



NATURALIST GUIDE
to the
GEM LAKE TRAIL
ROCKY MOUNTAIN NATIONAL PARK

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Estes Park, Colorado

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INTRODUCTION

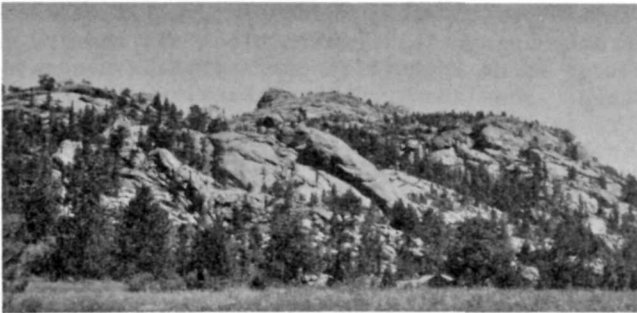
FEATURES: This is a short hike (four miles round trip, with a 1000 foot rise) on a good trail, suitable for foot or horse, close to Estes Park. It is a fine trail along which to see birds (an average of 25 species), mammals (an average of five species), and a variety of flowers, trees, and shrubs. Indeed, all of the Park's trees except the alder, lodgepole pine, and balsam poplar are to be found along this trail. Many interesting rock figures are visible from the path, as well as fine panoramas of the Estes parkland, Long's Peak, and the continental divide. Gem Lake itself is a small shallow pool set in a granite basin surrounded by steep cliffs. This is one of the few park trails leading into an unglaciated area and remains accessible early and late in the season when higher country trails are snowed in.

DISADVANTAGES: The trail is somewhat steep and rocky in spots and is quite hot and dusty during the latter part of the summer, at which time drinking water is usually unavailable. Small trailside creeks, when running, may be drunk from, but their use is not recommended by the National Park Service. It is possible, though most unlikely, that rattlesnakes might be encountered in this area.

RECOMMENDATIONS: This is a good early morning hike of three hour's duration (about two hours up, one back). Leave at 6 a.m. for wildlife, earlier for the sunrise, otherwise 7:30, from the small parking area alongside the Devil's Gulch road, 1.9 miles northeast of Estes Park (the Devil's Gulch road leaves Estes Park north by the high school). Carry water from mid-summer. For morning hikes, slickers are ordinarily not needed unless it is clouding early. There are several natural rock shelters from bad weather along the trail. The lake makes a good lunch spot for mid-morning hikes. The entire trip offers good photographic possibilities.

NOTE ON THE USE OF THIS GUIDE: This guide is a detailed description of the Gem Lake trail, including not only its scenery but also most of the animals and plants which one might expect to encounter. Because of space limitations, the flora and fauna have ordinarily been named but not described, and the following references will supplement this guide: "Plants of R. M. N. P." (Ruth A. Nelson), "The Birds of R. M. N. P." (Fred Packard), "A Field Guide to Western Birds" (Roger T. Peterson), "Wild Animals of the Rockies" (James Gilligan). The U. S. Geological Survey topographic map of Rocky Mountain National Park is useful in orienting oneself with respect to the surrounding countryside.

This guide is designed to be used on the trail, being followed by a combination of landmarks, time and trail distances, and numbered wooden markers. Reading ahead will give advance notice of things to be anticipated. This is the first in a series of naturalist guides to the Park's trails. Your criticisms, directed to the Naturalist Office, R.M.N.P., Estes Park, Colorado, are invited. The author wishes to express his appreciation to Park Naturalist Edwin Alberts, Ranger Naturalists Hugh Kingery, Herman West, Clarence Rethorst, and Mary Ann Yetter, and Fred A. Beidleman for invaluable editorial assistance. He is also indebted to Ranger Naturalist Roger L. Spitznas and Miss Lucille Hyatt for help in preparation of the manuscript.



Trail Junction at Devil's Gulch road, elevation 7800 feet. From this point one can look northward at the unglaciated granite-dome country which farther to the north is known as "Wonder Basin." The flat top of this long ridge (difficult to visualize from this point) lying at an altitude of 9000 feet represents an erosional plain which millions of years ago was leveled by meandering streams when it lay at a much lower elevation, before uplift to its present height. On the extreme west of this ridge are the Needles, barely visible from here, with the columnar Twin Owls (better seen from Estes Park) rising about in the middle of the ridge as one sees it from this vantage point. The name "Lumpy Ridge" has been given to this area because of the rock outcrops, the Arapaho Indians calling it "Little Lumps on Ridge." Incidentally, Indian flint artifacts have been found in this region: end scrapers (for scraping hides) but very few arrow points. The country into which the trail leads was added to the Park in 1917, two years after the Park's establishment, and the trail was first improved in 1923. Gem Lake itself lies in a rock basin west (left) of the highest rounded cliff visible on the northeastern skyline of Lumpy Ridge.

The broad trail starts west between fenced grassland fields which are filled with flowers throughout the summer and in June are quite marshy. To the left at the start of the trail are several young Colorado blue spruce (the state tree), surrounded by yellow-flowered shrubby cinquefoil (which bloom all summer), a pioneer shrub in moist areas, and young ponderosa pines, some showing the debarking typical of porcupine damage. From the very start of the trail in the distance to the southwest can be seen Long's Peak (with its sheer east face and notched summit), the highest point in the Park and on the skyline (14,255 feet), down the right slope of which, with binoculars, can be picked out the rock keyhole through which passes the west hiking route. The cable hiking

route is up the slanting northeast face, usually dotted with snow patches.

In the meadow to the right of the trail blue iris, golden banner and white bistort bloom in June, followed in July and later by many flowers including fireweed, mountain-sage, wild mint, curlycup gumweed, valerian, bedstraw, mariposa lily, gaillardia, sulphur flower, gold cup, purple thistle, black-eyed susan, tall penstemon, yarrow, horsemint, small-flowered lupine, mountain harebell, wild onion, miners candle, goldenrod, wild rose, yellow evening-primrose, morning primrose (white), Fremont's pink geranium, Colorado loco, blue flax, squaw-currant, and others. In late July the field is grown up in rushes, with their brown burr-like side blossoms, and a few brown-topped, triangular stemmed sedges. Late summer finds the rough white aster, common (purple) aster, tansy aster and Bigelow gentian common along this stretch of trail. Many grasses grow alongside the path and in the fields, especially conspicuous being the comb-shaped blue grama, timothy, needle-grass, wheatgrass and bluegrass. Violet-green swallows are common in flight over these meadows and mountain bluebirds and vesper sparrows are often seen perched on telephone and fence wires. The high-pitched chinking calls are made by Wyoming ground squirrels. Near the west end of this first section of trail, on the left by a ponderosa pine at the fence, are several of the spineless squaw-currant bushes which in August bear insipid red fruit relished by many of the birds and small mammals.

There is a Gem Lake trail sign ahead on the fence as the trail turns north (right), still between fences, shortly to swing northwest into a small grove of ponderosa pines. To the left of this section of trail in a little drainage south of the big pines can be seen young narrow-leaf cottonwoods, the common cottonwood of the mountains. Left at the edge of the pine grove near the trail is a small brown shed where house wrens or violet-green swallows nest (in a hole at the left end of the building).

Broad-tailed hummingbirds, robins, wood pewees, red-shafted flickers, long-crested jays, mountain chickadees, pigmy nuthatches, and occasionally a western bluebird are encountered in this particular spot. To the east is a grassland filled with golden banner in June, black-eyed susan, Fremont's geranium, gaillardia, horsemint, yarrow, woundwort, and others, during the middle of the summer, and golden aster and rough white aster in late August and September. Alongside the trail grow wild roses, squaw-currant, some thimbleberry (with large, rose-like white flowers and large reddish berries), shrubby cinquefoil, and mountain gooseberry (spiny with dark purple fruit). The staccato clicking or buzzing heard overhead in the pines in mid-summer is made by cicadas, a famous relative of the local variety being the so-called "seventeen-year locust." These insects spend most of their life underground.

As the trail leaves the grove to the north past the buildings, rose bushes cluster along the right edge of the sandy path, with, beyond, a scattering of low snowberry bushes which bear white fruit in late summer (SIGN NO. 1, right on pine trunk). Past the pines the trail starts climbing a slope covered with shrubs, especially antelope-brush (with yellow flowers and three-toothed leaves) and squaw-currant whose tops have been heavily browsed by deer, with a few ponderosa pines and much grassland with flowers. Ahead the Twin Owls show up on the skyline to the right of the trail (a high rounded outcrop leaning eastward) and left of them straight ahead an interesting group of rock figures resembling deformed people but called the "Hen and Chickens." Years ago Indian tepee rings of stone (used to brace the tepee poles) were found on the slope to the west.

The interesting erosional features in the granite walls ahead are completely different from the scenery of much of the Park, having been created primarily by weathering rather than glacial action. The rock making up Lumpy Ridge is Long's Peak granite which was intruded

into the older metamorphic gneiss-schist of the Rocky Mountain core during pre-cambrian time, probably more than 500 million years ago. This is a coarse-grained granite made up of quartz, white and pink feldspar, mica (especially black) and sometimes hornblend. It is often jointed (cracked) extensively and decomposes fairly readily, producing potholes, natural bridges, and so on. If unfractured rock overlies jointed granite, erosion may form balanced rocks. Another erosional peculiarity of the granite in this area is the production of domes by a process known as "exfoliation," in which layers of the rock peel off much like the layers of an onion. This layering phenomenon has never been adequately explained but may have arisen as a result of pressure release on the granite by the erosional removal of thousands of feet of sediment (sandstone, etc.) which at one time overlay this region.



East of the trail is grassland and brushland, sloping down to a small drainage, clustered with magenta horsemint, with much pungent gray-green mountain-sage and dark green antelope-brush on the far hillside. Here the gray Wyoming ground squirrels ("picket-pin gophers")

are common, in the shrubs green-tailed towhees (greenish tail, rufous crown) are often seen or heard, and in the grassland the rufous-crowned chipping sparrow is glimpsed. Towards the upper end of this grassland the small creek bed is shaded by a few white-barked quaking aspens, the trees becoming more abundant northward. Flowers like the white, square-stemmed bedstraw (used formerly for mattress ticking because of its fragrance), black-eyed susan, horsemint (flaring lavender heads), mountain harebell, and goldenrod are abundant in the aspen grove during the summer, and house wrens, broad-tailed hummingbirds, red-naped sapsuckers and warbling vireos are frequently seen or heard. Along the drier trailside during August bloom the lavender blazing star, golden aster, and goldenrod.

The trail passes through a break in the fence and climbs gradually into an open ponderosa pine forest with many lichen-covered rock outcrops, especially on the left (west). At this point a small side trail leaves to the west, returning later to the main trail. The lichens, usually forming a dry crust of gray, black, green, orange or yellow on the stones, are actually two types of plants, a fungus like a mushroom and an alga like a green pond scum which live together and by their activity decompose the rocks. Many of the trees here show debarking near their tops as a result of porcupine work, in some cases (where foliage is red or gone) actually having been killed.

Alongside the trail to the right where the trail levels and swings left (SIGN NO. 2) are the remains of a large dead pine, killed by a combination of lightning and beetle activity, then blown over. Note the very small beetle holes in the bark and the larger holes left by woodpeckers hunting for the beetle larvae. The ponderosa pine, of which this is one, a common tree of the dry, middle altitude, mountain hillsides, is easily identified by its reddish, "jigsaw-puzzle" bark which smells like vanilla, its fairly large, sharp-spined cones, and the 2-3 long needles in a bundle.

Past the level spot of trail, the path drops to the north. As the rock outcrops start closing in on either side, especially on the right, the trail crosses a small, aspen-lined drainage (note flat stems of the aspen which permit the leaves to tremble in the slightest breeze), usually dry, the grade steepens, and the trail enters an open canyon of aspen, ponderosa pine, and in the shadier spots large Douglas--fir (single needles coming out all around the branch, papery cones with three-cornered bracts). Just beyond this creek crossing, several tall, red-foliaged pines on the left (SIGN NO. 3) show damage by yellowish-orange mistletoe, a parasite which produces bunchy "witches brooms" (note yellow foliage and growth) on the trees which it attacks. Beyond the pines and about 25 feet left (west) of the trail, through the aspens at the base of a low gray-black rock outcrop, can be seen a "harp" Douglas-fir whose main trunk runs along the ground, giving rise to two large and several smaller ascending "trunks." East of the trail from SIGN NO. 3, beneath a flat, overhanging granitic outcrop, is an extensive porcupine den, identified by the capsule-shaped woody droppings.

For the next eighth of a mile up the trail there is good habitat for pigmy nuthatches, white-breasted nuthatches (listen for nasal "yanking" calls), mountain chickadee (white line above eye), Audubon's warbler (yellow throat and rump patch), wood pewee, gray-headed junco (white outer tail feathers, rufous back), Townsend's solitaire (white outer tail feathers, white eye ring, tan wing-bars), brown creeper, and olive-sided flycatcher (seems to call "cago" or "Chicago"). The gray or black tuft-eared squirrels and porcupines are sometimes seen in the trees, less often the smaller, rusty-colored pine squirrel (chickaree), while chipmunks (striped backs and faces) and Say's ground squirrels (striped backs but unstriped faces) are common on the ground and among the rocks. Mule deer and Rocky Mountain cottontails are often encountered on the rocky hillside to the

west. Now and then the loud "cheep cheep cheep" call of the red crossbill can be heard overhead.

Up-trail beyond the harp tree and past a buried log barrier in the path, a small creek (usually dry) crosses the trail from the east as the trail climbs northeast. Looking back from the log barrier towards the rocks above the porcupine den one sees the trunks of several old Douglas-firs flattened against the granite boulders around which they have had to grow to reach the sunlight. Ahead along this section (to the left on the hillside) is an occasional flattened and spreading dwarf juniper (prickly foliage), while to the right along the small creek grow aspen, wax flower (a wild hydrangea shrub with many small waxy white flowers), wild rose, Rocky Mountain cedar (a tree-like juniper), blue mountain harebells, and red Indian paintbrush, with a scattering of shrubby cinquefoil. The aspen bark shows some stripping by elk, resulting in black scars. The elk utilize the bark for food in the winter.

The trail swings northwest (left) around a rock outcrop, climbs north for about 100 feet, and then swings northeast by a high, layered, brownish-black granite outcrop (right) and winds uphill through a dense grove of Douglas-firs, with many wax flowers and some aspen along the creek to the right. As this grove is entered there is a huge Douglas-fir left of the trail measuring about 33 inches in diameter breast high (SIGN NO. 4). Although this is a large specimen for the Rocky Mountain region, in the Pacific Northwest such trees have been known to exceed 400 feet in height and twelve feet in diameter. Note the chocolate-colored trunk and the typical cones scattered about on the ground. Looking back (south) from this large tree a good view of the Twin Sisters fire lookout can be had in the far distance, and, in the foreground (about 50 feet away) right of Twin Sisters, a Y-trunked pine. This type of growth is caused when the original top of a tree is destroyed and side branches try to assume "top status." During moist summers various mushrooms

grow in this woodland, especially conspicuous being the white-flecked red fly amanita (poisonous). The western flycatcher, calling "birdie," is frequently encountered, and sometimes the hermit thrush (with rufous tail) is seen.

One hundred feet beyond the large fir, near the upper end of this small grove where the trail starts turning left, watch alongside the creek (right) for an interesting three-trunked Douglas-fir, surrounded by several dead aspens. Up the dry hillside to the left in late summer bloom goldenrod and sheathflower. Beyond the three-trunked fir, where the trail swings northwest and comes to an opening in this grove with many fallen dead aspens ahead in the draw (about ten feet down-trail from SIGN NO. 5), on the skyline to the east at the right end of the ridge can be seen an "elephant head" in granite, with the pendant trunk towards the south. There is evidence of an old fire burn here, as well as recent red-foliaged, beetle-killed trees and some old stump cuttings.



The magenta fireweed, a fire pioneer and member of the evening primrose family, blooms here in late summer. Clark's nutcrackers (first seen by William Clark of Lewis and Clark Expedition in 1805) are often heard uttering their raucous calls overhead.

The trail climbs steeply ahead into the hillside and then turns northeast (right) rather steeply along the side of the hill. Just below this turn and to the left (south towards Twin Sisters) is a large balanced rock and a small trail turn-off which leads along the hillside southwest and eventually back down to the main trail.

Up the hillside along which the main trail is now going grow many large ponderosa pines, some of which are bent around overhanging boulders. The "elephant head" again can be seen to the southeast (right) on the skyline from a spot along the trail about 80 feet up from the turn, at a break in the trees. Below in a little

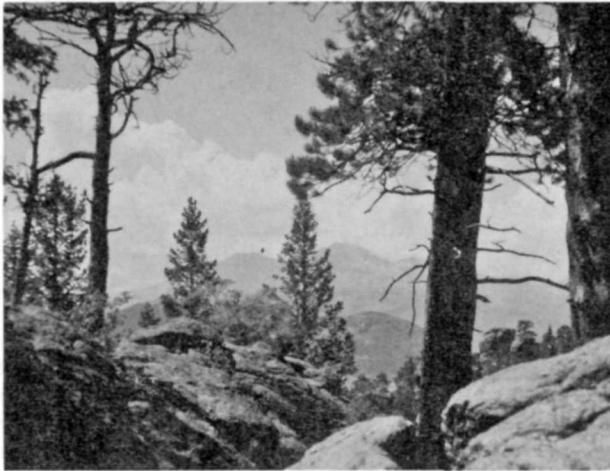
valley (right) where a small creek (often dry) emerges from beneath a large boulder (atop which two pines are growing), there is an interesting young bow-trunked Douglas-fir. The large boulder is sort of a natural bridge, having fallen from the hillside above to block the valley, the arch subsequently being filled up with dirt on which are now growing trees and shrubs.



The trail continues up the little canyon, passing a table rock (right) supported by two upright boulders (look back to see), and climbs along the rocky cliffside (right) covered with moss and lichens, thimbleberry, wax flower, chokecherry, polypody fern (growing in moist, shady crevices), and alumroot, then, eventually, up the northeastern head of the canyon. As the rock wall falls away to the south and the trail starts climbing steeply, an opening appears (right) which affords a nice "rock gap" frame of Long's Peak. On the rock wall a few feet east (left) of the gap is a "turtle" balanced rock. From this same spot looking about twenty feet up the trail and to the left, a leaning

Douglas-fir can be seen which has tipped across the top of a younger ponderosa pine, killing the top and forcing a side branch to grow out into a new top.

A ponderosa pine left of the trail near the beginning of this climb (SIGN NO. 6) is pitted with holes produced by the Williamson's sapsucker, a type of woodpecker which later returns not only to eat the oozed sap but also to pick out the insects which have become caught in the pitch. Beyond the pine and at the first upstanding granite boulder on the left (where a log barrier crosses the trail) there is a good view east (right) to the skyline where can be seen a very thin arch on the left end of the highest rock outcrop. Just beyond the log barrier one can look back (left) and down to the upstanding granite boulder previously mentioned and see numerous weather pits ("pot-holes") and two miniature natural bridges.



This weather pitting which will be common along the rest of the trail has not been caused by running water, as one might at first suspect, but rather by a combination of chemical and mechanical erosion. The granite is initially

weakened by acids from decomposing conifer needles, lichens and other vegetation, and from alternate expansion and contraction as the temperature changes. Water collecting in pockets and cracks of the granite freezes during cold weather, also expanding and flaking off bits of the rock. Meanwhile, the feldspar in the granite breaks down into clay as weathering proceeds. When the water dries up, the depressions are further enlarged by wind blasting at the decomposing granite, finally resulting in a series of basins which may erode through to produce arches. Potholes usually number six to twenty in a single outcrop, solitary ones being rare. The record pothole for this area occurs atop Lily Mountain to the south, measuring thirty feet across and more than ten feet deep.



The trail climbs left, and before the trail switchbacks right up the hillside there is a good view back to McHenry's peak (left of leaning tree) and Taylor peak (right of leaning tree) on the skyline to the southwest. Looking west across the valley from the right (leading

east) switchback one can see several dead-topped trees which have been struck by lightning. One in particular, about half-way up the far (west) slope, has a spiral gash in the bark with a fire burn at the base of the trunk. The split was caused by the sudden expansion of the tree's sap as a result of the lightning's intense heat.

The Williamson's sapsucker (a black and white woodpecker with yellow on breast, female with brown head) is occasionally seen in the small grove of tall, dead pines to the left (west) of the upper switchback and has nested in the nearest bark-stripped pine. Some of these pines were killed by beetles, as evidenced from the flow of pitch out of holes in the trunk. This is known as "pitching out," an attempt by the trees to drown the beetle larvae by throwing out pitch.

Looking back south from the top of the switchbacks (SIGN NO. 7) one gets a good view of Long's Peak in the distance, twelve airline miles away. Left of the trail on a granite outcrop is a balanced boulder. After about twenty-five feet of fairly level trail, the path recommences climbing, passing (right) several young, smooth and gray-barked, five-needled limber pines, the only type of white pine in the Park. Ordinarily, the limber pines prefer wind-swept promontories, such as occur on Trail Ridge. Ahead and left in the shade of a Douglas-fir is a large balanced rock, better seen from above. Downhill from this balanced rock are several old potholes in a boulder.

Within about 75 feet the trail levels, drops down briefly and then again gradually climbs about 200 feet up the slope. To the left in the small canyon up which the trail has come is a creek (dry in late summer) along which grow willows, Rocky Mountain cedar (fringy gray-green foliage), Douglas-fir, wax flower, aspen, Rocky Mountain maple, and Rocky Mountain birch (mahogany-colored bark marked with gray lines). Across the creek (SIGN NO. 8) is a fallen log covered with olive-green moss and two kinds of lichens, a gray crusty form and a shaggy gray-

green form resembling Spanish moss. The latter also grows on the shady sides of standing tree trunks but does not harm the trees. Upstream from this log is a young blue spruce. Note the sharp needles, each set on a wooden base or pedestal. Rising east and west the rock outcrops shelter canyon wrens whose clear, descending songs can occasionally be noted, also the burring chink of the rock wren. Pine squirrels, mountain chickadees and pigmy nut-hatches are often seen or heard chattering here.

The trail swings left along the edge of the creek, with much sapsucker working visible on the trees here, then switchbacks up the right hillside and, going between upstanding rocks, passes the park boundary sign (right). Within a few feet there is a register box (right). Visitors are urged to sign their names, giving an indication of usage in this particular part of the Park. More than 2000 hikers and horseback riders travel this trail each summer. Tourists are reminded that within a national park all features are preserved, including the animals, plants and rocks, so that all may have the opportunity to enjoy these things, untampered with by man's activity. The park entrance, incidentally, is 7/10 of a mile from the start of the trail. The section of the trail already traversed has run through private land.

From the park entrance register, through the Douglas-firs, one can see the profile of the Twin Owls on the skyline to the northwest, and a few feet up the trail a view southwest (left) opens up through the trees to a dead, lightning-struck, jagged-topped pine about seventy-five feet away. From here the trail climbs steeply north (note disarticulated rock "skeleton" 50 feet left of the trail here on a low ridge), then northwest along the east edge of a pleasant aspen grove in which runs a small creek (often dry) with a crowded undergrowth of bracken fern. Even in the slightest breeze the flat-stemmed leaves of these aspens flutter. On the dry hillside to the right grow Indian-hemp

(bell-shaped pink flowers, drooping opposite leaves), pink geranium, scorpion weed, and kinnikinnic (flat-spreading, evergreen shrub), while to the left miners-candle, wild mustard, tansy aster, goldenrod, gaillardia, bedstraw and sulphur flower are common during the summer.

At the point where the trail turns sharply right up the hillside there is a short side trail (left) down to the small creek in the aspen grove. Along this stream grow Rocky Mountain birch, aspen, Douglas-fir, kinnikinnic as a ground cover, pearly everlasting, white bog orchis, veronica, cress, and some large Rocky Mountain cedars. Following this side trail west up the hillside leads to a good vantage point for an unobstructed view of the Twin Owls profile, and, in the background, the snow-dotted peaks of the continental divide.

The main trail swings east up a dry open hillside where yellow, many-flowered puccoon blooms in July, goldenrod, wild yellow mustard, tansy aster, sulphur flower, common aster, sheathflower, and others in August. From the lower portion of this hillside trail there is a good view south to Twin Sisters peak and the former Bureau of Reclamation village at the foot of Prospect Mountain. The trail runs across much decomposed granite on this upward slope as it climbs into an open forest of mature ponderosa pines and Douglas-firs. The decomposed granite is mainly in the form of glassy chunks of quartz and gray crystals of plagioclase feldspar. Paralleling this main trail on the hillside above are several well defined game trails, probably made by deer.

As the trail swings south (right) and beside a rock outcrop to the west (SIGN NO. 9), there is a good view of Long's Peak (left) and to the west in the foreground the wooded flat top of Deer Mountain and, beyond, portions of Trail Ridge road from Many Parks Curve area to Rainbow Curve. Both the flat top of Deer Mountain (10,000 feet) and Trail Ridge (12,000 feet) were eroded off when these ridges were at a much lower elevation millions of years ago.

Subsequent uplift has preserved portions of these ancient erosional plains, separated by more recently eroded canyons. Such flat surfaces, lying at different altitudes, suggest that the formation of the Rocky Mountains involved alternating periods of uplift and of erosion. The name "peneplane" has been given to such eroded uplift surfaces.

The trail continues climbing gradually to the east and northeast for about 300 feet, with periodic good views back (west) towards the monolithin Twin Owls rock. To the south an irregular rock wall rises a short distance from the path. A faintly marked game trail leaves the main trail to the right shortly before a small cluster of aspens is reached. These aspens, like many along the Park's trails, show elk debarking.

The trail gradually swings northward. One hundred feet beyond the aspens where the trail definitely turns north (SIGN NO. 10) there is a granite outcrop close (left) to the trail which has several eroded, seat-like weather pits. From atop this outcrop there is a good panorama of the Front Range from Long's Peak to Trail Ridge. Note the young ponderosa pine growing out of a crack in this outcrop. The dead branches on the shrubbery in this area suggest heavy usage (browsing) by deer.

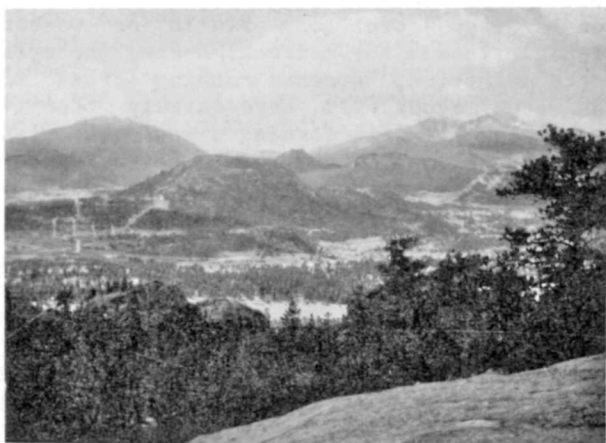
The trail climbs the slope to the north and then swings west, away from a fairly extensive open aspen grove on the east (right). There are many dead fallen aspens here which were probably killed originally by the elk debarking. There is a dense low ground cover of kinnikinnic in this grove, and, at times, some coralroot orchids are to be found.

The path climbs west (left) steeply a short distance, heading for a series of large rock outcrops. As the trail next turns north up the hillside (SIGN NO. 11) a side trail takes off to left (west) towards the rock outcrops, where several weather pits can be seen. Near the outcrops there is a scattering of quartz on the ground and three depressions filled with logs,

from which gravel for the trail was excavated by trail crews.

The main trail switchbacks up the hillside above the previously mentioned rock outcrops, with first a good view back to Lake Estes, and then, as the trail levels and swings north by a flat granite boulder, along the trail to the left, a good view of the power plant, Twin Sisters, Estes Park and the peaks of the continental divide.

Within a few feet from the flat observation rock the trail swings northeastward up the hillside beside a symmetrical Rocky Mountain cedar (right). Ahead to the left can be seen a big boulder fairly close to the trail which has several very deep weather pits in it. The trail climbs a short distance (about 150 feet) through an open forest, including many cedars, and then levels onto a broad rocky observation flat.



This gravel-bedrock flat, about $1\frac{1}{4}$ miles along the trail and a leisurely hour trip, is the best vantage point for the view of Estes parkland and westward to flat-topped Deer Mountain. South rises the knobby summit of Twin Sisters, with the fire lookout barely visible

atop one of the high points (11,436 feet). This fire lookout, incidentally, is the only one on the eastern side of Rocky Mountain National Park. Beyond Estes Park in the foreground rises Prospect Mountain. Farther to the west is Long's Peak, and on the skyline the peaks of the continental divide: left to right, Meeker, Long's Peak with notch on left, McHenry (pointed), Thatchtop (sloping), Taylor (pointed), Otis (sloping), Hallett's (very pointed), and Flattop (sloping). Notice how jagged are many of the peaks on this skyline and how "U-shaped" the adjoining valleys, all a result of cutting by ice (glaciers) in the past million years.

The great grassland in the foreground was formerly the site of Arapaho Indian summer villages, especially where the town of Estes Park is now located. The Indians called the basin "Tah Kah Aanon," "The Circle." This broad valley, unlike those to the west in the national park, was not created by glacial action. In this area crossed two long faults or weakened slippage lines in the bedrock. During the uplift of the mountains, streams rushing across this weak zone eroded it more quickly than the surrounding country, forming a vast meadowland.

On October 15, 1859, Joel Estes came by accident into this grassy valley, returning later to become the area's first settler. He and his family stayed until 1866 when he left for health and economic reasons, reputedly selling his squatter's rights for a yoke of oxen. The site of Joel Estes' cabin is at the junction of the North St. Vrain highway (running east across the middle of Lake Estes) and the road running south from the southeastern edge of the lake (Fish Creek road), and is marked by a large pillar of native granite. Byers, editor of the old Rocky Mountain News, so enjoyed his visit with the Estes in 1864 that he named the parkland for them.

Later, in the early 1870's, this same grassland became involved in a big "land grab" by an Irish nobleman, the Earl of Dunraven, who hired men to claim the land under homestead rights so

that the Earl could create a huge hunting preserve for himself and his European friends. The Earl build the first hotel in the region (the English Hotel, destroyed long ago by fire) and a small fishing lake which occupied the same valley where Lake Estes, a retaining reservoir for the Big Thompson irrigation project, is seen today. The Earl's cottage can still be visited along the Fish Creek road about half a mile south of the previously mentioned road junction. The white house is now part of the Dunraven Campfire Girls' camp.

The water in Lake Estes has been brought through the Rockies from Grand Lake by a series of pipes, the longest one (Adam's Tunnel) being 13 miles in length, nine feet in diameter and running 4000 feet beneath the continental divide at Andrew's Glacier. This tunnel comes out above the Y.M.C.A. conference grounds which can be seen as a group of red-roofed buildings dotting a grassland slope in the foreground right of Long's Peak and beneath McHenry's peak. Incidentally, over the conical wooded hill beyond the Y.M.C.A. camp towards McHenry's lies Glacier Basin Campground.

From this vantage point the three main approach roads to Estes Park from the east can be picked out. The South St. Vrain highway swings south, right of the rodeo grounds, and leads into the historic gold country of north central Colorado; the North St. Vrain road crosses Lake Estes and rises into wooded hills, being the most direct route towards Denver; the famous Big Thompson highway skirts the north side of the lake before it disappears into the canyon. The village of Estes Park, towards which these roads converge, was incorporated in 1905, at which time 25-foot lots on the main street (Elkhorn Avenue) sold for \$50.

It is interesting to note how much denser the woodland on the distant, north-facing hillsides to the south is than the forest through which we have been hiking. The north slopes, being shadier and cooler, provide fine habitat for almost pure stands of the Douglas-fir, whereas

the drier, sunnier, south-facing slopes are suitable primarily for the open forests of ponderosa pine.

Looking east and somewhat north from this rock promontory one can see, across the wooded valley and close to a rocky ridge, a terrace of potholes, one above another, in a narrow outcrop. As one leaves the promontory there is, left beside the trail, a very small limber pine growing right out of a granite boulder, together with a wax flower and thimbleberry shrub.

From this vantage point the broad gravel trail climbs to the northeast into and out of a shady cedar-aspen-Douglas-fir grove and then into an open forest of ponderosa pines where in the latter part of the summer goldenrod blooms alongside the trail. Antelope brush and Kinnikinnick are common beside the path on this hillside. In the trees are often heard the mountain chickadees, and chipmunks are abundant in the rocks.

The trail climbs steeply and then levels, skirting the mountainside with continual views into the Estes parkland to the south. On the left (SIGN NO. 12) up the hillside several of the large pines show sapsucker pitting on their trunks. This hillside is covered with tumbled boulders, many large ones forming natural caves and overhangs. Some of the big pines have been forced to spread and flatten their trunks around these rocks during growth, and in cracks atop many of the boulders young trees are growing. The cracks, and the sparse soil which they contain, have been produced by a combination of mechanical weathering and the work of primitive pioneer plants such as the crust-like lichens and the mosses. Beneath the rock overhangs can be found small funnel-like craters in the sandy soil made by predaceous ant-lions. White puffballs are commonly encountered growing out of the pine duff on this hillside in mid-summer. Beside the trail (right) there is an oblong black boulder around which a pine has grown (SIGN NO. 13). The dead pine beyond this spot (right) was killed by lightning.

Notice the gash down the east side of the trunk.



As the trail approaches a draw and swings right, note a small ravine to the left of the trail up which there is evidence of a fire burn among the pines and Douglas-firs (SIGN NO. 14). This particular fire, started by a cigarette, was reported on July 14, 1948, more than 24 hours after it had been started. It was estimated by the national park ranger force that between 100 and 150 people passed the fire as it burned, yet the report was finally turned in by an observer seeing the smoke from Estes Park. The fire was crowning and spreading at the time of discovery, and twenty men on the fire worked until the afternoon of July 16 to put it out. The fire burned only one-third of an acre but cost \$235.18 to extinguish, an emphatic commentary on the cost of carelessness. Much of the area has grown up in a heavy cover of bracken fern at the present time. Along this same section of trail is evidence of a much older fire burn, probably one started by lightning. The antiquity of this latter burn is emphasized by the fact that fire scars on living trees on the hillside have been nearly covered by a growth of bark.

As the trail comes east off the hillside onto

a small, gravel, rocky flat (SIGN NO. 15), there is a view left up the rocky hillside to several red-topped pines which have probably been killed by beetles. South (right) of the flat rise a series of rock outcrops. It is worth strolling southeast to the east edge of the outcrops to see (south) a tall pillar of granite rising from the main portion of the outcrop. East across the valley from this same point can be seen a gigantic rock arch being weathered out of the bedrock. Farther to the left up the skyline is an interesting series of jagged, wedge-shaped rock spires. In the grassland below can be seen the Devil's Gulch road.

Returning to the main trail, it drops northward several hundred feet into a walled canyon. On the left beside the trail as the trail starts to drop can be seen a Douglas-fir, limber pine and a ponderosa pine growing out of a blackened boulder. Down the slope as the walled canyon is entered and the trail begins climbing again, there is a huge boulder (left) overlying a low-ceilinged cave which is always refreshingly cool, even on the warmest summer day (SIGN NO. 16). Fifty feet beyond on the right by the trail is a large ponderosa pine whose bark has been riddled with sapsucker workings. East up the far hillside can be seen many balanced rocks and layered cracking of the bedrock.

To the right of the trail in this shady canyon a small creek runs most of the summer, having a tendency to dry up or become filled with algae late in the season. Along this creek is a dense grove of shaggy Engelmann spruce, one giant beside the trail (right), having a diameter of $32\frac{1}{2}$ inches (SIGN NO. 17). (This spot is about $1\frac{3}{4}$ miles from the beginning of the trail.) It is unusual to encounter the Engelmann spruce in this particular area at such an elevation without the transitional belt of lodgepole pines between the spruce and ponderosa pines. Some of the dead branches of the spruce are covered with a gray-green lichen. This lichen, like those on rocks, is

not parasitic. It grows on dead branches simply because there is more room on dead branches devoid of foliage. Along this creek, together with the spruce, there are a few Rocky Mountain birch and young aspens. Around the bases of the spruce trees north of the giant spruce are piles of cone debris ("kitchen middens") left by pine squirrels. These animals are closely associated with the spruce-fir forest of the higher mountains. Often during the summer the small lithe squirrels can be heard noisily chattering or can be seen cutting and tearing apart cones to obtain the seeds. They sometimes cache green cones alongside the small creek where the cones will remain moist, and hence unopened, until needed.

In this moist canyon which the trail is now traversing, many flowers bloom during the summer, including chiming bells, leafy cinquefoil, wild raspberry, wax flower, heartleaf arnica, pink geranium, rose, senecio, shooting star, pearly everlasting, mountain gooseberry, and others. There is some Rocky Mountain maple here and, unfortunately, an occasional mosquito.

The trail soon crosses the stream to the northeast (SIGN NO. 18). A faint trail goes left into a tributary canyon, following one branch of the stream, but is soon obscured in low dense thickets of mountain ninebark. Looking from the stream crossing up this side canyon about 150 feet, beyond and to the right of a tall red-barked spruce, one can see a somewhat shorter gray-barked alpine fir, an unusual species for this section of the park but commonly associated with the Engelmann spruce where the two trees form a great forest on the flanks of the continental divide to the west.

After crossing the creek, the main trail heads up a narrow walled canyon closed in by moss, lichen and liverwort-covered rock outcrops. Growing from the crevices in these rocks are alumroot and an occasional dotted saxifrage cluster. The latter are worth a close look to see the delicate red dots on the glossy white petals. Both of these plants are in the

botanical family Saxifragaceae, whose members are pioneer "rock breakers." Solomonplume grows close along the trail, blooming in early summer and bearing red fruit later on. The rocks walling this canyon exhibit interesting horizontal layering. Ahead up the canyon (right) rises a tall, fire-burned, lightning-debarked yellow ponderosa pine.

At the upper end of this narrow canyon the trail makes several short steep switchbacks, levels, switchbacks again and comes out onto a flat after a leisurely hour and a half on the trail. To the left nearby is "Paul Bunyan's Boot," a huge granite rock in the form of a foot with a weather-pitted hole in its gigantic sole. Behind to the west is a group of balanced rock figures. Northwest beyond the boot area is a canyon of spruce and large aspens.



East of the trail here is a small canyon along the bottom of which, in early summer or during moist weather, runs a little creek. Out of this shady canyon rise some unusually large and tall aspens. Slightly north of east, on the skyline, can be seen a large round balanced rock on the side of a dome-shaped eroded knob.

The trail leaves the Paul Bunyan Boot flat and swings northeast briefly into a rocky, wooded dell of aspens, Douglas-fir and Rocky Mountain maple, with rock walls covered with moss and lichen. Kinnikinnic, wild rose, harebell, wax flower, goldenrod, thimbleberry, wild raspberry, and dwarf juniper grow commonly here. The trail leaves this dell to the east and starts climbing the hillside by a series of steep switchbacks where wild raspberries are plentiful.

Before starting the steep climb, the trail turns right (SIGN NO. 19) at a grove of tall aspens (ahead of the trail and in front of a gigantic boulder) and after a short climb turns left again. The next section of trail runs alongside a rock wall (right) in whose crevices grow three varieties of ferns, Malefern (fairly large and bushy), Brittlefern (small and delicately dissected) and Western Polypody (rounded lobes), finally coming out beside the large boulder below (left) in the valley. Looking back to the southwest skyline from this point (i.e., left above the path) one can see a rock "setting hen" atop the near ridge. Looking northwest above the large boulder to the high rock wall on that skyline one can, with a good imagination, make out the imprint of a huge bighorn sheep's face on the cliff, the nose pointing south, the horn curled around to the northeast.

The trail makes another short right turn, and then a left turn onto a fairly long stretch of trail trending northeast, along which grow dotted saxifrage, maple, wax flower, and Douglas-fir. At the bend where this section of trail again turns right a slanting rock shelter is a welcome sight to hikers in bad weather.

The trail goes right about thirty feet, then turns northeast again for some distance, with a large, fire-scarred but living limber pine (left) about 100 feet above the turn (SIGN NO. 20). The living bark can be seen covering the old fire burn at the base of this tree. Large black carpenter ants are often seen running in

and out of holes in the fire scar. As the trail approaches the east wall of the canyon, it switchbacks steeply several times, coming out onto a small, treeless, open promontory (twenty feet beyond SIGN NO. 20), from which point one can look back down into the aspen-filled canyon, on to the west towards a sloping rocky hillside covered with many beetle-killed, as well as living, Douglas-firs, and across to the "sheep face" atop the north rock wall. On the immediate slope are several fallen trees showing an old fire burn.

From this vantage point back to the south near the skyline and left of Long's Peak can be seen a tiny, balanced rock which resembled a seal, the animal appearing to be bouncing a stone "tennis ball." Beyond the vantage point, the trail winds towards the rock wall and then for about fifty feet right along the cliffside. Above the trail both horizontal (high up) and vertical (lower) jointing is evident in the granite cliff, and much moss and alumroot is growing out of cracks in the rock. Below the trail grow many bushes of thimbleberry and wax flower. The rough and rocky trail swings left away from the cliff face and ascends through an area of boulders, interspersed with turnip-leaved senecio, wax flower, thimbleberry, and wild raspberries.

Several walled switchbacks take the hiker up the upper end of the canyon (SIGN NO. 21). There is a good view southwest from the upper switchback of the Front Range, extending from Long's Peak north to Flattop. The smoke from Glacier Basin campground can be seen in the distance (southwest, in the summer), and nearer the red-topped buildings of the Y.M.C.A. Conference Grounds.

The trail emerges onto the rocky saddle, between two granite walls, and soon the south west edge of Gem Lake is reached, after about two hours on the trail. South of the lake in wet weather there may be a water seepage over the rocks and down the hillside. In this area, a few feet right of the trail and about 75 feet

south of the lake, there is a lone willow.

The trail drops to the lake shore and skirts the west side, continuing into a rock-walled canyon to the north. At the north end of the lake is a hitching rack, a fireplace, and, beyond, against the east cliff, are rest rooms. Incidentally, a fire permit must be obtained from the National Park office in Estes Park for the use of the fireplace. From here the trail continues northward, dropping into a small aspen grove, to the McGraw Ranch, Glen Haven, and eventually up to Lost Lake. It is worth walking to the north end of the lake for the view south to Twin Sisters and often a beautiful reflection of the rising cliffs in the lake.

Gem Lake, about 200 feet long by 150 feet wide, has neither inlet nor obvious outlet. It is fed by rain, snow-melt and seepage. The lake occupies a shallow basin which was probably produced in the same way that weather pits are produced. The layered granite rocks surrounding the lake, especially at the southwest end, are good examples of exfoliation weathering. In the rock basin east of the lake, at the cliff base, can be seen some large limber pines and Douglas firs and many deep weather pits. Early in July the red clusters of rock saxifrage will be blooming on ledges overhanging the lake, and along the west shore many maples are to be seen. White-throated swifts and violet-green swallows play over the lake, as well as, at dusk, an occasional brown bat, catching insects. In the shallows can be seen tadpoles and adult three-lined tree frogs, backswimmers (true bugs), water striders, and other aquatic life. Dragon flies are common, flying across the water. There are no fish in this lake, because of the tepid water and other factors.

It is possible to scramble up the rock wall to the northeast of the lake, taking the narrow rock trail leading east from the rest rooms up the cliff or going up the rock ledge south from the rest rooms. From the top of the cliff, one cannot only look back down on the lake but also get excellent views of the mountain

country to east and west.



Potholes dotting this cliff-top are often filled with rain water and contain an amazing variety of animal and plant life, including primitive flatworms (planaria), small back-swimmers, aquatic beetles, and many small, transparent fairy shrimp which typically swim upside down and whose black eyes stand out conspicuously in the light bodies. The eggs of the shrimp apparently can withstand periods when the potholes are dry of water, hatching out into adults when water is available. The pines atop the outcrop are, in the main, five-needled limber pines. There is one young Douglas-fir whose foliage has completely filled the basin of a pothole.

To the west beyond the lake is a good view of exfoliation on the granite mountain-side. To the east and northeast an interesting view can be had onto a rocky pothole flat and on towards a cliff peppered with all sizes of potholes. Beyond is visible the Great Plains country near Greeley.

The return trip from the lake, taking about

an hour, is made over the same trail, or one can return via the McGraw Ranch trail. The latter trail drops about 500 feet in $1\frac{1}{2}$ miles and reaches the Devil's Gulch road roughly $5\frac{1}{2}$ miles from Estes Park.



With the completion of your trip, we hope that you have enjoyed this naturalist guide. After visiting Gem Lake, you might like to explore more of Rocky Mountain National Park, in which there are about three hundred miles of developed trails. Each day throughout the summer season there are ranger naturalist conducted trips on the trails, while every evening, at various locations including Moraine Museum and Glacier Basin Campground, illustrated naturalist lectures are given on subjects of outdoor interest. Free schedules of naturalist activities are available at the National Park office near Estes Park and at Moraine Museum.

