for a glacier. Movement along the fault may trigger surging. Maybe not. Whatever the cause, the next surge will probably be as unannounced as the others.



68.5 mi.

Grassy Pass. During the next mile there are several beaver dams. Just ahead is the closest point on the road to the Muldrow Glacier—about one mile.

NEW TERRAIN

Beyond Muldrow Glacier the mountains taper into hills, and the hills grade into rolling tundra. The land is more flat than angular, more horizontal than vertical, more wet than dry. It is a world of deposition, not erosion. Glaciers spilled this landscape off their snouts and have since retreated.

Ponds lace the wet tundra and attract other wildlife species. Beavers and muskrat live here, and the wood frog, the only species of amphibian in Alaska's interior. Moose often stand belly-deep in the water to feed on aquatic vegetation. And many species of waterfowl raise their young here.

72.8 mi.



On clear days, Mt. Foraker (elev. 17,400 ft.), known as Denali's Wife by natives, shows itself from behind Mt. McKinley. Mt. Foraker is the second highest peak in the park.

82.0 mi.



A large spruce forest called the Big Timber is seen below to the southwest.

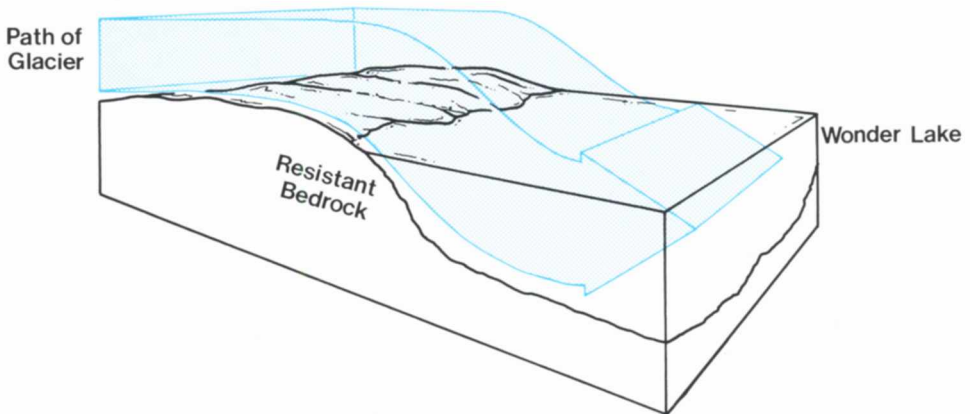
83.6 mi.



First View of Wonder Lake and Wonder Lake Campground.

WONDER LAKE

As are most features in this landscape, Wonder Lake is a product of the Ice Age. Thousands of years ago, a glacier flowed over a ridge of resistant bedrock (where the campground is today) and cut deep into weaker rock behind and to the north. After the glacier retreated, the large cut filled with water.



Wonder Lake measures four miles long and about 280 feet deep. It is a relatively sterile body of water, primarily because of its youth and subarctic location.

Lake trout, burbot, arctic char, and ling cod live in Wonder Lake, each with its own long-evolved reproductive and feeding strategies. As with birds and mammals, nature tends to favor those fish species that best minimize rather than maximize competition. The lake trout, a close relative of the arctic char, is Alaska's largest freshwater fish. When surface waters warm in summer the lake trout move deeper, changing their diet yet maintaining a constant body temperature. Large fish often feed on younger fry and occasionally swallow mice and voles that fall into the lake. Burbot, on the other hand, prefer cool, deep water and probably live near the lake bottom. They are less particular in their choice of

foods, taking what they can get — a common circumstance in nature.

Loons, grebes, mergansers, and other diving birds visit Wonder Lake. Some breed here, some remain to rest, and others fly farther north. With a hard journey behind them and mating ahead, these birds depend heavily on the large numbers of fish in June's chilled waters.

Beaver also visit Wonder Lake. In fact, Adolf Murie discovered a beaver dam in 1960 at the north end of the lake that had raised the water level two feet.

Caribou migrate past Wonder Lake, and moose circle its shores. And when summer closes, Sandhill cranes fly southbound overhead, hundreds a day for weeks on end. Temperatures drop rapidly and soon Wonder Lake lies locked in winter, a white plain in the noiseless subarctic.



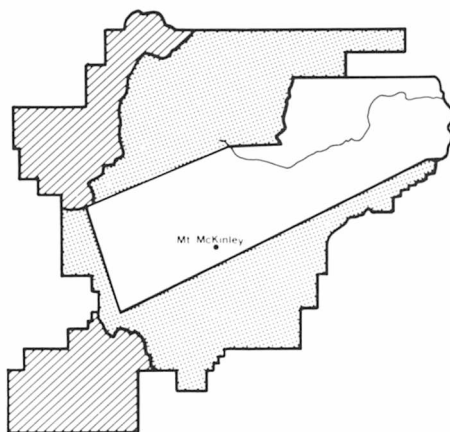
84.6 mi./2290 ft.

Road Junction. The road to the south leads to the Wonder Lake Campground. The one to the north leads to the Wonder Lake Ranger Station and the Kantishna mining district.

BEYOND WONDER LAKE

Beyond Wonder Lake are reminders, problems of the past and challenges of the future.

Before 1980, Mt. McKinley National Park ended just north of Wonder Lake. Today, Denali National Park and Preserve reaches far to the north, the south, and the west. Although Denali National Park and



-  Original Park
-  New Park Additions
-  New Preserve Additions

Preserve is one administrative unit, there are three distinct management zones: the original park lands, the new park lands, and the preserve lands. Each has separate regulations and different degrees of protection. Combined, these zones encompass a complete subarctic ecosystem, affording a tremendous opportunity to take full inventory of natural processes.

Congress recognized Alaska's unique characteristics by allowing for uses not normally allowed in other national parks. Mining, hunting, trapping, and fire management have become important issues in these new park additions.

Mining is a good example. While returning from an unsuccessful attempt to climb Mt. McKinley in 1903, Judge James Wickersham discovered placer gold in the northern

Kantishna Hills, a few miles north of Wonder Lake. Gold fever spread, and Kantishna became an overnight boom town. Miners are still active in Kantishna today; however, modern mining operations hardly resemble turn-of-the-century pick and shovel methods. Heavy back hoes and large earth movers, more efficient, more costly, and more destructive, now turn over the land. Fire is another example.

The northern preserve includes lands in the subarctic's heavily forested lightning belt. Fire is important to the ecosystem, and the National Park Service intends to let such fires burn. Scientists can thereby better understand how fire improves wildlife habitat and cycles nutrients. This is only one of several management challenges in the new additions to the old park.

THE ROAD TO THE CAMPGROUND

85.7 mi.



The trail to McKinley River leaves from the south side of the road. Mountaineering parties climbing Mt. McKinley from this side start from here.

86.1 mi./2090 ft.



Wonder Lake Campground. This is the closest point to Mt. McKinley on the park road. The mountain is 27 miles distant. Wonder Lake Campground has 20 sites and is for visitors with tents only. During the summer it is ex-

posed to winds and ferocious mosquitoes, but the views of the Alaska Range are spectacular. Check the bulletin board for naturalist-conducted programs.

THE ROAD NORTH FROM THE JUNCTION.



85.4 mi.

Reflection Pond. On clear, calm days Mt. McKinley is reflected in this pond.



86.7 mi./2110 ft.

Wonder Lake Ranger Station. Emergency assistance is available here. Only vehicles with special permits are allowed beyond this point.



87.9 mi.

Denali National Park Wilderness Boundary. The park land beyond this point was added in 1980. Active mining, subsistence hunting and trapping, and even sport hunting are non-traditional park activities that occur. Several private lodges in this area accept guests who have made prior arrangements.



Mining for gold

Conclusion

Foresight and dedication created this park in 1917 and enlarged it in 1980. It represents a chance — perhaps a last chance — to find a land ethic beyond mere possessive ownership.

For all its ruggedness, this is a fragile environment. Here the land does not bend, it breaks. Centuries hence, in this increasingly automat-

ed and technical world, will there still be such a place as Denali National Park and Preserve? With every inspiration comes a little responsibility.

To preserve Denali National Park we must both understand and appreciate it. And this can begin with braided rivers and bear tracks.

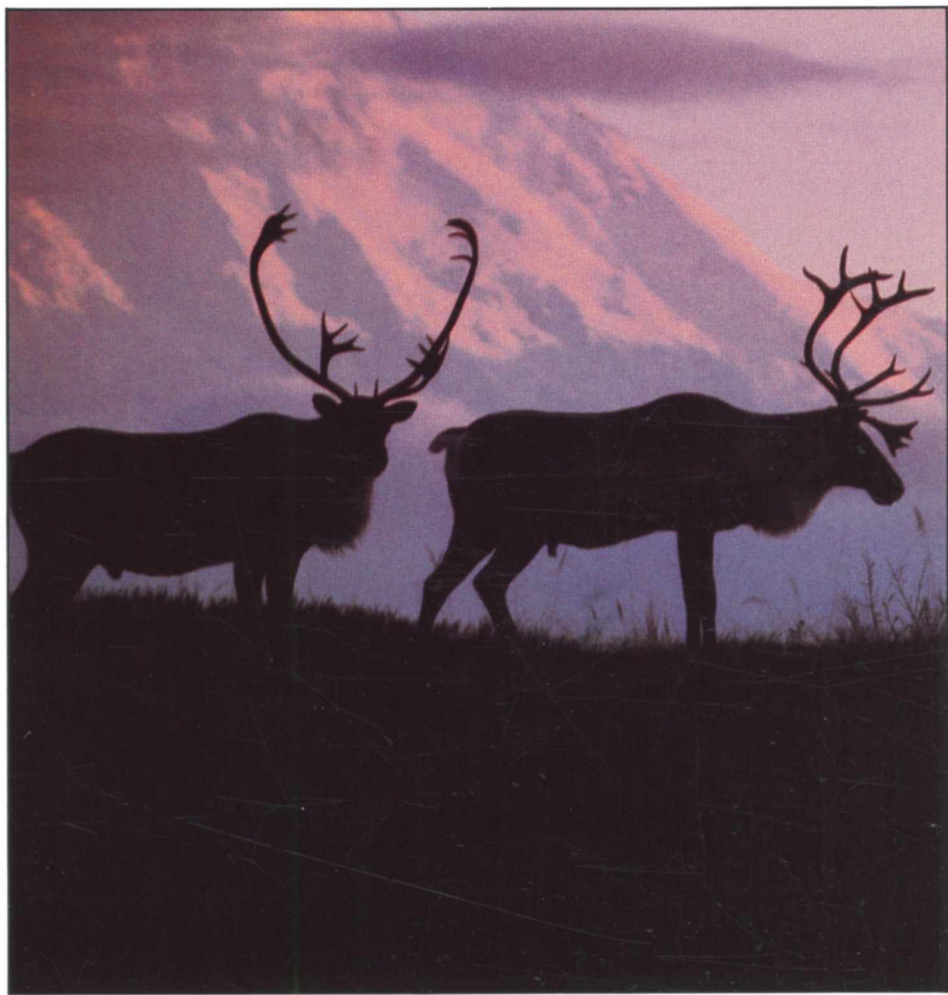


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