

TETON TRAILS

A NATURALIST'S GUIDE TO GRAND TETON NATIONAL PARK



The Tetons as seen from Lake Solitude

MUSEUM BULLETIN NO. I.

JACKSON HOLE MUSEUM ASSOCIATION

TETON TRAILS
A NATURALIST'S GUIDE
TO
GRAND TETON NATIONAL PARK

BY

HOWARD R. STAGNER

Revised by

CARL E. JEPSON

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A TABLE OF TRAIL DISTANCES

TRAIL DISTANCES		(Continued)	
Around Leigh Lake	7 1/2 Miles	7 to 8	1 Miles
Around String Lake	4	7 to 6	2 1/4
Around Jenny Lake	7 1/4	7 to 22	9 1/2
FROM JENNY LAKE MUSEUM TO :		7 to 24	9 1/2
String Lake	3 1/4	7 to 28	1 3/4
Leigh Lake	4	8 to 9	2 3/4
Amphitheater Lake	6 3/4	9 to 10	2 1/4
Bradley Lake	6	9 to 25	3
Taggart Lake	7 1/2	9 to 27	2 3/4
Holly Lake	9 1/2	10 to 11	1
Hidden Falls	2 3/4	11 to 12	1
Forks of Cascade Canyon	6 3/4	12 to 13	1/4
Lake Solitude	9 1/2	11 to 14	3 3/4
Divide So. Cascade Canyon	13	14 to 15	2
FROM PARK HEADQUARTERS TO :		15 to 16	2 1/4
Taggart Lake	2	15 to 17	9
Bradley Lake	4	17 to 18	2
Amphitheater Lake	8 1/4	16 to 18	5
Phelps Lake	6 3/4	16 to 19	3 1/2
South End Skyline Trail	9	19 to 20	6
Head of Death Canyon	13	20 to 21	6
Marion Lake	16	21 to 22	3
Alaska Basin	14	21 to 6	4 1/2
BETWEEN NUMBERS ON TRAIL MAP.		22 to 23	2 1/2
1 to 2	3 1/2	22 to 7	9 1/2
1 to 3	2 3/4	22 to 24	4 3/4
2 to 3	3/4	24 to 3	5 1/2
2 to 4	1 1/4	24 to 7	9 1/2
3 to 5	1 1/4	25 to 28	5
4 to 5	1/4	28 to 26	3
5 to 6	2	28 to 27	5
5 to 7	3	28 to Teton Glacier is	
6 to 7	2 1/4	6 1/2 Miles.	

Distances given above are to the nearest 1/4 mile.

THE GUIDEBOOK

The purpose of this guidebook is to point out the important scenic and natural features along the trails of Grand Teton National Park, and to supply the necessary information for an understanding and appreciation of them. Most of the comments are necessarily brief, and merely list or point out important features. At important points longer discussions serve to coordinate the many items mentioned briefly along the trail.

For the purpose of this guidebook the trail system is divided into sections, each section including that portion of the trail system which would be traveled in reaching a given destination. Numbers have been placed on the trail map at the trail starts, junctions and ends of trails. A full size map appears on Page 4, and smaller portions of the map, enlarged in scale, are shown at the beginning of sections of the trail being described.

All trail descriptions are written as though the traveler were going in a direction away from the Museum or other starting point for that trail. The important details or phenomena to be observed along a section of trail are located in relation to their proximity to important land marks or viewpoints such as creek crossings, waterfalls, talus slopes or other easily recognized points along the trail.

A number of photographs taken from important viewpoints on the trails have been included as a means of assisting the hiker in locating his position on the trail and in recognizing the important features to be found along the Teton Trails.

Distances given are from the Museum or from other important trail starts as: Park Headquarters, String Lake or the White-Grass Snowshoe Cabin. A table of trail distances is given on Page 6. Most trails start at the Jenny Lake Museum but the start of some of the trails may be reached by going some distance by car. All trails except the secondary trails are suitable to horse travel. Before starting on extended pack trips inquire at the Museum as to the condition of the trails.

Annotated lists of birds, mammals, flowers and trees, a summary of geologic history of the region, origin of some of the important place names, a table of elevations and a glossary of scientific terms are included as aids to a better understanding of the phenomena described.

GRAND TETON NATIONAL PARK

Grand Teton National Park includes the most scenic portion of the majestic Teton Mountain Range and the northern portion of Jackson Hole, a high mountain valley famous for its associations with early western history. Through congressional action in 1950 the greater portion of the former Jackson Hole National Monument was added to the park. The portions not so added were included in the National Elk Refuge and the Teton National Forest. The enlarged park contain about 484 Sq. Miles.

The park is a part of the National Park System owned by the people of the United States and administered for them by the National Park Service of the Department of the Interior.

The great array of peaks which constitute the scenic climax of Grand Teton National Park is one of the noblest in the world. Southwest of Jenny Lake, which is in the central portion of the park, is a culminating group of lofty peaks whose dominating feature is the Grand Teton. Much of the mountainous area of the park is above timber line; the Grand Teton rises to 13,766 feet and towers more than 7000 feet above the floor of Jackson Hole.

The Snake River, flowing south from Yellowstone National Park, widens into Jackson Lake, 14 miles long. Below the lake, the swift river bisects and cuts even deeper into the glacial outwash plain of the Ice Age. North of this upland valley lie the high plateaus of Yellowstone National Park; on the east and south are the Mount Leidy highlands and the Gros Ventre Mountains. Emma Matilda and Two Ocean, two lovely mountain lakes, lie north of the Snake and its tributary, Buffalo Fork.

Together the Teton Mountains and Jackson Hole form a Landscape of matchless grandeur and majesty unlike any other in America.

HELP PROTECT THIS PARK

National parks are established "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Please cooperate in maintaining and protecting this park. The following gives a brief summary of some of the park rules and regulations for your guidance.

PRESERVATION OF NATURAL FEATURES AND PUBLIC BUILDINGS -- Trees, flowers, vegetation, rocks, minerals, animals or birds may not be disturbed, injured, or destroyed, and buildings, signs, or equipment may not be defaced or destroyed. No material of any kind may be taken from the park without a written permit from the superintendent.

BEARS Feeding, touching, teasing, or molesting bears is prohibited. Any close approach to bears is dangerous.

CAMPING Camps should be kept clean, rubbish and garbage burned, and refuse placed in cans provided for this purpose. CAMPFIRE PERMITS ARE REQUIRED for building campfires in areas outside designated campgrounds.

FIRES Be careful with fires at all times. Make sure your campfire is completely out before leaving it. Smoking and the building of fires may be prohibited when hazard makes such action necessary. ALL KINDS OF FIREWORKS ARE PROHIBITED.

FISHING Fishing regulations are subject to change from year to year and the limit for a day's catch may vary. Learn the limit and the regulations before starting to fish in any of the park waters. Fishing in any way other than with hook and line, and with the rod or line held in hand, is prohibited.

A STATE FISHING LICENSE IS REQUIRED.

HUNTING Public hunting within the park boundaries is not permitted and the use of firearms while in the park is prohibited except upon written orders or permission from the superintendent.

BOATING Boating permits, which are required for boats placed on the waters of the park may be obtained at any ranger station.

MOUNTAIN CLIMBING All mountain climbers must register at the ranger stations before starting to ascend any peak and must report their return from each climbing expedition.

SOLO CLIMBS ARE NOT PERMITTED.

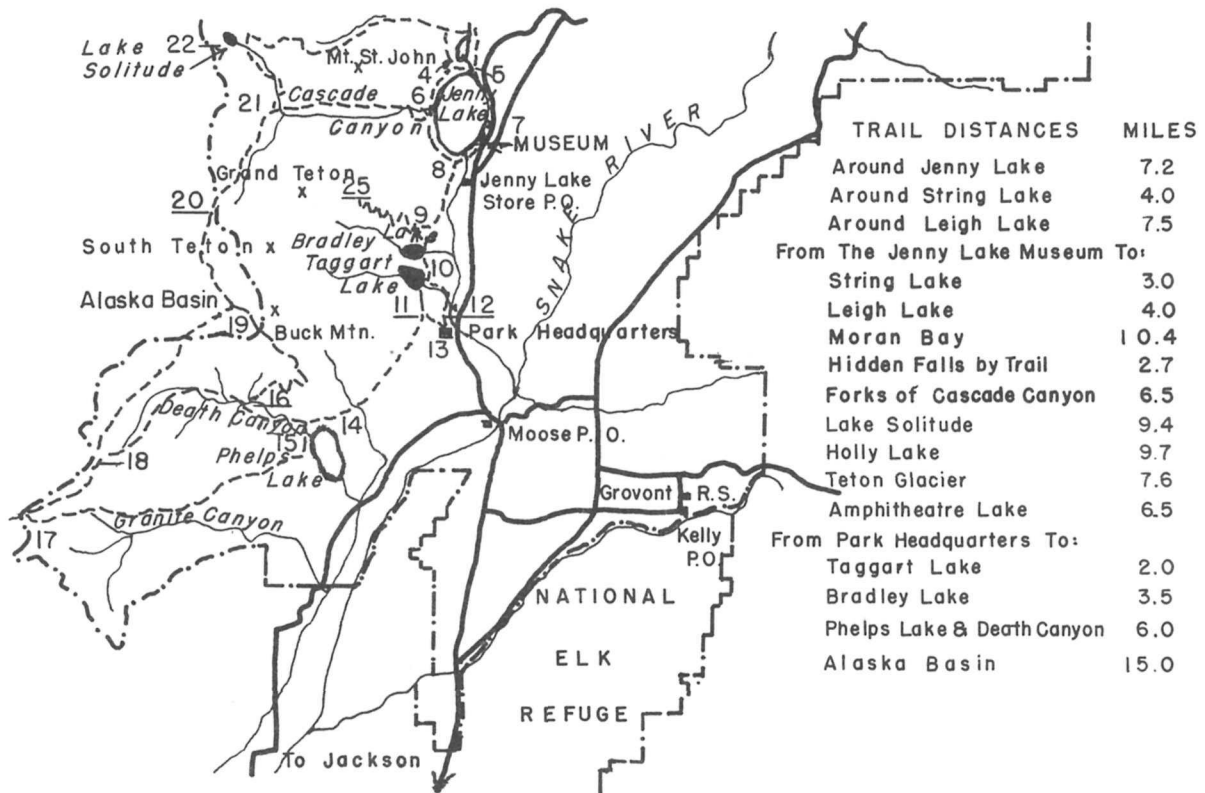
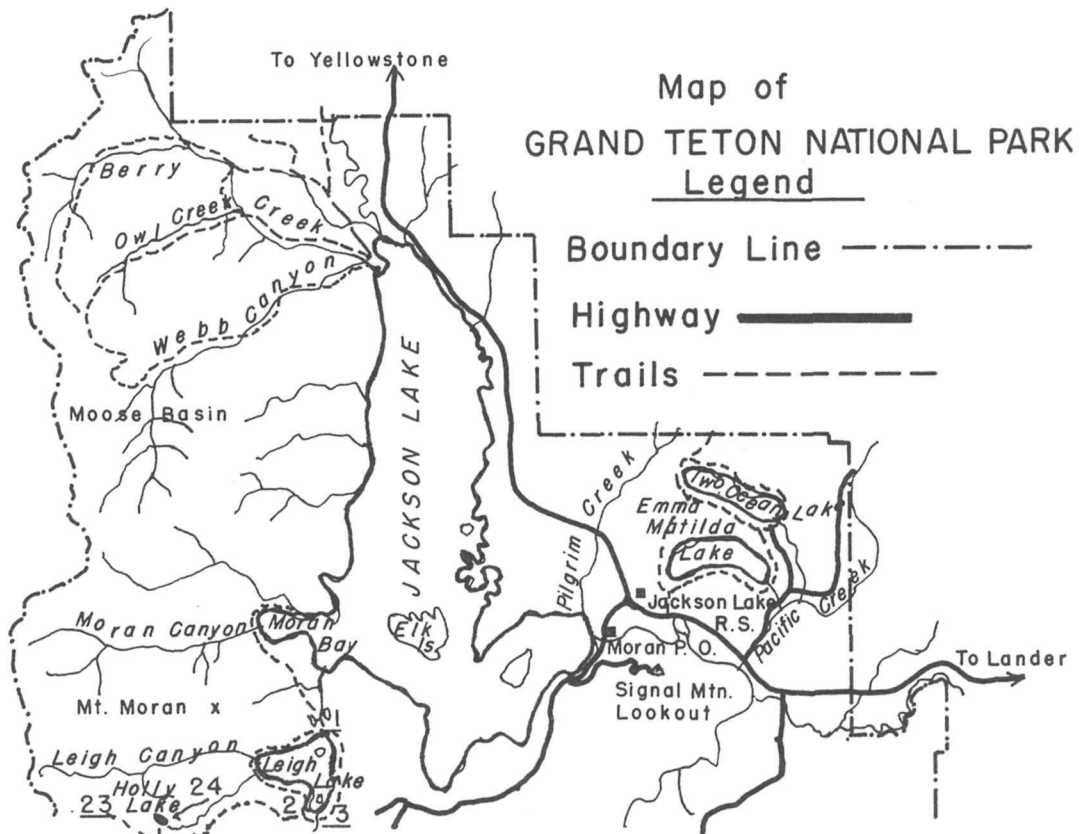
AUTOMOBILES Drive carefully at all times. Speed limits are posted; these vary for different sections of the park. All accidents should be reported at the nearest ranger station.

DOGS AND CATS Dogs and cats may be taken into the park, but must be kept on leash, crated, or otherwise under physical restrictive control while within park boundaries.

PENALTIES The penalty, upon conviction, for violations of the rules and regulations may be a fine not exceeding \$500, or imprisonment not exceeding 6 months, or both, together with all costs of the proceedings.

ADMINISTRATION

The superintendent is the representative of the National Park Service in immediate charge of the park, with offices at park headquarters. Park rangers and ranger-naturalists are stationed at various locations in the park to assist in the protection of the area and to help visitors to enjoy the park and understand its natural phenomena.

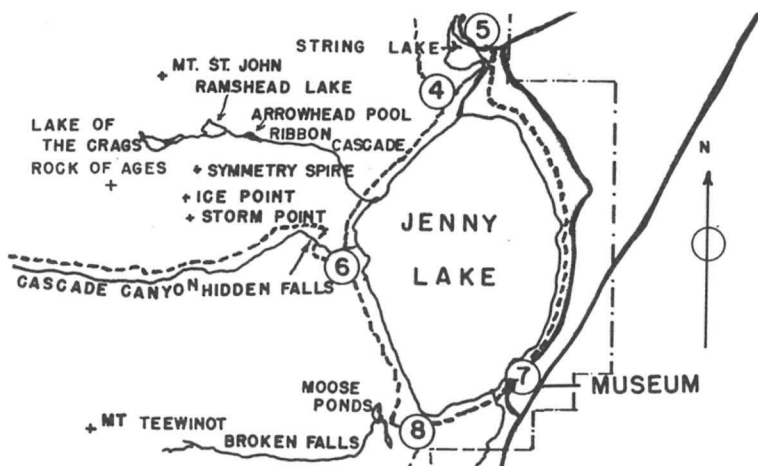


THE TRAIL MAP NUMBERS

Numbers on the Trail Map refer to the following locations:

1. Junction of Leigh Lake and Moran Bay Trails.
2. Junction of Indian Paintbrush Canyon and String Lake Trails
3. Junction of the Leigh Lake and String Lake Trails.
4. Junction String Lake and Jenny Lake Trails.
5. The Start of the String Lake and Jenny Lake Trails.
6. Junction of Cascade Canyon and Jenny Lake Trails.
7. Trail Start at the Jenny Lake Museum.
8. Junction of the Jenny Lake and Lakes Trails.
9. Junction of the Teton Glacier and Lakes Trails.
10. Junction of Taggart Creek and Lakes Trails.
11. Junction of Beaver Creek and Lakes Trails.
12. Junction of Beaver Creek and Taggart Creek Trails.
13. The Trail Start at Park Headquarters.
14. Start Death Canyon Trail at White Grass Snowshoe Cabin.
15. Junction of Death Canyon and Marion Lake Trails.
16. Junction of Death Canyon and Alaska Basin Trails.
17. Marion Lake. Elevation 9,275 feet.
18. Summit Divide of Death Canyon. Elevation 9,500 feet.
19. Summit Divide of North Fork of Death Canyon. Elev. 10,800
20. Summit Divide of South Fork Cascade Canyon. Elev. 10,644'
21. Forks of Cascade Canyon and junction of the trails.
22. Lake Solitude. Elevation 9,024 feet.
23. Summit Divide Indian Paintbrush Canyon Trail. Elev. 10,600
24. Holly Lake. Elevation 9,400 feet.
25. Amphitheater Lake. Elevation 9,750 feet.
26. Junction of Garnet Canyon and Teton Glacier Trails.
27. End of Garnet Canyon Trail. Elevation 8,500 feet.
28. End of Road and Start of the Teton Glacier Trail.

THE TRAIL AROUND JENNY LAKE 7 Miles



The trail starts across the road from the Jenny Lake Museum
Important points of interest for each mile are:

First Mile: Jenny Lake - elevation 6779 feet, depth 256 feet, length $2\frac{1}{2}$ miles, width $1\frac{1}{2}$ miles. Named for the Indian wife of "Beaver Dick" Leigh, guide for the Hayden Survey of 1872

The two mountain peaks across the lake are; Mt. Teewinot, elevation 12,317 feet. The Indian word means (Many Pinnacles), Mt. St. John, elevation 11,412 feet, named for a geologist of the Hayden Survey of 1877.

Note the low inner moraine of Jenny Lake; the outlet of the lake; the footbridge and boat dock on Cottonwood Creek and that the trail passes over a low valley crossing the moraine, probably an old outlet of Jenny Lake.

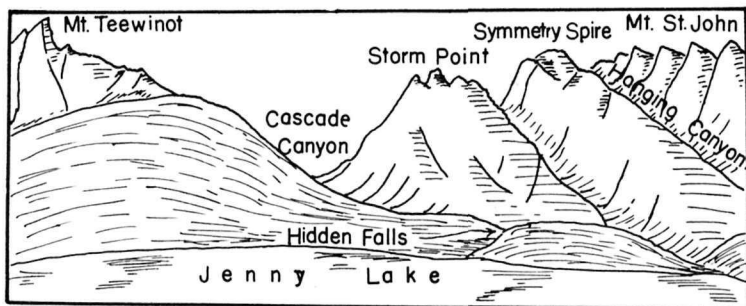
Several large boulders being covered with lichens, moss, and small plants; a forest of several varieties of trees and shrubs.

Trail junction No. 8 is passed at $\frac{3}{4}$ mile from Museum.

Near the end of the first mile the moraine becomes very hummocky and is typical dumping ground topography of glaciers.

The first mile ends at the overlook of the Moose Ponds, this is an ideal spot from which to observe moose and beaver in the late afternoon.

The Teton peaks in view are named in the sketch at the top of page 8.



Looking west across Jenny Lake from Museum

Second Mile: Overlooking Moose Ponds, formed by the damming up of the drainage from Mt. Teewinot by the Jenny Lake Moraine.

Common habitat of moose and beaver. Beaver dams, ponds, beaver slides and cuttings of aspen trees visible at this point.

Other points of interest for the second mile are; The flattened irregular top of the Jenny Lake moraine; a number of moose rubbing posts; (scars on small trees made by moose rubbing the velvet from their antlers), several good view of Jenny Lake; colorful flower displays depending upon the season of the year.

Between the trail and the lake is an area of loose, angular boulders representing the original surface of the moraine not yet covered by soil and trees. Here the moraine rests directly upon the lower slopes of Mt. Teewinot and in some places merges with the talus or loosened rock that has tumbled down the slope to cover the moraine.

Seepage of water through the loose rock of the moraine and good exposure to sunlight make of this area a vertiable flower garden.

Third Mile: This mile begins at the Boat dock on the west shore of Jenny Lake.

Good views of the tree-covered moraine on the north and east sides of Jenny Lake, which fills a basin partly glacier-scooped and partly moraine dammed.

The trail passes through a forest of large Douglas firs, with moss lichens on their banches, several alpine fir and a number of large Engelmann spruce. A few quaking aspen and cottonwood trees line the shoreline of the lake. A few beaver cuttings

One-fourth mile from the boat dock, trail junction No. 6 is reached.

One-half mile up Cascade Canyon or the left hand trail Hidden Falls is located, further described in the description of the trail to Lake Solitude.

Follow the trail to the right to go around Jenny Lake.

Note the three bridge crossing of Cascade Creek and that this creek in building a delta at its mouth has separated into several branches near its mouth.

From the creek crossing of the stream coming down from the Hanging Canyon between Symmetry Spire (left) and Mt. St. John (right) note the tree covered flat peninsula extending into Jenny Lake. This is an old delta now built above water level.

The present delta is forming where the shallow, yellowish lake bottom is visible at the mouth of Cascade Creek.

Fourth Mile: Note the fine view of the highpeaks to the southwest; the good view across Jenny Lake to Sheep Mountain on the east side of Jackson Hole; the hummocky Jenny Lake moraine pushed against the mountain front; that the slow seepage of water through the moraine provides constant moisture for the fine Engelmann spruce-Douglas fir forest on the west side of Jenny Lake and that the few lodgepole pines which were probably the original forest are now almost completely replaced by a spruce-fir forest.

Fifth Mile: A short distance from junction No. 4 on the trail to the right is the String Lake outlet and trail junction No. 5.

To the northwest, across the lake is Mt. Moran with its black diabase dike and Falling Ice Glacier in view. To the west across the bridge is Mt. St. John (left) and Rockchuck Peak (R).

The trail passes through the woods for one and one-half miles to the east shore of Jenny Lake. Notice that the small rounded pebbles and sand covering this flat are materials deposited by water and that this area was once a stream bed.

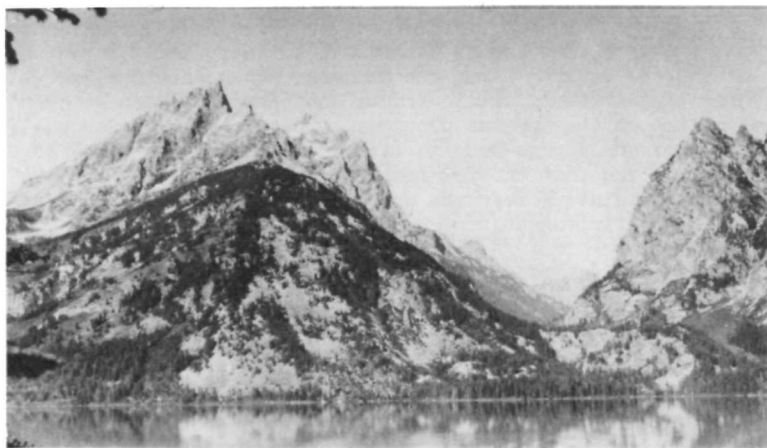
The trail passes through a few fine groves of Engelmann spruce. There are also a goodly number of Douglas Fir. Note the large number of squirrel caches under the large trees.

The Jenny Lake moraine becomes very irregular and hummocky; the stream flowing from String Lake is one of the inlets of Jenny Lake. The fifth mile ends in the forest about one-third mile from where the trail leaves the stream.

Sixth Mile: A good view across Jenny Lake toward the high peaks may be obtained from the lake shore about fifty yards to the southwest from the trail.

Note that the many white, angular granite boulders, not rounded as are boulders transported by streams, are glacier carried boulders. (Very similar granite occurs in place several miles up Cascade Canyon).

There are pure stands of Douglas fir forests and in some areas of the forest there are many small alpine fir and some large Douglas fir indicating that the Douglas fir forest is being replaced by the alpine fir.



THE JENNY LAKE VISTA: A viewpoint or overlook from the highway and trail following the east shore of Jenny Lake. This point is less than one and one fourth mile from the Jenny Lake Museum. The sixth mile ends one-fourth mile south of the vista.

The canyon directly across Jenny Lake is named Cascade Canyon.



THE JENNY LAKE MUSEUM

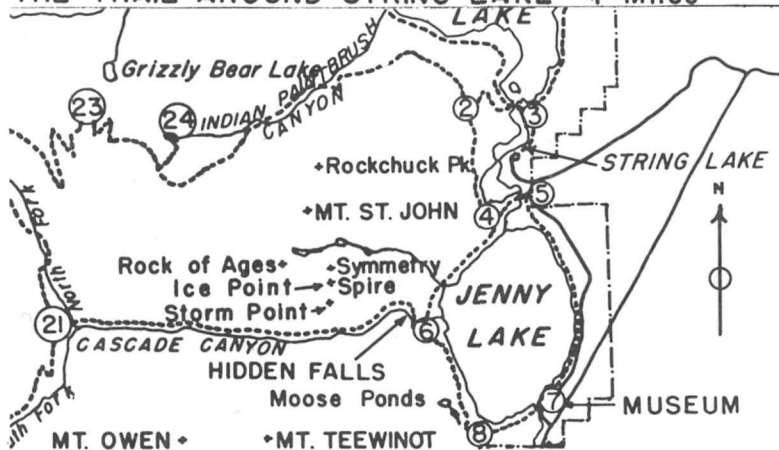
Seventh Mile: The basin of Jenny Lake was partly scooped out by a glacier coming down Cascade Canyon and partly dammed by the moraine deposited around the edge of the glacier. The morainal ridge, now forest-covered, can be traced all the way around Jenny Lake from one side of Cascade Canyon to the other.

This last mile of the trail around Jenny Lake contains several open vistas of the lake and the mountain peaks to the west. At a point one-fourth mile from the Jenny Lake Museum this trail joins the Jenny Lake Nature Trail along which many of the natural features, plants, and rocks are fully described on trail side markers

The trail ends at the Jenny Lake Museum which contains exhibits of geological, historical, and biological phenomena relating to the park and gives the interesting story of Mountaineering in the Tetons.

Here the National Park Service provides information service through its naturalists and ranger-naturalists, who conduct, nature walks, all day hikes, auto caravans and give campfire programs or illustrated nature talks each evening during the summer season.

THE TRAIL AROUND STRING LAKE 4 Miles



This trail may be reached either by hiking the Jenny Lake trail along the east side of Jenny Lake or by driving to the start of the trail at the String Lake outlet two and one-half miles by road from the Jenny Lake Museum.

The trail around String Lake is about four miles in length and is frequently used for the nature walks given by the ranger-naturalists. The circuit of the lake can be made in either direction.

The following points of interest may be observed by starting at the south end of the lake and going around its west side first and then returning along the east side.

Three trail junctions are made on this trail, one with the Jenny Lake trail, No. 4, one with the Indian Paintbrush trail No. 2, and one with the Leigh Lake trail No. 3.

The trail skirts the base of Rockchuck Peak on the west side of String Lake.

String Lake fills a narrow, meandering depression, possibly an old river channel now obstructed by the Leigh Lake Moraine on the north and the Jenny Lake moraine on the south.

Excellent view of Leigh, String and Jenny Lakes as well as many of the features of Jackson Hole may be observed from the point near where this trail joins the Indian Paintbrush trail.



STRING LAKE AND PART OF JACKSON HOLE

A wide open area at the base of Rockchuck peak is crossed by this trail. This area is kept swept clean of trees by yearly snowslides. Now and then a rare cluster of trees in a protected spot may reach full growth but the smaller aspen and young evergreens are either uprooted, bent over and twisted by the annual snowslides. Only the shrubs are able to grow to a normal size in the snowslide track.

Large boulders and trees have been carried well out onto String Lake by these slides which occur generally during the spring months or sometimes during heavy snows of the winter months.

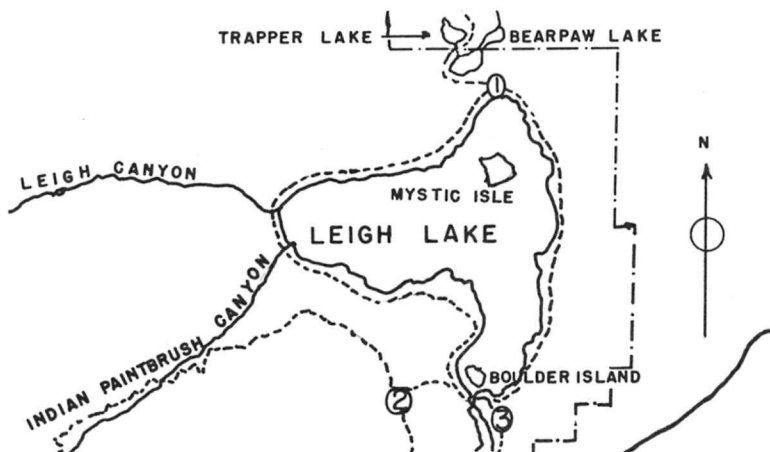
Many of the slides pack very hard on the lower slopes and melt much more slowly than the areas where snow slides have not stopped and because of this spring flowers may often be found blooming as late as August when the last of the snow slide melts away.

At the north end of String Lake this trail joins the trail that goes around Leigh Lake and crosses the footbridge near the outlet of the lake.

Excellent view may be obtained from this point and at the outlet is an excellent location from which to observe beaver, water ouzels and other water birds.

The island near the outlet is named Boulder Island.

THE TRAIL AROUND LEIGH LAKE 7 1/2 Miles



This trail may best be reached by driving to the end of the String Lake Road. Here the trail follows the east shore of String Lake north to the Leigh Lake outlet. From this point the lake may be circled either to the left or to the right.

Along the east shore of the lake excellent view of Mt. Moran, Leigh Canyon, Mystic Island and Indian Paintbrush Canyon may be obtained.

The trail follows generally close to the shore line of the lake and passes for the most part through a young lodge pole pine forest, which indicates that this area was swept by fire not more than one hundred years ago which destroyed the mature forests and the new reproduction was that of lodge pole pine.

The gentle sloping lake bottom on the east side of the lake is the only large sandy beach of any of the lakes in the park.

The moraine around Leigh Lake is not nearly as rough or prominent as the moraines around Jenny and Phelps Lakes and other lakes of the area.

Along the north side of the lake at Junction No. 1 a secondary trail leads to the northwest to the Trapper and Bearpaw Lakes at a distances of one-half mile and to Moran Bay on Jackson Lake at a distance of five and one-fourth miles.

The main trail continues along the shore of Leigh Lake and along the steep slopes of Mt. Moran. Much of this trail is over open grassy slopes, and through dense vegetative growth of flowering plants and shrubs.

The lake bottom is very steep along this the **northwest** shore. A number of otter have been noted in the lake at this point.

The trail crosses over rugged moraines and talus slopes along the northwest shore of the lake.

At the beginning of Leigh Canyon denser growth of trees with Engelmann spruce, Douglas fir and alpine fir becoming predominant.

The crossing of Leigh Creek is about one and one-half miles from the trail junction No. 1. Beautiful cascades and water falls at this point.

Glacial polished rock lines much of the canyon floor in the places where it has not become covered with vegetation.

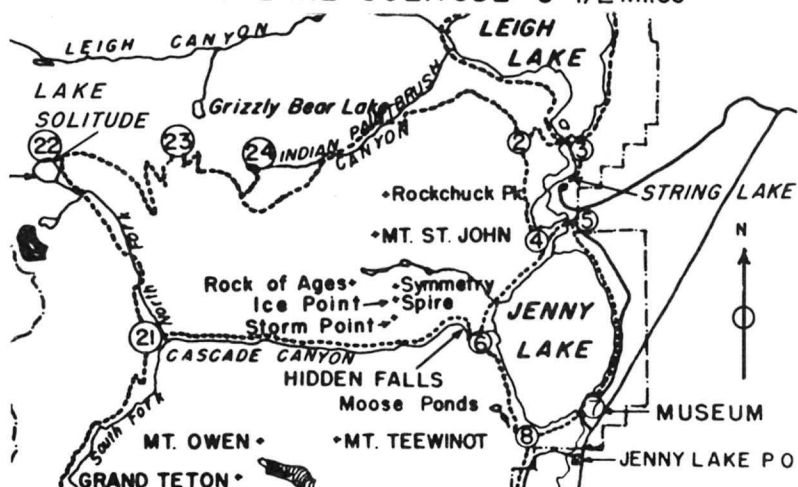
One-half mile up Leigh Canyon occurred one of the largest mud flows known to have happened in recent years in the Tetons. (There is no trail up Leigh Canyon)

From the inlet of Leigh Lake to the outlet along the west shore of the lake the trail passes through rather dense forest with but few views. This is a good area in which to observe birds, pine squirrels, bears and other animals.



Mt. Moran as seen from the east shore Leigh Lake

THE TRAIL TO LAKE SOLITUDE 9 1/2 Miles



Lake Solitude may be reached by two different trails, the first by the way of Cascade Canyon and the second by the way of the Indian Paintbrush Canyon trail 10 1/4 miles from the parking area at String Lake.

The Cascade Canyon trail starts on the west shore of Jenny Lake and may be reached either by crossing the lake by boat or by going around the south shore of Jenny Lake from the Museum a distance of 2 miles or along the northwest shore from String Lake a distance of 2 3/4 miles.

Starting from the Boat Dock on the west shore of Jenny Lake the trail follows for one-fourth mile the Jenny Lake trail to Junction 6. then turns left up Cascade Canyon.

First Mile: Note the following; The fine Engelmann spruce forests in the lower canyon, which have resulted because of good alluvial soil and abundant moisture supply; the outcropping of the bed rock; the glacial deposits to the eastward and glacial erosion to the west; the polished bed rock rounded and fluted by glaciers and the very large spruce trees.

At three-fourths mile from the Boat Dock the trail crosses Cascade Creek. Here a small picnic spot beside the creek and a short trail leading to the left to the base of Hidden Falls

The trail to Lake Solitude continues to the right across the bridge.



HIDDEN FALLS

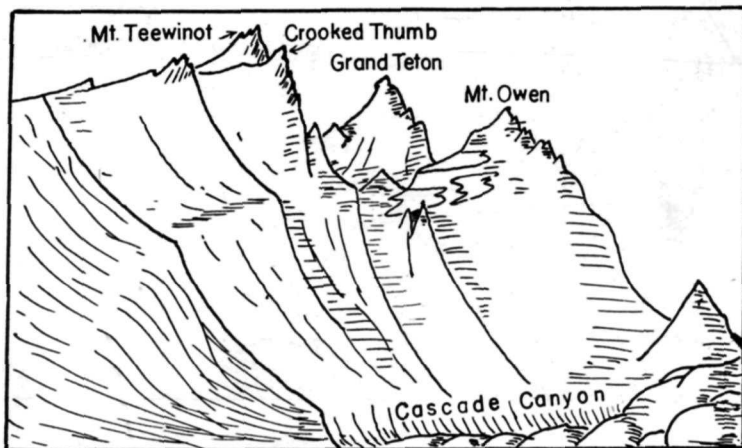
stream - the corresponding high benches one each side of the canyon ahead may be remnants of an older, higher valley.

The trail crosses a "Rock River", a deposit made by torrents from the canyon walls after cloudbursts or heavy rains.

The main trail begins a number of switchbacks and leads to the top of the glacial bench, an excellent viewpoint for view of Jenny Lake, Jackson Hole as well as the high peaks on either side of Cascade Canyon.

Along this trail blasted out of the bed rock there are many fine exposures of gray granite, black schist, pegmatite and several minerals as; white feldspar, glassy quartz and black mica.

Second Mile: The trail follows a subsidiary valley - the glacier apparently split around the rocks to the south forming two valleys, this one and the one now followed by the



Looking southwest from the trail above Hidden Falls.

The trail passes a large overhanging rock beside the creek and comes to a wide talus slope.

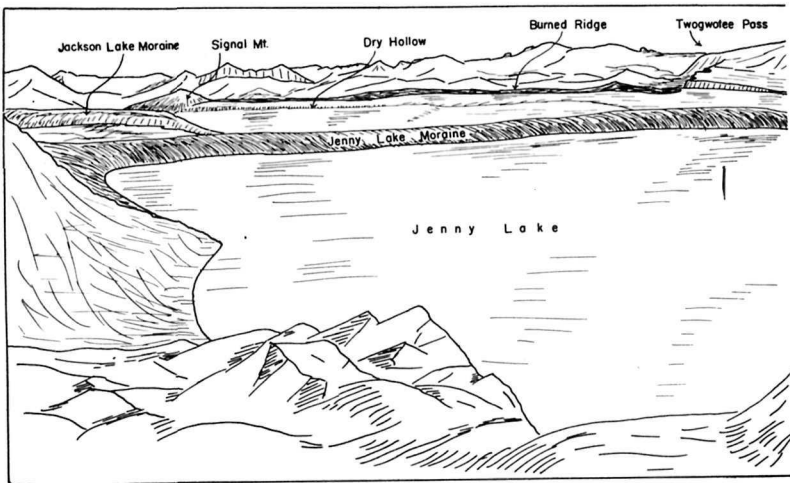
Frost action is chiefly responsible for the loosening of boulders from the canyon walls which roll down the slopes to become the talus. Broken angular boulders of gray granite and pegmatite, pink granite and pegmatite, gray banded gneiss, black biotite gneiss and schist make up this accumulation of rock or talus.

Ahead up the canyon are visible the massive mountains which divide the north and south forks of Cascade Canyon.

The glacial carved valley of Cascade Canyon is well covered with trees, (alpine fir, Douglas Fir, and Engelman spruce), and browse plants of willow, spirea, honeysuckle, huckleberry and others.

These brushy valleys are a favorite habitat of the moose.

Third Mile: This mile begins near the end of the first broad talus slope.



Prominent land features to be seen to the east

Note the following: Forests of large Douglas fir and Engel-man spruce with small alpine firs; the water flowing beneath and through the talus; a second large talus slope; a great number of raspberry plants in the talus; and the banded structure of the summit rocks.

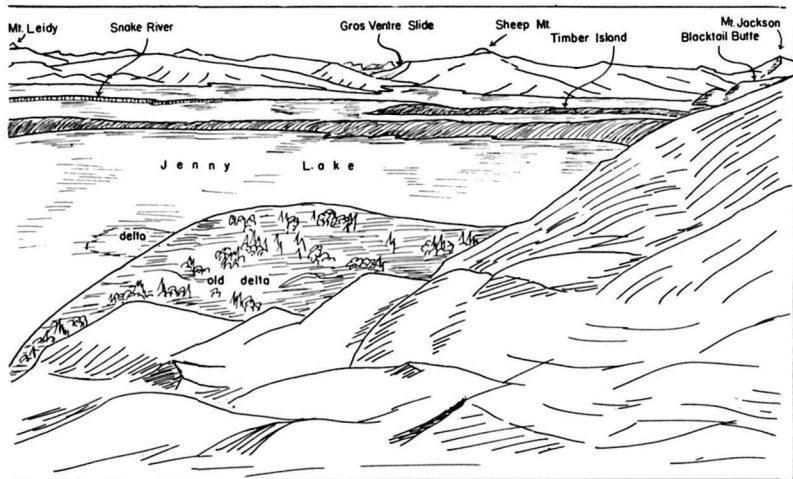
This banding is due to the intrusions of pegmatite into the older rocks. The bands appear to be inclined about 45 degrees westward.

The extreme summit of Mt. Teewinot comes into view and the Grand Teton goes out of view behind Mt. Owen.

Across the canyon to the south is the mouth of a high, glacial formed, hanging canyon. Cascades form as the tributary stream plunges from this high level to the level of Cascade Canyon.

A fine alluvial cone, now partly covered with willows, aspen and small fir trees, has formed at the base of this cascade.

Fourth Mile: This mile starts at the third large talus slope. Many dikes and other irregular intrusions are visible in the



across Jenny Lake and part of Jackson Hole

canyon wall to the north. Note the variety in colors of the lichens covering some of the rocks in the talus.

A snowslide area: Many of the trees are small, distorted, pushed over and broken by frequent spring snow slides.

The true summit of Mt. Owen becomes visible back of the East Spur. Behind Mt. Owen the West Spur or lower summit of the Grand Teton comes into view.

The true summit of the Grand Teton comes into view back of Mt. Owen. The Grand Teton, highest peak of the Teton range has an elevation of 13,766 feet.

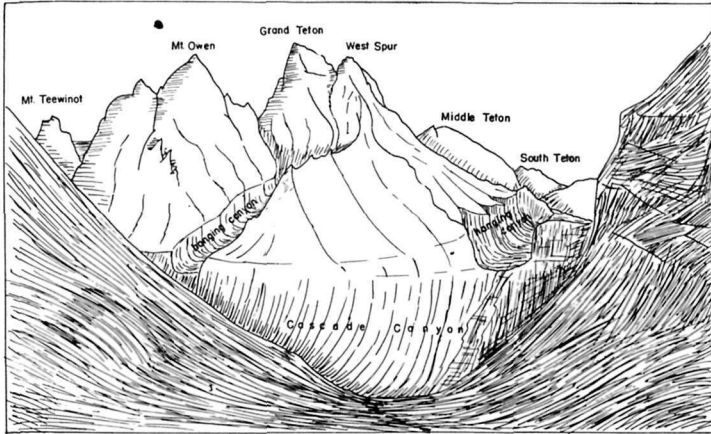
The Tetons were named by early French-Canadian trappers who saw the three projecting peaks from the west and called them "Les Trois Tetons", meaning "The Three Breasts".

The trail passes through forests of very large spruce trees. Several of the alpine fir trees have snow mats or spreading branches close to the ground around their bases.

In the bottom of Cascade Canyon is a long ridge of broken rocks probably deposited by a slowly-moving wet snow slide.



Mt. Owen (L), Grand Teton (R) from N. Cascade Canyon.



THE TETON PEAKS TO THE SOUTHEAST FROM NORTH CASCADE CANYON

Fifth Mile: This mile starts at a point one-half mile east of the crossing of North Cascade Creek.

Note across the canyon to the south the mouth of a large hanging canyon in a cirque between Mt. Owen and the Grand Teton.

The bridge across the North Cascade Creek is six and one-half miles from the Jenny Lake Museum.

One-fourth mile from this bridge is the trail junction No. 21. North Cascade trail turns to the right and at this point is three miles from Lake Solitude.

Fifth mile ends at second bridge crossing of North Cascade Creek about one-fourth mile north of trail junction No. 21.

Sixth Mile: Cascade Creek has cut its channel well below the main level of the canyon floor since the time of the last glacial period.

A few whitebark pine trees appear in the spruce-fir forest and the number of trees becomes less as greater elevation is gained.

Note the hanging canyon to the southwest in Middle Cascade Canyon and the large, pointed monolith, with its base rounded by glacial action, straight ahead or to the northwest.

The hanging canyon between Mt. Owen and the Grand Teton comes into view. The glacial ice in Cascade Canyon was probably thick enough to permit glaciers from such tributaries to discharge on a level with the top of the main glacier. The melting of the ice left such tributaries "hanging".

Seventh Mile: This mile starts near a long talus slope. The height of the rounding and polishing on the canyon walls indicates the depth of the glacial ice during glacial times.

Note that the alpine fir trees become smaller and somewhat distorted and that whitebark pine trees become the prominent large tree, although a few spruce still grow at this elevation.

The trail passes close to the floor of the valley which is strewn with boulders dropped by the glacier when it melted back for the last time.

The head of the canyon comes into view. It is encircled by nearly verticle walls. The skyline around this canyon is remarkably flat and unbroken by sharp peaks or ridges.

Several rock slides or talus slopes extend to the bottom of the valley covering portions of the true valley floor. Small streams from the hanging canyon to the southwest flows over and beneath the talus.



Lake Solitude near the head of N. Cascade Canyon.



LOOKING SOUTHEAST from LAKE SOLITUDE

The trail crosses the outlet stream from Lake Solitude about one-fourth mile from the lake. Lake Solitude is reached at nine and one-half miles from the Jenny Lake Museum, or at seven and one-half miles from the boat dock on the west shore of Jenny Lake.

This beautiful lake is in a glacial cirque or basin carved by a very heavy body of ice, snow and rock called a glacier.

It is not unusual for the center of a cirque to be excavated by glacial quarrying to a level somewhat below the point of discharge of the ice from the cirque. The melting of the ice thus leaves a basin which often becomes the bed of an alpine lake. Solitude is such a rock-floored lake and very little morainial material is seen around its lower end.

In other Teton canyons glaciers remained long enough to build up huge terminal moraines but here the ice melted rapidly away to leave only a thin scattering of loose boulders in the valley and below the cirque.

The lake is fed from melting snowbanks in some of the small canyons back of it, and from seepage from these canyons after the snow has melted away in late summer.

Near the north side of the lake the trail turns abruptly to the right and crosses the divide into Indian Paintbrush Canyon and to Leigh, String and Jenny Lakes.

TRAIL from LAKE SOLITUDE to INDIAN PAINTBRUSH CANYON DIVIDE 2 1/3 Miles.

The distance from Lake Solitude to the Summit is about two and one-third miles; to String Lake is ten miles and to the Jenny Lake Museum is thirteen and three-fourths miles.

First Mile: Starts at the north end of Lake Solitude and views of the high peaks become very good farther up the trail.

Most of the rocks of this area are gray gneissoid granites intruded by pegmatite dikes.

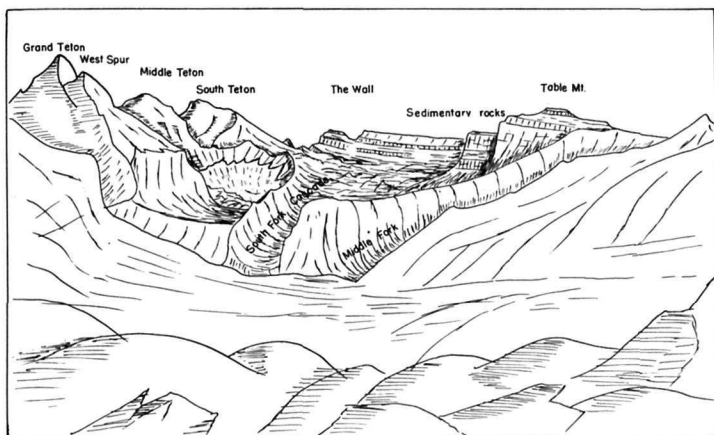
South of Lake Solitude is a hanging canyon containing a small lake, Mica Lake and a permanent ice field or a glacier named the Peterson Glacier.

The head of South Cascade Canyon with its steep Limestone Wall comes into view. Near the Wall is the start of the Skyline Trail.

At the end of the first mile, Mica Lake, a small glacial lake comes into view in the hanging canyon south of Lake Solitude.

Second Mile: At the first switchback. Table Mountain west of the Grand Teton is in full view. Most of this mountain is composed of the Pre-Cambrian granite and gneiss rocks, but it is capped with nearly horizontal layers of sandstone and shale.

Whitebark pine and alpine fir are the trees of this elevation.



LOOKING SOUTH FROM THE SUMMIT PLATEAU



Mt. Moran as seen from the summit divide.

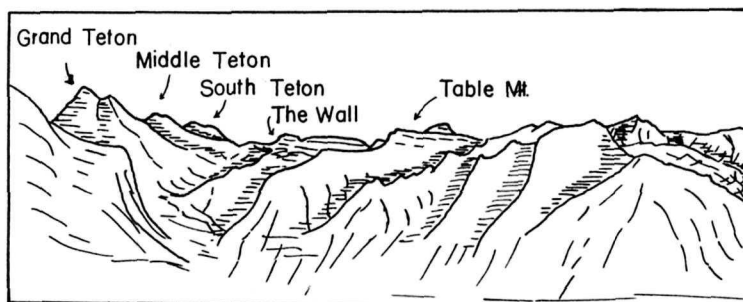
Below the trail is a large deserted cirque which comes into view to the north as the divide between Cascade Canyon and Leigh Canyon is reached. It is a hanging tributary of Leigh Canyon which is one of the longest in the Teton Range and can be traced about a mile and a half westward from this point.

To the northeast the rather square-topped peak is Mt. Moran. A black diabase dike forms the prominent jagged ridge west of the peak. This dike is a continuation of the one in the eastern side of the peak so conspicuous from the main highway in Jackson Hole. A thin layer of sandstone and shale covers the top of Mt. Moran. It was named in honor of the famous artist and painter of the west, Thomas Moran.

Little's Peak, elevation 10,710 feet is visible back of the rim to the north of Lake Solitude.

The summit plateau overlooking Indian Paintbrush Canyon is the junction of this trail with the Indian Paintbrush Canyon trail, which will be described from its start near Leigh Lake and is given on page 28.

To the northeast, lying between Indian Paintbrush Canyon and Leigh Canyon is a massive, conspicuously mottled peak with dark and light colored rocks. It has been given the name Mount Woodring in honor of the Park's first superintendent.



THE INDIAN PAINTBRUSH CANYON - CASCADE CANYON SUMMIT PLATEAU

The summit plateau is conspicuously flat in marked contrast with the normal, pointed, jagged peaks and ridges of the Teton Range. It is composed of the same hard granitic and gneissoid rocks that form the high peaks and the core of the Teton Range.

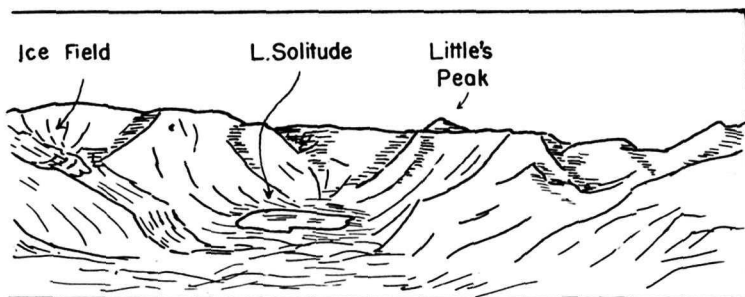
The flat plateau can be traced westward to the smaller flats on the rim back of Lake Solitude, and southward toward Table Mountain. The appearance of this rim around North Cascade Canyon is that of a plateau so deeply dissected by canyons and cirques that only a few flat remnants and nearly level stream-divides remain.

How was this flat formed? The story begins some 500 million years ago, according to estimates of geologic time, (Pre-Cambrian times). Then this part of western North America was a flattened, low-lying land surface composed of the same granites and gneisses that now form the core of the Teton Range.

Again and again seas flooded this flat area, each time leaving layers of sand and silt to harden into shale, sandstone and limestone.

Then followed the uplifting of the Teton Range some fifteen to twenty thousand feet above sea level.

Sculpturing by glaciers and streams gave the Teton Range its present very rugged character, and in the process the sedimentary rocks were completely eroded away in certain areas.



THE INDIAN PAINTBRUSH CANYON - CASCADE CANYON SUMMIT PLATEAU

On the small flat on the divide west of Lake Solitude are visible several patches of buff to pinkish-colored rock which appears to be in nearly horizontal layers.

These are remnants of a very hard sandstone called the Flat-head Quartzite - the oldest sedimentary rock of the region -, the first that was formed in the ancient seas.

This and later shales and limestones once entirely covered the Teton area as they now cover most of the western slope of the range, but to the east of the divide these rocks have been largely eroded away to again expose the granites and gneisses of the basement rocks.

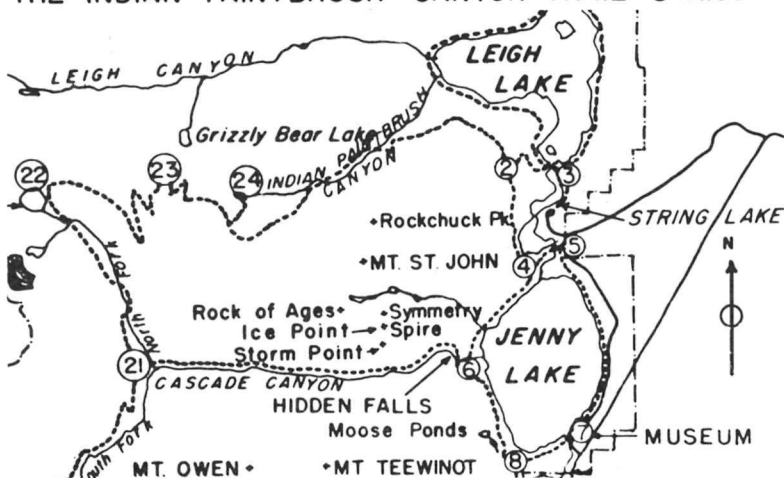
Mount Moran to the northeast and Table Mountain to the south, however, still retain caps of sedimentary rock.

In general, sedimentary rocks do not resist erosion as strongly as do the much harder crystalline granites and gneisses.

It now becomes evident that this flat plateau-like area is a remnant of the old sea floor upon which the sedimentary rocks were originally deposited.

Erosion has stripped the former covering of shale, sandstone and limestone from this flat to again expose the older Pre-Cambrian rocks.

THE INDIAN PAINTBRUSH CANYON TRAIL 8 Miles



This trail can be reached by driving to the end of the road at String Lake and taking the trail to the outlet of Leigh Lake and then the trail around the west side of String Lake to the junction No. 2, which is the start of the trail.

First Mile: At this trail junction Leigh Lake and Jackson Lake can be seen to the north, Boulder Island is near the outlet of Leigh Lake. Jenny Lake to the south and String Lake directly below appears as a quietly flowing stream.

The first portion of the trail passes through a forest area and over the Indian Paintbrush Canyon moraine on the east slopes of Rockchuck Peak.

To the northwest a good view of Mt. Moran with its black diabase dike and the Falling Ice Glacier.

The bottom of the canyon is filled with moraine but no prominent ridges were formed.

The trail passes through fairly dense forest of Engelmann spruce with a few large Douglas fir and some alpine fir.

Second Mile: Trail crosses a corduroy bridge. A short distance beyond this bridge is an old dead spruce tree with many small holes made by bark beetles emerging from the tree. There are many beetle channels beneath the bark.

The first exposure of bed rock appears. It is a gray granite intricately intruded by small, white pegmatite dikes.

Leigh Lake appears fiord-like and fills the mouth of Leigh Canyon to the north.

Note the white dike in the wall of the canyon to the southwest and the talus cone at the base of the dike, and the steeply westward inclined dikes in upper rocks of the canyon wall.

Third Mile: Trail crosses stone bridge. This creek is in a subsidiary valley parallel to the main stream in the bottom of the canyon to the north. The two channels were formed as a glacier split around the resistant granitic rocks in the middle of the canyon.

The trail climbs the steep face of a glacial "stairstep" or bench and ahead is seen the flat floor of the step.

The trail crosses the main stream and a short distance ahead is a view of the head of Indian Paintbrush Canyon.

Glacial erosion formed the rounded and polished bed rock of the lower canyon walls. Higher above the former ice level, the rocks are rough, angular and many of them are not held firmly in place and may break off and cause rock slides.

To the south, a steep talus cone at the base of a deep crack in Rockchuck Peak. Ahead is the face of the second glacial "stairstep".

Outcrops of pink pegmatite containing pink orthoclase feldspar gray, glassy quartz and black to gold-colored mica beside the trail.

The canyon wall to the south is composed of banded gneiss, with the bands inclined toward the east. Many of the rocks of the canyon walls may be examined closely as they appear in the loose rock along the trail.

A few whitebark pine trees begin to appear at this elevation.

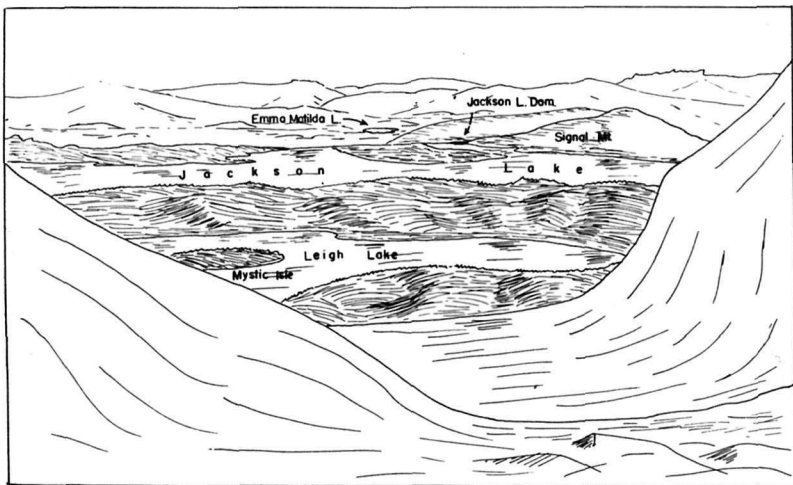
The white-crowned sparrow is a bird very often seen at these higher elevations. Other common birds are the Stellar jays, Mountain chickadees and the Clarke's Nutcracker.

Fourth Mile: The floor of this glacial stairstep is covered by a large, flat talus fan composed of three conspicuous rock types, namely schist, granite and gneiss. These may be described in detail as follows: The nearly black finely laminated rock is a hornblende biotite schist; the rock with large crystals of feldspar and quartz and often large crystals of black biotite mica is white granite or pegmatite, and the gneiss is a greenish or grayish banded rock with large "eyes" of white feldspar.

These rocks can be distinguished in place in the mountain to the northwest above the talus. The black schist and the banded gneiss are probably the oldest of these rocks. The mottled appearance of the mountain suggests that the older rocks were broken up and included as floating rocks in a large mass of hot; liquid, white granitic magma, and "frozen", in place as the magma cooled.

The high cascades on the south side of the canyon are formed as a tributary stream descends from a hanging valley which heads between Rockchuck Peak (left) and Mt. St. John (right).

The floor of the third glacial stairstep and the first of eight switchbacks to the next glacial bench. This mile ends at the sixth switchback. A good view to the east.



LOOKING EAST DOWN INDIAN PAINTBRUSH CANYON

Fifth Mile: After the eighth switchback where the canyon turns westward, the canyon floor is divided by a long narrow, tree-topped ridge.

The trail follows the north side of this ridge and near the midpoint of the ridge a dim trail to the north leads to Holly Lake frequently the destination for many hikers coming up the Indian Paintbrush Trail.

Holly Lake is in an old glacial cirque exposed toward the south, as the glacier which formed this cirque melted rapidly away at the close of the Ice Age, it left very little morainal material to surround the lake. Holly Lake is 1/2 mile north of the main trail.

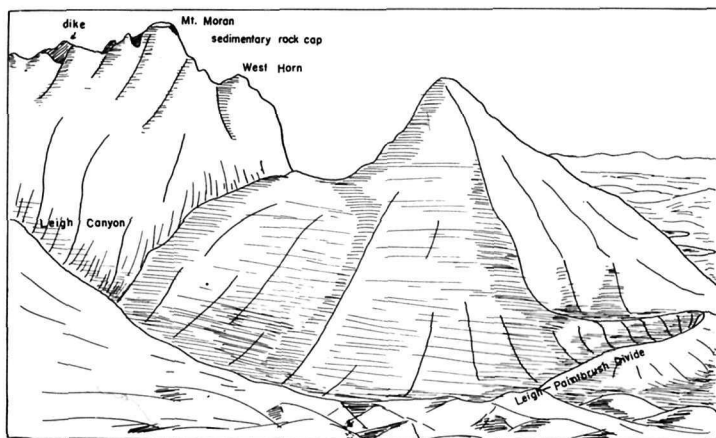
Sixth Mile: The main trail crosses the top of the rocky ridge composed of loose, angular rocks and gravel, apparently of glacial origin.

This rocky ridge continues up the canyon north of the trail and becomes hummocky like the Jenny Lake moraine. The basin to the south is partly filled with talus, but several small morainal ridges roughly parallel the trail.

To the south is a high cirque filled with permanent ice, enclosed by a horseshoe-shaped terminal moraine.



SNOW AND ICE IN AN OLD GLACIER CIRQUE BELOW THE NOTCH
NEAR THE HEAD OF THE INDIAN PAINTBRUSH CANYON.



Seventh Mile: There is a small pond beside the trail and the long rocky ridge dies out at this point. Ahead is a similar morainal ridge running transverse to the valley.

The white bark pine becomes the dominant tree at this elevation although some alpine fir and spruce are found also.

A good view down the canyon across Holly Lake at this point.

The Grand Teton is visible through the notch in the canyon wall to the south.

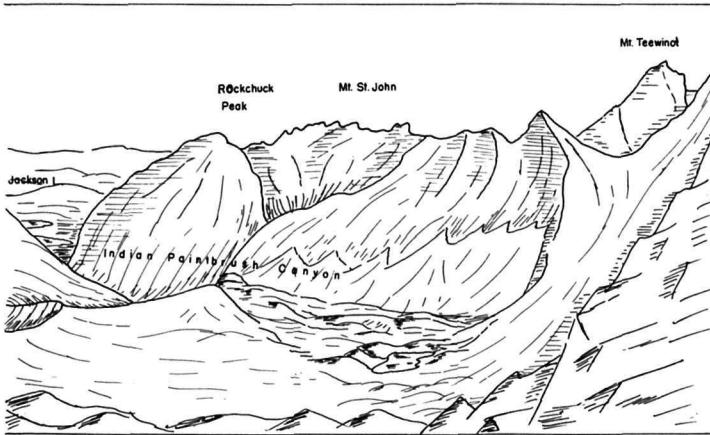
Eighth Mile: Mount Owen becomes visible through the notch in the canyon wall to the south.

Outcrops of black hornblende-biotite schist, and coarse-grained pink pegmatite become prominent along the trail.

Mt. Moran comes into view to the north, its black diabase dike, forms a prominent ridge to the west slope of the mountain.

Indian Paintbrush and Leigh Canyon Divide to the north of the trail.

Mt. Teewinot becomes visible through the notch in the canyon wall to the south. See sketch on page 33.



To the north below the trail is a deep cirque, a tributary to Leigh Canyon in which is located Grizzly Bear Lake.

The summit is reached at eight and three-fourths mile from the start of the trail at String Lake.

From the summit on the rim above Indian Paintbrush Canyon- elevation 10,600 feet- excellent views are afforded.

From this high lookout point it is evident that the broad basin-like head of Indian Paintbrush canyon was formed by the convergence of a number of small, inter-connected glaciers.

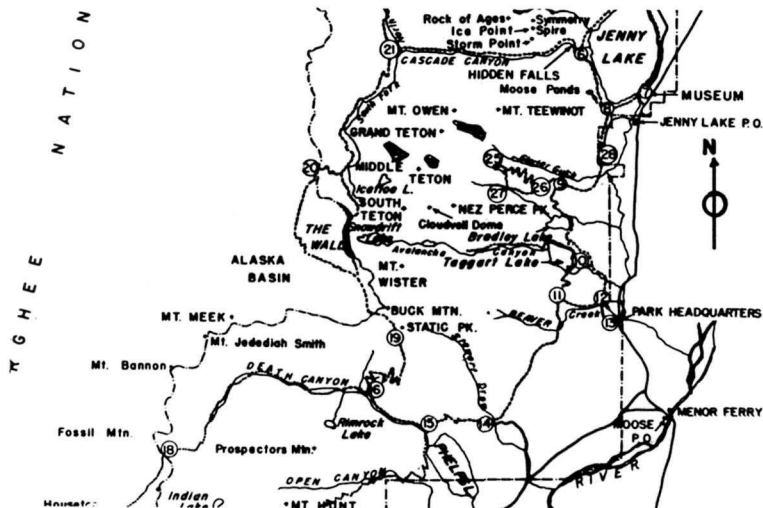
The moraines formed in the last stages of these glaciers now fill the head of the canyon in a jumble of mounds and ridges with numerous small intervening basins.

Here and there bed rock protrudes through the loose rock of the moraine, and where so exposed has been rounded and smoothed by the glaciers.

Probably the last glaciers hung in the shadow of the south wall of the canyon and formed as a terminal moraine the long rocky ridge followed by the trail.

For further description of the summit area turn to page 26.

THE TRAIL TO THE WALL & ALASKA BASIN



This trail starts at Trail Junction No. 21 or the forks of Cascade Canyon 6 1/2 miles from the Jenny Lake Museum. It leads to Alaska Basin and to a spur trail to The Wall.

First Mile; The cascades of the south fork of Cascade Canyon are in a steep walled canyon at this point, the walls of which are of black schist, composed of hornblende and mica.

Farther on the trail affords a fine view down the glacier formed "U" shaped canyon and of the Absaroka Mountains on the horizon beyond Jackson Hole.

Note that the large, sharp angular, unweathered boulders in the talus are granite from the canyon wall to the west.

A fine view of the cliffs from the west side of the Grand Teton. The last 800 feet of the route of ascent of the Grand follows the ledges and cracks to the left of the most prominent vertical crack visible from this point.

Across the canyon to the east is the mouth of a hanging canyon in the head of which, between the Grand and Middle Teton Peaks is a glacier.

Note the broad "U" shaped glacial canyon to the south up the canyon and in it the narrow "V" shaped gorge below its floor now being followed and cut deeper by the stream.

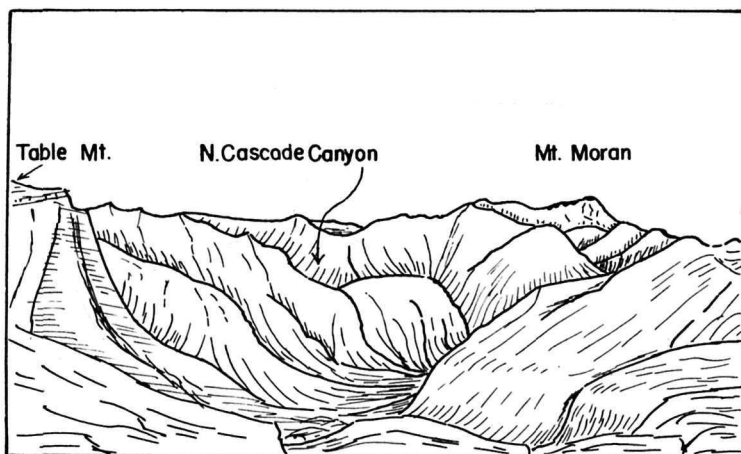


WM. H. JACKSON PHOTOGRAPHING THE TETONS IN 1872

Wm. H. Jackson, the Pioneer Photographer, made the first photographs of the Teton from the summit of Table Mountain during the summer of 1872.

Second Mile: Note the white, coarse-grained pegmatite beside the trail which contains large crystals of white feldspar, the crystals of which break along smooth faces, the other crystals in this rock are the small grains of clear glassy quartz and black, flaky mica.

At the switchback there is a fine view down the canyon toward the St. John Peaks and to the right of the trail ahead is a view of Table Mountain. It is the massive mountain with a nearly vertical east face cut by a deep gulch.



LOOKING DOWN SOUTH CASCADE CANYON TOWARD THE FORKS

Whitebark pines become the dominant tree at this elevation. The largest whitebark pine tree found in North America grows in this area a short distance to the right of the trail.

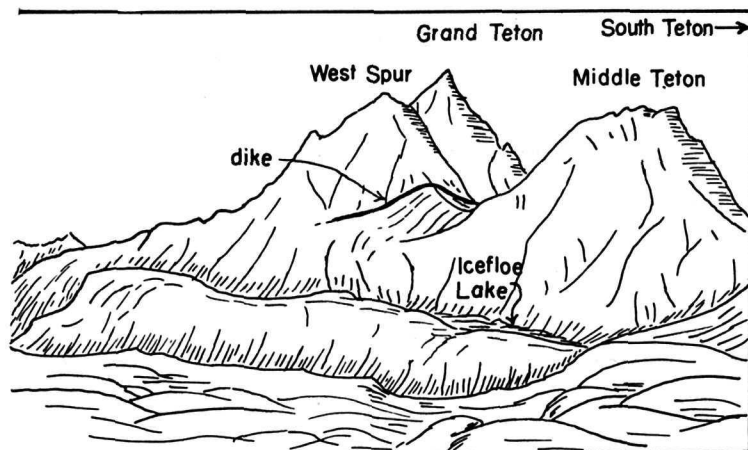
Note the white pegmatite containing many good crystals of red-dish brown garnets.

The trail crosses the alpine meadow and beyond are several fine examples of glacial stairsteps. The canyon does not offer a smooth, unbroken course for the present stream, but rather consists of a number of steps flat-floored in part and separated by steep rises.

Third Mile: A small waterfall beside the trail at this point.

The many pegmatite dikes in the large boulders contain garnets. There are other large boulders of very coarse pegmatite and large masses of glassy quartz. Crystals of feldspar, muscovite and biotite mica are also recognizable.

The first good view of the Wall and the head of the canyon.



The trail goes up many switchbacks climbing to the level of the next glacial stairstep. The granite rocks of the narrow canyon show cracks at nearly right angles. (this is called cubical jointing).

On the second stairstep level black diabase dike in the canyon wall to the east is a continuation of the one at the base of the Grand Teton. It is off-set or faulted near the top of the canyon wall. The South and Middle Teton come into view

More switchbacks up the glacial stairsteps. A fine talus cone at the base of the steep gully across the creek.

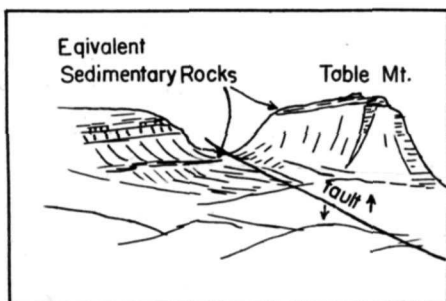
Some coarse pegmatite containing unusually large tabular crystals of biotite.

The sedimentary rocks which cap Table Mountain can be traced far down its western slope.

Fourth Mile: Top of the third glacial bench. A fine view of the sedimentary rock cliffs which form the wall around the head of the canyon. The Grand Teton is now to the northwest. The usual route to the summit of the Grand leads from the saddle between the Grand and Middle Teton peaks to the saddle between the summit and the West Spur of the Grand Teton.

THE TABLE MOUNTAIN FAULT: The top of Table Mountain is covered with sandstone and shale that normally lies between the basement granites and the limestones of the wall.

Table Mountain has been uplifted some one thousand feet above the corresponding rocks of the wall. The fracture along which this uplift took place is an east west fault between Table Mountain and the wall.



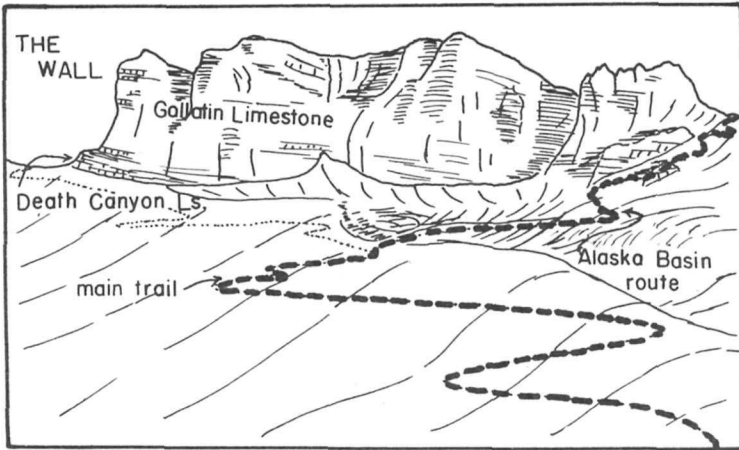
Fifth Mile: Mt. Moran, with its black diabase dike is visible eight miles to the north.

The head of South Cascade Canyon - To form this broad, benched canyon head, glaciers of the past were most active, assisted by erosion of the streams. At one time the limestones, shales and sandstones, the exposed edges of which now form the cliffs around the south and west sides of the canyon, were continuous over the entire area. Very rapidly and quite easily the agents of erosion stripped away the mantle of comparatively soft sedimentary rocks, but when the basement rocks were exposed, downward erosion was slowed down by these harder rocks.

The canyon head continued to enlarge due to the sapping of the sedimentary walls by the glaciers. Here and there shallow depressions were excavated into the granite. As a result this canyon head is very broad and has a very irregular floor.



THE "U" SHAPED VALLEY OF SOUTH CASCADE CANYON



THE OLD TRAIL ACROSS THE HEAD OF AVALANCHE CANYON IS UNSAFE

To follow the Alaska Basin Trail turn right at this point and ascend to the divide to the north of a small glacier or ice field and follow the trail to the west of the WALL into Alaska Basin and on to where it rejoins the Death Canyon Trail. Further description of the Alaska Basin Trail on page 62.

By following the OLD TRAIL to the divide between South Cascade Canyon and Avalanche Canyon some excellent views are obtained.

Avalanche Canyon offers a route to Jackson Hole. The upper part of the canyon has no trail, but a secondary trail leads from below the Shoshoko Falls to Taggart Lake and Junction with the Lakes Trail. This Route Should Not Be Attempted ALONE. The Distance to Taggart Lake is about six miles and to Park Headquarters eight miles.

At the Divide note the deep cirque to the northeast between Middle and South Teton Peaks.

The large ice field at the base of the wall to the right is possibly a glacier. Many irregular morainal ridges enclose its lower end, and deep crevasses form in the ice in late summer. Ice underlies much of the loose rock within the moraine.

The Old Trail passing beneath the Limestone Wall has been abandoned because of the collapse of portions of the wall which destroyed much of the trail and has made it unsafe to all travel.



THE LIMESTONE WALL; Cambrian limestones make up most of the Wall. Great masses of rock are constantly being loosened from the Wall to fall upon the trail and into the basin below, and for this reason the OLD TRAIL PASSING BENEATH THIS WALL HAS BEEN ABANDONED.

Occasionally a large column of limestone loosens from the Wall but does not immediately fall, but settles into the Gros Ventre shale upon which it rests, squeezes the shale outward to carry away portions of the trail this led to the abandonment of this trail along the steep cliffs and a new route being laid out along the west slopes of the Wall.

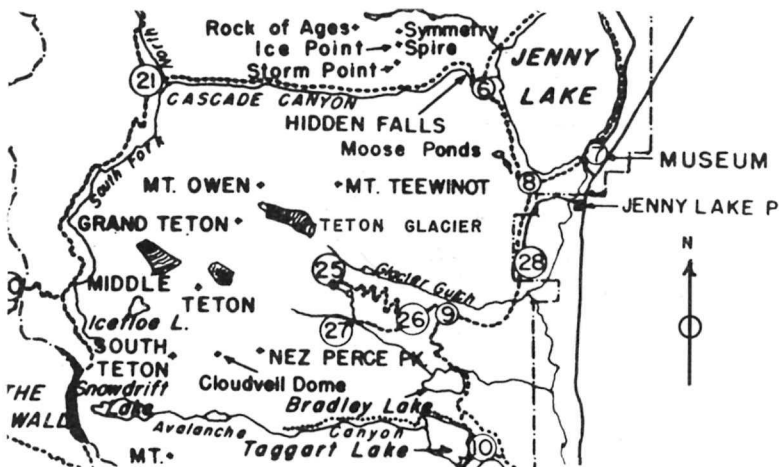
Most of the limestone columns now standing have solid ice behind them, the expansion of which is largely the cause of the prying off of these large masses of rocks.

In some parts of the Wall seeping water has dissolved out small caves.

The basin below the wall is an old glacial cirque, and below the talus that now covers the floor of the basin, ice still remains. This is especially true of the south, shaded side of the basin.

For the geologic structure of the Wall turn to the generalized profile section on page 72.

THE TETON GLACIER TRAIL 7 Miles



The start of the Glacier Trail may be reached by walking from the Jenny Lake Museum around the south side of Jenny Lake to the trail junction No. 8 and then following the trail that leads to the south across the open flat parallel to the mountain front, or by driving over the road leading from the Jenny Lake Store across Cottonwood Creek then westward to the west side of the open flat and then south to the end of the road at the forest's edge and the start of the trail about two miles from the Jenny Lake Museum.

The treeless flat named Lupine Meadows is covered with sand and small rounded gravel which were deposited here by the streams flowing from melting glaciers.

The forest along the mountain front are largely restricted to the moraines or deposited rock debris left by the glaciers.

These deposits are more capable of retaining moisture than are the gravel and sand-composed stream-formed flats which cover much of Jackson Hole.

Sagebrush, balsam root, wild buckwheat, stonecrop, lupine and other plants are adapted in various ways to growth on such dry flats.

The marshy, willow-covered flat to the right is in a shallow valley between the mountain front and Jenny Lake moraine.

This area is a favorite habitat for moose.



MT. TEWINOT ACROSS JENNY LAKE

suspension from the Teton Glacier on the north side of the Grand Teton and south of Mt. Owen.

At the crest of the terminal moraine note the hill and vale character of the moraine as well as its composition of angular rocks of all sizes and all kinds.

The crest of the moraine makes a definite bend toward the west. Between this and the Bradley Lake moraine to the south is Burned Wagon Gulch

Second Mile: Nez Perce Peak (pronounced nes purse), resembling the upturned head of a howling dog, is beyond the head of Burned Wagon Gulch. Buck Mountain is the pyramid-shaped peak to the left of Nez Perce.

The summit of Mt. Teewinot is to the northwest. The Glacier Canyon moraine can be traced in a horseshoe-shaped ridge around the mouth of the canyon.

Leigh, Jenny, Bradley, and other piedmont lakes are located in basins such as the one formed here between Glacier Canyon and its encircling moraine.

First Mile: The trail starts at the edge of the Lodgepole pine forest and passes over a long corduroy bridge.

Ahead is the outer slope of the Glacial Canyon moraine up which the trail begins its ascent.

The trail crosses Glacier Creek.

This stream has cut a channel below the moraine.

Note the milky appearance of the water which is due to the very fine rock flour carried in

To the north, in the bottom of the morainial basin, the grassy meadow is an old lake bed.

The lake was destroyed by being filled with glacial rock flour and by being drained as Glacier Creek cut a channel through the moraine.

At 3 1/2 miles from the Museum this trail passes trail junction No. 9, and the trail leading to Bradley and Taggart Lakes and to Park Headquarters.



TETON GLACIER & GLACIER CANYON
BELOW THE GRAND TETON PEAK

The glacier trail climbing from Jenny Lake- elevation 6779 feet - to Amphitheatre Lake - elevation 9750 feet - affords an excellent opportunity to observe the altitude distribution of the various tree types. The Jenny Lake area is populated with lodgepole pine, which continues in scattered groups to this point. In moist situations at this same range of elevation Engelmann spruce and Douglas fir are characteristic. Farther up the trail at higher elevation alpine fir becomes the dominant tree, with whitebark pine increasing in importance until it replaces the fir at or near timber line.

The trail passes two small springs. Usually there is an excellent flower display at this point.

The first of seventeen switchbacks is reached. Excellent views of Jackson Hole begin to open up.

Third Mile: To the northeast, the stream terraces along the Snake River become visible and can be traced southward to Blacktail Butte.

The trail passes open, grassy slopes. Taggart Lake and Bradley Lake nestled on the moraine at the foot of the mountain come into good view.

Typical development of alpine fir - tall symmetrical slender spired trees, with branches growing down to the ground which become snow mats around the base of the tree.

Fifth Switchback. A short distance beyond is a side trail leading southward into Garnet Canyon and to the usual base camp for climbers making ascents of the Grand, Middle and South Tetons or other nearby peaks.

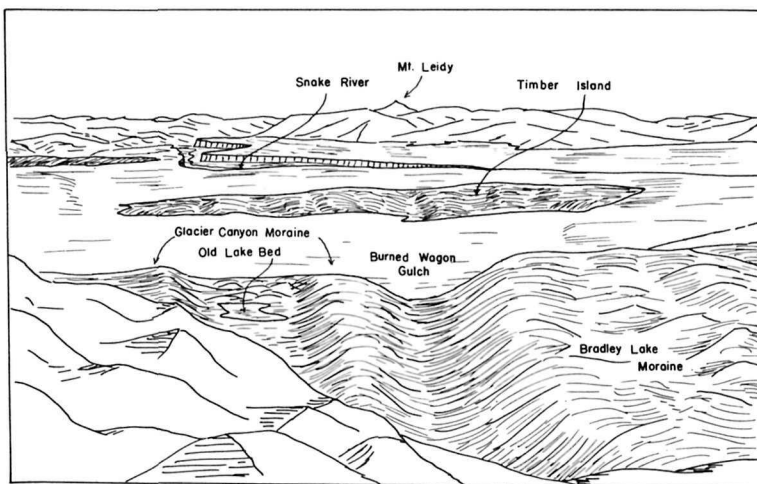
Fourth Mile: Sixth Switchback. Excellent view to the north over Jenny Lake, Jackson Lake and beyond.

Seventh Switchback. Best view of Bradley and Taggart Lakes on the tree-covered moraines of Garnet and Avalanche canyons.

In each lake a delta is forming at its inlet, and the old grass covered deltas are distinguishable above them.

A good view of Mt. Teewinot to the north and the best view of Jenny Lake with its encircling, tree-covered moraine, Jackson Lake and Emma Matilda Lake come in view to the northeast.

Fifth Mile: Tenth switchback. Distances between switchbacks becomes less. Last switchback. Rounding the top of the climb Nez Perce Peak is straight ahead, the Grand Teton and Mount Owen are at right angles to the right.



Surprise Lake. This glacial lake is fed from Amphitheatre Lake above, and drains through the sharp, narrow defile to the south into Garnet Canyon.

OBSERVATION POINT: From the summit of the sharp pinnacle just east of the outlet of Surprise Lake can be obtained one of the finest views of the Jackson Hole Country and of the high peaks of the Teton Range. The climb from the lake is about 260 feet. The following features can be observed:

To the Northeast: Jenny Lake, Jackson Lake, Emma Matilda Lake
Burned Ridge - the timber-covered ridge extending southeastward from the south end of Jackson Lake.

Snake River flowing south through Jackson Hole.

The Absaroka Mountains, beyond Jackson Lake.

To the East: Mt. Leidy, low pyramid-shaped peak.

The Red Hills, in the canyon of the Gros Ventre River.

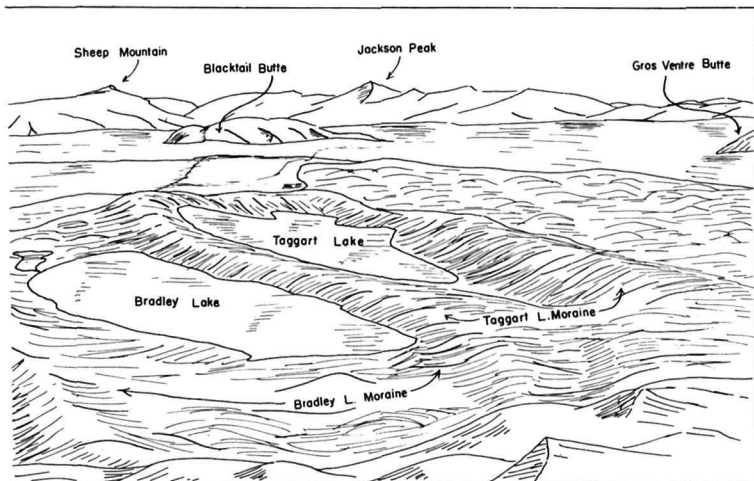
The Gros Ventre Landslide. A great white scar on the Mtn.

To the Southeast: Sheep Mountain, a bald-topped mountain.

The Gros Ventre Mountain Range continueing to the south.

Wind River Mountains, 75 Miles beyond Sheep Mountain.

Park Headquarters at the edge of the forest.



Blacktail Butte in the middle of Jackson Hole beyond the Snake River.

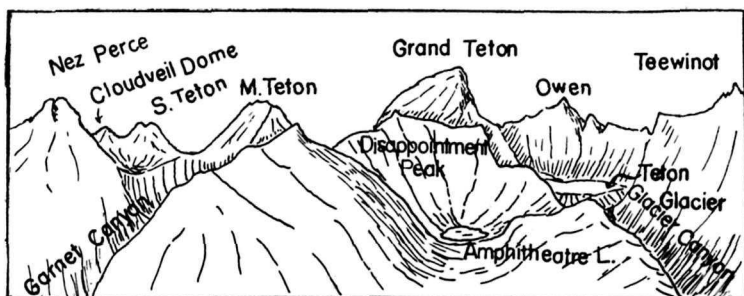
Mormon Row, a farming community northeast of the Butte.

To the South: The Gros Ventre Buttes, low buttes at the south end of Jackson Hole.

South Park, a meadow country south of the Gros Ventre Buttes.

To the Southwest: Buck Mountain, a pyramid shaped, notch-topped peak, the southmost major peak of the Teton Range.

The peaks of the range are indicated in the sketch below.



Continuing on the trail as it comes to the outlet of Amphitheatre Lake. The end of the trail is at the upper end of the lake.

From Amphitheatre Lake the route to the Teton Glacier follows a beaten path to the lowest point on the ridge above and to the north of the lake overlooking Glacier Gulch to the north and Amphitheatre Lake to the south.

Note the great number of whitebark pine trees that have been blown down by a tornado in recent years.

A good view of the Teton Glacier may be obtained from this point.

Those who wish to continue to the glacier may follow the beaten path for a short distance into Glacier Canyon, but the trail is soon lost amid the loose, broken boulders of talus and moraine.

In crossing this jumble of boulders the one instructions are: Do not lose any more elevation than necessary. Cross the last high moraine where it abuts (on the left side) against the solid rock of the northeast ridge of the Grand Teton; Avoid starting rocks rolling; Be exceedingly careful not to start slid-

ing when crossing any snowfields.

Be very cautious near the glacier crevasses or deep cracks in the glacier ice.

HISTORY OF GLACIER CANYON

Formation of the Glaciers - Along the course of the present canyon, a deep and narrow canyon had been carved by water before the advent of glacial times. Snow accumulated in the head of the canyon faster than melting was possible to form the glacier. The tremendous weight of the snow with some melting and refreezing transformed the snow into ice.

Glacier Movement - When the ice became heavy enough, it began to move down the canyon under the pull of gravity. At certain times the accumulation of snow and ice and its downward movements were rapid enough to carry the glacier the entire length of the canyon and out onto the floor of Jackson Hole before the ice was completely melted.

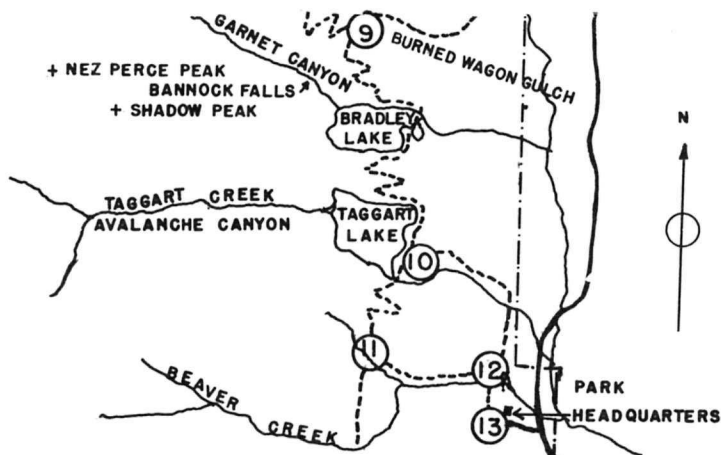
Glacial Erosion - Glacial ice froze to and around the rocks in the bottom and sides of the canyon. As the ice moved, these rocks were plucked or quarried from their sources and carried downward by the ice. In this way the great amphitheatre-like basin or cirque in which the present Teton Glacier rests, was formed. Armed with the rocks frozen into the ice, the glacier scoured out the lower part of the canyon. The original deep, narrow river canyon was thus further deepened and much widened and smoothed. This typical glaciated canyon is as a result deep "U" shaped, with steep sides and a broad, rounded floor.

Deposition by the Glacier - Around the terminal, melting edge of the glacier all of the rocks eroded and carried from the canyon were dropped. In this way the large terminal moraine which encircles the mouth of Glacier Canyon was formed.

The Glacier Today - A change of climate has caused the glacier to melt back until today it is confined to its cirque. Erosion and deposition still continue, and the high ridge of loose rock that enclose the lower end of Teton Glacier is the terminal moraine recently formed and still being added to.

All of the Major Teton Canyon have had a similar history.

THE TRAIL TO TAGGART & BRADLEY LAKES



Taggart Lake is two miles from Park Headquarters.

Park Headquarters - Office of the Superintendent, Chief Ranger and other Park Service Personnel. Information Service.

The start of the trail is at the end of the oiled road passing through the Headquarters area to the west. One-fourth mile from the trail start the trail junction No. 12 is reached. One leads to Taggart Lake by the way of Beaver Creek Trail which turns left at this point and the other leads by the way of Taggart Creek Trail and continues to parallel the pasture fence toward the north from this point.

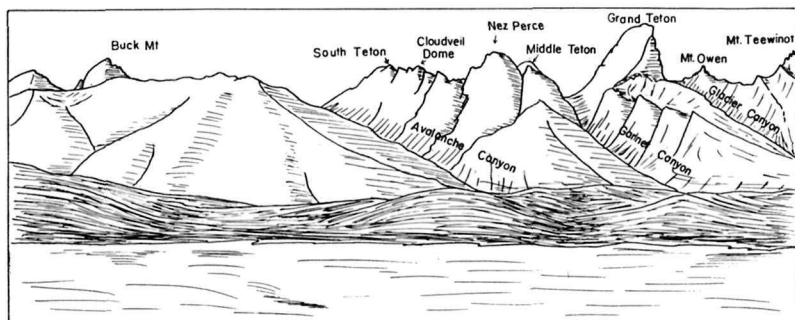
This description of the trail goes by the way of Beaver Creek and returns by the way of Taggart Creek.

From this junction No. 12, the trail passes through the lodge-pole pine forest for about one-fourth mile then comes to the Beaver Ponds. Here may be seen several beaver dams, beaver cuttings and a few beaver houses or dens built above the water.

At the forks of Beaver Creek is an old beaver pond now filled and grass covered to the south. Note that the dead trees have been killed by the impounded water and that the grassy willow-covered valley floor is the result of beaver dams being completely filled with silt and then reclaimed by vegetation.

Some of the old dams are still discernible as low ridges.

Some of the trees on the steep slope are curved down hill by soil creep and by the weight of the winter snows.



Second Mile: At this point trail junction No. 11 the trail divides, the left hand trail leading to Phelps Lake and the right hand trail leading to Taggart Lake.

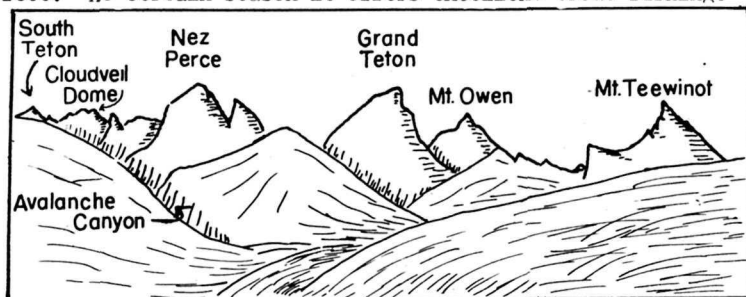
The trail ascend the south, outer side of the Taggart Lake moraine. At the switchback note the view of the high peaks. They may be identified by a study of the sketch at the bottom of this page.

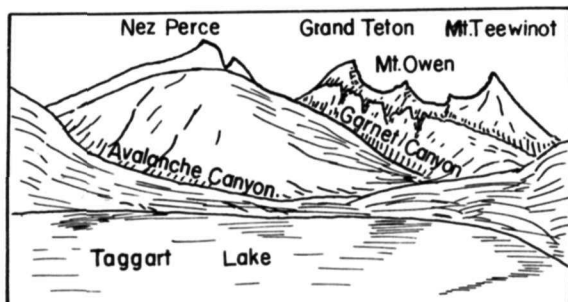
Note the sparse growth and low brush on the south exposed upper slopes in contrast to the dense forest of the moist valley bottoms.

The trail tops the irregular, ridged moraine, and then descends the inner side of the moraine through a Douglas fir- alpine fir forest to the outlet of Taggart Lake.

The bridge crossing of the outlet of the lake. Note the forest covered, ridged moraine to the north of the lake.

Taggart Lake was named for a member of the Hayden Survey of 1872. It has an area of 163 acres and a maximum depth of 31 feet. At certain season it offers excellent trout fishing.





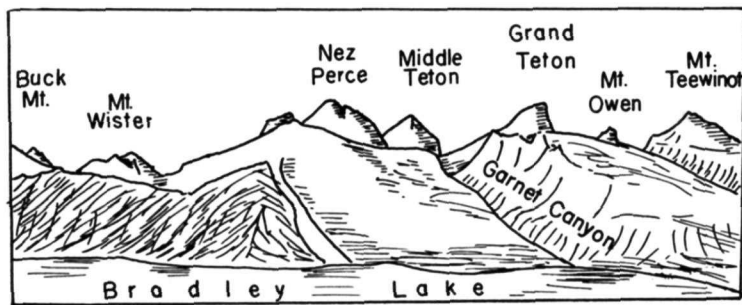
Along the east shore of Taggart Lake the Trail divides and the right hand trail to the east leads back to Headquarters by the way of Taggart Creek Trail and the other trail leads to Bradley Lake and to the Teton Glacier Trail.

Third Mile: A good view across Taggart Lake. Note Sketch Above

The trail divides on the north shore of Taggart Lake. The trail continueing around the lake to the west leads into Avalanche Canyon for about three miles. This is a secondary trail and hikers can continue beyond the trail up Avalanche Canyon to join the Skyline Trail at the head of South Cascade Canyon. THIS TRIP SHOULD NOT BE ATTEMPTED ALONE.



VIEW FROM THE OUTLET OF TAGGART LAKE



The trail to Bradley Lake ascends the moraine north of Taggart Lake.

Mount Wister separates the two forks of Avalanche Canyon to the southwest of Taggart Lake.

Fourth Mile: Near the top of the moraine between Taggart and Bradley Lakes.

The north facing slopes of the moraines are heavily timbered, south-facing slopes have but a scattered forest and much low growth sage, aspen, Oregon grape, mountain ash and buckbrush.

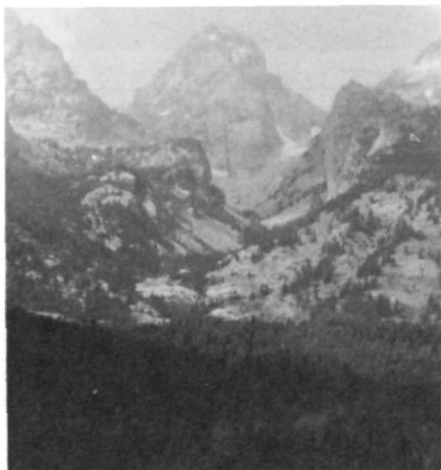
Bradley Lake was named for a member of the Hayden Survey of 1872.

Its maximum depth is 93 feet and it has an area of 73 acres.

Trout fishing is generally good.

Several ridges form the crest of the Taggart Lake -Bradley Lake moraine.

A good view across Bradley Lake from its east shore and at the outlet of the lake.



A VIEW OF GARNET CANYON AND THE MIDDLE TETON TO THE WEST.

The trail goes around the east and part of the north side of the lake and then climbs the south side of the Bradley Lake moraine, a number of switchbacks to the top of the ridge.

Fifth Mile: Several distinct ridges form the top of the Bradley Lake moraine.

The trail crosses the head of Burned Wagon Gulch, a valley left between Bradley Lake moraine on the south and the Glacier Canyon moraine on the north.

This trail joins the Teton Glacier Trail at trail junction No. 9, at six and three-fourths miles from Park Headquarters.

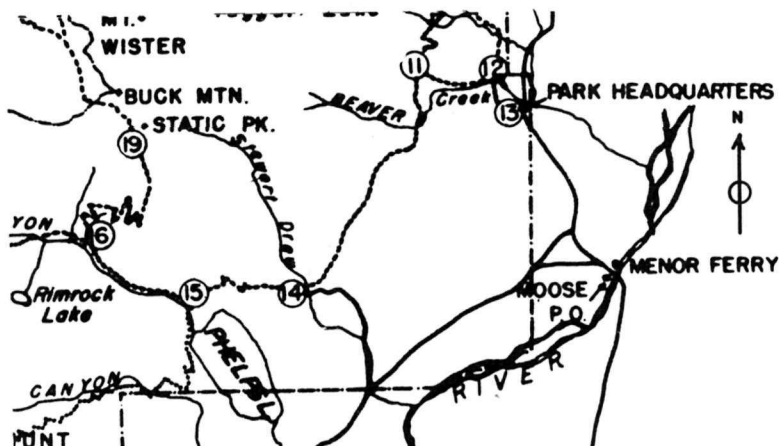


AMPHITHEATRE LAKE AND THE END OF THE TETON GLACIER TRAIL.



BRADLEY AND TAGGART LAKES AS SEEN FROM THE GLACIER TRAIL.

THE TRAIL TO PHELPS LAKE 6 3/4 Miles



The first mile of this trail is the same as the Taggart Lake Trail along the north shore of the Beaver Ponds, Page 48.

Second Mile: The trail turns to the south across Beaver Creek and passes through a forest of mature lodgepole pine.

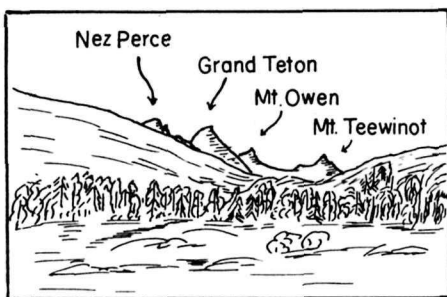
In places alder and aspen trees are populating open areas in the forest. Beneath the mature lodgepole cover is a new growth of alpine and Douglas fir which will eventually replace the lodgepole pine as they mature and die.

Third Mile: Most of the trail from Park Headquarters to Phelps Lake crosses a wooded bench some 300 feet above the level of Jackson Hole and is on a moraine of the second ice period.

This moraine is older than those which immediately enclose the piedmont lakes. It is a remnant of a large moranian system formed by a glacier that at one time filled most of the north end of Jackson Hole. Timbered Island and Burned Ridge in Jackson Hole are other remnants of this older glacial deposit.

This portion of the older moraine is now somewhat covered with sand and silt brought onto it by the small rivulets which come down from the mountain slopes to the west.

At a small creek there is a conspicuous rock fan of large boulders and gravel deposited by the spring run-off from melting snows.



The trail passes a few open areas which present view of the tops of some of the peaks.

Note the sketch to the left for identification of the peaks seen.

Fourth Mile: The open fields of the Whitegrass Dude Ranch come in view to the east.

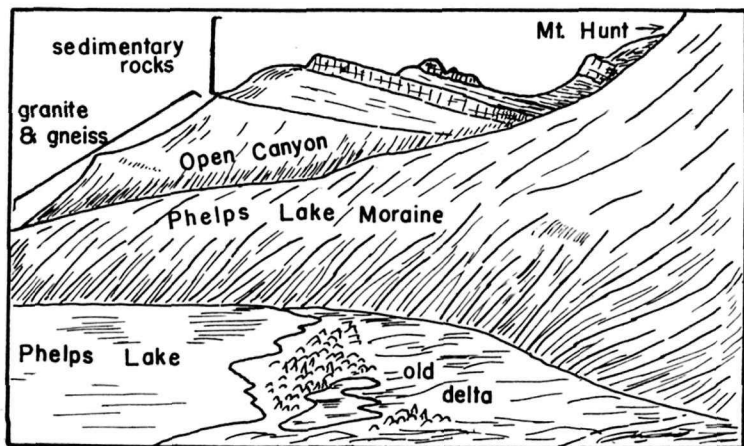
Douglas fir trees become more numerous in this area indicating an older forest cover.

Fifth Mile: There are many branchings of the trail in this area. If in doubt as to which is the main trail, follow the one on the side toward the mountains.

Trail junction No. 14 is about one-fourth mile south of the Whitegrass Ranch and is near the junction with a road.

100 yards to the east is a Park Service snowshoe cabin and it is at the end of the nearest approach road to this trail.

Note the dense lodgepole forest, the rank undergrowth of thimble berry and other plants. Abundant moisture from seepage through the moranian deposit on the mountain slopes affords an excellent habitat for many plants.



Sixth Mile: The trail passes an area of broken, bent, small trees and shrubs, typical of a snowslide area.

Wister Draw is the small valley ahead and to the left. The author of the Virginian, Owen Wister, had a homestead at the mouth of this valley, about a mile to the east.

Phelps Lake moraine is the high, wooded ridge extending eastward from the mountain front about one-half mile to the south. This moraine is above and on top of the older moraine which the trail follows from Beaver Creek to this point.

Three large Douglas firs beside the trail. Two of these have an unusually scaly bark. Their ragged shape contrasts with the symmetrical cone type of the alpine fir visible on the moraine to the left of the trail.

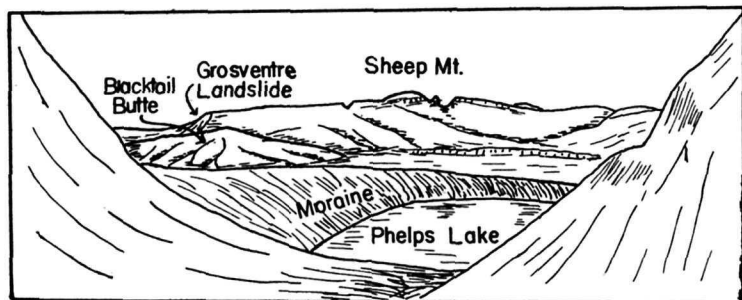
The top of the Phelps Lake moraine is reached at 5 and $\frac{1}{4}$ miles from Park Headquarters or a little less than one mile from the Whitegrass Snowshoe Cabin and the end of the road.

The entire moraine of Phelps Lake is visible in a horseshoe-shape, enclosing the mouth of Death Canyon and damming the waters of Phelps Lake, which has a maximum depth of 158 feet, covers 525 acres and was named by the Hayden Survey of 1872.

The trail goes down the south slope of the moraine. Notice that this open slope is covered with mountain maple, choke-cherry bushes, buckbrush, mountain ash, Oregon grape, huckleberry and other shrubs common to south exposures.

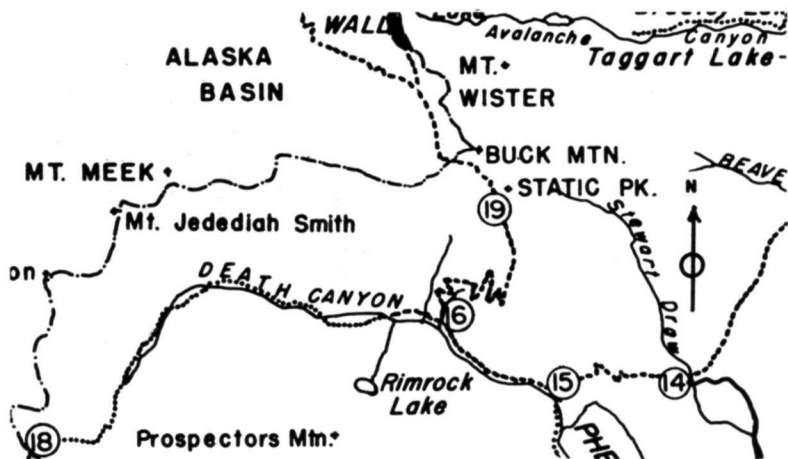
Contrast this south exposure with the dense forest growth on the moraine south of the lake, where on the north exposure, evaporation is very slow and the trees grow more abundantly.

The Phelps Lake Trail ends where it joins the Death Canyon Trail or trail junction No. 15, six miles from Park Headquarters. This point is also the start of the Marion Lake Trail to Marion Lake 9 miles from Phelps Lake.



A VIEW OF PHELPS LAKE AND THE MORaine ALONG ITS NORTH SHORE

THE DEATH CANYON TRAIL 7 3/4 Miles



This trail may be reached by the trail from Headquarters over the Phelps Lake Trail or by driving by car to the Whitegrass Snowshoe Cabin, which is about 100 yds. to the east of the trail that leads to Phelps Lake and the start of this trail.

Description of this trail starts at the west side of Phelps Lake where a secondary trail leading toward Phelps Lake leads into Open Canyon, Thence into Granite Canyon and on to Marion Lake and is described briefly on page 65.

First Mile: Mouth of Death Canyon ahead.

Note that the banded gneiss in the north wall is nearly horizontal, while in the south wall it is sloping downward about 45 degrees toward the north.

This is evidence of a fault of which there are several in the Teton Range.



LOOKING WEST TOWARD THE MOUTH OF DEATH CANYON



LOOKING UP THE NORTH FORK OF DEATH CANYON and the route to the SKYLINE TRAIL.

The trail passes through a grove of very large Cottonwood trees. There are also many tall spired alpine fir, some fine beds of ferns and several other plants along that portion of trail in the lower floor of the canyon.

Note the very large Englemann spruce some of them are nearly twelve feet in circumference. There are two species of spruce in this region, the Colorado Blue Spruce and the Englemann Spruce. Most of the blue spruce are found along the Snake River

The good alluvial soil and a constant moisture supply is responsible for the fine spruce-fir forests and the abundant flowers of the canyon floors.

Note the outcrop of a black, foliated rock - hornblende schist. Analysis of this rock indicates that at one time it was a sandy limestone. Great heat, pressure and chemical solutions emanating from volcanic rocks have metamorphosed or changed it to its present form.

Second Mile: The trail crosses a small side stream.

Note the glacial rounded and polished bed rock on the south side of the canyon near the overhanging rock of pegmatite.



LOOKING UP THE SOUTH FORK OF DEATH CANYON and an alternate route to MARION LAKE.

Along the trail there are many fine examples of rock forms such as this beautiful example of a faulted, overturned fold emphasized by the white pegmatite which has intruded the dark gray granitic rock to the right side of the trail.

Here too may be found many of the minerals which have been described elsewhere, such as, feldspars, quartz, mica, hornblende, garnet and diabase.

Some of the black schist included in the pegmatite is fragments of the older rock which became detached and fell into the pegmatite when the latter was in a liquid condition.

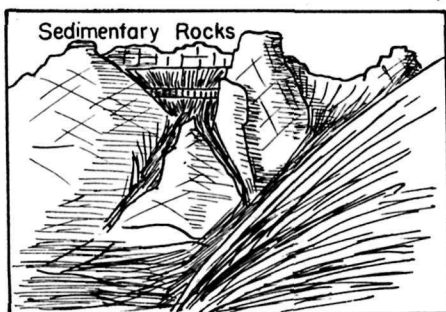
At the cascades near the switchback note the great bank of thimble berry bushes on the opposite side of the stream.

Last switchback to the main valley of the south fork of Death Canyon.

Note the several medium sized garnets in the rock at the inside turn of the trail.

Third Mile: Top of the lower, steep part of Death Canyon.

The Canyon walls are still of granite, pegmatite and gneiss, but at the top of the great rock buttress to the northwest are sandstone shale and limestone with somewhat rounded terraced contours, as shown in the sketch above.



Many beautiful gneissoid rocks, blackish gray schist intruded by numerous veins of pink pegmatite, all tightly folded. Such rocks originate far below the surface of the earth where the rocks under great pressure and heat are probably somewhat "plastic". A tremendous amount of erosion of the surface rock has been required to uncover what is visible in the bottom of this canyon.

Trail junction No. 16 is reached, the trail to the right is the main Death Canyon Trail and leads to the Skyline Trail and

Alaska Basin, while the trail continuing on up the south fork of Death Canyon is a secondary trail for the most part. It leads into a most interesting canyon and is also an alternate route to Marion Lake and to the Alaska Basin.

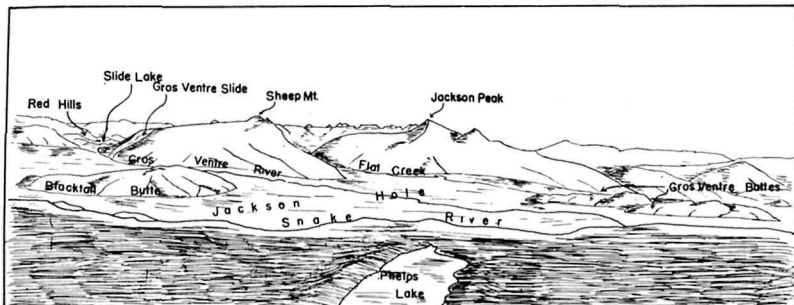
Following the trail up the north fork of Death Canyon or the trail to the right at trail junction No. 16, the sedimentary rocks and limestone wall become visible on top of the granitic rocks which form the walls of Death Canyon.

A good view into the south fork of Death Canyon as pictured on the top of page 58. Note the steep-walled, rounded-floor of a quite straight deep "U" shaped canyon formed by glacial erosion.

Fourth Mile: Trail crosses an outcrop of brown weathered rock and comes to a good lookout point with good views into Death Canyon and of the limestone wall at its head with Fossil Mountain at the south end of this wall.

A small stream. (The last sure water to Alaska Basin).

Some old prospector holes three to four hundred yard above the trail. The brownish and yellowish outcrops of shattered



LOOKING SOUTHEAST FROM LOOKOUT

rock probably encouraged prospectors to search for minerals at this point.

Switchback. Buck Mountain becomes visible through the notch at the head of the steep gully to the northwest.

Fifth Mile: The beginning of a Whitebark pine forest. This tree with the alpine fir are becoming more dominant in the ascent from the lodgepole pine-Douglas fir- Engelman spruce of the canyon floor.

Sedimentary rocks; sandstones, shale and limestone, are visible on top of the ridges and peaks that enclose Death Canyon on the south, west and northwest. These now separated outcrops were at one time continuous over the entire region, but have been isolated from each other by the cutting of the canyons deep into the granite rocks.

The first Summit: A short trail to the right leads to an observation point from which to view Jackson Hole and much of the surrounding country. Note the sketch above and the photograph on top of page 61.

Sixth Mile: Top of the divide between Death Canyon and Stewart Canyon. The upper part of Stewart Canyon is quite deep and flat-floored, but the lower part is very steep and narrow. The group of buildings to the northeast at the edge of the forest near the base of the mountains is Park Headquarters.

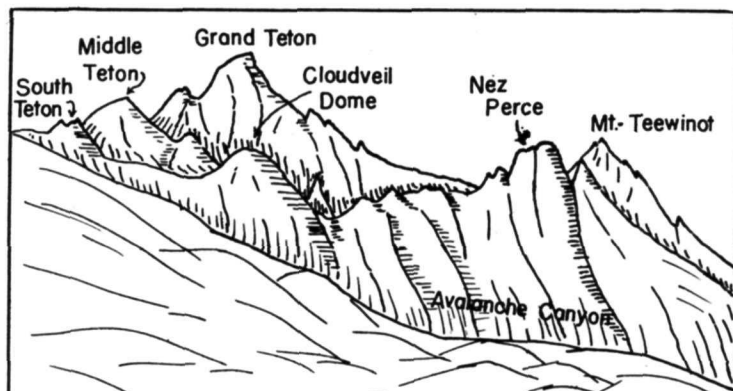


A VIEW OF PHELPS LAKE AND A PART OF JACKSON HOLE TO THE EAST

Rimrock Lake high up the south wall of Death Canyon comes into view.

Seventh Mile: Several short switchbacks as the trail climbs to the ridge southwest of Static Peak and south of Buck Mountain.

This is trail junction No. 19 and is the south end of the SKYLINE TRAIL, which leads to Alaska Basin and to the trail junction at the head of South Cascade Canyon.



Several kinds of sedimentary rocks appear in the talus along the trail. Note the Quartzite, a fine-grained, pinkish buff to gray rocks which splits along parallel planes. It is of the Flathead Formation, in the Cambrian Age.

A study of the Generalized Profile Section on page 72 will give a key to the various geological formations of the area.

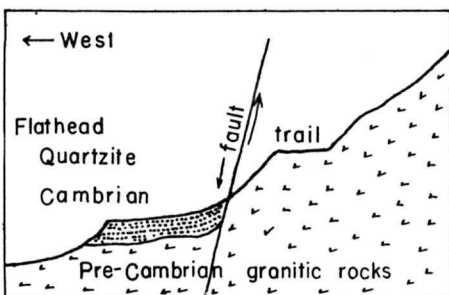
The divide between Death Canyon and Alaska Basin is reached.

Alaska Basin is drained by the south fork of Teton River in Idaho. Great walls of sedimentary rocks form the upper slopes of this basin and were obviously at one time continuous across the broad valley. Glaciers rapidly gouged out and widened the basin leaving the present high walls to form the canyon rim. The floor of the basin is largely of granite with the Flathead Quartzite forming the lowest flattened bench. Downward erosion and the deepening of the basin by glaciers was held up by the resistance of these hard, deeper formations. In many places in the basin the granite bedrock has been conspicuously rounded and polished by glaciers. In other places local softer areas of granite have been gouged out to form small lake basins. Since the glaciers melted, streams have cut narrow canyons below the general level of Alaska Basin.

Ninth Mile: In several places around the head of Alaska Basin the Flathead Quartzite occurs below the trail. The slopes to the east above the trail are mostly of granite and gneiss which is the rock normally beneath the sedimentary rocks.

The evidence of a fault is apparent toward the

saddle where the old trail turned from Alaska Basin.



The New Skyline Trail turns left following a ledge through Alaska Basin and climbing the hydrographic divide to join the Cascade Canyon Trail north of the Limestone Wall.

THIS NEW ROUTE SHOULD BE FOLLOWED AS THE OLD TRAIL ALONG THE EAST SIDE OF THE WALL HAS BEEN DESTROYED BY ROCK SLIDES AND IS UNSAFE.

THE BUCK MOUNTAIN FAULT: Just below and slightly to the right of the pass between South Teton and the Wall, the Flathead Quartzite is again visible, and here again it is sharply tilted, being nearly vertical in position. The great fault called the Buck Mountain Fault, which has been suggested by various Phenomena along the trail from Phelps Lake to this point, may now be described more fully. It appears to cross Avalanche Canyon just a short distance to the east of the two passes crossed by the trail, then turns a little to the southeast to descend into Death Canyon. Where it makes this descent the rocks have been badly shattered and later discolored by weathering as seen along the trail a few miles back. The fault may pass through the mouth of Death Canyon to produce the change in dip of the Pre-Cambrian rocks mentioned at the start of the Death Canyon Trail. If so, it probably continues southward to join the main front-of-the-mountain fault.

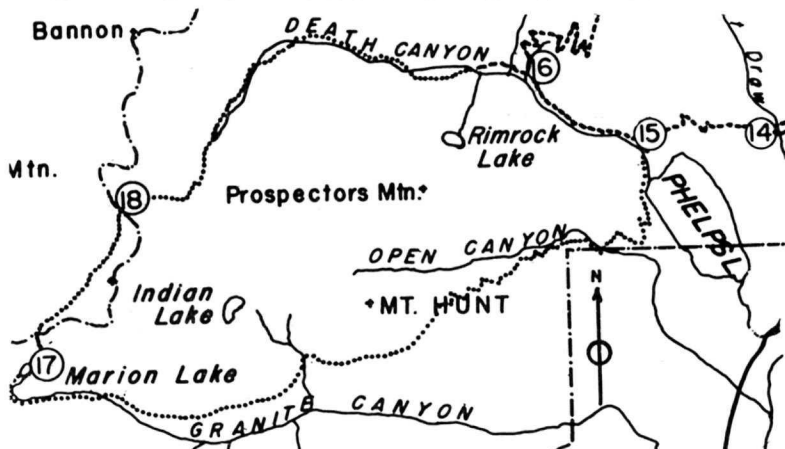
The effect of the fault has been to lift the granite and gneiss that now form the high peaks from Mt. Cwen southward to Buck Mountain high above the sedimentary rocks that outcrop to the west. This is especially noticeable at the head of Avalanche Canyon where the top of the South Teton, composed of granite and gneiss to the very top, is abruptly higher than the limestones of the Wall which is on top of the granite and gneiss. The vertical displacement of the rocks on the east side of the fault is at least more than 2,000 feet.

The trail in Alaska Basin continues to the west and northward to join the trail from the South Fork of Cascade Canyon. It passes along the west slopes of the Wall to the saddle just north of a small glacier or icefield near the north end of the Wall, where it joins the trail described on page 40.



SNOWDRIFT LAKE IN AVALANCHE CANYON

THE TRAIL TO MARION LAKE 11 Miles.



Marion Lake may be reached by two different trails starting from trail junction No. 15. at the west shore of Phelps Lake.

The first starting at Phelps Lake is a secondary trail leading across the creek to the south of the trail junction and by a series of switchbacks over the moraine on the south side of Phelps Lake leads to Open Canyon and thence up Open Canyon and again by a series of switchbacks passes through the saddle to the southeast of Hunt Mountain and then drops down into the north fork of Granite Canyon.

Contact is made with the sedimentary rocks that cap the top of Mt. Hunt and interesting studies in geology of the area may be enjoyed. Numerous fossils have been discovered in these sedimentary rocks.

The trail is not too evident along the south slopes of Granite Canyon as several game trails and other old trails leading up and down Granite Canyon makes this trail rather difficult to follow in certain portions.

A careful study of the topographic map of the area should be made before attempting this trail to Marion Lake.



LOOKING NORTHEAST FROM THE HEAD OF THE MAIN FORK DEATH CANYON

Marion Lake may also be reach by the way of Upper Death Canyon. Or a return trip may be made by coming down Death Canyon from Marion Lake. The Head of Death Canyon is about two miles to the northeast from Marion Lake.

THE TRAIL TO MARION LAKE BY WAY OF THE SOUTH FORK OF DEATH CANYON.

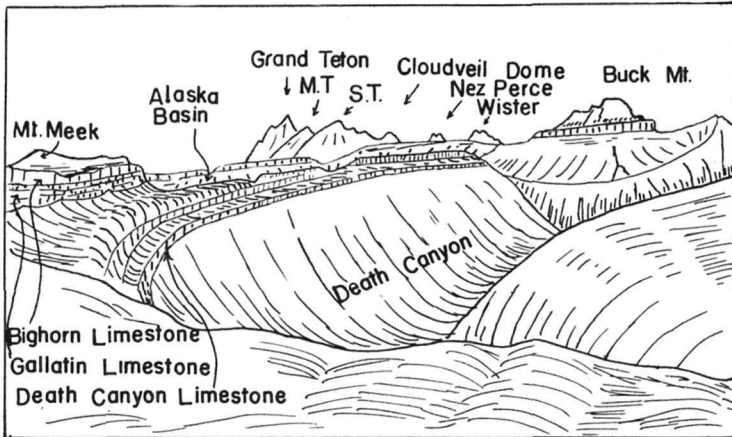
Starting at the west end of Phelps Lake up Death Canyon to trail junction No. 16 and then continueing on the trail that leads straight ahead at this junction which soon becomes a secondary trail but is quite easy to follow and leads to one of the most beautiful and most interesting of the Teton Canyons

The Broad, flat meadows, fed by small streams and springs and warmed by the sun that has easy access into the bottom of this open canyon, are covered during most of the summer with a great abundance of wild flowers.

No where else in the Tetons is a more gorgeous or such an abundant display of colorful flowers found.

While the deep cut canyon of Death Canyon is cut into the granite, the upper walls are formed of limestone, shale and sandstone whose differential erosion produces walls, terraced benches, turreted ridges and isolated, spired monoliths.

The diagram below will help identify the scenic and geologic features of the area as view from the head of Death Canyon.



THE TRAIL FROM UPPER DEATH CANYON TO ALASKA BASIN

At the head of the South Fork of Death Canyon a faint trail follows the high bench north to Alaska Basin and joins the Skyline Trail at the head, east end of Alaska Basin.

The two photographs of Alaska Basin given on page 68 will assist in locating the Skyline Trail which passes around the upper portion of Alaska Basin on its north and east side, goes around the west side of the Limestone Wall at the head of Avalanche Canyon and leads to the divide between South Cascade Canyon and a branch of Teton Creek in Alaska Basin.

This plateau above the Wall and the slopes from Alaska Basin offer some wonderful displays of alpine flowers in midsummer. Excellent views of the Tetons from the west may be obtained from the top of the Limestone Wall or at the place where the trail crosses the saddle into south Cascade Canyon.



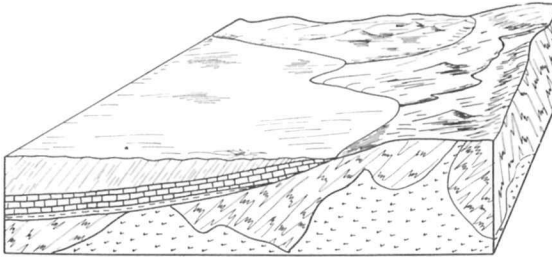
LOOKING NORTHEAST FROM ALASKA BASIN TOWARD THE GRAND TETON



THE SKYLINE TRAIL PASSES TO THE RIGHT OF THE PEAK AT THE LEFT.

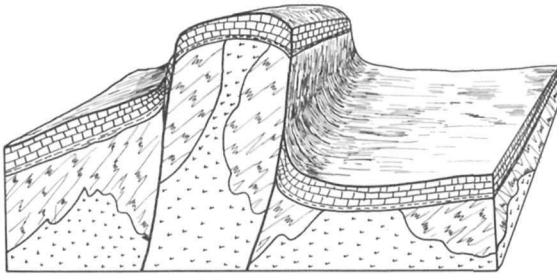
GEOLOGICAL STORY OF THE TETONS AND JACKSON HOLE, A SUMMARY

1. An Ancient Landscape - In pre-Cambrian times, a low rolling topography, close to sea level, existed in western United States. Previously, volcanic eruptions, mountain building, and erosion on a grand scale had occurred. Original sedimentary rocks had been changed to metamorphic rocks which were intruded by granitic and diabasic rocks. Old mountain ranges were uplifted and completely eroded away before Cambrian times.

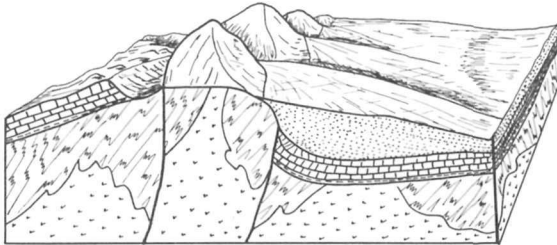


2. The Ancient Seas and the Sedimentary Rocks - Later ocean waters flooded great areas of the ancient land. Many times the seas advanced over the land, then drained away. In each sea millions of tons of sand, silt and limy ooze, and the hard parts of millions of plants and animals were deposited as sediments. Time, pressure and natural cements have hardened these materials to form sandstone, shale and limestone, the sedimentary rocks. Some animal and plant remains were preserved in these rocks as fossils.

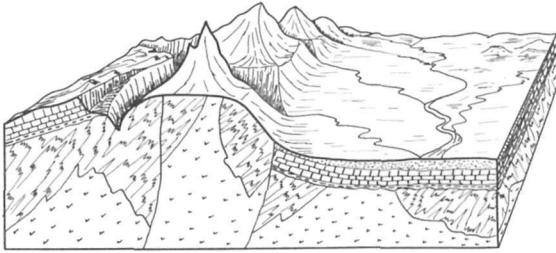
3. Building the Mountain Highlands - Then the continent gradually and permanently emerged from the sea. Squeezing forces wrinkled the surface rocks into long, upward folds which usually trended north and south. From these uplifted areas erosion has carved the present ranges of the Rocky Mountain Region.



4. The Teton Fault - One such fold broke along its eastern side to form a great fracture along which the central part of the fold was uplifted some 14,000 feet or more. A smaller fault developed near the center of the fold. The Teton Range has been carved from this uplifted fault block, and Jackson Hole is the basin to the east of the fault.

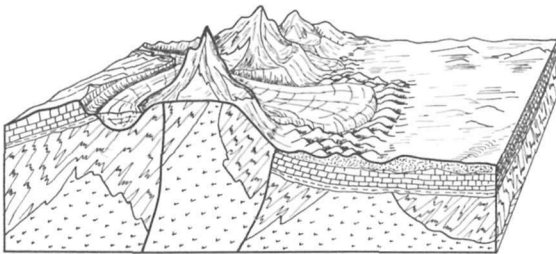


5. Erosion and Deposition, the Filling of Jackson Hole - As the Teton block was lifted, erosion by streams began. The sedimentary rocks were stripped away from the highlands, and deep canyons were cut into the pre-Cambrian basement rocks. Much of the eroded material was deposited in Jackson Hole, filling it to a depth of some one thousand feet.

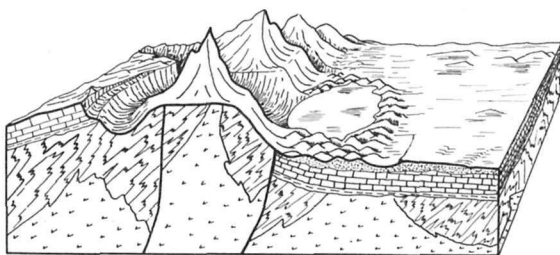


6. Jackson Hole Re-excavated, the Mountains Re-exposed.

Later, rivers began to carry away the sand and gravel which filled Jackson Hole, and the nearly buried mountains were again exposed to about their present height above the valley. The mountains may have been re-elevated by new earth movements as well. The mountain canyons were much deepened, but in their depths were quite narrow.



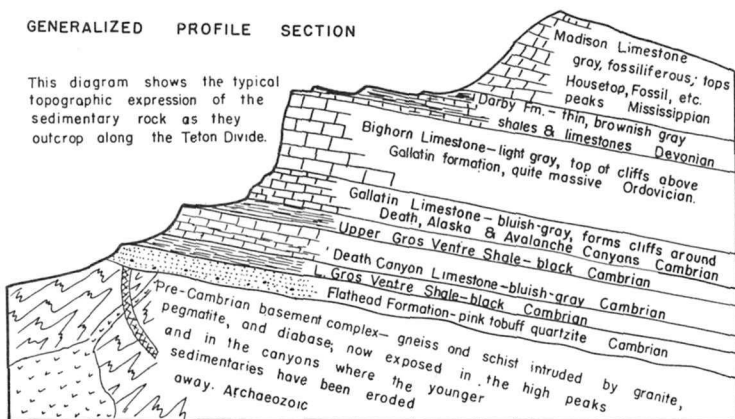
7. The Glaciers - Great glaciers formed in the highlands and moved downward into Jackson Hole. At one time most of this basin was covered with glacial ice. At a later time glaciers filled the Teton canyons and extended only a short distance beyond the canyons onto the floor of Jackson Hole. The rock material eroded from the mountains was deposited around the melting edge of the ice in Jackson Hole to form large moraines.



8. The Tetons Today - Seven present day glaciers and many permanent ice fields are the last remnants of the once large glaciers of the Tetons. The moraines of the last glaciers form dams behind which the piedmont lakes, Jackson, Leigh, Jenny, Bradley, Taggart and Phelps, lie. Glacier-gouged, rock basins of the higher country are now filled with the waters of alpine lakes. The smoothness of the canyons and the extreme ruggedness of the peaks and ridges are the results of erosion by the glaciers. Erosion of the sedimentary rocks has again exposed the pre-Cambrian rocks of the ancient land in the high peaks and in the deep canyons.

GENERALIZED PROFILE SECTION

This diagram shows the typical topographic expression of the sedimentary rock as they outcrop along the Teton Divide.



SOME COMMON BIRDS OF GRAND TETON NATIONAL PARK

WATER BIRDS

- California Gull - white, bluish gray back; lakes and streams of the valley.
- Mallard - green head, chestnut breast, white V on tail in flight; lower elevations.
- Barrow's Golden-eye - Black and white, glossy purple head; frequently seen on Jenny Lake.
- American Merganser - white, black head and back; may be seen on Jenny Lake.
- Spotted Sandpiper - brownish gray above, white below with black spots; a shore bird.
- Killdeer Plover - grayish brown above, chestnut rump, two black bands across white breast; call loud "Kildee"; open lowlands.

GROUSE

- Richardson's Grouse - bluish slate gray with gray terminal tail band; higher canyons and mountain slopes.
- Gray Ruffed Grouse - gray-brown with black shoulder ruffs; timbered areas of lower elevations.

HAWKS AND OWLS

- Osprey - black above, white head, neck and underparts; is seen fishing on lower lakes and streams.
- Western Red-tail - large; dark with chestnut tail; low open country.
- Bald Eagle - white head and tail; all elevations.
- Western Horned Owl - large; dark; may be seen in evenings or heard at night at lower elevations.

WOODPECKERS

- Red-shafted Flicker - larger than robin; mottled gray, white rump, red shafts of wing feathers conspicuous in flight; cottonwoods and aspens.
- Red-naped Sapsucker - smaller than robin; black and white, black breast, yellow belly, red crown, throat and neck; aspen habitats at lower elevations.

WOODPECKERS (continued)

Rocky Mountain Hairy Woodpecker - size of robin; black and white, nape scarlet; aspen and coniferous forests.

OTHER LAND BIRDS

BLACK AND DARK-COLORED BIRDS

American Raven - large; all black; lower elevations.

Dipper, Water Ousel - dark, slate gray; near cascades and rapids; teeters on rocks, dives and walks in water.

Pacific Nighthawk - larger than robin; dark with conspicuous white spot on each wing; soars and dives with fluttering whistle in evenings.

BIRDS WITH BLACK MARKINGS

Mountain Chickadee - size of sparrow; gray, head and throat black with white stripe through eye; forests all elevations.

Long-tailed Chickadee - More black on head than Mtn.

Chickadee, no white stripe through eye.

Rocky Mountain Nuthatch - smaller than sparrow; gray, white on side of head and below, black on wings and tail; walks on tree trunks frequently up side down;

Red-breasted Nuthatch - bluish gray, light reddish brown below; all elevations on trunks of trees.

Eastern Belted Kingfisher - larger than robin; light slate blue, black head, crest and band across throat; streams of lower elevations.

Clark's Nutcracker and Cliff Swallow - see birds with white markings.

BIRDS WITH YELLOW OR ORANGE MARKINGS

Desert Horned Lark - larger than sparrow; brownish gray, black tufts (horns), yellow throat; open grasslands.

Audubon's Warbler - small; dark gray to black, yellow on head, throat and wings; forests of lower elevations.

Eastern Yellow Warbler - small; greenish yellow, streaked below with reddish brown; lower elevations.

Western Tanager - see birds with red markings.

BIRDS WITH RED MARKINGS

Western Robin

Western Tanager - little larger than sparrow; yellow, red head, black back; forests of lower elevations.

Rocky Mountain Pine Grosbeak - size of robin; purplish red changing to dark brownish gray on back, sides and belly; coniferous forests of higher elevations.

Cassin's Purple Finch - size of sparrow; gray, somewhat streaked, purplish head and neck; lower forests.

BIRDS WITH WHITE MARKINGS

Clark's Nutcracker - larger than robin; gray, black and white wings and tail; timberline forests.

Cliff Swallow - black above, white forehead and underparts, chestnut throat, buff rump; square tail; canyon walls and cliffs.

Tree Swallow - Upper parts black to iridescent green, lower parts white; lower elevations.

Northern Violet-green Swallow - Upper parts iridescent purple, green and black, lower parts white, white cheeks and sides of rump distinctive. Low elevations.

Pink-sided Junco - size of sparrow; dark slate, white breast and outer tail feathers, pinkish sides; forested areas of all elevations.

Western Vesper Sparrow - brown streaked, white outer tail feathers; sagebrush areas.

American Pipit - larger than sparrow; gray above, light buff below, white outer tail feathers; near and above timberline in summer.

Townsend's Solitaire - smaller than robin; gray to brownish gray, white outer tail feathers; in quiet forests of canyons and lower mountain slopes.

White-crowned Sparrow - gray and brown, conspicuous black and white stripes on head; moderate elevations.

BIRDS LARGELY BLUE

Mountain Bluebird - larger than sparrow; azure above, lighter below; lower and medium elevations.

BIRDS LARGELY BLUE (continued)

Black-headed Jay - larger than robin; dark blue, black head and crest; forested areas.

BROWN, GRAY AND OBSCURELY COLORED BIRDS

Ruby-crowned Kinglet - small; greenish gray, crimson crown patch; sings loud song from tree tops.

Mountain Song Sparrow - gray, brown and black streaked, white below streaked with brown, brown central spot on breast; brushy areas of lower elevations.

Western Chipping Sparrow - small sparrow; gray, brown and black streaked, grayish below, chestnut crown; shrubs and low trees of lower elevations.

White-crowned Sparrow - see birds with white markings.

Vesper Sparrow - see birds with white markings.

Northern Pine Siskin -, smaller than sparrow; gray, brown streaked, yellow spots on wings and tail show in flight.

Black Rosy Finch - Brown, washed above with rose, gray and black on head; near glaciers and snowbanks.

Audubon's Hermit Thrush - smaller than robin; tawny brown, heavy brown spots on white breast, tail reddish brown; canyons and lower slopes in forests.

Rocky Mountain Jay, Camp Bird - larger than robin; gray, darker gray mask and upper parts; quiet bird of forests of mid-elevations.

Flycatchers - Say's Phoebe, Western Wood Pewee, and Olive-sided Flycatcher are quite common; most easily recognized by their habit of catching insects on the wing on short flights from a perch on a tree.

Clark's Nutcracker, Pink Sided Junco, American Pipit, Townsend's Solitaire - see birds with white markings.

Nuthatches, Chickadees - see birds with black markings.

Desert Horned Lark - see birds with yellow markings.

Rocky Mountain Creeper - small; brown, black streaked, gray below; curved bill; climbing tree trunks at all elevations.

SOME COMMON MAMMALS OF GRAND TETON NATIONAL PARK
(From a check list by O. J. Murie)

FLESH EATERS

- Black Bear (*Euarctos americanus cinnamonum*) - occasionally seen along the trails.
- Grizzly Bear (*Ursus* sp.) - very rarely seen.
- Martin (*Martes caurina origenes*), Weasel (*Mustela arizonensis*), Mink (*Mustela vison energumenos*) and Otter (*Lutra canadensis*) - are rarely seen in the summer in forested areas and along water courses.
- Skunk (*Mephitis hudsonica*) - quite common along the streams in Jackson Hole.
- Badger (*Taxidea taxus*) - occasionally seen up to 9,000 feet elevation.
- Coyote (*Canis latrans nebracensis*) - occasionally seen at all elevations.

RODENTS

- Marmot, Rockchuck, Woodchuck, Groundhog (*Marmota flaviventris mosophora*) - one of the most commonly encountered animals of campground and trail. A rare black variety is frequently seen in the mountains.
- Golden-mantled Ground Squirrel, (*Callospermophilus lateralis cinerascens*) - occurs at mid-elevations. This golden brown rodent with a striped back is often mistaken for a chipmunk. Its face, however, is not striped.
- Uinta Ground Squirrel (*Citellus armatus*) - the common, short-tailed, gray animal of the sagebrush areas. Commonly called the "Chizzler", or "Picket Pin".
- Chipmunk (*Eutamias* sp.) - reddish brown rodent; with striped back and face.
- Pine Squirrel, Red Squirrel - (*Sciurus hudsonicus ventorum*) the common tree squirrel.
- Beaver (*Castor canadensis* ssp.) - common in most wooded streams and lakes.
- Yellow-haired Porcupine (*Erethizon epaxanthum epaxanthum*) -

Porcupine are fairly common at low and mid-elevations. Cony, Pika, Rock-rabbit (*Ochotona princeps ventorum*) - Very common at all elevations in the rock slides. Its squeaky, bleating call first attracts attention. Snowshoe Rabbit - *Lepus bairdii bairdii*) - fairly common at Jenny Lake and in similar locations.

GAME ANIMALS

American Wapiti or Elk (*Cervus canadensis*, and Black-tailed Deer (*Odocoileus hemionus macrotis*) - are occasionally seen in the forests and on grassy meadows at mid-elevations in the summer. Both are very numerous in certain parts of Jackson Hole in the winter. Shiras Moose (*Alces americana shirasi*) - common in and near marshy areas and willow patches throughout the park. Rocky Mountain Bighorn (*Ovis canadensis*) - are rarely seen above timberline.

SOME COMMON FLOWERS AND SHRUBS

(by Willis Smith, Ranger Naturalist)

FLOWER COLOR WHITE

Achillea (Yarrow) - late spring, early summer; open places; flat-top cluster of flowers, finely dissected leaves.
Actaea (Baneberry) - summer; shady areas near streams; thrice-compound leaves, bright red fruit; tall.
Amelanchier (Service Berry) - late spring, early summer; along mountain streams; shrub or small tree, small bluish apple-like fruit, edible.
Anemone (Wind Flower) - spring; mountain meadows; creamy white flower, leaves of stem form cover for flower in bud.
Aquilegia (Columbine) - early spring and summer; mountain canyons; creamy white flower, sometimes pastel pink and blue; similar to domestic variety.

- Aster (Aster) - late summer; dry places; similar to daisy but with imbricated bracts.
- Bossekia (Thimble Berry) - summer; shady woods; large maple-like leaves.
- Caltha (Marsh Marigold) - early spring; marshy places, at edge of retreating snow banks; yellow flower center.
- Ceanothus (Buckbrush) - late spring; open dry places; one side of leaf shiny, other side dull; a shrub.
- Erigeron (Daisy) - late spring; open places; bracts of head of equal length and in one or two rows.
- Heracleum (Cow Parsnip) - summer; wet banks; plant stout, 4 to 7 feet high with very large compound leaves.
- Pedicularis (Lousewort) - summer; shady woods; irregular corolla, lanceolate leaves.
- Prunus (Chokecherry) - late spring; along streams, hill-sides; a small tree, simple leaf, single-seeded fruit, bark exudes gum.
- Phlox (Phlox) - spring; exposed places; low perennial with united petals.
- Pterospora (Pine Drops) - summer; deep shade; flesh brown stem.
- Rubus (Wild Raspberry) - late summer; rock slides; excellent fruit very similar to domestic raspberry.
- Sambucus (Elderberry) - late summer; mountain slopes; a shrub with clusters of dark red or blue berries.
- Smilacina (Solomon Seal) - early summer; rich, moist soil; shady places; Lily Family; single unbranched stem.
- Sorbus (Mountain Ash) - summer; mountain slopes; shrub, compound leaf, clusters of orange berries.
- Spiraea (Bridal Wreath) - summer; oval leaves, flowers in dense clusters.
- Streptopus (Twisted Stalk) - early summer; stream banks; small whitish flower underneath the leaves, similar to Solomon Seal.

FLOWER COLOR YELLOW

- Arnica* (*Arnica*) - summer; shady woods; perennial herbs; erect stem, opposite leaves.
- Balsamorhiza* (*Balsam Root*) - spring; dry, open places; large conspicuous flowers and silver-colored, arrow-shaped leaves.
- Berberis* (*Oregon Grape*) - spring; an under shrub; leaves similar to holly.
- Eriogonum* (*Wild Buckwheat*) - summer; dry exposed places; flower cluster on top of naked stem, hairy leaves close to the ground.
- Erythronium* (*Glacier Lily*) - early spring; rich soil in mountains; clear yellow, reflexed petals, six stamens, two smooth leaves.
- Fritillaria* (*Yellow Bells*) - early spring; open places; nodding, bell-shaped flower, smooth alternate or whorled leaves.
- Helianthella* (*Sun Flower*) - summer; open places; similar to common sun flower with branching stems and several heads
- Lonicera* - (*Twin-berry Honeysuckle*) - early summer; shady woods; fruit two-globose, dark purple berry.
- Mimulus* (*Monkey Flower*) - moist places; handsome flowers borne in axils of opposite leaves. (A pink *mimulus* is common in late summer along mountain streams.
- Potentilla* (*Cinquoil*) - summer; open places; leaves palmate, five-petaled corolla, many stamens.
- Solidago* (*Golden Rod*) - late summer; dry places; pyramid-shaped flower clusters.
- Ranunculus* (*Buttercup*) - early spring; moist places; yellow petals waxy, many stamens, low herb.
- Viola* (*Violet*) - early spring; shady places; yellow petal with purple stripe on inside.

FLOWER COLOR BROWN

- Rudbeckia* (*Cone Flower*) - summer; moist places; dark brown, cone-shaped flower head on a stem 3 to 4 feet high.

FLOWER COLOR RED, PINKISH OR PURPLISH RED

- Allium (Wild Onion) - early spring; open sunny places; characteristic odor of onions; smooth, narrow leaves.
- Calypso (Orchid) - early summer; wet, boggy woods; a showy, drooping, brownish pink flower mottled with purple; one broad, thin leaf.
- Castilleja (Indian Paintbrush) - summer; common in shade or sun; red and pink of various shades sometimes other colors except blue; alternate leaves. Color is in bracts, and the flower is small, green and inconspicuous.
- Chimaphila (Pipsissewa) - summer; pine forests; pink, on reclining stems; evergreen; erect leafy branches; dark glossy green leaves.
- Gilia (Trumpet Flower) - spring; open places; a trumpet-shaped, red flower on a tall stem.
- Clematis (Purple Clematis) - early summer; shady woods; upright or climbing stem, opposite leaves, four large petal-like sepals.
- Corallorrhiza (Coral Root) - summer; shady woods; pinkish or straw-colored stem, no true leaves, brownish purple.
- Geranium (Geranium) - spring and summer; very common in open places; pink to light purple, five petals with purple stripes.
- Kalmia (Swamp Laurel) - early summer; along lake shores; pinkish violet, umbrella-like flowers in clusters, suggests a Japanese lantern; evergreen.
- Penstemon (Wild Snap-dragon, Beard-tongue) - summer; mountain canyons; opposite leaves, blue-pink irregular corolla, one sterile filament.
- Phacelia (Mountain Phacelia) - summer; mountain canyons; purple flower with very conspicuous exerted stamens and bright yellow anthers.
- Phyllodoce (Mountain Heather) - summer; alpine meadows; low shrub, nodding flowers, small leathery evergreen leaves, pink to violet.
- Primula (Primrose) - summer; sub-alpine in moist places; large spatulate leaves, crimson-purple flowers with

yellow centers.

Pyrola (Wintergreen) - late summer; deep woods in rich soil; delicate, naked, erect, pale pink flower; stem bears raceme of pink saucer-shaped flowers; basal rosetts of evergreen leaves.

Sphaeralcea (Wild Hollyhock) - late summer; along roads and trails; tall, coarse stem 3 to 4 feet high; pale pink to purple flowers; leaves large, five lobed.

Spiraea (Pink Spiraea) - summer; stream banks in shaded canyons; pyramid of dark rose to pink flowers; low shrub.

Symphoricarpos (Snow Berry) - summer; mountain slopes; low and branching, upright shrub; pink flowers; waxy white berries.

Vaccinium (Huckleberry) - fruit in late summer an excellently flavored deep red-purple berry; a low shrub of shady mountain slopes and forests; small leaves.

FLOWER COLOR BLUE

Aconitum (Monk's Hood) - summer; moist woods; leaves similar to larkspur; showy flowers; helmet-shaped sepal.

Aster (Aster) - late summer; open woods; bracts on head arranged like shingles.

Campanula (Hare Bell) - summer; roadsides, dry places; conspicuous bell-shaped flower on slender, branching stem.

Delphinium (Larkspur) - spring; open areas; 12 to 18 inches high; leaf palmately lobed; sepal spurred.

Erigeron (Daisy) - summer; open woods; bracts in head in one or two rows of about equal length.

Gentiana (Blue Gentian) - summer, late summer; canyons; corolla oblong; flower funnel-shaped; stems usually 6 to 18 inches high; bitter herbs.

Penstemon (Beardtongue) - summer; mountain canyons; opposite leaves; blue, irregular corolla with one sterile stamen.

Linum (Wild Flax) - summer; open places; flat, delicate, five-petaled flower on a tall, slender stem.

Lupinus (Quaker Bonnet, Blue Lupine) - summer; open woods and plains; very common; raceme of pea-like flowers, leaves digitate.

Mertensia (Mountain Bluebell) - summer; mountain streams; attractive plant with bright blue, funnel-shaped corolla flowers pink in the bud; foliage smooth.

Viola (Violet) - spring; open woods; typical violet with round to kidney-shaped leaf with crenate margins.

THE EVERGREEN TREES OF GRAND TETON NATIONAL PARK

Lodgepole Pine (*Pinus contorta*) - In dense stands with tall slender trunk devoid of limbs except at top. Bark thin, flaky, brown to blackish in color. Needles in bundles of 2, about 2 inches long. Cones small, woody, contorted, and armed with prickles; cling to tree for many years. Habitat arid plateaus of mid-elevations, lower mountain slopes, and floor of Jackson Hole.

Whitebark Pine (*Pinus albicaulis*) - Ragged, Unsymmetrical, low-branched crown. Bark smooth gray on twigs, furrowed gray on trunk. Needles from 2 to 3 inches long and in bundles of 5. Cones 3 to 4 inches long, oval, dark purple, not opening at maturity, with edible seeds. Habitat, wind-swept ridges and open areas near timberline. Similar to Limber Pine in all but the cone.

Limber Pine (*Pinus flexilis*) - Similar to Whitebark Pine except the cone is 5 to 7 inches long, is more tapering, greenish when immature, open when mature. Usually grows at lower elevations than the Whitebark.

Engelmann Spruce (*Picea engelmanni*) - Tall, pyramidal, deep blue-green general color, branches droop to give a dense appearance. Bark a flaky, reddish brown. Needles single, sharp, stiff, four-angled in cross-section, well distributed around twig. Cones oval or oblong, drooping, brown when mature, about 2 to 3 inches long. Mid elevations to timberline in moist situations.

Colorado Blue Spruce (*Picea pungens*) - Beautifully symmetrical, cone-shaped tree with spreading branches, usually not as tall as Engelmann Spruce. Bark thick, deep-furrowed, gray in older trees. Needles similar to Engelmann Spruce. Cones 3 to 5 inches long. Along Snake River and in similar situations.

Alpine Fir (*Abies lasiocarpa*) - Tall tree with extremely narrow, spire-like top, frequently with a snow mat around the base. Bark smooth and ashy gray, cracked in very old trees, with many pustules of pitch. Needles single, short, flat in cross-section, blunt on end, and flexible. Cones purplish brown, fleshy, velvety texture, clustered in erect position near top of tree, disintegrate at maturity. Mid elevations to timberline in moist situations.

Douglas Fir (*Pseudotsuga taxifolia*) - Stately trees with spreading, rugged branches. Bark thick, deep-furrowed, gray. Needles similar to Alpine Fir. Cones ovate, pendant, brownish, with each scale subtended by a three-forked bract. Mid elevations.

SOME COMMON DECIDUOUS TREES OF GRAND TETON NATIONAL PARK

Quaking Aspen (*Populus tremuloides*) - the most common broad-leaved tree; in dense groves at low and mid elevations; small, roundish leaf is toothed and has a sharp point, and is on a flat petiole which permits leaf to tremble in the slightest breeze.

Balsam Poplar, Balsam Cottonwood (*Populus balsamifera*) - the cottonwood of stream banks and lakeshores of low elevation which has the broad, ovate, toothed leaves.

Narrowleaf Poplar (*Populus angustifolia*) - the cottonwood with narrow, lance-shaped, toothed leaves growing along streams and lakeshores of lower elevations.

Mountain Alder (*Alnus tenuifolia*) - a small, foothills tree with reddish brown bark marked with small, warty swellings or lenticels. A cone-like catkin is characteristic.

ELEVATIONS

Amphitheatre Lake -----	9,750
Bannon, Mt. -----	10,960
Bivouac Peak -----	11,045
Blacktail Butte -----	7,676
Bradley Lake -----	7,061
Buck Mountain -----	11,923
Cloudveil Dome -----	12,026
Coyote Lake ----- about	10,300
Disappointment Peak -----	11,616
Eagle's Rest Peak -----	11,257
Fossil Mountain -----	10,912
Gannet Peak, highest peak of Wind River	
Mountains visible from the Tetons-	13,785
Grand Teton -----	13,766
Headquarters, Grand Teton Park -----	6,627
Holly Lake -----	9,400
Housetop Mountain -----	10,533
Hunt, Mount -----	10,775
Indian Lake -----	9,805
IceFloe Lake -----	10,649
Jackson Lake, mean level -----	6,742
high level -----	6,771
Jackson, Mount -----	10,707
Jackson, town of -----	6,244
Jenny Lake -----	6,779
Leidy, Mount -----	10,317
Leigh Lake -----	6,870
Littles Peak -----	10,710
Marion Lake ----- about	9,400
Meek, Mount -----	10,677
Mica Lake -----	9,534
Middle Teton -----	12,798
Moran, Mount -----	12,594
Moran, town of -----	6,748

Museum, Jenny Lake -----	6,789
Nez Perce Peak -----	11,900
Lookout Point, above Phelps Lake--	9,750
Lookout Point, above Surprise L.--	9,762
Owen, Mount -----	12,922
Pass Lake -----	9,600
Pass, Cascade to Avalanche Canyon -	10,613
Pass, Avalanche to Alaska Basin ---	10,700
Pass, Alaska B. to Death C. Skyline	10,513
Pass, Upper Death C. to Alaska B. -	9,750
Phelps Lake -----	6,615
Prospector's Mountain -----	11,231
Ranger Peak -----	11,353
Rendezvous Peak -----	10,924
Rock of Ages -----	11,383
Rockchuck Peak -----	11,150
Rolling Thunder Peak -----	10,902
Shadow Peak -----	10,363
Sheep Mountain -----	11,190
Signal Mountain -----	7,730
Solitude, Lake -----	9,024
South Teton -----	12,505
Smith, Mt. Jedediah -----	10,615
Spearhead, The -----	10,129
Storm Point -----	10,040
String Lake -----	6,867
St. John, Mount -----	11,412
Summit Plateau, Cascade-Paintbrush-	10,600
Surprise Lake -----	9,650
Symmetry Spire -----	10,546
Teton Pass -----	8,431
Twogwotee Pass -----	9,204

ORIGIN OF SOME OF THE IMPORTANT PLACE NAMES

Jackson Hole - Named in honor of David E. Jackson a leader in the American Fur Trade 1824 to 1840. First named in 1829.

Teton - A French Canadian word meaning breast. Was probably given to the Teton Peaks as early as 1810. First known map showing the Tetons was made in 1824.

Togwotee - A shoshone word meaning "We can go any way from here!"

MOUNTAINS:

Hunt - For Wilson Price Hunt, leader of the Astorians in 1811.

Jedediah Smith - Leader in the American Fur Trade and explorations of the West. He was a partner of David E. Jackson.

Meek - Joseph L. Meek, a member of Jackson's Trapping Party.

Moran - For the distinguished landscape artist, Thomas Moran. Nes

Nez Perce - For the Indian tribe which was active in the surrounding region.

Owen - Named in honor of William O. Owen, Wyoming surveyor and leader of a successful ascent of the Grand Teton in 1898.

St. John - For Orestes St. John, geologist of the Hayden survey party of 1877.

Teewinot - Shoshone name meaning many pinnacles.

Wister - For Owen Wister, novelist and homesteader in the valley. His homestead is now the R Lazy S Ranch.

CANYONS:

Colter - Named for the early explorer John Colter, the first whiteman to see this region.

Leigh - For Richard (Beaver Dick) Leigh, guide of the Hayden survey party of 1872.

Snowshoe - Named for the location of a ranger's snowshoe cabin at the mouth of this canyon.

Stewart Draw - Named for an early rancher in this vicinity.

LAKES:

Bradley - For the leader of the Hayden survey party of 1872.

Jenny - For the Shoshone wife of Richard Leigh.

Phelps - For a hunter attached to the Hayden survey party.

Taggart - Named for the assistant geologist of the Hayden survey party of 1872.

Paminah - Name from the Shoshone meaning "spring".

Peterson Glacier - Named in honor of the late Frank Peterson early homesteader in Jackson Hole and a member of the Owen Party that climbed the Grand Teton in 1898.

GLOSSARY

- Alluvial - composed of material deposited by water.
- Alluvial cone - a cone-shaped deposit of rocks and soil made by a stream at the mouth of a steep gully.
- Alluvial fan - a low alluvial cone.
- Anther - the part of a stamen that contains the pollen.
- Axil - the angle between the leaf and the stem.
- Biotite - black mica
- Bract - small, scale-like leaves at the base of a flower.
- Calyx - the usually green flower envelope.
- Cirque - the large, cliff-bound, amphitheatre-shaped basin formed by glacial quarrying at high elevations, usually in the head of a canyon.
- Compound Leaf - consisting of two or more leaflets on a single leaf stem.
- Corolla - the colored part of most flowers, usually within a green-colored calyx.
- Crenate - scalloped, with rounded teeth.
- Dike - a long, narrow, tabular-shaped mass of rock formed by the intrusion of a liquid igneous rock into a crack.
- Diabase - a dark-colored, rather fine-grained igneous rock, forming the black dikes of the Tetons. Hornblende or pyroxene and a calcic feldspar (labradorite) are the chief minerals.
- Digitate leaves - arranged like the fingers of a hand.
- Exserted - protruding out of.
- Exfoliation - The process by which an outer layer of exposed rock spalls off, caused by expansion and contraction of a thin outer layer of rock in response to changes in temperature, aided by chemical weathering.
- Fault - a fracture or break in the rocks of the earth along which movement has taken place.
- Feldspar - the most common mineral of igneous and metamorphic rocks. It splits or cleaves in two directions at nearly right angles to form flat surfaces. From these surfaces light is reflected as from a pane of glass. In other di-

rections it breaks unevenly. Different varieties may be white, gray, pink, or bluish gray in color.

Filament - the stalk of a stamen.

Garnet - a mineral commonly associated with metamorphic rocks, pegmatites, or other igneous rocks. The common garnets of the Tetons are brown to reddish brown, and many have the characteristic 12 diamond-shaped crystal faces.

Granite - an igneous rock composed of quartz and orthoclase feldspar, and usually some mica or hornblende. The minerals are usually large enough to be distinguished with the unaided eye, but commonly are not larger than a pea.

Glacier - a natural body of ice and snow which does not melt away during the summer, and which is in motion.

Gneiss - A banded metamorphic rock. The bands are wider than in a schist, and are usually alternate bands of different mineral composition. The bands are frequently folded and distorted, and are not always of uniform thickness.

Hanging valley - a tributary canyon whose mouth and valley floor are at a considerable elevation above the level of the floor of the main canyon.

Hornblende - a common mineral of igneous and metamorphic rocks. Usually black in color, quite hard and lustrous, and splits in certain directions to form flat planes. Distinguished from biotite by its greater hardness, and by its failure to split into thin sheets.

Igneous rock - a rock which has been formed by the cooling and solidifying of a molten solution of rock minerals.

Lava, granite, pegmatite, diabase are igneous rocks.

Imbricated bract - overlapping like the shingles of a roof.

Intrusion - a body of igneous rock which, while liquid, has been forced into cracks in older rocks, or which has invaded them by melting or stopping. The word also describes the process by which such igneous bodies come into place.

Irregular corolla - one composed of unlike petals.

Jointing - the formation of cracks (joints) in a rock mass by its contraction upon cooling, or by pressure and twisting during earth movements.

Limestone - a sedimentary rock formed by the hardening of a limy ooze deposited in a lake or ocean, or of the accumulated limy hard parts of plants and animals.

Lichens - a dry, variously colored encrustation, chiefly on rocks, consisting of two primitive plants -algus and fungus which assist each other in obtaining food and moisture from the air.

Metamorphic rock - a changed rock; one which has been altered from an older sedimentary or igneous rock by great pressure, heat and chemical solutions emanating from near by hot, igneous bodies.

Magnetite - an iron-bearing mineral, black in color, quite hard, attracted by any magnetized metal.

Mineral - a substance occurring in nature in the rocks of the earth which has a definite chemical composition and definite physical characteristics - color, hardness, luster, cleavage, crystal form and others.

Moraine - the deposit of unconsolidated rock, gravel, sand and powdered rock made by a glacier.

Microcline - a feldspar, almost identical to orthoclase.

Mica - a common mineral of the igneous and metamorphic rocks. Easily recognized by its ease of cleaving into thin, flexible sheets.

Muscovite - the common white-colored, or clear mica.

Opposite leaves - with the leaves paired, one on each side of a stem.

Orthoclase - the common pink, gray or white feldspar of granite, pegmatite and various metamorphic rocks.

Palmate - a compound leaf whose parts branch out from one point like the fingers of an outstretched hand.

Perennial - lasting from year to year.

Piedmont - a term meaning "at the foot of the mountain".

Quartz - a common mineral of granite, pegmatite, metamorphic rocks and sandstone. It is very hard, colorless or white to red, black, amethyst or rose in color, breaks unevenly and has a luster like that of broken glass.

Quartzite - a very hard, fine-grained form of sandstone (as

used in this guidebook). Its hardness is due to its composition of almost pure silica -quartz sand grains cemented with other forms of silica. It frequently breaks along smooth, parallel bedding planes, but in other directions it breaks to form thin, flaky chips.

Raceme - a flower cluster consisting of single flowers on stems of equal length attached to a long axis.

Reflexed petals - bent outward or backward.

Rock - a natural substance making up the outer zone of the earth, composed of aggregates of one or more minerals.

Snow mat - a circle of small alpine firs around a mature tree formed by the rooting of the lower branches of the larger tree.

Sandstone - a sedimentary rock made up of sand grains held together by a natural cement.

Schist - a common metamorphic rock made up of numerous thin layers or leaves of minerals. Usually each of the layers is similar in mineral composition to the others (compare gneiss), and usually the layers are bent and twisted.

Sedimentary Rock - a rock formed by the hardening of a sediment (sand, silt, limy ooze, accumulated hard parts of plants or animals, chemical precipitates from ocean or lake waters). Most sedimentary rocks were formed in layers and retain their layered or stratified character.

Sepals - the parts, usually green, of the calyx of a flower.

Spatulate leaves - spoon or spatula-shaped.

Stamens - the pollen-bearing part of a flower.

Till - glacier-deposited material. Moraines consist of till.

Talus - broken rock which accumulates at the foot of a cliff chiefly as a result of gravitational fall.

United petals - at least partly joined together.

Whorled leaves - three or more leaves radiating out from the same point of attachment.

CREDIT PAGE

This guidebook has been prepared for the convenience and use of the visitor who wishes to seek out the natural phenomena along the trails of the park. Another important aid to the hikers and to the mountain climbers is the Topographic Map of the Park which is for sale at the Jenny Lake Museum.

The information presented in this guidebook is based chiefly on the observations of the permanent Naturalist and Ranger Staffs of Grand Teton National Park.

The photographs used in this revised edition are either those of the authors or other Park Service personnel of Grant Teton National Park and permission has been granted for their use in this publication.

In this revision of 1950 changes were made in the trail map and the trail map sections given for the various portions of the trail system being described.

Some material has been deleted because of the changes in the trails now being used and some new material has been added because of changes in the trail system.

The addition of photographs is the most important change and it is believed that they will assist the user in following the Teton Trails.

For those who wish additional reading matter and information on the Tetons and Jackson Hole, there are a number of other publications offered for sale at the Jenny Lake Museum and a complete list of them may be obtained by writing to the Executive Secretary of the Jackson Hole Museum Association, Grand Teton National Park, Moose, Wyoming

