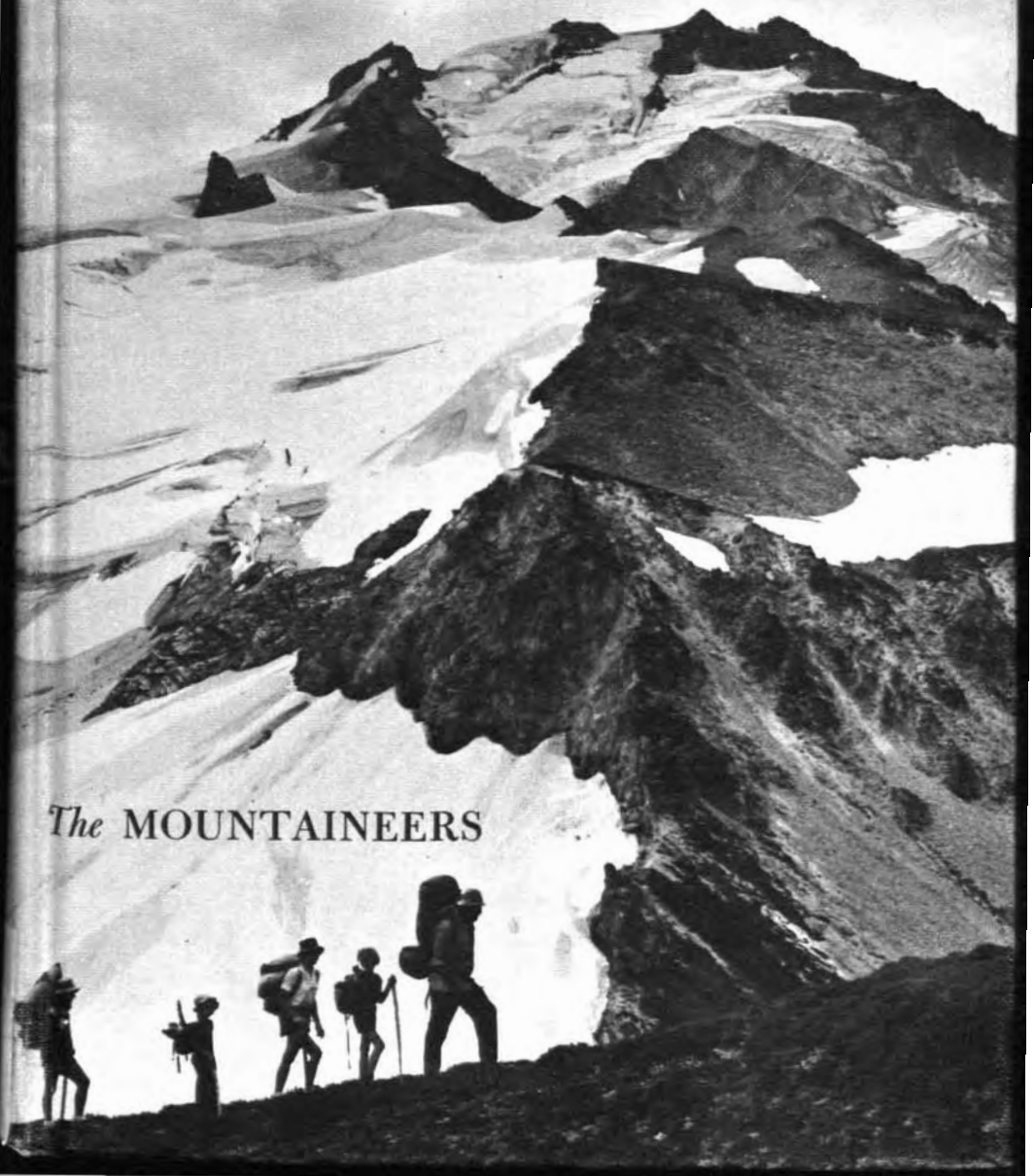
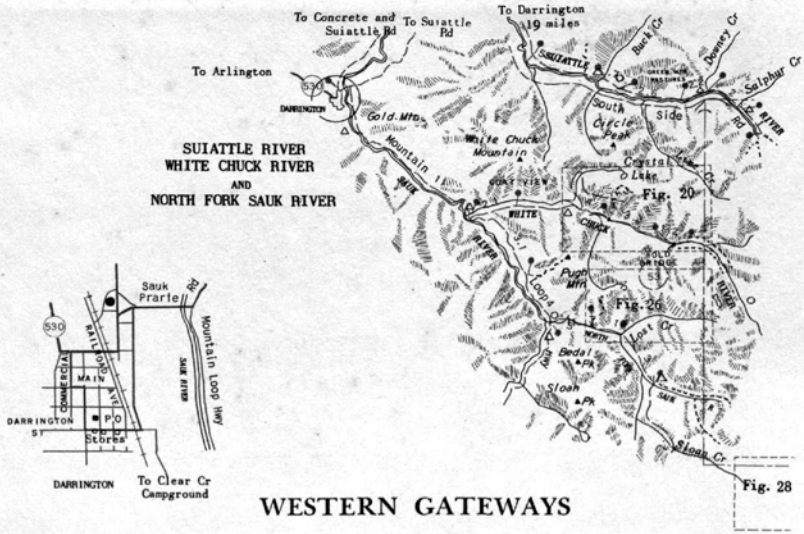
ROUTES *and* ROCKS

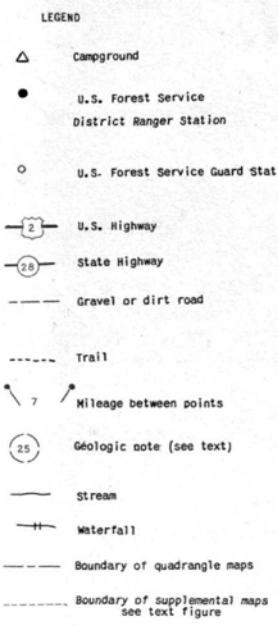
Hiker's Guide to the North Cascades from Glacier Peak to Lake Chelan

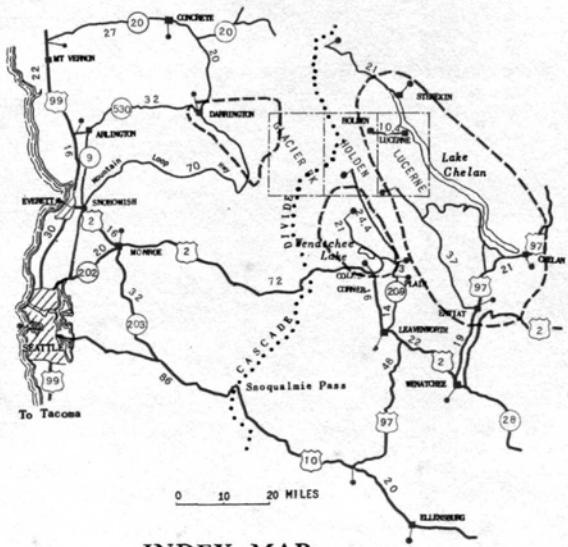


The MOUNTAINEERS



WESTERN GATEWAYS





INDEX MAP

EASTERN GATEWAYS

ROUTES *and* ROCKS

Hiker's Guide to the North Cascades

from Glacier Peak to Lake Chelan

". . . —for there is no opiate like Alpine pedestrianism."

MARK TWAIN, *A Tramp Abroad*

". . . and some rin up hill and down dale,
knapping the chucky stanes to pieces wi' hammers,
like sae mony roadmakers run daft—
they say it is to see how the warld was made!"

SIR WALTER SCOTT, *St. Ronan's Well*

Cover illustration: Glacier Peak from Pumice Creek side trip. (Bob and Ira Spring)

ROUTES *and* ROCKS

Hiker's Guide to the North Cascades from Glacier Peak to Lake Chelan

---

By D. F. Crowder and R. W. Tabor

WITH DRAWINGS BY ED HANSON

THE MOUNTAINEERS

Seattle, Washington

© 1965 by The Mountaineers

THE MOUNTAINEERS

P.O. Box 122

Seattle, Washington 98111

Organized 1906

Library of Congress Catalog Card Number 65-27406

First Edition 1965

Second printing 1966

DESIGN BY JOHN WARNER

MANUFACTURED IN THE UNITED STATES OF AMERICA

COMPOSITION AND BINDING BY VAIL-BALLOU PRESS, INC.

MAP PRINTING BY RAND McNALLY & CO.

TEXT PRINTING BY VALLEY OFFSET, INC.

FOREWORD

SINCE 1950 the United States Geological Survey, an agency of the Department of the Interior, has been making an intensive study of the North Cascades between Glacier Peak and Lake Chelan. While participating in the study, the authors have had ample opportunity to hike the trails and off-trail high routes of the area, and in preparing this guide have combined the information they have gained about geology with the information they have gained about trails and routes. The result is a very special and valuable sort of guidebook that not only tells the hiker what places are worth visiting, and how to get there, but also adds to his wilderness experience by telling him how these peaks and valleys came to be, and why they are what they are.

The Mountaineers take particular pleasure in publishing this book because it furthers so well certain purposes of the organization, especially the mandates "to explore and study the mountains, forests, and water courses of the Northwest" and "to gather into permanent form the history and traditions of this region"—and surely geologic history must here be included.

Furthermore, The Mountaineers have a profound interest in the proper use of America's natural heritage, as does the Geological Survey and the Department of the Interior, which says of itself: "In its assigned function as the nation's principal natural resource agency, the Department of the Interior bears a special obligation to assure that our expendable resources are conserved, that renewable resources are managed to produce optimum yields, and that all resources contribute their full

measure to the progress, prosperity, and security of America, now and in the future."

By act of Congress in September 1964, the Glacier Peak Wilderness, much of which is covered by this guide, was included in the National Wilderness Preservation System, and thus set aside as an area where "the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." The importance of *Routes and Rocks,* over and above the immediate pleasure it will bring alpine pedestrians, is that it will acquaint more people with the North Cascades, and in the process make more friends for wilderness, here and everywhere.

The Mountaineers, with groups based in Seattle, Everett, Tacoma, and Olympia, warmly invite the membership of all who sympathize with club purposes and wish to partake in its offerings. In addition to programs of research into the best and highest uses of "the natural beauty of Northwest America," The Mountaineers sponsor year-round activities in climbing, hiking, camping, ski-touring, and snowshoeing. Hundreds of outings are scheduled each year, ranging from single-day excursions to trips lasting two weeks or more. A climbing school—the oldest and largest in America—is presented annually, and also schools in hiking and camping and in ski-mountaineering.

For further information on club activities and how to join, please write The Mountaineers, P.O. Box 122, Seattle, Washington 98111.

THE MOUNTAINEERS

June 1965

Other Books from The Mountaineers

Mountaineering: The Freedom of the Hills, edited by Harvey Manning.

Textbook of the Climbing Course presented annually since 1935 by The Mountaineers. First published in 1960—more than 20,000 copies now in print. Chapters: Equipment, Camping and Sleeping, Alpine Cuisine, Wilderness Travel, Navigation in the Hills, Routefinding on Rock, Balance, Counterforce, Roped Climbing, Belaying, Pitoncraft and Rappels, Snow, Ice, Glaciers, Arrests and Belays, The Climbing Party and its Leadership, Climbing Dangers, First Aid, Alpine Rescue, Mountain Geology, The Cycle of Snow, and Mountain Weather. Appendix: Food Requirements for Climbers. 430 pages, 134 drawings, 16 photographs. $7.50

The North Cascades, photos by Tom Miller, text by Harvey Manning, maps by Dee Molenaar.

A stunning collection of photographs by a climber-photographer who has traveled the peaks and glaciers, forests and meadows, for 20 years, and an urgent plea for creation of a North Cascades National Park. Published in 1964. Chapters: Northern Pickets, Nooksack Cirque, Park Creek Pass, Cascade Pass, Kool-Aid Lake to White Rock Lakes, Dome Peak, and Bonanza-Entiat. 96 pages, 10 x 12 inches; 70 photos, most occupying a full page; 10 maps which for each photograph identify the location of the camera and the direction in which it was pointed. $10.00

Mountain Rescue Techniques, by Wastl Mariner.

The acknowledged bible of mountain rescuers throughout the world. Translated and published in 1964 in cooperation with the Oesterreichischer Alpenverein. Chapters: Summer Rescue—Specialized Rescue Gear, Transport with Specialized Gear, Improvised Rescue Gear, Transport with Improvised Gear; Winter Rescue—Specialized Rescue Gear, Improvised Rescue Gear, Avalanche Rescue, Winter Transport. Appendix: Principles of First Aid for Mountaineers. 200 pages, paperbound, 117 drawings. $3.50

Guide to Leavenworth Rock Climbing Areas, by Fred Beckey and Eric Bjornstad.

Detailed description of all routes so far completed in the principle rock-practice area of Cascade climbers. Published in 1965. 86 pages, paperbound, 13 drawings. $2.75

Mountain Medicine, edited by James A. Wilkerson, M.D.

Prepared by a group of climber-physicians who among them have experience ranging from Everest and K-2 to Northwest wilderness. The first book published in America that goes extensively into the principles of "second-aid," as distinguished from first-aid. Due in 1966.

Walking the Hills and Valleys: 100 Trail Trips, text by Louise Marshall, photos by Bob and Ira Spring.

A guide, in words and photos, to 100 of the finest trail hikes available in the Puget Sound country, ranging from beach hikes to high summits. Due in 1966.

PREFACE

As geologists for the United States Geological Survey, we and our co-workers have spent altogether 20 summers making a detailed study of the rocks in a small part of the wilderness of the North Cascades. From camps supplied by horses, helicopters, and our own backpacks, we have explored a 600-square-mile area covered by three modern map sheets: the Glacier Peak, Holden, and Lucerne quadrangles. Geologic data gathered by the U.S. Geological Survey are most often published in technical journals and books and on maps designed to reach primarily the professional geologist. We here report to hikers parts of the geologic story that hopefully will enhance their enjoyment of the North Cascades.

We speak to those who wish to savor the many byways of this varied region. The guide is written and designed to be carried in the rucksack; it is not so well-suited for the saddlebag, although there is much information for the horseman. Our tendency to rush the hiker out of canyon forest up to timber-line alp and crag is not necessarily because more rocks are to be found up there, or because we mean to belittle the impressive jungles, but because we so often meet people who think of the North Cascades only in terms of trees. Though we know that evaluation of view or campsite is subjective, we have tried to inspire as well as to direct, to give the flavor of a route as well as useful details. We are alpine pedestrians by hobby as well as by profession, and hopefully we hear the same music as our readers.

Much of the geologic data and some of the route information has been supplied by our colleagues: Fred Cater, Art Ford, Cliff Hopson, Don Kellum, and Tom Wright. We thank employees of the U.S. Forest Service at Darrington, Wenatchee Lake, Chelan, and Entiat for trail logs, maintenance schedules, and advice. Although most of the draw-

ings were made by Ed Hanson, some were contributed by Jim Crooks, Betsy Crowder, Esther McDermott, Dee Molenaar, and Meade Norman. We gratefully acknowledge the help of friends, typists, packers, hikers, draftsmen, administrators, and camp followers: Fidelia Alger, George Arnold (alias Bill Wallace), Mary Brannock, Bea Bregman, Vera Campbell, Ray Courtney, King Huber, Fay Koonce, Frances LeBaker, Harvey Manning, George Martin, Dean Rinehart, Bill Stark, Elizabeth Stevens, Sumi Sumida, Lesley Tabor, and Clancy Yung. We thank the following publishers for permission to quote: Harper and Row, Inc., New York (*A Tramp Abroad,* by Mark Twain); E. P. Dutton & Co., Inc. (*Winnie-the-Pooh,* by A. A. Milne); Simon and Schuster, Inc. (*The Odyssey: A Modern Sequel,* by Nikos Kazantzakes, trans. by Kimon Friar); and Appleton-Century-Crofts, Inc., New York (*Mont Blanc,* by Albert Smith, quoted in *The Book of the Mountains, by* A. C. Spectorsky). The final responsibility, however, must lie with the authors, who shared equally in all phases of this effort from the first "knapping the chucky stanes" to the last agonizing edit.

DWIGHT CROWDER
ROWLAND TABOR

Menlo Park, California
1965

CONTENTS

Foreword v
Preface ix
Introduction 1
  The Setting 1
  The Guide 4
  Travel Hints 6
Geologic Story 11
Western Gateways 18
  Suiattle River 19
  White Chuck River 62
  North Fork of the Sauk River 83
Eastern Gateways 94
  White River 94
  Chiwawa River 122
  Entiat River 140
  Lake Chelan 166
Annotated Bibliography 201
Appendix: Mountain Climbing 206
Index 221

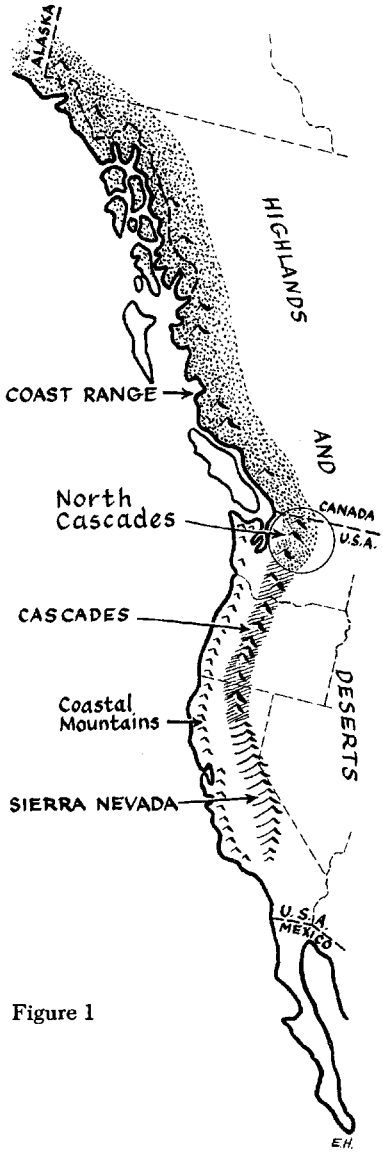

ALASKA
HIGHLANDS
AND
DESERTS
COAST RANGE
North Cascades
CANADA
U.S.A.
CASCADES
Coastal Mountains
SIERRA NEVADA
U.S.A.
MEXICO
E.H.

Figure 1

INTRODUCTION

The Setting

General Character. Along the western edge of North America a near-continuous mountain rampart faces the sea, keeping ocean moisture from the drier deserts and plains to the east and becoming ever wetter northward from California. The lofty Sierra Nevada merges into the forested Cascade Range of Oregon, where only an occasional snow-capped volcano rises above the general low level. In Washington, about a hundred miles south of the Canadian border, begins abruptly the longest and wildest part of the Pacific Coast mountain system, extending from Washington to the Aleutians. The southern end of these wild and relatively unexplored mountains is known as the North Cascades. They stretch from the vicinity of Stevens Pass in Washington to the Fraser River in British Columbia (Fig. 1).

Here in the North Cascades are deep and narrow valleys cloaked with vegetation, sharp ridges, glaciers, snowfields, and fjordlike lakes that make these mountains utterly different from the Cascades and Sierra to the south. Here also are two more Pacific Coast volcanoes, Mount Baker and Glacier Peak, graceful cones in a sea of jagged peaks.

West of the Washington Cascades, in the Puget Sound lowland, is the Seattle metropolitan area, noted for a moist maritime climate. On the east, in the rain shadow of the mountains, are the desert-dry and sparsely settled Columbia lava plateau and the rolling hills of the Okanogan highlands.

Altitude and Relief. These are not high mountains; Glacier Peak is

only 10,541 feet high and most summits are between 7000 and 8000 feet. But the country is very steep and the valley bottoms are as low as 1100 to 3000 feet; therefore, even to reach timberline at 5000 to 6500 feet is a fair climb. Vegetation in the valleys is thick, especially in canyons west of the crest; this, combined with the jagged nature of the topography, the generally poor condition of trails, and the prevalence of glaciers, explains why this hiker's guide is as detailed as it is. It is much easier in the North Cascades than in most accessible American mountains to get into difficulty, and hikers who leave the beaten path should be sure they are properly trained and equipped.

Snow. Snowfall is tremendous. Depths on the ground in March, just east of the divide at 2000 to 3000 feet (Holden and Trinity), commonly are 10 to 15 feet. This represents a snowfall of 40 to 60 feet. Farther east in the rain-shadow of the divide along Lake Chelan, depths of only a few feet are the rule.

In the Lucerne quadrangle, June and early July is the time for trips because, in our opinion, the spring greenery and flowers and interspersed snowbanks are preferable to the dryness of later summer and fall. Such dryness never exists in the wetter region near and west of the Cascade Divide, where, even in July, one can count on much snow under foot—indeed there is enough in some years to make travel with stock difficult.

The very heavy snowfall in all but the eastern parts of the area, combined with the steep slopes, making this a great country for avalanches. Despite this, several ski-mountaineering parties have been to the relatively safe slopes near Cloudy Pass and have stayed at the cabin at Lyman Lake. At least one party has skied on the relatively gentle glaciers south of Glacier Peak.

The discomfort of walking in snow in light shoes should be clear. Though one may get along elsewhere on trails without good boots, they definitely are recommended here. The hazards of steep snow should also be obvious. We strongly recommend that no one take the off-trail trips described in this guide without both an ice ax and the knowledge of how to use it. Early in the year the ax should be taken even on the high trails for crossing steep snowbanks. A canteen is a foolish burden in this land of meltwater, though it verges on necessity if one is climbing in the Lake Chelan valley. See Bibliography for a list of references that give complete information on technique and equipment.

Weather. From June into October the weather can be good. A nearly rainless July, August, and September is not unknown, but rain at any time is probable west and just east of the Cascade Divide, and some

drops may fall on Lake Chelan. The rains are generally not of the short thunderstorm variety familiar to many western mountaineers, but are storms from the ocean lasting several days. One soon becomes able to recognize the high wispy cirrus clouds which usually announce an oncoming front and to appreciate the comparatively sudden breakup of the solid gray overcast, often in the evening, that foretells a fine tomorrow. West-side canyons and main-divide passes are commonly enveloped in a blanket of ocean fog—a spectacular sight. The fog wraps around the alpine fir, drifts through the giants of the rain-forest, and spills in a flowing wave over passes. But to the hiker buried in fog, the views are not spectacular. He must not despair, but climb and hope to break free up above. The distinction between thick fog and real storm clouds is not easy to make from a canyon, but if it is raining, there is no hope of climbing above the clouds. The visitor who meets a storm must be patient and realize that fine weather will normally come within a few days and that without the moisture, the snow and ice and greenery that are the unique attractions of these mountains would not exist. Rain is hardly any problem in midsummer in the Lucerne area, and fog never gets as far east.

Since the temperatures are mild and vicious winds uncommon except on exposed ridges, it is possible to keep warm if one can keep dry; it will not help to realize that the skin is waterproof. A tent or at least a waterproof tarp is a necessary bit of insurance in all parts of the Glacier Peak-Lake Chelan area except in the Lucerne quadrangle. Waterproof garments can extend, but not insure, the period of dryness. Those who hike stripped and rely on exercise to keep warm will sooner or later, without eventual dry refuge, be cold and miserable. A little more skill than that needed in dry mountains may be necessary to start a fire; dry matches and more complicated artificial aids are useful.

Pests. Mosquitoes vary greatly in number from place to place, month to month, and year to year; bugproof tents and repellents are necessities. The deerfly and horsefly ignore repellents and must be tolerated, but they are seldom worse than mildly annoying. Bigger animals—black bear, mule deer, and mountain goat—are their typical shy selves. The bears are not familiar with scavenging and so seldom molest a camp. Rattlesnakes are restricted to the east side of Lake Chelan and even there are not very common. There is no poison ivy, oak, or sumac.

The Guide

Organization. The area of the guide is divided into gateways—the drainage basins of seven major rivers (Front end paper). These drainage basins are grouped into eastern gateways and western gateways as defined by the Cascade Crest. The three topographic maps of the Glacier Peak, Holden, and Lucerne quadrangles, with a special red overprint of route data, give the real details. To scan routes described in the guide, refer to the Geologic Map (Fig. 3) and to find anything in text or on the topographic maps see the Index which is keyed to both.

Notes describing the minerals, rocks, and other geologic sights between Glacier Peak and Lake Chelan are with the route descriptions; they are each given a number and located on the maps. In the Geologic Story we summarize the geologic history and offer a few basic principles. If we raise more questions than we answer, well and good. (See the geologic references in the Bibliography.) Definition of terms are in the text and may be found by use of the Index.

Distances and Classification of Routes. Routes are divided into trails and high routes. For trails we list the distance and the elevation changes and the frequency of maintenance by the Forest Service, which is some measure of the condition. Trails maintained periodically may not be cleared for horses. The reader can estimate for himself if the trip will be easy or difficult—a judgment that depends on his speed and the load he carries. On trails it is optimistic for most bipeds and quadrupeds to count on averaging much more than 2 miles per hour or over 1000-foot elevation gain per hour. "Mileage approximate" or "about" indicates our estimate; otherwise all mileages are by wheel and are taken from Forest Service logs.

High routes are by and large trailless excursions along the high ridges and are not for stock. Routefinding and technical difficulty become factors, so we have rated the high routes easy, intermediate, or difficult and give, in addition to mileage, the estimated hours for the average backpacker. An easy high route presents little scrambling or routefinding difficulties; the hands will seldom be needed. A difficult high route is

for experienced backpackers only; hands and ice ax may be needed. Only on one high route is a rope recommended. We do not mean to imply, however, that high routes rated difficult are for mountain climbers only; this is a hiker's guide, not a climber's guide. An intermediate high route is . . . well, intermediate.

Glacier Peak Loop. Timberline circumnavigation of Glacier Peak itself is possible without crossing glaciers by using the high routes and some trails. Study the Glacier Peak map sheet to plan this challenging and rewarding trip which has, as far as we know, been done only piecemeal.

Cascade Crest Trail. This link in the Pacific Crest Trail System does not live up to its name in the area described; only about 3 of roughly 30 miles of Cascade Crest are followed by the trail. As with the Glacier Peak loop, we leave to the reader the pleasure of studying the maps and the guide to piece together the *real* Cascade Crest route. This will not be an easy trip, for parts are high routes we rate intermediate and difficult.

Trans-Cascade. The trail usually followed from Lake Chelan to Glacier Peak is from Holden via Lyman Lake, Cloudy Pass, and Image Lake; this route offers some fine scenery and an excellent trail, but is almost as short on high country as the Crest Trail is on crest. We recommend a more consistently scenic route that begins at Lucerne, goes over Milham Pass, and continues west toward the scenic climax of the region via ridge-crest trails and high routes; only in three places need the route dip down (never below 4200 feet) to cross a canyon. This is about a 10-day junket for the experienced backpacker. See Index, North Cascades.

Entiat Mountains, Chelan Mountains, Methow Mountains. The routes along the crest of these main sub-ranges offer continuous high country. Walk them from south to north to enjoy a steady improvement of scenery and camp sites.

Short Trips. Unfortunately, many visitors in the North Cascades spend their holiday in the roadside forest camps and never enjoy the timberline sights for which the North Cascades are famous. It is a major effort in most places to get up above the trees, and the tradition of building and maintaining trails in valley bottoms rather than up spurs and along timberline does not help. However, it is not impossible for the one-day hiker and weekend visistor to get to fine views of the high country, and in each section of the guide we have recommended suitable short trips.

Travel Hints

Equipment and Experience. Preparing for a camping trip in the North Cascades differs little from preparing for a trip in any western mountain range; the Bibliography refers the inexperienced traveler to books that discuss equipment and preparations for such a trip. On preceding pages we have mentioned natural features peculiar to the North Cascades which have some bearing on training, selection of equipment, and timing of the expedition. We repeat: do not forget good boots, ice ax, tent, fire starters, and insect repellent. Remember the lingering snowpack, formidable brush, ubiquitous cliffs, steep snow, and rapid streams.

Routefinding aided by this guide will be easier if a good compass and a pocket altimeter are carried. A compass, generally considered essential anywhere, is of less use here than in flatter, less jagged, and less distinctive mountain terrain. The altimeter (which need not read over 10,000 feet in the North Cascades) is particularly useful, for a foot moved forward here is usually a foot climbed up or down. Be sure to reset the instrument at every point of known elevation, such as summits, stream crossings, and route junctions. With a good topographic map, compass, and altimeter, and knowledge of how to use them, it is impossible to become lost in the North Cascades.

Maps and Photographs. If read with proficiency, good topographic maps (see Bibliography for sources) are an invaluable aid to any wilderness trip. Only the modern topographic maps of the Geological Survey are fully adequate. Topographic maps of smaller scale—more than one mile to the inch—are not accurate and should be avoided; if they must be used, carry in addition a Forest Service planimetric map (without contours). Some topographic maps are available around the three included in this guide (see Bibliography, Figure 53). The standard Geological Survey quadrangles, like those reproduced with this guide, have a green overlay showing the distribution of trees and brush. The special shaded relief edition of the Holden quadrangle is a fine display emphasizing glaciated mountains, but its contours are difficult to read. A concise description of topographic map reading may be found in *Mountain-*

eering, The Freedom of the Hills, p. 74-77. Use a plastic envelope to protect maps in the field. To prevent damage along folds, cut into sections and mount on cloth. Commercial wax-coated cloth for mounting is available. Geologic buffs need geologic maps—see Bibliography.

A series of 1 by 2 degree small-scale topographic maps (United States Series, scale 1:250,000 or 1 inch = 4 miles) are sold by the Geological Survey; the Wenatchee sheet covers the south half of the North Cascades and the Concrete sheet the north half. The Army Map Service (Bibliography) sells these sheets in raised plastic relief. Whether flat or in relief, these maps are useless for wilderness travel, though they do give a general picture of the entire North Cascades. A better general picture can be had by study of the masterful shaded relief map of the North Central Cascades, a privately printed map by Martin and Pargeter available locally.

Aerial photographs are taken looking straight down from an elevation of 20,000 to 40,000 feet; they are quite expensive—about 50¢ per square mile for stereo coverage—and take many weeks to obtain. But on good photos individual trees and, even more important, brush patches can be picked out. The photos can help in off-route pioneering, and studying them at home in stereo is the next best thing to taking a plane ride over the crags.

Rescue. Make definite plans. Help cannot reach you if no one knows where you intend to go, nor will you be missed if you do not tell someone when and where you are due back. This information is best given to friends who have some interest in your welfare. Registering with the Forest Service is second best, but nevertheless is better than nothing and should be done. The Forest Service provides registration books at ranger stations, guard stations, and on some main trails. Units of the Mountain Rescue Councils in Seattle, Bellingham, Mt. Vernon, and Everett are volunteer groups that can help in case of emergency, especially when expert climbers are needed.

Pathfinding. Hikers in the North Cascades who are accustomed to the numerous fine trails in the more arid and more visited ranges of the west, such as the Sierra Nevada, are in for a shock. River-bottom trails and the Cascade Crest Trail have been built with an eye to easy building and the requirements of pack stock; they tend to avoid the most scenic routes, which are above timberline, up spurs, and along ridges. Many miles of secondary trails do follow the timberline routes. They were built long ago by the occasional sheepherder, prospector, or the Forest Service. They are adequate for good horses and good riders and

fully adequate for bipeds, but they get little or no maintenance today. The trees and brush close in locally, and a pleasant hike can become a nightmare if what is left of the track is lost. These secondary trails can be much improved if each traveler will do a little maintenance himself —kick a stone here, lift a branch there, and build a duck, but most important, stay on the trail. Over many miles such simple maintenance is all that is necessary to keep the track quite adequate.

We offer the following hints at pathfinding to be used when both this guide and the track are vague. New blazes are unmistakable works of man but old ones must be examined carefully. Rocks flying into the woods from cliffs above make blazelike scars. Look in the dry wood at the center of the scar for telltale ax cuts; if the scar is healed shut you are out of luck unless the scar has a clear dot-dash pattern. Look, too, for the smooth cuts where branches and brush have been cut. In some places cut twigs or trunks are not easy to tell from naturally broken ones; your finger can tell the difference between the smooth cut and the rough natural break. Where the trail is snow covered look for the swale. Deer often follow the snow-covered path with amazing accuracy and their tracks are worth following unless they trend wildly from the general route. Sheepherder trails are generally quite steep and in many places dispense with switchbacks altogether. But the whims of trail builders can never be counted on; as a rule it is best to forget the general trend and concentrate on looking for blazes and other signs.

Almost always the trail offers the easiest passage, and only the novice would abandon it for his own route through a jungle without first making a careful search for the trail. To plunge down a brushy hillside to reach a valley-bottom trail is the best way to get brush-bound or, to use climbers' jargon, "hung up" at the top of a cliff. As geologists, we have had to make hundreds of such plunges and can state with certainty that it is generally most unpleasant. If you do get brush-bound, head for the biggest trees, where the shade may have killed the underbrush. Because of the heavy snow and snowslides in these mountains, the brush has been combed straight down, so it is infinitely more maddening and exhausting to cross the hillside than to go straight up or down.

Wilderness Management. Most of the region between Glacier Peak and Lake Chelan belongs to all of us and is currently managed for us by the Forest Service. Exceptions are a few small patented mining claims on Miners Ridge, near Holden and Trinity, and a few areas on Lake Chelan—primarily at Moore, Meadow Creek, and Lucerne. Controlled sheep grazing, mostly on a biennial schedule, is permitted in some of the meadows in the headwaters of the White, Napeequa, Chiwawa, and Entiat Rivers, and logging is allowed in some gateway canyons. Most of the region lies within the Glacier Peak Wilderness which has been designated by Congress as a National Forest unit of the National Wilderness Preservation System. The area is closed to machines. Aircraft can be used to reach marginal areas, principally along Lake Chelan. Boat service is available on the lake (see Lake Chelan section). Forest Service roads with campgrounds (see front end paper) penetrate the edge of the guidebook area. The district ranger stations* which are of principal interest to visitors, are mentioned in the guide and located on the end paper. Talk or write to district forest rangers in these local stations for first-hand information. The area west of the Cascade Crest is in Mt. Baker National Forest, with headquarters in Bellingham, and the area east of the crest is in Wenatchee National Forest, with headquarters in Wenatchee.

Stock. Much of the rugged area is not stock country, and compared to some other ranges, packers are scarce—perhaps half a dozen in the whole North Cascades. To our knowledge, burros are not available. Those interested in pack trips should write the Chambers of Commerce in the gateway towns. Contact packers well in advance; remember that the demand is greatest during the fall hunting season (see below) and that a persistent snowpack can hamper or prevent an early trip.

Fish and Game. With some notable exceptions, fishing (for cutthroat, Dolly Varden, or rainbow trout) is not sensational. The living is tough in lakes that can be icebound into August and in swift streams, some of which (notably the Suiattle) are cloudy with glacial silt. Most of the named lakes have been stocked, and fishing in them, though generally

* Mt. Baker National Forest
- Suiattle drainage: Suiattle district, Darrington
- Sauk and White Chuck drainage: Darrington district, Darrington

Wenatchee National Forest
- White River and Chiwawa drainages: Lake Wenatchee district, Lake Wenatchee
- Entiat drainage: Entiat district, Entiat
- Lake Chelan drainage: Chelan district, Chelan

erratic, can be good. Fishing in Lake Chelan is confined to shallows near the mouths of main streams such as Railroad Creek and Fish Creek. Stream fishing is limited to the flatter portions of main drainages.

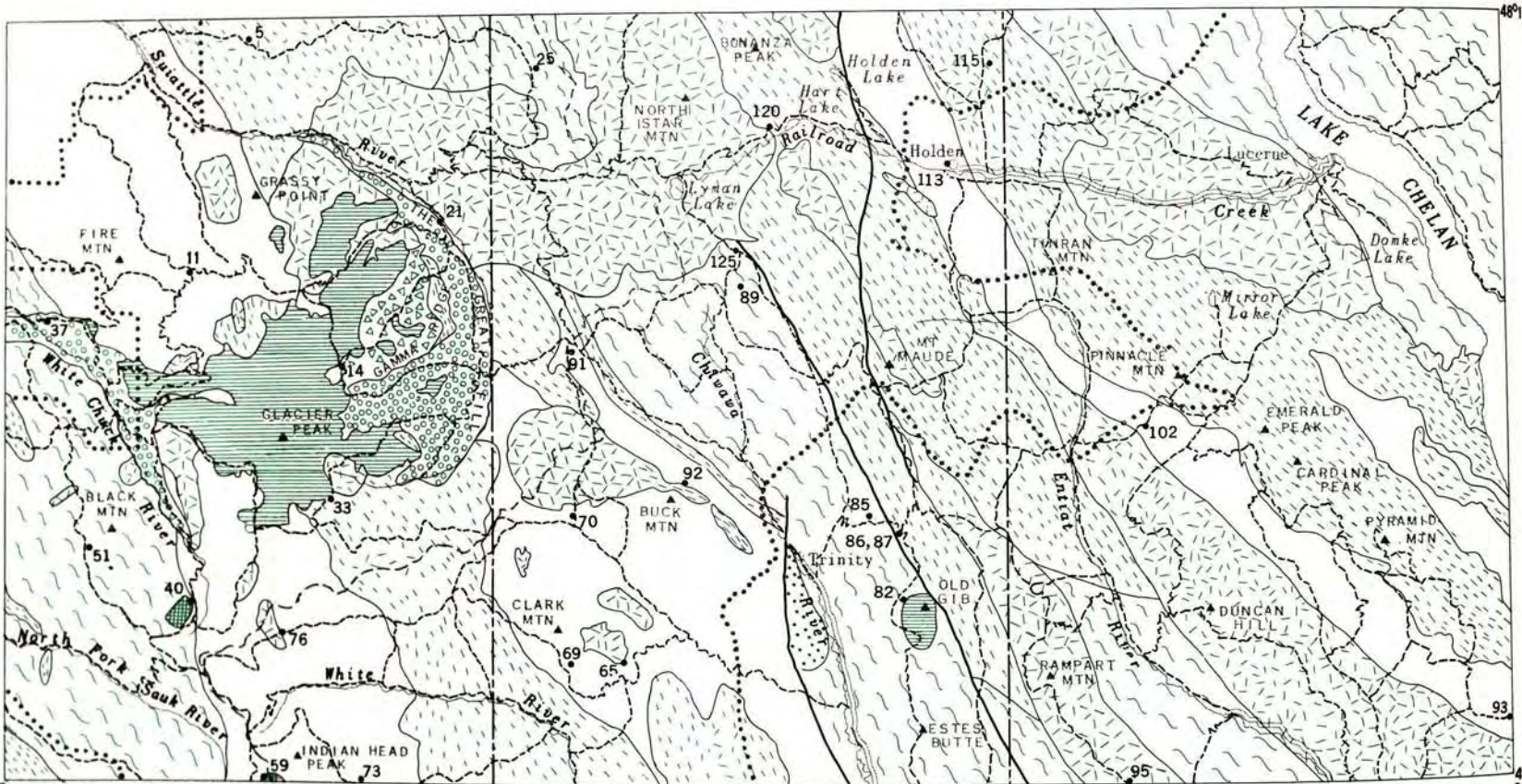
Black bear, mule deer, mountain goat, and grouse are the game, and because of the rugged terrain, hunting is not easy. Except for the eastern half of the Lucerne quadrangle and a few square miles in the northwest corner of the Glacier Peak quadrangle, all the area between Glacier Peak and Lake Chelan is in what is called the High Cascade Deer Area, which is open to an early 2-week hunting season in mid-September. With rifle or bow the expert and ambitious can try their luck in the high country for deer, mountain goat, and grouse. The goat hunting requires a special permit; a limited number of these permits are selected in August from a list of applicants. Only a few of the better hunters take advantage of the early season, so the danger of being shot at this time is at a minimum. Nevertheless, wear a bright rag. We advise the nonhunter to stay out of the mountains during the shooting seasons.

The main hunting season (for bear, deer, and grouse, but not for goats) generally lasts 3 to 4 weeks beginning in mid-October and is open in the whole area of this guide.

Brochures giving details on fishing and hunting regulations should be procured from sporting shops or from Washington State Department of Game, 600 North Capitol Way, Olympia, Washington.

Climbing and Hiking clubs. Anyone taking up backpacking as a hobby will benefit greatly by joining a local climbing club and participating in their training programs and trips. The short-time visitor to Washington can gain much information from western clubs. For a list of clubs the world over, see *Summit Magazine,* Vol. 8, No. 9, 1962. A few of the larger western clubs are listed below.

Cascadians: P. O. Box 1526, Yakima, Washington 98901
Mazamas: 909 NW 19th Street, Portland, Oregon 97232
The Mountaineers: P. O. Box 122, Seattle, Washington 98111
Sierra Club: Mills Tower, San Francisco, California 94104
Spokane Mountaineers: P. O. Box 1013, Spokane, Washington 99210
Washington Alpine Club: P. O. Box 353, Seattle, Washington 98111



IGNEOUS — METAMORPHIC

SEDIMENTARY

Sandstone and conglomerate

Sand and gravel

Mostly lava

Cinder cones

Tuff and breccia

Granite

Gneissic granite

Gneiss

Schist

N

Gravel road

Trails and high routes

Boundary of U.S.G.S. topographic maps

Boundary of Glacier Peak Wilderness Area

Cascade Crest

Fault

Contact

Geologic note describing major feature or rock type *See text*

0 — 5 MILES

GENERALIZED GEOLOGIC MAP

GEOLOGIC STORY

"To me are mountain masses grandly dumb
I question neither whence nor why they come."
Goethe, *Faust*

EARTH history is vastly long and profoundly obscure. To unravel it, the geologist must look closely at the rocks composing the earth. He must observe how rock masses differ, where they occur, and what their shapes and sizes are. He observes the form of the land and the processes at work on the earth today. To do all this, he takes roundabout hikes: he examines outcrops, hammers off samples, writes notes, and plots the distribution of rock masses on a map. Back in the laboratory, he studies the samples, and compares his map and observations with those of others.

From the moment the geologist observes the first rock, he starts imagining what the history of the rocks and landforms must have been. He makes guesses: this granite was once molten, this stratum has been broken, this valley was carved by ice. Now with something definite to look for, he searches for more evidence—baked rock around the granite, crushed rock between broken strata, scratches on the side of a glaciated valley. He is delighted if he finds a pattern—a pattern showing how rocks develop, how mountain masses come, how life evolves.

But before grand patterns can be found, the geologist must define the fundamental building blocks of the earth—the minerals and rocks. A *mineral* is a natural substance with properties (hardness, shape, composition, etc.) that are essentially fixed. The properties are nearly fixed because the atoms of elements that form minerals can be packed and

held together in only a limited number of ways—ways that depend on how the mineral formed (*crystallized*) from a liquid, a vapor, or, more commonly, from another mineral. Minerals usually occur in aggregates of small and poorly formed crystals, packed firmly together in *rock*. Rarely do minerals occur as the spectacular specimens seen in museums.

BURIED SEDIMENTS

Hundreds of millions of years ago the area of the North Cascades was an ocean receiving rock fragments and chemicals worn or dissolved, *eroded*, from adjacent lands. The debris, *sediments*, accumulated as layers (*beds or strata*) of mud, sand, and gravel on the sea floor. Volcanos contributed ash and lava to the pile. The weight of the ever-increasing load of overlying sediment pressed the loose material together and squeezed out the water. Percolating water deposited mineral cements between fragments. Gradually *sedimentary rocks* were formed: mud became *shale*, sand, *sandstone*, gravel, *conglomerate*.

As the sea floor sank, heat and pressure began to *metamorphose* (change) the sedimentary rocks. New minerals formed from the old and a squeezing from the sides folded and crumpled the layers. The new minerals, controlled at least in part by the squeezing, became aligned like sardines in a can. Most probably the rock floor beneath the sediments was also metamorphosed and blended with this overlying material.

Schist and gneiss formed during the metamorphism (pronounced "shist" and "nice"). A *schist* usually contains many small flakes of mica, closely packed and looking like fish scales; the rock tends to break in thin slabs. *Gneiss*, on the other hand, has larger grains and is richer in the white mineral, feldspar, which does not form flat flakes like the mica; hence the gneiss does not break in such thin regular slabs. Indeed, some gneisses show few aligned minerals at all and are called gneissic granite or just granite (Fig. 4). Such metamorphic granite is not easily distinguished from granite solidified from a melt (see below). Emanations from surrounding rock and below may help convert schist and gneiss into granite.

Despite the great changes in the original sediments, some of their layering is still preserved. On the geologic map (Fig. 3) the northwest trend of squiggles and bands of metamorphic rock represents aligned minerals formed during metamorphism and the upturned edges of beds that were once flat. This alignment, or grain of the rocks, shows that the squeeze during the metamorphism was from the southwest and northeast. Almost totally lacking, however, are clues in the rocks that would

help tell more exactly where the sediment was deposited, such as mud cracks indicating shallow water. Ripple marks, the fingerprints of currents, have been found.

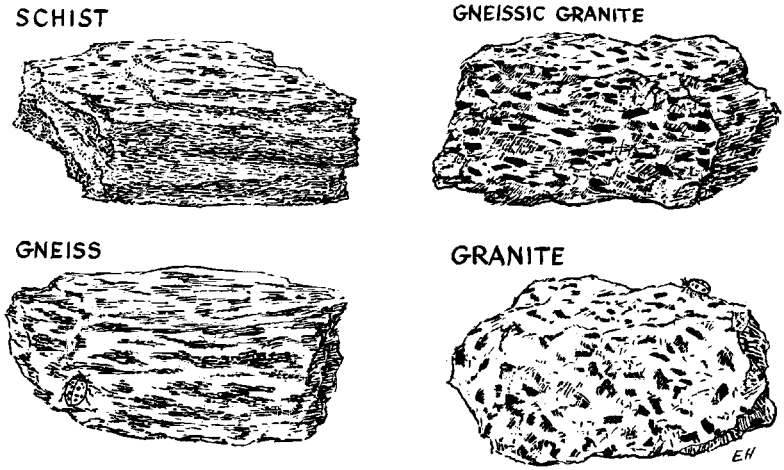


Figure 4

The remains of plants or animals, *fossils,* are rare in the rocks of the North Cascades, and none have been found in the metamorphic rocks between Glacier Peak and Lake Chelan. Most likely the fossils have been destroyed by the metamorphism, but possibly life was only present as specks or jellys not likely to survive burial, much less compaction and metamorphism.

OLD MOLTEN ROCKS

Both during and after the metamorphism, pockets of rock deep in the crust melted and moved upward. The molten material forced its way into (*intruded*) the more rigid metamorphic rocks. As the melt cooled, crystals of various minerals grew in much the same fashion that ice crystals grow in water. Rocks so formed are called *igneous* (fire-formed). When they crystallize deep underground (in the realm of Pluto), they are called *plutonic.* Because the molten rock was deep enough in the earth (a few thousand feet to many miles down) and well insulated, it cooled slowly and the crystals had time to grow to a fairly large, visible

size; the rock so formed has a rough, granular look and is called igneous *granite*. Granite (an ancient word; 78 A.D.) in the strict sense has a certain composition which most rocks in the area of this guide do not have. Accurately speaking, they would go by such names as tonalite or monzonite (from Mount Tonali and Monzone in northern Italy) or trondhjemite (from Trondheim in western Norway). Yet even to geologists, some "granites" look very much alike. All have similarities; small but easily seen dark minerals, biotite and hornblende, dot a white mass of quartz and feldspar. The oldest granites studied here pushed up when the surrounding schists and gneisses were still hot and pliable and being squeezed. The squeezing and flowing of the molten masses aligned and streaked out their minerals to make gneiss and gneissic granite. Other large masses of granite were intruded after the main period of metamorphism and show no alignment or streaking.

UPLIFT AND EROSION

Gradually crustal forces began pushing the deeply buried rocks toward the surface. Erosion slowly stripped off miles of overlying rock as the upheaval continued. Eventually the gneisses, schists, and much of the granite and gneissic granite seen today were exposed in the ancestral North Cascades. Sand and gravel eroded from the ridges, were spread out in nearby valleys by swift streams. This was about 60 million years ago. Remnants of this sand and gravel, now sandstone and conglomerate, remain as a small patch just west of Old Gib. The erosion of the earth and deposition of sediment, ultimately powered by the sun working on the oceans and the atmosphere, are well-understood processes. The cause and operation of crustal forces are still little understood. But without them erosion would soon reduce all lands to a sea-level plain.

The metamorphic and igneous rocks, now exposed at the cool surface, could no longer bend and stretch as they had done when deeply buried, but could only crack. *Faults* formed as one block of rock slid past another. West of Old Gib, one large block (a *graben*) dropped down between two faults, carrying with it the overlying sedimentary rock.

YOUNG MOLTEN ROCKS

Yet in the depths more rock was melting—or perhaps it had been liquid all along. It rose up into the gneiss and schist and up into cracks in the sandstone lying on it; the granite mass at Cloudy Pass crystallized

from such an intrusion. Some of the liquid rock came very near the surface and at least in one place broke through to form a volcano. All that is left of this volcano is the feeder tube that makes Old Gib Mountain; the superstructure has long been stripped away by erosion.

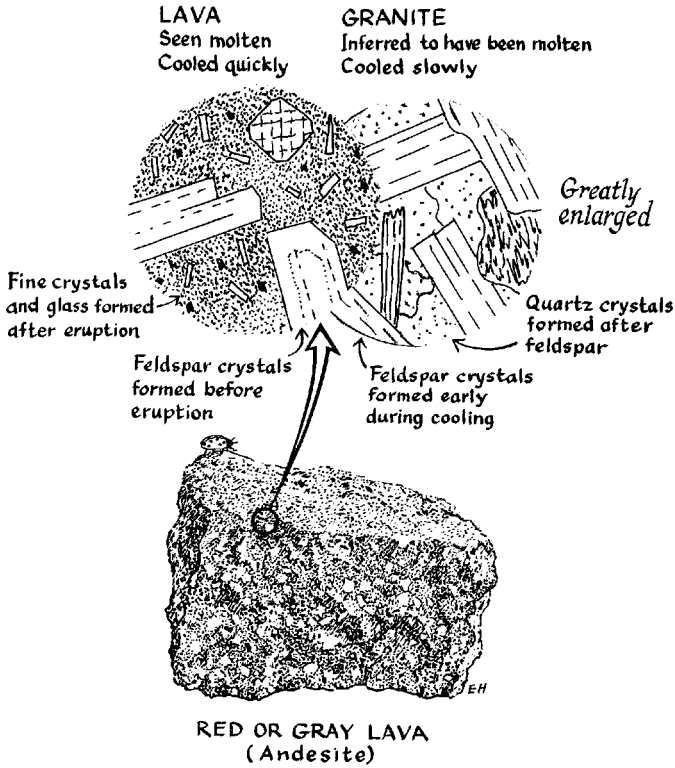


Figure 5

It has been mentioned that crystals in a deeply buried molten rock grow to visible size. In contrast, when the melted rock reaches the surface, to solidify as a *volcanic rock,* it cools quickly, and crystals have no time to grow large (Fig. 5). Instead, a great many smaller ones are formed and the resulting *lava* is relatively smooth; most of the crystals cannot be seen without a lens or microscope. Indeed some volcanic rocks cool so quickly that no crystals form at all, so the rock is glass. In some

volcanic rocks, however, crystals that formed at depth may be seen as spots. Small masses of molten rock that penetrate cracks close to the surface may also cool rapidly and like lavas be dense or glassy. Such is the case with many dikes and the tube that fed the Old Cib volcano.

Dissolved in subterranean molten rock is gas that forms bubbles and escapes when the rock comes near the surface—just as does the gas in champagne when the bottle is uncorked. The gas may blast forth violently, ejecting tiny bits of rock (*ash*), rock froth (*pumice*), and cork into the air. Lava flows may be riddled with round holes formed by gas bubbles (*vesicles*).

How does a geologist know the granite at Cloudy Pass was once molten? Deep subterranean chambers of molten rock are utterly inaccessible to direct study. Still, molten rock does in fact pour out on the ground as lava and so must also exist below the surface. The geologist searches for features in the rock that verify the supposition that it was molten. In the field the geologist finds that the granite at Cloudy Pass in places fills cracks in adjoining rocks and surrounds disarranged fragments as it could do only if quite fluid. He finds that minerals in the rocks near this granite, but not elsewhere, have assumed new shapes, and in places are bleached, and altered; these effects are most likely due to heat, hot gas, and water that emanated from the cooling granite. The geologic map (Fig. 3) clearly shows that the granite cuts across the grain of the surrounding rocks. Most likely it pushed its way into these older rocks, thus interrupting older layers and aligned minerals. And in the granite the microscope may show crystals with certain unique features also found in lava (Fig. 5). Finally, experiments with molten rocks in the laboratory crucible show that minerals like those found in the granite do indeed form as molten rock cools. It is most difficult, however, to experiment with a molten rock containing as many minerals as does a natural rock, and quite impossible to keep the experiment going for millions of years—the time it may take for a granite to cool. Yet when the sleuthing is complete the evidence that a particular mass was molten may be quite convincing. In other instances the evidence is either not convincing or lacking; the gneissic granites near Holden, for example, are most likely much metamorphosed schists and gneisses.

MORE EROSION

The latest stage in uplift of the North Cascades is expressed in the north-south trend of the range. Streams have carved valleys in this up-

lifted belt. Beginning about one million years ago glaciers periodically grew and descended these valleys to put some of the final touches on today's landscape; valleys were deepened, peaks and ridges sharpened, and lake basins formed. One of the more spectacular results of this glaciation is the Lake Chelan trench, sculptured by the 70-mile-long Ice Age (Pleistocene) glacier that headed near Cascade Pass and, at Chelan, joined a tongue of Canadian ice that descended the Columbia River.

THE LAST VOLCANOS

Some time before 10,000 years ago, molten rock was brewed up again and reached the surface. From volcanic centers unlocated, lava fragments were ejected to collect in thick layers of *tuff* and *breccia*. Eroded remnants of these deposits, varicolored and altered by percolating hot waters, occur close to Glacier Peak. Finally Glacier Peak itself was born. Its lavas spilled out over all the deeply eroded earlier rocks. Flows filled valleys such as the Suiattle, blocked streams, and caused them to seek other routes to the sea. As the volcano grew, probably in spurts, glaciers and streams began tearing it down. In addition to Glacier Peak, two very small volcanos were erupted near the Cascade Crest.

Well after Glacier Peak had become the dominant mountain in the region, two huge deposits of sand and gravel that extend far up to their source on the flanks of the cone, filled the White Chuck and Suiattle valleys on opposite sides of the peak. Much of the material in these fills shows thin and irregular beds of round cobbles that indicate it was deposited by streams. Much of the debris, however, is in thick layers containing large blocks and must have been carried down the flanks of the peak by big mud slides.

Glacier Peak gave forth its last(?) gasps in explosive eruptions of pumice and ash which was blown far and wide. Much was carried to the east by prevailing winds. A yellow pumice accumulated on the great fills in the White Chuck and Suiattle valleys as well as at more distant spots such as Ice Lakes in the Entiat Mountains. During one of these violent outbreaks, a cloud of hot debris avalanched into the White Chuck valley, settled down, and welded together. The result is the layer of cliff-forming tuff below Kennedy Hot Springs. Is Glacier Peak dead? No one can say. The three hot springs found about its base suggest that the crustal fires still smoulder. Looking at the magnificent peak from some safe vantage, one cannot but hope another eruption is at hand.

WESTERN GATEWAYS

THE roads that lead to the western side of the Cascade Crest provide only a few tantalizing views of summits, snowfields, and timberline meadows. Some glimpses are across farm fields but most are through a foreground of second-growth forest. From U.S. 99 on the Puget Sound lowland, turn onto paved state road 530 up the North Fork of the Stillaguamish River. Follow 530 through ARLINGTON to DARRINGTON (78 miles from Seattle) where Whitehorse Mountain towers an impressive 6,000 feet above the rooftops. Alternatively, go to Darrington via Concrete or over the Mountain Loop Highway via Barlow Pass; the latter is the most scenic. No public transport serves either Arlington or Darrington; the lone traveler might try the daily mail truck or the drayage concern in Everett.

Arlington and Darrington are supported largely by timber cutting on nearby public land. Both have tourist facilities and stores. Arlington has the only hospital. Darrington has campgrounds at Clear Creek south of town, and Squire Creek west of town. Headquarters for the SUIATTLE and the DARRINGTON DISTRICTS, MOUNT BAKER NATIONAL FOREST, are at the large compound north of Darrington, where climbers and hikers are advised to register.

[1] *Darrington lies between the Stillaguamish and Sauk Rivers on a broad and forested flatland underlain by stream gravels. The gravels along the Stillaguamish (exposed in roadcuts near Squire Creek) contain pebbles of Glacier Peak pumice and lava, which is surprising only when it is realized that today the Sauk, not the Stillaguamish, carries such debris off the slopes of the volcano. Professor Joseph Vance, University of Washington, proposes that the Sauk once flowed via the present site of Darrington straight west to the sea (Fig. 6). The river abandoned this route because another deeper channel was carved for it to the north by an Ice Age glacier.*

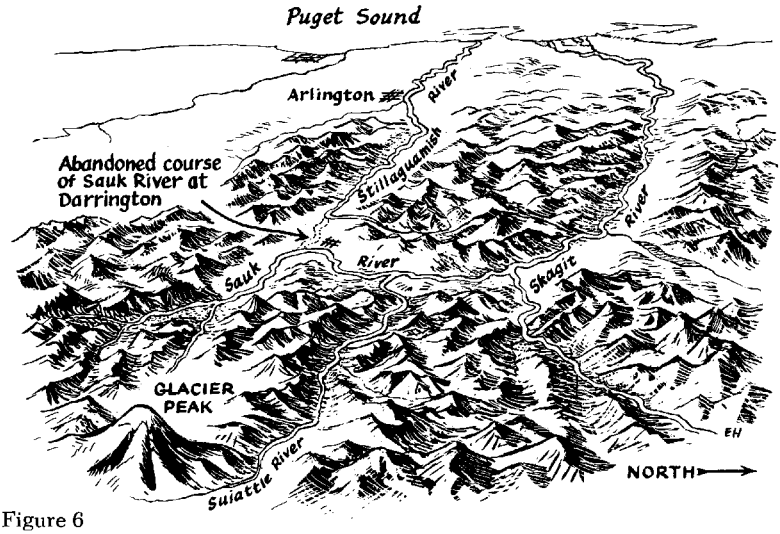


Figure 6

The western gateways to the Glacier Peak area are the three main branches of the Sauk: the Suiattle, the White Chuck, and the Sauk North Fork. The following three sections describe the roads into each of these and the trails leading from them.

Suiattle River

From DARRINGTON (0.0) a paved road (to Concrete) leads north through second-growth timber and past scattered farms to the SAUK RIVER BRIDGE (11.0). **0.0** **11.0**

During high runoff, the mud-choked Suiattle water can be seen hugging the eastern bank of the clear green Sauk; most of this mud is washed from sand and gravel deposits on the east side of Glacier Peak. [2]

The Suiattle Road begins just across the bridge and winds eastward up the river. A bridge over the Suiattle (19.0) leads to the SOUTH SIDE **19.0**

ROAD along which no campgrounds are developed, though camping is possible in several places. Clear-cut patches near the end provide some moderately good views of rock and snow on the peaks above. Up lateral logging roads—Box Mountain Road and Lime Creek Road—the way is bumpy, but the views are better, and one gets a close look at logged forest in various stages of recovery.

Beyond the South Side junction, the Suiattle Road leaves the second-growth forest and enters attractive stands of old timber. BUCK CREEK
24.0 CAMPGROUND (24.0) is the best and largest developed campground along the way, and just down the road is SUIATTLE GUARD STATION (24.7). Beyond is GREEN MOUNTAIN PASTURE (27.3) where the Forest Service pastures pack animals and helicopters. DOWNEY
29.5 CREEK CAMPGROUND (29.5) serves travelers bound for the wilderness north of the Suiattle River. SULPHUR CREEK CAMPGROUND
31.5 (31.5), located among tall and stately trees, is the handiest camp for travelers about to set off for the wilderness of the Glacier Peak area. There is parking space but no camping at the END OF THE ROAD
32.5 (32.5).

Recommended short trips from Sulphur Creek campground are listed below:

Sulphur Creek Trail through rain forest to a smelly hot spring (0.7 miles each way).

Sulphur Mountain Way directly up to timberline and grand views including Glacier Peak (about 4 miles each way).

Milk Creek Trail to an avalanche track, a waterfall, and a view of Glacier Peak (3.5 miles each way).

SULPHUR CREEK TRAIL TO SULPHUR HOT SPRINGS

Maintained yearly

300-foot climb

.7 mile

0.0 The trail begins on the SUIATTLE ROAD (1550-0.0) a few hundred feet below the bridge over Sulphur Creek. It climbs a little from the

road through beautiful open forest, traverses the hillsides, and drops slightly to the banks of Sulphur Creek (about 1650-0.5). The trail continues on up the creek for another 4 miles but is not maintained and is not described further in these pages. Leaving the trail, cross the creek on an interesting maze of narrow footlogs and continue a short distance upstream on the bank to SULPHUR HOT SPRING (1650-0.7). **0.7**

This disappointingly small seeping of warm sulphurous water and odoriferous gas (hydrogen sulfide) is the smallest of the known hot springs near Glacier Peak and the most distant from it. The others are Kennedy Hot Spring and Gamma Hot Spring. (Notes 30 and 38). [3]

SULPHUR MOUNTAIN WAY

Maintained periodically

4300-foot climb

5 miles

"To climb steep hills
Requires slow pace at first."
Shakespeare, *King Henry VIII*

This is a short route to the high country; the good views from timberline, about 4 miles up, and the handsome granite cliffs make it a rewarding trip. The peaks and pinnacles northeast of Sulphur Mountain offer challenging rock climbs not yet tried. Sulphur Mountain itself is an easy scramble from the end of the trail, where begins the Bath Lakes High Route. Mileages are approximate.

The trail begins on the SUIATTLE ROAD 0.1 miles above Sulphur Creek (1800-0.0) and unless it has been recently traveled, is not obvious **0.0** where it climbs the steep roadcut. There is a sign on top of the cut. There may also be an official notice "steep and dangerous" intended to scare off horseback riders. The trail switchbacks up through fir thickets, avoiding rock ledges of hornblende schist and biotite schist.

The repeated rock benches encountered here in step-like succession [4]

are characteristic of this valley side and result from glacial scour. Layers in the rocks differ in hardnesses and thus erode at different rates.

1.0 A small stream beyond a slight descent (about 2200-1.0) is the last possibility of water before reaching high snow. The trail then climbs steadily again in many, many switchbacks. From a semi-open hillside are glimpses of the peaks above Milk Creek. The way continues ever upward
3.0 to the ridge crest (4800-3.0) where the woods are open. To avoid talus the trail leaves the ridge (5200-3.2) and traverses southeast before climbing again to the first meadows and glorious views of Glacier Peak. Here the trail may be a bit hard to find. It goes toward the 6000-foot saddle
5.0 directly above and reaches the ridge (6050-5.0) just southeast of the low point. The BATH LAKES HIGH ROUTE begins here.

SULPHUR MOUNTAIN is a rewarding scramble. Follow the ridge southeast over the next grassy hump to the next saddle (5950) where camping is possible but water scarce late in the season. Scramble up the ridge to the summit for marvelous views.

BATH LAKES HIGH ROUTE

Difficult

3600-foot climb

4500-foot descent

11 to 15 miles

12 hours

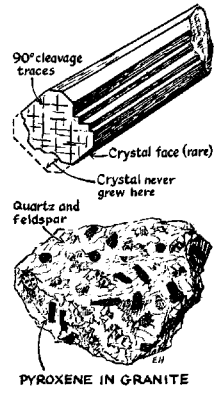


Figure 7

This is a trip with lengthy climbs followed by abrupt descents that will tax the endurance and patience of even the most resolved hiker. It begins high on Sulphur Mountain and ends at Canyon Lake, traversing very rugged country, and allowing visits to several alpine lakes. Take an ice ax for the steep snow and heather and, if the complete trip is made, carry a belaying rope for the short pitch at the bottom of the "Great Wall" east of Bath Lakes.

Leave SULPHUR MOUNTAIN WAY where it first reaches the ridge-

crest (6050) and drop 100 feet into a draw filled with talus blocks on the east side of the ridge. Follow game trails, periodically engraved by horses. Traverse steeply down to the south (right) over several benches and past camp spots to reach the creek draining LOOKOUT LAKE. Cross the stream (about 5450) just below some bluffs. SULPHUR MOUNTAIN LAKE and fish are downstream and easily reached from here.

Turn northward on the east side of the stream and skirt the edge of a large talus. Steer for a heathery draw which breaches the sheer cliffs of the spur east of the stream by working up along the north (left) margin of the talus. The draw is steep but has good footing, thanks to heavy traffic of goat and deer. From the heather saddle (5950) at the head of the draw angle southeast (right) and down through trees into the open basin directly north of Sulphur Mountain (5750-2½ hours) on grassy flats among jumbles of large talus blocks. At the base of the steep slopes, a little further east, is an even flatter and grassier meadow with meandering streams.

The many talus blocks in this area reflect the numerous joints (cracks) in the granite and gneissic granite which make most of the ridge between Canyon Creek and Sulphur Creek. A close look at the rock reveals spots of glassy quartz and uncommonly large and stubby pencils of light-green pyroxene surrounded by white feldspar (Fig. 7). PYROXENE is a complex mineral common in igneous and some metamorphic rocks. It is probable that this rock was once a molten mass which was squeezed and altered during metamorphism. Near the margin of the body, several miles east of Bath Lake, the squeezing has made a streaky gneiss out of the rock. [5]

From the edge of the easternmost meadows the route goes east through the notch in the ridge leading northeast from Sulphur Mountain. Climb eastward up talus leading between cliffs and benches and on up talus and heather of a steep basin. Cross through the notch (6650) to a spectacular rock table which overlooks an unnamed lake in a chasm to the south (see below for the alternate route via this lake). Cross the rock table to another obvious notch (6650) to the east and drop onto steep snow in Bath Creek drainage. Descend snow and rock, paralleling the cliffs on the south (right) (Fig. 8). The snow narrows (6100) and the way becomes a narrow passage between the rock walls above and cliffs and steep moraine below on the north. This narrow passage is a very

steep snow slope or, late in the summer, fairly easy rock. Continue traversing and dropping, staying as close to the bottom of the cliffs above as is comfortable. The cliffs eventually give way to heather. Swing south (right) and cross the main ridge via basins, glaciated slabs, and heather-floored swales. Along here are camping spots with water; wood is scarce (6100-4 hours).

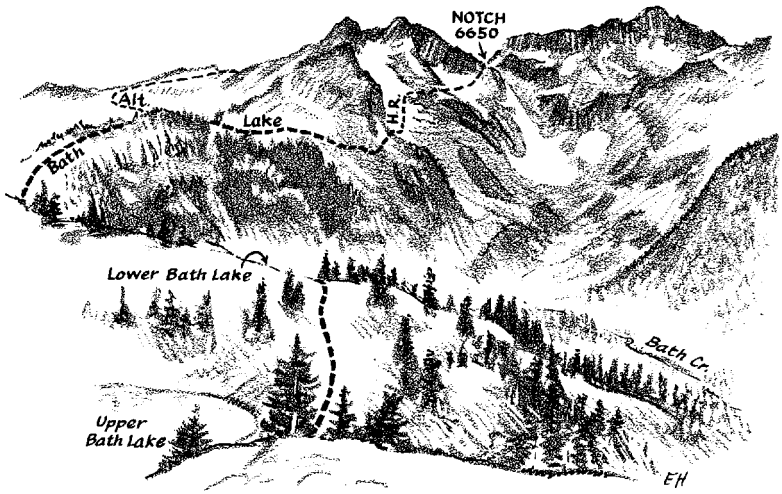


Figure 8

Cross well onto the south side of the ridge before traversing east again. Skirt down and around the south side of a tree-covered knob (6200) on the ridge. A good game trail leads up again to a grassy swale (6000) on a long tree-sprinkled spur which extends southeast into Canyon Creek. The alternate route via unnamed lakes joins the main route here. The view is a grand panorama southward (Fig. 16). Deer and goats abound.

Follow the grassy swale back onto the ridge crest and find, near the crest, goat trails which lead down to a low sharp vale (5850) on the divide at the head of Bath Creek. In this vale there are two passes separated by a slight hummock. The western one leads north down steep talus and heather to Bath Creek—do not descend. The other leads to the north side of the ridge via a goat trail which very adroitly avoids steep cliffs and most of the extremely steep heather slopes. Follow this goat trail until it disappears above pockets strewn with talus blocks.

Follow the talus and the heather- and needle-carpeted slopes beyond down to the outlet stream of LOWER BATH LAKE (5650). Camping here is adequate but cannot compare to that of the uppermost Bath Lake.

From the outlet climb (north-northeast) up the ridge rimming the lake, keeping in heathery swales free of huckleberry brush. This ridge becomes broad and open above, where there is a pile of large blocks. Directly above this talus is a steep, shallow, grubby gully, much used by game, which leads to benches above UPPER BATH LAKE (5950-6 hours). Bath Lake is a delightful spot with a perfect combination of blue water, white rock, and green heather. For those who like spectacular panoramic views, a short climb to the ridge top brings immediate satisfaction. The lake is well-stocked with fish and seldom visited.

A longer alternate to the main and easiest route to Bath Lakes goes via the two high lakes east of Sulphur Mountain. From the flat meadows north of Sulphur Mountain (5750) climb talus and heather southward to the pass (6450) east of Sulphur Mountain. Drop down an easy spur to a good camp spot perched on a knoll overlooking the FIRST UNNAMED LAKE (5800-4½ hours). Water seeps from the grass on the south side of the knoll. Descend very steep heather to the lake and cross the outlet on logs. Bounce an echo here. Traverse and climb south (right) along a ledge of heather and scree to the crest of the irregular broken spur which forms the east wall of the lake chasm. There is an old burn on the lower part of this small spur. Brush and small trees can be avoided by climbing east toward the main spur ridge with its apron of talus. Climb northeast toward a broad saddle (6650-5½ hours) on this main spur; this saddle is the only good passage through the sheer granite cliffs whose joints are so wonderfully displayed. To reach pleasant lakeside camping spots with nice views of Glacier Peak, go down along the top of the main spur to a broad smooth shoulder (6300) and drop over rounded hillocks to the south side of the SECOND UNNAMED LAKE (5900-6 hours). To rejoin the main route to Bath Lakes, traverse and climb northeastward, avoiding cliffs by not climbing too high. Head for the grassy swale (6650-6 hours) on the tree-spotted spur crossed by the main route.

Follow the main route from the outlet of the uppermost Bath Lake. Go easterly around the north side and up a sharp nose dotted with groves of alpine fir. Cross filled-in pockets where tiny, sandy meadows are as smooth and flat as billiard tables. Swing southeastward on approaching spur summits and talus and traverse prominent benches (game trails) to the main ridge (6750).

From here on to Canyon Lake the route traverses the south side of

the main ridge. Drop 150 feet and traverse into a rocky, block-filled basin containing a small pond (possible camping). Traverse benches below talus and climb slightly to the top of the next spur (6550).

From here survey the large open basin to the east. The eventual goal is the crossing of the next spur near Peak 7021, the high peak at the northeast corner of the basin. Traverse steep meadows (6500); do not drop much. Goat trails help pass rocky ribs. The traverse should lead with ease to the talus-covered benches in the center of the basin. It is important to cross the spur at the correct notch to avoid difficulty in descending the GREAT WALL beyond. This inconspicuous notch can be seen 400 feet above the basin, about 150 feet below Peak 7021, where the main rocks of the summit begin. The notch is above the highest and easternmost irregular patch of talus on the south slope of Peak 7021; in it protrudes a prominent block of black rock.

From the notch, go straight down an extremely steep gully of heather, grass, and dirt (Fig. 9)—a possibly dangerous passage if covered with

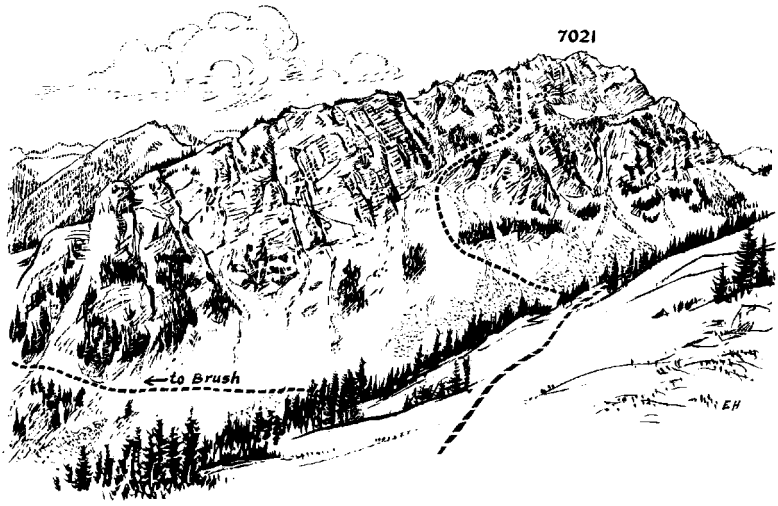


Figure 9. Looking west at the Great Wall

snow. Go down about 200 feet to where an awesomely steep meadow widens out. Bear a little south (right), keeping about 100 to 200 feet below the summit cliffs of the spur. Search for goat trails leading down. The correct tack leads directly toward Fortress Mountain in the far

distance. If the traverse is carried too far south, too high, a cliffy gully will be encountered; backtrack and drop. Go down through fir and cedar patches, angling right, heading toward a vertical rocky buttress on the far side of the cliffy gully. The goat trails finally converge on a narrow, steep ledge, roofed and guarded by fir and cedar. Crawl down 15 feet to a short steep chimney on the left leading to less steep rocky ledges below. Belaying is wise at this point. An angling descent along a broken green dike leads to the steep meadow below the Great Wall.

From the base of the wall drop and traverse north (left) over the steep meadow to the lip of a nearby rocky basin (5900-9 hours). There is good camping here.

(NOTE: The Great Wall can be painfully circumnavigated to the south by dropping down to 4700 feet and rounding the cliffs in trees and steep brush.)

The GREAT WALL stands up because it is composed of a slightly gneissic granite a little more resistant to erosion than the rock farther east, which is more gneissic and thus more easily split and broken. [6]

Climb diagonally northeastward out of the basin and traverse heather and rocky benches just above tree line; between 6300 and 6400 feet there is a line of joint-controlled benches making this traverse quite easy and providing small flats for camping.

The next barrier to easy travel is another cliffy spur about 1 mile east of the Great Wall. A heather slope (6400) between talus above and dense trees below marks the best spot to go around the spur. Climb the heather slope to find goat trails traversing a steep grassy draw. Drop slightly to round the base of the main cliff and turn north on steep meadow toward a deep basin. Drop 50 to 100 feet to just above the trees and traverse down goat trails through the trees and small cliffs to rocky meadow in the basin. Cross the stream (6200) at the lip. There is camping here, but it may be dark and gloomy in the morning and evening.

The hogback spur just passed is the last of the uniform gneissic granite of the Sulphur Mountain area. To the east as far as Canyon Lake are prominently layered rocks—dark layers of gneiss rich in the dark minerals, hornblende and biotite, and a few layers of light-colored gneiss rich in feldspar. The deep basin here is carved in a thick layer of white gneiss, which produces marvelously white talus blocks. [7]

Traversing eastward from the deep basin can be unpleasant unless the route is carefully (or perhaps luckily) chosen. Contour southeast (6400);

stay above the thickest scrub trees, but not so high as to get into the cliffs of white gneiss. Good goat trails can be found which lead neatly through the jungle. Continue around a corner until a steep grassy meadow is reached; one may come out too high—above a cliff overlooking this meadow—but it is easy enough to descend through tangles of brush and trees to reach the base of the cliff. Follow the meadow around the base of the cliffs, another cuesta, and then down to a small, level, rocky basin (5950) containing snow or a shallow pond. Go north of the rock bastion at the lower end of this basin and climb to the grassy shoulder (6100) on the east.

[8] *Note the old prospect pits here. Optimistic miners came to this place via Canyon Lake to dig in a small pod of soft greenish SERPENTINE. Hot waters alter peridotite (Note 65) to the serpentine family of minerals. Asbestos is a familiar serpentine mineral.*

Do not climb high on this spur above the grassy shoulder, unless a side trip to TOTEM PASS is intended. Contour on grassy benches (6100) to find sheep trails which cut diagonally down. The correct trail bypasses all obstacles of brush and cliffs and leads down to cliff-rimmed CANYON LAKE (5625-12 hours).

The CANYON LAKE TRAIL to Image Lake is a bit difficult to find. From the lake outlet, go east (bearing 140°) heading just right of a thicket of trees; this is in a line at approximately right angles to the long axis of the lake. The trail begins climbing immediately.

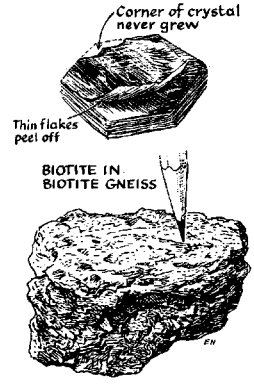


Figure 10

MILK CREEK TRAIL

Maintained yearly

4700-foot climb

11 miles

A hike into the Milk Creek valley provides a quick introduction to Cascade scenery. The trail is a link in the Cascade Crest Trail System,

joining the trails and high routes of nearby Glacier Peak with the Suiattle River Trail. Mileages are approximate.

The Forest Service has plans for a trail up the East Fork of Milk Creek to join the Cascade Crest Trail (under construction in Dolly Creek Meadows).

The trail begins at the SUIATTLE ROAD END (1651-0.0). It drops **0.0**
20 feet down to the footbridge over the Suiattle, a thrilling crossing when the river is high. Immediately across the bridge and just beyond the riverside brush is the junction with the RIVORD LAKE HIGH ROUTE. Past the Glacier Peak Wilderness boundary sign, the Milk Creek Trail winds through a dark rain forest of magnificent trees, then crosses a picturesque stream (1750-0.5) and begins switchbacks. After traversing a gentler slope (2000-1.0), the trail begins a climbing traverse to the southeast across a very steep timbered hillside where it dives in
and out of gullies (water). The top of a slight rise (2250-2.0) marks the **2.0**
edge of the flat Milk Creek valley.

An interesting exploratory trip can be made from just beyond here. Hunt along the left side of the trail for an old trail (marked by blazes) which drops across Milk Creek and climbs onto the northwest nose of Grassy Point. The trail switchbacks high before disappearing in timbered cliffs.

Milk Creek valley is a glacial hanging valley (Fig. 37). At one time [9]
it may have contained a lake or two, but all evidence of them is buried beneath debris from the steep valley sides.

From the entrance to the valley the trail drops slightly as it winds through evergreen forest; it then enters deciduous woods and brush just beyond a trail camp on a stream bank. Views open out at brush fields
and meadows (2350-3.5), revealing the first of several enormous snow **3.5**
avalanche slopes that characterize this valley. At the north edge of this first avalanche track (possible camping) is the first good view of Glacier Peak and of a nearby waterfall. Beyond the brush, the trail enters the woods again, and a short distance farther reaches a ford at MILK
CREEK (2400-4.0). To cross, follow a trail upstream to (hopefully) a foot **4.0**
log. On the opposite bank is an uninspiring camp spot in the woods.

Continue to the EAST FORK OF MILK CREEK (2500-4.5, no foot **4.5**
log) and a passable camp spot just south of the creek in a small clearing —the last level camp spot before the meadows near Mica Lake.

This way leads on to a second avalanche scar (2650-5.0), and a fantastic jumble of downed trees. A granddaddy of a snowslide rushed down

the western valley wall and up the eastern. The trail here begins a slightly more earnest climb. It goes through more trees and comes out in a bouldery brush patch with a view to the west of cascades draining the Mica Lake cirque. On a sunny day this is a hot stretch of trail, winding up through blocks of talus and oppressive brush bordering the torrents of Milk Creek.

[10] *Some welcome relief can be found just beyond a switchback on the steep canyon side (3400), where a surprisingly cool rush of air issues from a tiny marmot-sized cave on the trailside. Several of these cool caves are passed; they probably connect with extensive labyrinthian caves in the talus.*

A few switchbacks and rocky traverses bring the trail to the junction
7.0 with the DOLLY-DUSTY HIGH ROUTE (4000-7.0) which climbs east on the old Glacier Peak Ridge Trail.

Find logs over MILK CREEK just upstream from the junction. Desperate hikers have camped here on flood gravels. Beyond the crossing the trail is rarely cleared of brush, hence may be a bit difficult to find. It traverses northward to reach trees (3950-7.2) and climbs many short switchbacks. Another northward traverse brings the trail to the first
8.2 bouldery meadow (4300-8.2). Camp spots are near a trickling stream just within the trees or by the main stream in the meadow.

The trail climbs steadily across the meadow, then switchbacks up on the north side, crossing the same cascading stream several times, and traverses through trees and over benches covered with blueberry and huckleberry bushes. The going is slow in late August when the bushes are drooping with berries.

The trail emerges from the trees in a pleasant small basin by a rush-
9.5 ing stream (5100-9.5). This is the best camping spot for Mica Lake, because higher up wood is scarce. The trail switchbacks up again—another slow stretch in berry season—to reach the junction with the RIVORD LAKE HIGH ROUTE (5300-9.9). A few hundred feet on to the south-
10.0 west the trail crosses the outlet of MICA LAKE (5450-10.0).

[11] *As the name Mica Lake implies, the schist here is rich in mica—mostly biotite. Round red garnet and black hornblende also occur. Good exposures of schist occur all along the trail from the lower basin up to Fire Creek Pass (Fig. 3). SCHIST is a rock characterized by flat or platy minerals packed closely together like a sheaf of papers. Minerals com-*

mon in schists are micas: biotite (black mica), muscovite (white mica), and chlorite (green mica). These are glassy-looking minerals which occur as thin, bendable flakes or books of thin flakes. They are easily scratched with the fingernail and characteristically split into finer and finer flakes (Fig. 10).

The trail southwestward from Mica Lake zigzags up past a number of meadows; these were once tarns but are now filled in. They make interesting but woodless camping places. The trail touches the ridge crest (6150-10.9) at the junction with the FIRE MOUNTAIN HIGH ROUTE. Around a rocky corner is FIRE CREEK PASS (6350-11.0). **11.0**
The trail continues down to the White Chuck River as the FIRE CREEK PASS TRAIL.

DOLLY-DUSTY HIGH ROUTE

Difficult

4800-foot climb

2650-foot descent

7 miles

9 hours

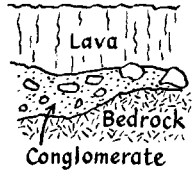


Figure 11

"O'er many a frozen,
Many a fiery Alp,
Rocks, caves, lakes, ferns,
bogs, dens, and shades of death."
Milton, *Paradise Lost*

This high route, a link in the timberline circuit of Glacier Peak, takes the hiker from Milk Creek through barren wilderness of glaciated upper Vista and Dusty Creeks and across the meadows and goat pastures on Gamma Ridge. The Forest Service is now building a trail that ultimately will traverse the high route described here between Milk Creek and the meadows at the head of Dolly Creek.

Fresh rock slides often obscure the junction (4000) of the old Glacier Peak Ridge Trail with the MILK CREEK TRAIL, but the tread is well-preserved farther up the slope. It zigzags up over loose rocks, goes into trees on the left for a short distance, and continues on up the talus; though the trail is soon enveloped in brush, the going is good. Traverse northward again into shady woods (4900) and up more switchbacks to just below the crest of the ridge. Here the improved trail ends but a crude tread leads steeply up through the berry bushes to the crest of GLACIER PEAK RIDGE (5600-2 hours). Pleasant camping may be found along the ridge, but water may be hard to find.

To reach the basin at the head of the East Fork of Milk Creek, continue up the ridge. Climb on gentle slopes through picturesque nooks of white rock and heather to a treeless shoulder (6000), where an easy and obvious traverse leads down to the East Fork. Pass near the highest wooded knoll in this basin. Cascading water is abundant here; camping is good, especially lower down where the meadow is flatter and wood more abundant.

To reach the meadows at the head of Dolly Creek, continue to the east side of the basin and cross a rushing stream (about 5700). Climb diagonally northeastward on steep meadows which extend up into the trees. A few gullies must be navigated; to avoid most of these, go straight up. Come out in a swale on the ridge (6175) *above* the DOLLY CREEK MEADOWS; a large snowbank on the east side of the ridge may mark the spot. Camping is pleasant in these sloping, lush meadows, and the views are magnificent (5850-4 hours). There usually are trickles of water in several gullies, but the best is in the southeasternmost. The VISTA CREEK TRAIL is easily reached in the saddle to the northeast.

A nice side trip from here is out along the crest of the rolling ridge to the north (camping in the saddle northeast of knob 5958) and up to the summit of Grassy Point (6505). The cliffy, brushy, north face of Grassy Point is awesome.

[12] *Knob 5958 is an isolated cap or outlier of Glacier Peak lava. On top of the east summit of Grassy Point (6596), look closely at the black schist; it is a jumble of schist fragments (a breccia), probably formed when a violent jet of steam blasted up from below. Another breccia composed of angular fragments of schist and gneiss in a fine-grained igneous rock (Fig. 12) occurs on the saddle west of this summit and below on the north face of Grassy Point. The intrusion of this igneous breccia into the schists near the surface of the earth caused the steam explosion.*

To continue on the high route, climb steeply south from the meadows at the head of Dolly Creek to the ridge above Vista Creek. Cross the ridge high amid the uppermost trees (5850) and traverse above the brushy and cliffy spurs extending down on the Vista Creek side. Then descend a draw on the talus and the scree to Vista Creek. Bear toward the high cliff of andesite where goats prowl.

At the bottom of the slope is an outcrop of conglomerate, rich in boulders of gneiss, schist, and granite. At this place the young lava of Glacier Peak spilled out on a slope covered with these boulders of older rock (Fig. 11). [13]

Figure 12

In the early season the crossing of VISTA CREEK (4900-5 hours) may be difficult, but late in the summer hop across on boulders. Head downstream on the southeast side and go around the lower end of a sharp ridge of fresh moraine (4900). Then go straight up the valley side in heavy timber (a little brush lower down) to reach the edge (5500) of an open basin blanketed with heather. There are good camping spots on knolls next to gullied pumice. Northwest of the main stream in this basin are large meadows (5300).

Conspicuous and cliffy Gamma Peak (7009) on nearby Gamma Ridge is off to the southeast. Do not cross the ridge at the lowest saddle just west of the peak but at the broad saddle about a mile to the west which is marked by white pumice banks and lavacliffs. Here in the saddle (6650-7 hours) ends the GAMMA RIDGE TRAIL.

The hiker standing in the broad saddle overlooking Dusty Creek is in the midst of well-displayed geologic features (Fig. 13). To his right (west) at the head of Dusty Creek is a great cleaver, consisting of tall vertical columns of jointed Glacier Peak lava. This lava rests on older, yellow rock consisting of layers of volcanic ash and volcanic breccia (Fig. 3). The ash, when solidified into a more or less solid rock, is called TUFF. [14]

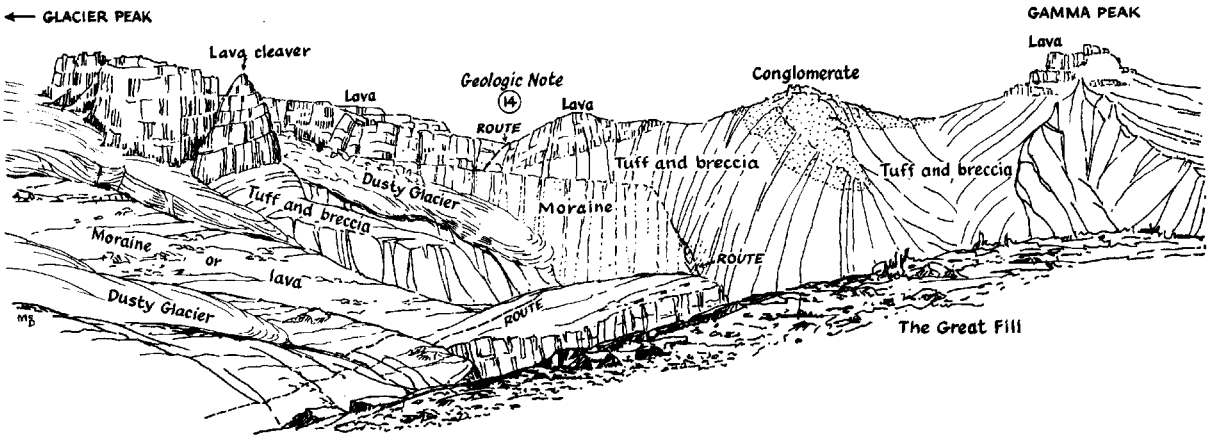


Figure 13. View across the head of Dusty Creek to Gamma Ridge

A BRECCIA (Fig. 12) is made of course angular rock fragments and in this case the fragments are of volcanic rock. Similar volcanic rock underlies most of Gamma Ridge, but Gamma Peak on this ridge, like the cleaver, is composed of Glacier Peak lava. The older tuff and breccia formation was once more extensive, but erosion has carried it away except where it is protected by overlying lava.

Patches of conglomerate (too small to be shown on the geologic map; Fig. 3), which make knobby pinnacles on the ridge west and east of Gamma Peak, contain cobbles of nonvolcanic rocks, gneiss, and schist. Such nonvolcanic rocks are not found today anywhere nearby. These stream-carried cobbles may have come from a bedrock ridge where Glacier Peak now rises. They were deposited on top of the old tuff and breccia some time before these younger lavas flowed forth.

To the southeast the hiker sees a high bank of gravels, the GREAT FILL, between Chocolate Creek and Dusty Creek (Fig. 15). Down to the left across and above Dusty Creek, cliffs of lava stand above perpendicular walls of red gravel fill and below a high slope of gray gravel fill. Apparently a lava sheet flowed out over the red gravels during Glacier Peak eruptions and was later covered by gray gravels.

From the 6650-foot saddle descend to Dusty Creek. Go down steep heather and scree to a stream held up in a narrow basin (6400) behind a ridge of fresh moraine. Follow the stream down and into a small southeast-trending gully between the fresh moraine and the main ridge. Although this gully is steep and filled with teetering boulders, the adjacent undercut moraine and crumbly rock slabs are even steeper. It leads the careful hiker to the rock-strewn basin at the head of Dusty Creek below (6100) (Fig. 13). Once out of this difficult gully, traverse (about 6100) southward beneath the NORTH TONGUE OF DUSTY GLACIER. Climb several hundred feet over a moraine-covered buttress of lava. Then contour over moraine just beneath the SOUTH TONGUE OF DUSTY GLACIER and around to the rubbly slopes of the Great Fill. Ascend to the top of the fill and go east-southeast across big gullies toward the highest trees (6150-9 hours). A few small but level camping spots are found in the tree thickets here and in the adjoining meadows. Water may be scarce in the late summer, but usually some trickles can be found in one of the innumerable gullies, though perhaps only late in the day.

The DUSTY CREEK TRAIL which leads down to the Suiattle River

Trail can be found by going east down the Great Fill. Bear off toward the abrupt edge of the fill above the abyss of Dusty Creek. The trail is not well-blazed and the tread is barely visible, but several hundred yards below timberline it follows a knife-edge gravel ridge on the very brink of the fill; it can be picked up here if not before.

The hiker who is making the timber-line circuit of Glacier Peak must, at this point, forsake the high meadows (6150) in order to bypass the Chocolate Creek gorge. He must go down to the Suiattle River Trail (3850) and then climb back up the Cool High Route to regain the alpine meadows (about 5500). If he questions this rather arduous detour, he need only traverse southward, across the many deep gullies to the edge of the fill, and look down. Incredibly steep slopes of loose gravel slant down to a vertical gorge of gravel that Chocolate Creek has cut in the Great Fill. There is *no* safe crossing of this Chocolate Creek chasm above 4600 feet.

A party equipped and experienced for glacier travel may cross high on the Chocolate Glacier; ropes, ice axes, and possibly crampons will be needed. Climb up the fill between Chocolate and Dusty Creeks until it narrows to a knife-edge ridge. Follow this spectacular ridge to a rock buttress (7000) between Chocolate and Dusty Glaciers and rope up. Usually the icefall on the south side of this buttress can be crossed with some step-cutting. Beyond the icefall, traverse southward on the much-crevassed Chocolate Glacier to a bedrock ridge leading back down to the timberline meadows and the Cool High Route.

RIVORD LAKE HIGH ROUTE

Intermediate

2100-foot climb

5700-foot descent

8 miles

7 hours

"Speedwell" (Veronica) x ⅓

For the lake lover and fisherman this route out along Lime Ridge is most appealing. Counting Mica Lake, eight fair-sized lakes and several

small ponds can be visited. All are scenic and a number offer good fishing.

From the Milk Creek Trail just north of the outlet of MICA LAKE (5300), climb westward over heather-covered humps, up the spur that forms the north side of Mica Lake cirque. Cross the spur at the first pronounced and obviously navigable notch (5950).

Look closely in the rocks hereabout for round and angular pieces of schist set in a fine-grained matrix; this looks something like a sedimentary conglomerate. However, the matrix is fine-grained granite that has shot up into the schist with such force it shattered the schist and penetrated between fragments. This breccia is similar to breccias on Grassy Point (Note 12). [15]

From the notch descend steep snow and scree; stay close to a rocky buttress on the west (left) but drop far enough to round its base (5900) below the cliffs. From the buttress one can survey the more-or-less level route across the broad cirque to the heather notch above Lime Lake. The giant avalanches of snow that sweep down into Milk Creek come from these high slopes. Go northwestward across very steep, sometimes hard scree to the gentler slopes beyond. At the northern edge of the cirque climb slightly from the level benches to drop into the heather notch (5850-2½ hours) east of the end of LIME LAKE and about 200 feet above the water. At the west end of the lake, heather benches in the trees offer camp spots, but as the lake is deep in a chasm these may be chilly. There are not many fish.

From the saddle (5850) at the end of Lime Lake, climb diagonally up steep heather, through a narrow guard of trees, to a second saddle (5900) just north of the lake and look down to a small pond. Climb down to this pleasant pond (camping here may be sunnier than at Lime Lake) and continue northward over easy slopes of heather and talus to MILK LAKES (5150) where there are good camp sites and abundant fish.

The next leg of the journey goes over the spur at a saddle (5450) just north of the larger Milk Lake; climb up to the saddle through trees, skirting small cliffs; some scrambling may be necessary. Then drop 250 feet down a swale, which is open and gentle at the top and steep and wooded at the bottom, to reach the LOWER TWIN LAKE (5175-4 hours). Find good camping at either of the Twin Lakes.

The hiker may wonder why there are so many lakes on Lime Ridge and why most of them are on the northeast side. All these lakes are in [16]

basins carved out by glaciers; such lakes are called TARNS (an Icelandic term). There are more glacial basins on Lime Ridge than on other ridges of the region. This is first of all because the prevailing southwest storm winds blow snow over the northwest-trending crest and dump it on the lee side; here on the shady north side the glaciers grew where they were protected by the ridge crest from the thawing heat of the sun on the south side. Second, the schist making the ridge is comparatively easy for glaciers to grind away. The layers of schist which here parallel the ridge vary in resistance from layer to layer; as the glacier ice slid across the upturned layers it could easily pluck and rasp away at a weaker layer, meanwhile riding over the resistant one which would later become the rim of a lake basin.

From the Lower Twin Lake (5175) climb northward over open heather to trees and cliffs just below the crest of the next spur. Pick the best gully up through the cliffs from below. Once on the spur follow it down to find a gentle ramp of snow and heather which leads down to rolling but gullied slopes. Once on these slopes, east of Rivord Lake, stay high and traverse (about 5600) to the top of the cliffs overlooking RIVORD LAKE. Drop down to the knolls at the outlet where trails and camp spots made by fishermen show the place to cross the chasmlike outlet stream (5350-5 hours).

Climb west through scattered trees to reach the lake close below Lime Mountain (6150) with camping at the outlet. LIME MOUNTAIN (6772) is easily climbed from either end of this lake and the view from the top is one of the most all-encompassing to be had in the area. From the north end of the lake go north around glacial-polished bosses of mica schist. Descend a steep open slope to the largest BOX MOUNTAIN LAKE (5550-6 hours) and walk along its eastern margin to the outlet and camp sites.

To reach the Suiattle Road, head east-northeast down through gentle meadows and woods. Blazes and crude trails show the way. Bear east (right); stay close to the steep slope which drops to the stream draining Rivord Lake but remain on the broad and ill-defined spur. A well-chosen route down through the trees meets the MILK CREEK TRAIL just west of the SUIATTLE BRIDGE, where the trail leaves riverside brush for the big trees (1675-7 hours).

SUIATTLE RIVER TRAIL

Maintained yearly to Skyline bridge
3100-foot climb
600-foot descent
17 miles

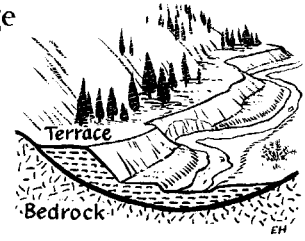


Figure 14

"Come wander with me,
For the moonbeams are bright
On river and forest,
O'er mountain and lea."
Charles Jefferys,
Come, Wander With Me.

It is a long pull to anywhere along the Suiattle River Trail, but it will take the misanthropist or wilderness lover as far from civilization as he can get in this area. Interesting side trips are numerous. Mileages are approximate.

The trail leaves the turnabout loop at the end of the SUIATTLE ROAD on the north side of the river (1660-0.0) and soon passes the **0.0**
turnoff (1660-0.2) to a trail shelter. A couple of switchbacks lead down to the shelter, which is in brush at the river's edge; it can also be approached via a poor trail directly from the east end of the parking lot. The shelter is in sad repair and has little to recommend it over the more convenient campgrounds on the road.

For several miles the trail follows narrow river TERRACES, now on a [17]
high one, now on a low one (Fig. 14). These terraces are made of river gravels. The Suiattle at one time could not carry all the debris delivered to it by the side streams and glaciers and hence deposited the surplus in the valley. Now the load of debris is less; the river has cut down through the gravel into underlying rock and carried most of the terraces away, leaving only small patches of gravel here and there. At one place (1900-

1.8) the trail crosses a "slide" (a steep cut in one of the terraces), composed almost entirely of volcanic material washed down from Glacier Peak.

Beyond a small woodsy camp spot with a crude table (1800-1.1), the
1.4 trail climbs a short way across a precipitous rocky face (1900-1.4) and onto another terrace. Here on the terrace is the boundary of the Glacier Peak Wilderness (sign).

[18] *At the trailside in the rocky face is a layer of white granular MARBLE (Fig. 33) in the dark mica and hornblende schists. Pure marble is made of CALCITE—a white mineral soft enough to scratch with a knife. Fragments of broken shells, coral, or sea mud made of tiny calcite crystals collect as sediment in the ocean; when these calcite-rich sediments are pressed by overlying sediment LIMESTONE is formed. When buried deeper, heated, and further pressed, the small calcite crystals grow larger and interlock; the limestone is then transformed into marble.*

The trail climbs several hundred feet above the river to avoid the rocky gorge at the foot of Grassy Point. Through the trees are glimpses of brush, cliffs, and cascades on the awesome north face. An elaborate camping place (2250-4.1) is perched in the dry woods, with water just around the corner. Beyond is a sizeable side stream with a good bridge (2300-4.3).

[19] *The trail comes out on a flat (2400-4.5), and if one looks closely at boulders here he sees they are gray Glacier Peak lava; this, then, is the first appearance of the Great Fill (Fig. 15).*

Soon one hears the roar of CANYON CREEK, and an unmarked trail
5.0 junction (2400-5.0) heralds the Canyon Creek Shelter, to the right and down. The shelter is in good repair and frequently used in the summer, but its setting in dry woods, though near the sunny bank of cascading Canyon Creek, is gloomy and dusty. The trail crosses Canyon Creek on a high and impressive bridge (built in 1953) before beginning a seemingly endless traverse across the dry, forested slopes of Miners Ridge.

[20] *Small pines and ferns grow on this dry hillside in contrast to the lush forest below Canyon Creek. The hillside is out of the gloom north of Grassy Point and in the rain shadow of Glacier Peak. But the dryness is also caused by the nature of the rock. Just below Canyon Creek the hiker*

leaves the schists and gneisses and enters granite. The granite is jointed and weathers to a coarse sand; water seeps rapidly away through the joints and sand leaving a dry soil. Look for views of granite walls where the trail crosses rocky draws which are quite dry by midsummer.

The rocky draws also provide views across the river where a rocky face and talus surmount forested slopes. The blocky jointed cliff is a truncated lava flow that caps a spur made of granite (Note 29). In trees below the face is a raw landslide scar.

A good view (2850-6.5) breaks the monotony of the trees where the **6.5** trail turns a corner and cuts across a dry slope into yet another rocky draw. To the south the flat floor of the Suiattle valley is well displayed; this is the Great Fill (Fig. 15). In the distance snowy peaks of the divide lead westward to the Tenpeak massif. A dry and dusty camp (2850-7.9), an old trail-crew establishment, appears on the north, and water is just beyond. These landmarks announce the long-awaited junction (2900-8.0) with the SUIATTLE PASS TRAIL. **8.0**

From the junction the trail drops nearly 300 feet to river level. Glacier Peak comes into view through the trees. On the river bank the trail passes a smelly bog on the east (left) where a few deer may be seen licking at the seeping mineral waters. There is one bad patch of brush (2675-8.7), and, unless the trail has been cleared recently, look out for nettles. A thin but beveled log leads across MINERS CREEK (2798-9.0). **9.0** A few steps upstream is the MINERS CREEK SHELTER, in fair condition and with a good supply of rusty pots.

Just down the trail from the shelter an old sign marks the abandoned MIDDLE RIDGE TRAIL. The route up Middle Ridge is good—open woods most of the way. It is hardly worth the effort to look for the old trail, marked by blazes, until brush and timber thickets are encountered at 5000 feet. Here in the thickets the old trail is as good as new and leads on up to the Miners Creek Trail. Descending Middle Ridge is more difficult than going up because side spurs can lead the hiker off the main ridge; keep an eye out for blazes.

Just beyond the Middle Ridge Trail junction are sunny camp spots on sand that has flooded in and killed many trees. The Suiattle River Trail reaches SKYLINE BRIDGE (2750-9.2), where more than one **9.2** horse has fallen into the torrent. In winter the bridge is removed with an overhead cable to prevent a washout, almost certain in spring floods. Footlogs are available for the off-season traveler.

Where the trail turns from the woods down onto the river gravel and

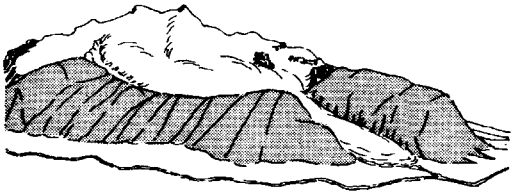
bridge a "trail abandoned" sign shows the location of the OLD SUIATTLE RIVER TRAIL on the east side of the river. One-quarter mile beyond the bridge on this old trail is a modern steel hut, the property of the Bear Creek Mining Company. Next to it is an old trapper's cabin, LYMAN CAMP, filled with interesting junk. The mining company lands helicopters on the river gravels nearby. Beyond Lyman Camp, the old trail becomes hard to find and eventually disappears in flood gravels. Remnants can be followed at least to SMALL CREEK, where there is an established camping spot in the woods near falls. The Forest Service may rebuild this trail and continue it up the hillside to Buck Creek Pass. (See below for an alternate route to Dusty Creek along this old trail.)

Just across Skyline Bridge, the Suiattle River Trail climbs 150 feet
9.5 via switchbacks to the flat top of the Great Fill (2900-9.5).

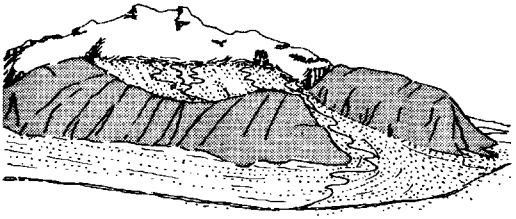
[21] *The GREAT FILL is a thick deposit of sand and gravel, washed down from Glacier Peak by streams and during great floods (Figs. 3 and 15). These sediments partially fill the Suiattle valley above Canyon Creek, and extend up to the glaciers on the east side of the mountain. First lavas and then these washed-down gravels forced the Suiattle River to flow in a great crescent around the east side of Glacier Peak; this crescent is obvious from any high point above the Suiattle and on the topographic map. As there are no trees entombed in the Great Fill it is likely that the climate was severe, that is glacial, when it was deposited. The Great Fill is overlain by a blanket of pumice, thought to have been erupted relatively recently. The Suiattle River, Dusty Creek, and Chocolate Creek have cut into the Great Fill, making high loose banks like the one at Skyline Bridge.*

Up on the flat top of the fill the trail goes away from the river in
9.9 dry woods to the junction with the VISTA CREEK TRAIL (3028-9.9) and then back toward the river to the junction with the poorly marked
10.2 GAMMA RIDGE TRAIL (3000-10.2) leading off to the south (right).

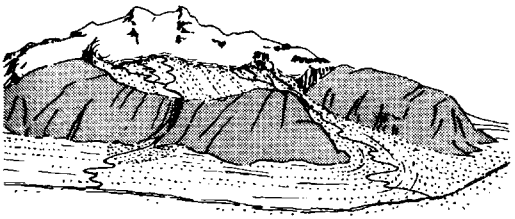
Beyond the junction, the Suiattle River Trail drops down the bank of the Great Fill and to the river (3950-10.4) where it becomes lost in alder brush and flood gravels. Strike out for the river's edge, then continue upstream to the desolate area of dead logs and gravel bars at the mouth of Dusty Creek (3950-10.5). Go a few hundred yards up the west bank of Dusty Creek until a sharp, seedling-covered ridge of gravel appears on the opposite side (east); this spur separates Dusty



Chocolate-Dusty glacier in an ancient valley.



Glaciers retreat; volcanic debris washed down from Glacier Peak builds up Great Fill; Suiattle River pushed to east side of valley.



Ancestral Chocolate Creek spills in falls over saddle in confining ridge. A new pile of sand and gravel spreads out on the fill. Ancestral Dusty Creek is formed.

Today—Chocolate Creek has cut through the confining ridge and into the Great Fill. Dusty Creek, hugging Gamma Ridge, also has cut deeply into the fill. Recently Dusty and Chocolate glaciers entered these valleys.

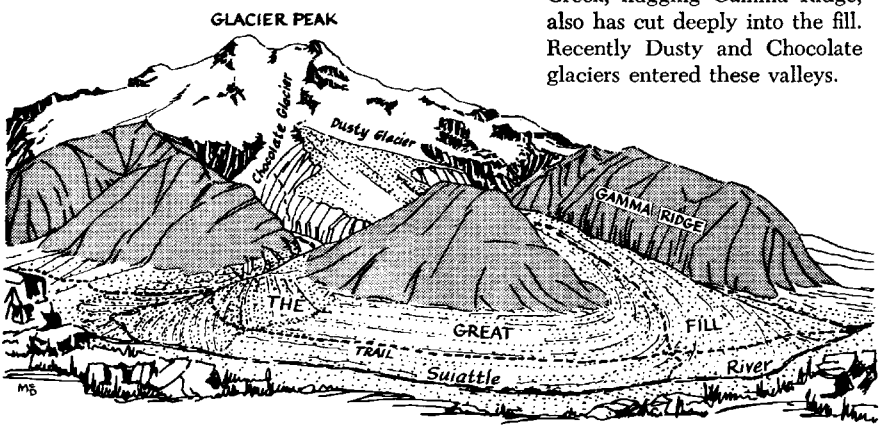


Figure 15. Development of the Great Fill

10.7 Creek and the Suiattle. Cross DUSTY CREEK (3050-10.7) and climb onto this sharp ridge to find the main trail.

[22] *The havoc of dead trees and gravels at the mouth of Dusty Creek was reportedly caused by a flood in 1938. There have been smaller floods since, and there will be more, both big and little. It is probable that a lake formed in Chocolate Creek, blocked by a landslide of sand and gravel from the steep, unstable sides. The dam was breached and a torrent of water and gravel flooded the valley for many miles downstream. Stands of dead timber, drowned in gravel, can be found along the Suiattle as far as the Sauk River, though it is not known which particular flood was responsible.*

The quickest route up the Suiattle avoids the somewhat annoying and circuitous route onto the Great Fill and back down to the mouth of Dusty Creek taken by the main trail. At Skyline Bridge, take the old trail along the east bank. It is hard to follow beyond Lyman Camp, but look for it on the hillside above the river-cut banks; detour where necessary above several washouts. Cross the Suiattle on good logs to gain the chaotic flood plain on the *east* side of Dusty Creek. Go up the south bank to the aforementioned spur and join the main trail.

The trail stays on the crest of this long, sharp ridge, which is a remnant of the Great Fill. It climbs back onto the nearly undissected top and enters big trees. There are many down trees, some that obscure the trail, but the tread is good and may be easily picked up again. The way climbs gradually, crosses several draws, then heads downhill (4000-12.9), riverward. At the brink of the fill is the junction with the TRIAD CREEK TRAIL (3900-13.4), well-marked with signs of many
13.4 vintages. On the main trail, about 100 yards beyond this junction, the DUSTY CREEK TRAIL goes off up Glacier Peak.

The river trail is hard to find beyond this junction. At the edge of the
15.1 gravel gorge of CHOCOLATE CREEK (4100-15.1) recent floods have washed it out. However, game and climbers have worn a fair route down to the gravel flats of the creek. Camping spots on the gravels can be found, but the water of Chocolate Creek is a bit gritty, especially on a hot day when the creek is up and boulders bump along the bed. Stroll down to the broad gravel flats near the confluence of Chocolate Creek and the Suiattle for a startling and unusual view of Glacier Peak.

Here at Chocolate Creek is the almost complete desolation of the recent floods. Even the mighty Suiattle has been dammed and pushed into the trees on the eastern bank by the gravels spewed out of Chocolate Creek. Small gravel terraces at various levels show that there have been many floods. [23]

Cross surprisingly small and innocent-looking Chocolate Creek (3975-15.2) by boulder-hopping or by constructing a bridge from the many poles lying about. Scrutinize the gravel bank on the south side for a steep track made by game. A large barkless log lying diagonally down the steep embankment may still mark the place. Scramble up the steep bank via the game trail to find the main trail on a terrace. Climb diagonally from this terrace to regain the top of the Great Fill. Just beyond the edge is a sign and junction with the very old CHOCOLATE CREEK TRAIL, the lower part of the COOL HIGH ROUTE (4100-15.5). **15.5**

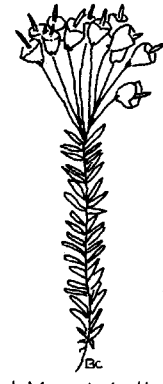
Beyond Chocolate Creek the Suiattle River Trail is almost impossible to follow. The route more or less follows the 4,000-foot contour, passes an unpleasant swamp (16.0), and then goes through fine forest to the edge of the upper Suiattle (4050-17.0). It is just about as easy to forget **17.0** the trail and traverse the woods by compass.

After a grim battle with riverside brush, it is possible to continue up the Suiattle on the north bank to reach the SUIATTLE GLACIER and high route connections. It is also possible to cross the river and go up to the tarn at the base of Tenpeak Mountain. (See HONEYCOMB HIGH ROUTE.)

SUIATTLE PASS TRAIL

Maintained yearly
3100-foot climb
350-foot descent
7.5 miles
Via Image Lake alternate:
3800-foot climb
900-foot descent
10.8 miles

Cassiope
"White heather"



x ½

Red Mountain Heath
"Red Heather"

This is one of the most popular stretches of the Cascade Crest Trail and is an integral part of many trans-Cascade trips. The panorama from Image Lake, a short detour from the direct route to the pass, is by itself well worth the long haul.

0.0 The trail climbs the hillside above the Suiattle River Trail (2900-0.0) in long gentle switchbacks. Where Glacier Peak comes into view, find the last water (3200-0.5) for 3 uphill miles. Switchbacks continue up
3.0 to the junction (4800-3.0) with the IMAGE LAKE ALTERNATE trail to Suiattle Pass via Miners Ridge Lookout and Image Lake. Travelers bound for Canyon Lake should take this alternate.

Just past this junction, the pass trail crosses the creek from Image Lake (4850-3.2) and climbs through small trees and across an ofttimes distressingly hot and dusty hillside. Just beyond the junction with the
4.9 eastern end of the Image Lake Alternate (5600-4.9), the way passes below two prospector's shacks, one old and of wood and one new, of corrugated iron. This is the site of the Glacier Peak "Mines." The wood shack can provide shelter, and behind its west end is a spring. A hundred yards beyond the buildings is the edge of a huge avalanche track
5.0 and the junction with the MINERS CREEK TRAIL (5549-5.0) which leads south to Buck Creek Pass (Fig. 16).

Ski-mountaineers should note how the snow sliding down on this

side of the valley has flattened big trees on the opposite side. Look up to the east to see the cliff-walled and quite inaccessible head of Miners Creek with Chiwawa Mountain on the east; Fortress Mountain is hidden behind huge cliffs. The Suiattle Pass Trail contours along the slide-swept hillside, crosses a stream above a waterfall (5500-6.2), and drops **6.2** slightly to a small cirque.

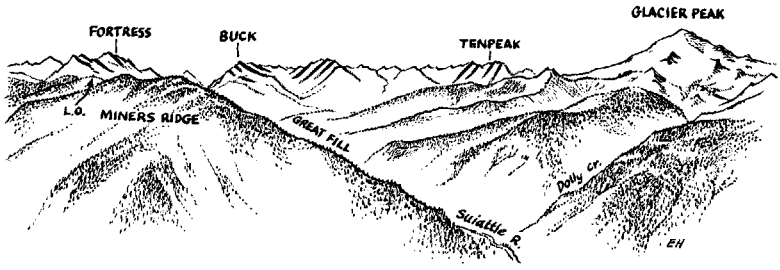


Figure 16. Looking south across Miners Ridge. See notes 20, 21, 29, 34 and 61.

The Bear Creek Mining Company has based an intensive prospecting [24] *operation on Miners Ridge. Company geologists have explored a low-grade copper deposit and drilled numerous holes into the mountainside to bring out samples. Because the claims were made and patented before the establishment of the Glacier Peak Wilderness, the company has access rights. The small encampment here has been supplied by helicopter for several years.*

Beyond the company shacks, the trail climbs up a spur, around bluffs of granite, and through meadows toward Suiattle Pass. A nice camp spot lies in a small flat meadow on the south side of the pass and east of the trail. One can look down to this meadow from one place on the main trail, where there is a branch trail off to the right. Down this branch a hundred feet is a sign saying "For Foot Travel Only." The lightly laden and nimble footed, to save 200 feet of climbing, may follow this alternate through the lowest point on the divide and on below cliffs and across coarse blocks of talus to rejoin the main trail below Cloudy Pass. (See Railroad Creek Trail.)

Staggering pedestrians should continue on the main trail, which

7.5 makes a short climb to SUIATTLE PASS (5983-7.5) above and west of the true low point on the divide.

From the pass the main trail traverses north and descends to a small stream-crossing (5750-7.8) and campspot. Here an unmarked path leads a short distance north to a treeless knoll where there is camping near a prospector's cabin, now collapsed. The prospector's scratchings are in the red-stained cliffs above. The main trail descends to a wet meadow and poor camping at the junction of the AGNES CREEK TRAIL
8.1 (5550-8.1). The Suiattle Pass Trail, now called the RAILROAD CREEK TRAIL crosses South Fork Agnes Creek and ascends directly to Cloudy Pass (6438-9.5).

IMAGE LAKE ALTERNATE

" 'Tis distance lends
enchantment to the view,
And robes the mountain
in its azure hue"
Thomas Campbell,
Pleasures of Hope

From the junction with the Suiattle Pass Trail, the alternate begins (4800-3.0) more switchbacks, soon leaving the trees for steep blueberry slopes and wonderful views to the south and west. At the crest of Miners
4.7 Ridge (6150-4.7) is another junction; to the west is the LOOKOUT TOWER (manned July to September), to the east Image Lake. The lookout is usually glad to have a visitor sign his guest book and in an emergency can radio civilization. Grand airy knobs out beyond the lookout provide fine camps when snowbanks still provide water. The two lakes northwest of the lookout are shallow and surrounded by marshy flats.

The lake trail winds eastward just under the ridge top and brings the weary but generally exhilarated hiker to IMAGE LAKE and Image
5.7 Lake shelter by the outlet (6050-5.7).

Image Lake is much visited because of its spectacular setting and

view. Campers must be especially careful not to litter and not to develop new scars and trails in the fragile meadows. Find relief from crowds by camping at good spots off the Canyon Lake Trail. A short hike up the meadows to the north of the lake brings one to a 6758-foot summit with fine views of upper Canyon Creek and Canyon Lake. Climb PLUMMER MOUNTAIN from Image Lake via easy going along the crest of Miners Ridge for 2.5 miles and up 1900 feet. The views are tremendous. Many campers are satisfied with the evening view from near the shelter, although the camera fan may try for a reflection of Glacier Peak in the still water, and the more energetic may even coax a few fish from the lake. The view displays many geologic features (Fig. 16).

Leaving the Image Lake shelter, the trail goes east across rolling meadow and climbs to a spur of Miners Ridge (6250-6.1) and the poorly **6.1** marked junction with the CANYON LAKE TRAIL.

On eastward along the steep and grassy side of Miners Ridge the trail drops gradually to Lady Camp, in a small cirque (6100-7.0) where **7.0** camping is possible. It climbs slightly from the cirque onto a wooded spur and descends switchbacks past old prospect pits to the end of the Image Lake alternate and the main SUIATTLE PASS TRAIL (5600-7.4). **7.4**

CANYON LAKE TRAIL

Maintained periodically

1050-foot climb

1650-foot descent

5.2 miles

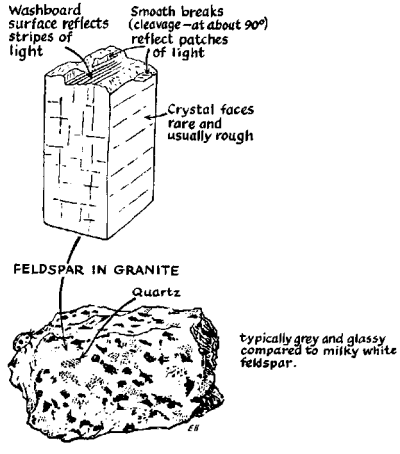


Figure 17

This trail, despite its lack of repair, provides the easiest route to spectacular Canyon Lake. Sitting Bull Mountain is a possible climb from the trail. One end of the Bath Lakes High Route anchors at Canyon Lake. Mileages are approximate.

From the junction with the IMAGE LAKE ALTERNATE the trail
0.0 climbs to the saddle directly north of Image Lake (6250-0.0), then drops over heathery knolls. Good camp spots abound in the basins just off the trail on the north. The trail swings easterly (6050-1.1) and takes a long dropping traverse across talus to the block-dotted cirque northwest of Plummer Mountain and a creek-crossing (5500-2.0). The trail contours around the spur to the north in timber and down into the cirque below SITTING BULL MOUNTAIN. It passes the wreckage of a futile
3.0 mining prospect and crosses a stream (5150-3.0). Do not camp here, but climb up the hillside to the north to find choice spots on a beautiful
3.7 flat at timberline (5800-3.7).

From here on the trail becomes less clear. Climb northward from the flat and eventually escape all the trees. Unaccountably, the trail climbs higher yet—probably to avoid rocky gullies that are difficult for stock but which are easy for the hiker. Keep to the trail if possible and enjoy the fine open expanse of bedrock smoothed by stones frozen into the base of a glacier. There are gurgling rills and many heather benches which make this an enchanting stretch of mountainside.

[25] *The smooth rocks are complex mixtures of brownish and streaky white biotite gneiss cut and sliced by younger white dike rock. The forms of the dikes are fantastically varied—crooked and straight, bent and swirled, short and fat, long and streaky. The streaks in the gneiss are also bent and swirled. It looks as if the whole mass had been a pasty mush, stirred by some fantastic spoon. Surely the whole mass was never molten or the different rocks would have melted together.*

A search will show that some of the white dikes have particularly large crystals of white, milky feldspar (Fig. 17). These have shiny smooth breaks (cleavage) which reflect the light. Also common is the brown mica, biotite, in stacks or thin flakes, and rarer is white muscovite. Dike rocks with large crystals like these are called PEGMATITES, and in many regions, but not here, they contain some of the rarest of minerals —occasionally of gem quality.

After a few false starts the trail leads down in earnest for the meadows
5.2 along the outlet stream of CANYON LAKE (5650-5.2). A superb base this is, with fishing, fine camping with a southern exposure, side trips out along the easy part of the BATH LAKES HIGH ROUTE, and scrambles to views of DOME PEAK from TOTEM PASS.

Dark vertical chimneys cut the cliff wall around the north end of the lake; each chimney follows a black dike which has been neatly quarried away by running water and frost. [26]

MINERS CREEK TRAIL

Maintained yearly

2200-foot climb

2000-foot descent

6 miles

This trail leads up and down across two spurs of the Fortress Mountain massif. It crosses fine meadows on Middle Ridge and leads on to the cool greenery of Buck Creek Pass and Flower Dome, Mileages are approximate.

From the junction with the Suiattle Pass Trail on MINERS RIDGE (5550-0.0), the trail goes down gentle switchbacks in dust and small **0.0**
trees west of an avalanche track. It turns east, crosses the track (4900), a tongue of trees, another track, and continues on down to the toe of a third track. Here, by trickles of water, are nice camping spots, better than those in the woods at MINERS CREEK (4450-1.0). Crossing the **1.0**
main creek on slick logs is tricky at high water. The trail climbs the south bank and goes westerly a short distance before turning up through open woods which end in a rocky, grassy cirque nestled below Middle Ridge. Beyond a stream crossing (5402-2.5) and possible camp spots is a westerly traverse up to the top of MIDDLE RIDGE (6150-3.5). **3.5**
An old trail to the Suiattle, the Middle Ridge Trail, goes directly down the crest of the ridge from here. (See Suiattle River Trail.)

From the ridge is a wide view. Out to the north lies Plummer Mountain. To the northeast, beyond the nearby steep shoulder of Fortress Mountain, and out across the lowest point in the divide (Suiattle Pass), rises the square-rigged top of Bonanza Peak—the highest peak in the entire Cascade Range that is not a volcano.

[27] *Note the big ramplike benches below Suiattle Pass controlled by joints in white granite which underlies the pass and the lower slopes of Miners Ridge. Plummer Mountain and the crest of Miners Ridge out to Image Lake are carved in a shattered brown gneiss lying over the granite (Fig. 18). The top of the once-rising mass of melted granite stopped here. The scratchings by prospectors on Miners Ridge have been along this top or roof where fluids from the once-molten granite concentrated ore minerals.*

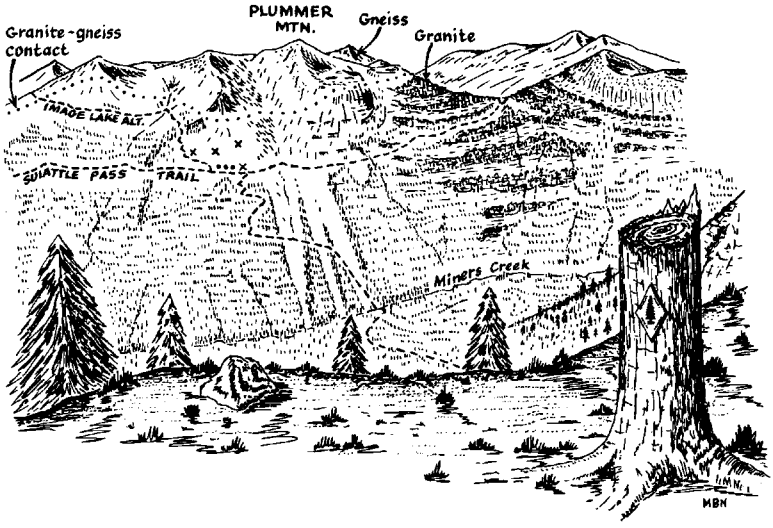


Figure 18. Looking north to Miners Ridge. Prospects are under gneiss cap. Flat benches in granite are on joints.

On the south side of Middle Ridge are meadows and groves of wonderfully symmetrical alpine fir. The trail crosses an old burn and a side stream. Pass-No-Pass and Helmet Butte loom ahead. A poor camp has been shoveled out of the steep forested bank at SMALL CREEK (5150-
5.0 5.0). The trail begins an upward traverse in woods, rounds the cliffs of Helmet Butte, and climbs a broad grassy gully to the saddle by FLOWER DOME. A stroll to the top of this aptly named rise (6350) gives a grandstand view of Glacier Peak and the forests of the broad Suiattle valley.

Look across at the broad, smooth, timbered ramp of outwash extending down from Glacier Peak. This view of the Great Fill (Fig. 15 and Note 21) is enough to cheer even the most jaded geologic buff. [28]

Fog and rain, driven by winds from the Pacific, funnel through BUCK CREEK PASS (5750-6.0), making it a particularly enchanting spot, sometimes a misty, ghostly, dream world of black evergreens, sometimes a sparkling green garden. **6.0**

VISTA CREEK TRAIL

Maintained yearly

2350-foot climb

4.5 miles

This trail, extensively improved in 1961-62, will ultimately be part of the Cascade Crest Trail when a new link between Dolly Creek meadows and Milk Creek is completed. Mileages are approximate.

From the junction (3028-0.0) with the SUIATTLE RIVER TRAIL, the trail trends northwest through magnificent Canadian-zone forests on the Great Fill. At GAMMA CREEK (2910-0.6) are camp spots in the woods; at the VISTA CREEK crossing (2877-1.2) is a developed camping place and a poor shelter. Between this crossing and the meadows at the head of Dolly Creek, there is little adequate camping. The trail continues up the north side of Vista Creek, switchbacking now and then. The zigzags begin in earnest (about 4100-3.6) as the trail climbs across talus and brushy avalanche chutes. **0.0** **1.2**

High on the ridge to the north are cliffs of gray Glacier Peak andesite. This ridge is capped by an outlier of Glacier Peak lava which at one time must have been continuous with the flows on the peak itself but has been separated from them by erosion. The low andesite cliffs on the south are of a much younger lava flow which came down the Vista Creek valley; its flow-shape has not yet been destroyed by erosion (Fig. 19). [29]

The first blueberry meadows begin in the saddle (5350-4.5), where the trail now ends (1964). There is little water here, but water and fine **4.5**

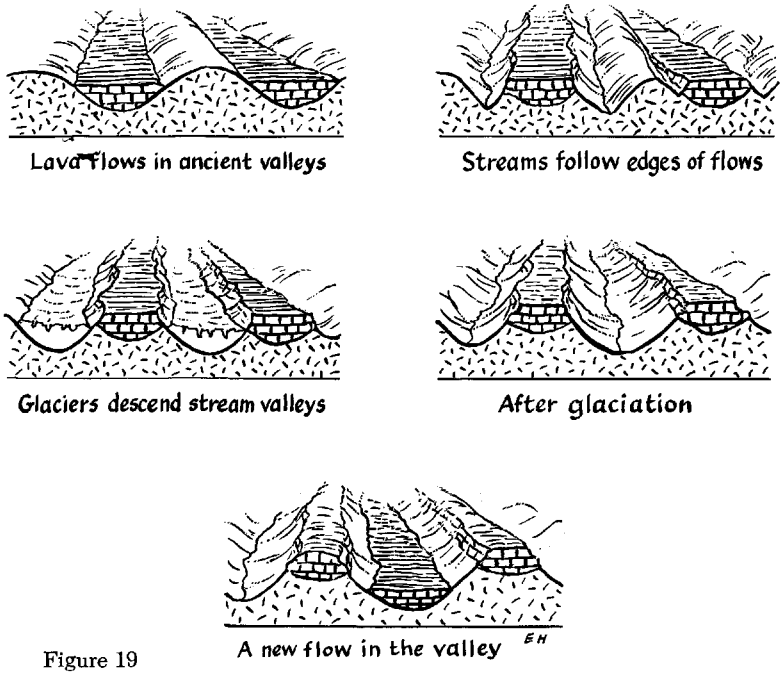


Figure 19

camping can be found to the southwest, 450 feet up the ridge in the DOLLY CREEK MEADOWS.

GAMMA RIDGE TRAIL

Maintained periodically

4000-foot climb

350-foot descent

5.7 miles

This trail is one of the easiest and quickest routes to the high country from the upper Suiattle. The trail ends on Gamma Ridge, and the

continuation to Gamma Peak and beyond is an easy high route. Mileages are approximate.

From the SUIATTLE RIVER TRAIL (3010-0.0), the way crosses **0.0**
the gentle surface of the Great Fill to a small stream (3380-0.7) and the abrupt valley wall. Switchbacks lead up through big trees to the flatter ridge crest (4500-2.0). A crude trail can be followed up the easy **2.0**
slopes of the ridge crest and through meadows and clumps of alpine fir, until the tread finally fades away. Camp spots abound in the grassy swales and saddles on the ridge; each has its spectacular view, but water may have to be fetched from draws 100 to 300 feet below. At the saddle (6450-4.5) just east of Gamma Peak is an overwhelming view **4.5**
of Glacier Peak. Near here the traveler is likely to scare up a large herd of mountain goats. Side trips for the hiker camping in the meadows on Gamma Ridge could be a visit to GAMMA HOT SPRINGS or a hike on up the open grassy ridge to GAMMA PEAK (7009) for one of the best views in this part of the Glacier Peak Wilderness.

Gamma Peak is a cap of Glacier Peak lava on a ridge of tuff and [30]
breccia. East and west of Gamma Peak are knobby outcrops of rock (too small to be shown on the geologic map; Fig. 3) which contrast notably with the smooth grassy slopes around them. The knobs are remnants of conglomerate which also overlies the crumbly tuffs making up Gamma Ridge (Fig. 13 and Note 14).

The hot springs, first discovered in 1962 by the U.S. Geological Survey, are at 4800 feet in Gamma Creek and are hard to reach except from Gamma Ridge. To find the springs, contour westward and drop down into the gullied basin at the head of Gamma Creek. The final descent to the spring has to be carefully selected; it is a scramble. The water is about 130° F and very sulfurous; the nose is a good guide. Take along a pot for a bath.

To reach the Dolly-Dusty High Route, continue up on the open grassy ridge. Skirt Gamma Peak on the south side on heather slopes between cliffs of lava to regain the ridge (6500) southwest of the summit. Follow the ridge on goat trails to the third saddle (6650-5.7) and **5.7**
the connection with the DOLLY-DUSTY HIGH ROUTE.

TRIAD CREEK TRAIL

Not maintained

2250-foot climb

400-foot descent

4 miles

0.0 From the junction with the Suiattle River Trail (3900-0.0), the trail drops down the Great Fill bank to Suiattle gravels. Camp spots are available on the gravel; a small side stream supplies water unclouded with Suiattle silt.

The problem here, and it may be considerable, is crossing the river. Find logs at some distance up or downstream, but once the river is crossed, return easily along the river gravels to the place opposite the trail on the west bank and scout for ducks and blazes near the trees on the east bank. The tread of the trail is good and fairly easy to find. It starts up immediately, crosses Triad Creek (3650-1.0), and continues up through the forest to the meadows at BUCK CREEK PASS
4.0 (5750-4.0).

DUSTY CREEK TRAIL

Not maintained

2200-foot climb

3 miles

"Kité mirêba
Sahodo madé nashi
Fuji no Yama!"
("Seen on close approach, the mountain of
Fuji does not come up to expectation.")
Japanese proverb

This is a standard climbing route (also called Glacier Peak Trail) up Glacier Peak (Appendix). It is a link in the Glacier Peak loop and in

spite of having to climb over about 102 logs (1962), the hiker will find this an excellent route to the timberline heather meadows.

The route begins (3950-0.0) on the SUIATTLE RIVER TRAIL about **0.0** 100 yards up from the signs to Triad Creek-Buck Creek Pass at the brink of the Great Fill. The tread is locally hard to find but it goes directly up an evenly sloping ramp on small ridges or in shallow gullies and through fine open woods. Eventually the trail climbs a steep bank to reach a knife-edge ridge (5750-2.5) overlooking a cut in the Great **2.5** Fill that drops away a breathtaking 1,000 feet to Dusty Creek; here the great thickness of the fill deposit can be appreciated. The trail goes along the brink a short distance before swinging back to the gullied surface of the fill. From here on the tread is obscure; it crosses small flowery meadows as the trees thin out. Continue up to timberline (6150-3.0), heather, fine views, and small tent sites. Here is the south- **3.0** ern terminus of the DOLLY-DUSTY HIGH ROUTE.

The trail has climbed the slope of the Great Fill. Both Chocolate and [31] *Dusty Creeks are cut into this deposit, and on a windy day huge dust clouds rise over Dusty and Chocolate Creeks, giving evidence of the silt in the fill. It is likely that the fill was built by many small inter lacing streams and by catastrophic mudflows (Fig. 15).*

COOL HIGH ROUTE

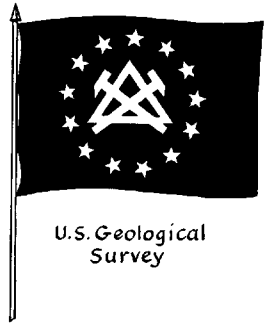
Intermediate

4400-foot climb

2400-foot descent

7 miles

7 hours



Touching some of the easier climbs of Glacier Peak and traversing some of the least-visited country in the area, this route is a major link in a timberline circuit around Glacier Peak. The earliest known exploration was by C. A. Rusk, who in 1906 came on horseback from Lake Chelan; Rusk named Chocolate Glacier and Cool Glacier, the latter for his companion, Colonel Cool.

Beyond its junction with the SUIATTLE RIVER TRAIL (4100-15.5), the old Chocolate Creek Trail, which is the first leg of the high route, may be hard to find. Go directly up the edge of the Great Fill in open woods parallel to Chocolate Creek. The route is no problem once the broad spur becomes narrow (4400). Climb steadily on the narrow crest. To avoid rocks higher up (5650), traverse south off the spur and continue climbing. Then contour below the rocky spur and regain the crest at a saddle (6150-2 hours). The view down into Chocolate Creek is awesome. Sneak up to this saddle with care, for goats may be about. They use trails which follow the spur crest exactly, and wherever the way along the spur crest is blocked, these wary beasts go out on the Chocolate Creek side and traverse insecure dirt above airy cliffs rather than take the easy way on the gentle south side.

Find camping in the basin (6000) south of the saddle. To continue the route, traverse up through the basin to cross the spur on the south (6550) and contour west in and out of many gullies cut in pumice. There is fine camping on heathered knobs below (6150-3 hours). Out across the Suiattle, the 4000-foot unclimbed north wall of Tenpeak Mountain towers above the Honeycomb Glacier and lesser ridges. Continue traversing (6500) to reach, at timberline, a view overlooking the slopes below COOL GLACIER.

[32] *The sharp contact between lava of Glacier Peak and white granite can be seen just above, at the foot of a black lava tower and south of the lowermost ice of Cool Glacier.*

Go straight down steep grass to a stream (6100) and moraine-strewn granite slabs. Traverse the rubbly basin but do not climb above 6100 until across a gully which comes down on the south side of the prominent tower of black lava. Beyond this cleft, climb to avoid cedar tangles. Cross several minor gullies and then aim downward for the base (6300) of a great cliff of columnar-jointed lava which lies up the valley well beyond the last trees.

[33] *The overhanging passage below this great wall of lava gives the hiker ample opportunity to examine its columnar joints (Fig. 38) and to look closely at the lava itself. Here the rock is dense and black with scattered shiny specks of white feldspar. The field geologist would call it BASALT and thus distinguish it from the usual and more abundant gray and red andesite lava of Glacier Peak (Note 44).*

Round the base of this cliff and climb steep heather and moraine to outcrops of dark granite cut by white dikes. Continue around the cirque over the glaciated ribs. Head for a rocky bench (6350-5 hours) north of the Suiattle Glacier and directly at the head of the Suiattle River; here is the junction with the HONEYCOMB HIGH ROUTE.

Unless the party is trained and equipped for travel on glaciers, a direct route from the bench across the glacier to the divide to the west should be avoided. Instead, go south of the glacier where rocky ledges protrude through the snow. Climb high on the rock ridge (peak 7739) of the divide, then drop *north* into the saddle (7350-6 hours). Straight north along the ridge over the volcanic scree of DISAPPOINTMENT PEAK is the easiest route to the top of Glacier Peak—see Appendix.

From the saddle drop westward directly down a rocky valley to a tarn (6250). Follow the outlet stream down to find splendid camp spots and the junction (6100-7 hours) with the DISAPPOINTMENT PEAK HIGH ROUTE.

HONEYCOMB HIGH ROUTE

Difficult

2800-foot climb

3900-foot descent

7 miles

6 hours

"The cold winds swept
the mountain height,
And pathless was the
dreary wild."
Seba Smith,
The Snow Storm

Begin where the Cool High Route reaches a rocky bench at the head of the SUIATTLE RIVER (6350). Drop eastward down rubble- and

snow-filled slots to a lower, moraine-covered basin just west of the terminus of the SUIATTLE GLACIER. Cross the bare ice at the snout or go around it on moraine. To avoid small cliffs and steep moraine, do not head straight up from the glacier. Instead climb southwards along the edge of the ice and thence straight up about 150 feet on steep snow and slabs. Above (6450) are gentle expanses of snow, moraine, and ice. For about 2 miles follow the northern edges of the Suiattle and Honeycomb Glaciers. Extra care must be taken here for in many places the edge of the ice and the crevasses will be covered with snow; the prudent hiker will traverse above and off the snow-covered ice, staying on snowbanks and moraine close to the dike-riddled cliffs.

At several places along the edge of HONEYCOMB GLACIER easy routes can be picked that lead up snow banks and talus to summits and passes on the ridge to the north. It is worth the climb, for the view from this ridge is wide; the viewer is on a high pedestal between Glacier Peak and the Cascade Divide.

[34] *Looking at Glacier Peak from this ridge the edge of the lowest lava flow is marked clearly by cliffs near the 6500-foot level. All the rocks below are much older than the volcanic rocks. The same older rocks make up the viewpoint. What remains of the volcano is thus actually a rather small excrescence on an old bedrock ridge that is at least 6500- to 7000-feet high.*

A small streamlined hump of rock protrudes from the middle of the Honeycomb Glacier a mile above the terminus. Geologists call this a NUNATAK, an Eskimo word adopted by the geologist for rock peaks completely surrounded by glacier.

Continue cautiously along the edge of the ice to a bluff that lies opposite (north) of the lower end of the nunatak. To find a verdant camp spot with magnificent views, go northerly round the bluffs and across and up moraine to the ridge crest (6400-2 hours). The only water is from trickling snowbanks.

To continue on the main route, go easterly from the bluff opposite the nunatak, across the bare and little-crevassed ice to a moraine-filled saddle (5950) at the very base of Tenpeak Mountain. Cross the saddle and drop straight down snow and moraine to a TARN (5500-3 hours). This lake is an ideal base for hitherto untried rock climbs on the north face of Tenpeak Mountain. Find wood north of the lake on a timbered spur.

It is possible to reach the main Suiattle River Trail from the tarn. Go northerly from the lake out the wooded spur and descend abruptly through dense timber down the nose; bear easterly (right) to avoid cliffs. At the bottom angle northwest across the stream from Honeycomb Glacier to the extensive river gravels. Cross the Suiattle on logs and search for the very vague Suiattle River Trail. Look for camping middens near the trail (1 hour from the tarn).

To continue to the Napeequa River, traverse eastward from the tarn at the foot of Tenpeak. Cross several hundred yards of steep and loose piles of fresh moraine to reach steep grassy slopes on older moraine. Avoid the colossal piles of huge boulders which are very loose and extremely dangerous. When slopes are reached which seem more stable, angle upward to the base of the rock arêtes on the north face of Tenpeak. At the eastern edge of the easternmost cirque on Tenpeak is a conical pile of moraine (6000). Keep an eye out for falling rock or ice and cross just above (south) of the pile.

The white gneissic granite of the Tenpeak massif is well exposed here. To the east, in the contact zone between the schists and the gneissic granite (Note 73), layers of dark schist appear in the white rock. At the lakes farther east the gneissic granite is left behind altogether and the terrain is of metamorphosed sediments—schists, quartzites, and marbles. [35]

Beyond the conical pile, scramble across a rocky gully close to the base of the cliffs; to cross any lower is much more difficult. Heather slopes, benches, and moraine lead up to UNNAMED LAKES (6450-5 hours). The best camping may be found in the heather on benches north of the lakes.

To reach the trail in the Napeequa valley, climb to the saddle (6750) south of the lakes. To avoid the rough and unstable moraine straight below in the Napeequa, go north along the Cascade Crest for about half a mile before traversing down open slopes of grass and heather to the valley bottom. Head for the lowest raw moraine along the stream and find the end of the BOULDER PASS TRAIL in the meadows just below (5250-6 hours).

White Chuck River

The White Chuck Road leaves the dusty SAUK RIVER ROAD (Mountain Loop Highway) 11 miles above Darrington (Front end paper). The campground developed here on both sides of the Sauk Road at
0.0 the turnoff (0.0) is not the best due to heavy log truck traffic and dust. However, a stop is not complete without the short stroll down a rough road, just south of the White Chuck bridge, to the old Sauk River bridge where a deep pool may be shining silver with salmon.

Up the White Chuck Road a Forest Service sign (2.1) gives a brief summary of mountain goat activity as seen on the impressive gray cliffs of White Chuck Mountain. The road winds on and crosses the river
5.3 (5.3). Just below the bridge, a lane leads down parallel to the road to a hidden grassy clearing, trail shelter, and a nice camp site. The river's roar drowns out that of the occasional logging truck. The road climbs and passes the very limited parking area for the MEADOW MOUN-
6.1 TAIN WAY (6.1). The best of all road views of Glacier Peak begin to appear just before another sign (7.6) explains that Glacier Peak is a volcano resting on the older metamorphic and igneous rocks. Small
9.4 roadside cairns (9.4) at a gravelly parking area mark an old trail that leads down to an abandoned trail bridge over the White Chuck River and to the CAMP CREEK RIDGE TRAIL. At the ROAD END (2300-
10.6 10.6) camping is limited to a few picnic-table areas beside the small roadside stream. It is difficult to see much alpine scenery on easy one-day trips from the White Chuck Road. The best possibilities are:

Meadow Mountain Way, directly up to pastoral meadows and views (5.3 miles each way).

White Chuck River Trail, through virgin forest to the gorge along Pumice Creek (2.2 miles each way).

MEADOW MOUNTAIN WAY–FIRE CREEK WAY

Maintained yearly

4300-foot climb

3000-foot descent

14.8 miles

The trail begins on the WHITE CHUCK ROAD. Present Forest Service plans call for logging of the forest and road construction up to the 4-mile trail marker at 3850 feet. This road will open up a short route (1.3 miles) to the Cascade timberline meadows. The first part of the trail is now much used by scooter riders, especially during hunting season. Mileages are estimated. (See Fig. 20 for a sketch map and Fig. 53 for available topographic maps).

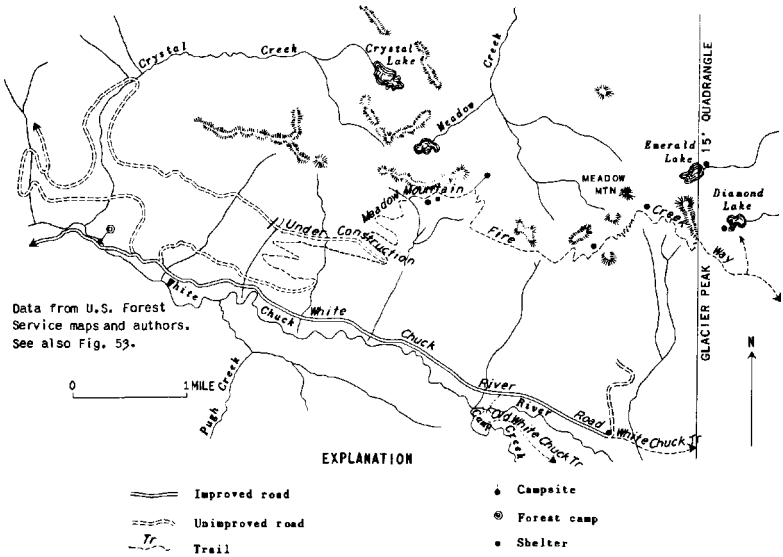


Figure 20. Sketch map of Meadow Mountain Way-Fire Creek Way

0.0 After leaving the White Chuck Road (0.0), the trail follows an old road, beginning steeply, but after a few hundred yards traverses eastward to cross a brushy, logged patch. Here are some nice views (0.5) of Glacier Peak and Mount Pugh. At the end of the traverse (1.5), the trail zigzags steeply up to the west to gain the uncut forest, the first good
5.0 stream (3.0), and finally the meadows (4800-5.0). New trail mileage markers have been placed beyond this point in anticipation of the new road; new mile marker 1 corresponds with mile 5 at present.

At the first grassy meadows (5.3) is a fine stream but little level ground for camping. Clusters of trees line the way as the trail contours
5.7 into an open basin (5000-5.7). The many branch trails to the south (right) go to the crude MEADOW MOUNTAIN SHELTER. There is camping here, but water is scarce in late summer; small stagnant pools can be found to the north along the ridge crest. Beyond the shelter is a nicer but equally dry camp spot in an old lake bed that is now a tiny flat meadow (6.0).

The trail turns south to leave the basin of the shelter and climbs across a spur (6.3) before beginning a long traverse through grassy meadows and past clumps of cedar and fir. Here views of Glacier Peak and the summits around the headwaters of the White Chuck River are wonderful. A slight detour at a meadowy ridge-crest saddle (6.5) permits a view to the north. From left to right far in the distance, Mounts Baker, Shuksan, and Chaval are prominent.

7.0 In the next rolling basin carpeted with heather and grass (7.0) are the best camp spots this side of Diamond Lake. The only water may be down on the north side of the ridge.

Abruptly the trail climbs to a high spur ridge (5800-7.2) where cliffs go up to the north to the rather sharp, craggy, and incongruously named MEADOW MOUNTAIN. To avoid the cliffs the trail drops into a bouldery basin (7.7) with camping and plenty of water. It climbs slightly out of the basin, then drops around the edge of loose talus blocks (5400-8.5). For the next mile the tread is vague. Climb up a steep tree-covered spur on short switchbacks (edge of the Glacier Peak quadrangle) to meadows and go through more trees to the ridge crest
9.0 (5850-9.0).

From here one can descend on the north side of the ridge (bear west) to DIAMOND LAKE. Less frequented EMERALD LAKE, with good camp sites, can be reached from the mouth of Diamond Lake; climb northwest on heather over the ridge between the two lakes.

From the ridge south of Diamond Lake (5850), the vague trail goes

up across the deep grasses, around a rocky corner to the ridge crest, and down it to a bleak and rocky saddle (5950-9.7). The way bears off 9.7
southerly, down through tree thickets and along swales, before contouring steep meadow. From the talus near the next spur, switchbacks climb steeply to the spur crest (5925-10.8). A little farther, a traverse leads down through the berry bushes to the best camping on this trail, in the splendid cliff-walled basin (5350-11.2) west of Fire Mountain. 11.2

The trail climbs to cross (5550-11.5) the southwest spur of Fire Mountain and meet the end of the FIRE MOUNTAIN HIGH ROUTE to Fire Creek Pass. To climb FIRE MOUNTAIN, contour eastward out onto the open slopes and go up them directly to the summit. Nestled north of the summit is a wasting glacier with a pond at its snout—a perfect example of a north-side glacier (Note 16).

Fire Creek Way descends, goes below coarse talus and through pleasant timberline groves to dilapidated FIRE CHIEF SHELTER (5150-12.3; nice camping). Beyond the shelter the way is through an old burn 12.3
that extends down to FIRE CREEK (3750-13.8). A newly built trail (1962) goes through woods close above the south bank of the creek, rounds a sharp nose, and drops to the WHITE CHUCK RIVER TRAIL (3300-14.8). 14.8

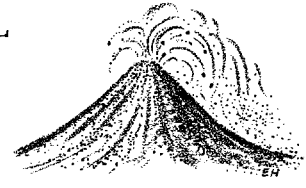
WHITE CHUCK RIVER TRAIL

Maintained yearly

4500-foot climb

500-foot descent

14.3 miles



Cinder Cone

"... though the earth be removed,
and though the mountains be
carried into the sea."

Psalms: 46

This valley-bottom route to Red Pass on the Cascade Crest has open vistas only in the last few miles. It is popular with hikers because it

reaches Kennedy Hot Springs after only 6 miles and a gentle climb of 1600 feet. At the springs is a guard station (manned July-September) where a radio allows emergency contact with civilization. A loop trip from the White Chuck River Road via Kennedy, scenic Lake Byrne, and along the Camp Creek Ridge Trail maximizes high-country travel. Laterals from the White Chuck Trail lead directly to timberline and ice on Glacier Peak. Construction on a new trail has begun and when finished the hiker will reach Kennedy Hot Springs via the east bank of the White Chuck River without having to climb onto high benches of the valley fill.

0.0 From the end of the WHITE CHUCK ROAD (about 2300-0.0) the trail wanders through dense rain forest on a flat river terrace. In wet weather this is a miserable stretch of trail because of deep mud holes. In fact, mud holes may be encountered all the way to Kennedy Hot Springs. Leaving the flat terrace, the trail climbs a short distance and traverses a steep timbered hillside above the White Chuck.

[36] *On the steep slope above the trail are perched a few glacier-carried boulders, dropped when the glacier melted away. The trail here has been blasted through several rocky ribs of biotite gneiss cut by white dikes.*

1.1 Beyond this hillside, the trail drops to cross FIRE CREEK (2450-1.1) by an airy beveled log with railing. Just after climbing a short distance into the woods above the Fire Creek stream bed, the vague, old White Chuck River Trail (see below) leads off toward the river. After a short level woodsy stretch, switchbacks climb a steep hillside and come out
1.7 (3100-1.7) on a surprising flat.

[37] *This steep bank is the eroded edge of the White Chuck valley fill, a thick deposit of volcanic gravel and sands washed down from Glacier Peak (Fig. 21). A similar valley fill occurs on the east side of Glacier Peak (Fig. 18). Look through the trees, down the valley, to see the continuation of this high bench on the opposite side of the river. Bearing the road and the first mile of trail is a lower terrace (Note 17) cut in the fill by the river.*

Just below the flat top of the White Chuck fill is some strangely solid-looking rock, buff-colored on old surfaces, but white and powdery where freshly broken. This is a layer of welded TUFF. According to Dr. Arthur B. Ford, this tuff formed when an explosion high on Glacier Peak

released a cloud of hot gas-charged pumice fragments, ash, and chunks of andesite. This hot cloud rushed down Kennedy Creek to spread out on the gravel and sand of the White Chuck fill. The still hot and gooey particles of rock became welded together.

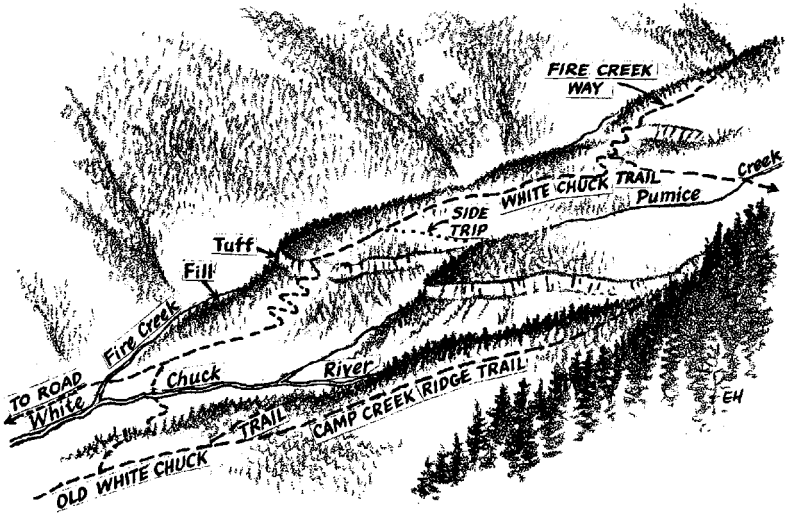


Figure 21. White Chuck fill and tuff viewed from the west-southwest

The most spectacular view of this tuff can be had where Pumice Creek has cut through it in an awesome but picturesque slot. To reach this gorge, go up the trail to a point about half a mile beyond the edge of the terrace; leave the trail and go to the south (right) to the brink—careful!

Beyond the edge of the fill, the main trail wanders through the woods. In several places a few steps toward Fire Creek will bring a view of the fine cliff formed by the tuff layer. At the junction with FIRE CREEK WAY (3300-2.9), the trail bears southeastward and, after **2.9** crossing several small bogs, reaches PUMICE CREEK (3360-3.6). A log leads across to an elaborate camp with a large garbage pit. The trail shortly reaches the edge of the relatively flat surface of the White Chuck fill and descends past the GLACIER RIDGE TRAIL (3400-4.7) **4.7** to GLACIER CREEK (3050-5.0) and a small bridge.

A few hundred yards beyond the crossing of Glacier Creek is the unmarked junction with the abandoned OLD WHITE CHUCK RIVER TRAIL which comes up the southwest side of the river. This abandoned trail offers much to the energetic hiker who wants a change of scene on the way out from Kennedy Hot Springs. However, log crossings of the respectable White Chuck River must be found at either end of the trail, the bridges being long-since gone. The trail hugs the steep southwest side of the river, traverses several brush patches, and dives into scenic side gullies. Toward the lower end of the trail, there are several traverses of steep cuts in the White Chuck fill; the tread is gone and the hazardous loose slopes must be detoured by dropping. There are excellent views of cliffs made of the tuff layer (Note 37) lying on the White Chuck fill. Several nice camp spots are found on terraces and an old shelter in remarkably good repair is perched on the precipitous hillside about a mile below FOURTEENMILE CREEK. About half a mile below the shelter, the LAKE BYRNE-CAMP CREEK RIDGE TRAIL comes down from the heights. Just below the junction a lateral drops off the fill to the boiling river. If a crossing can be forced, the main White Chuck River Trail at Fire Creek is close at hand. On down the Old White Chuck River Trail is Camp Creek and a decrepit bridge leading over to the road. (See Camp Creek Ridge Trail.)

From the junction with the old trail, the main White Chuck River Trail climbs beside rapids in the White Chuck River to reach the KEN-
5.6 NEDY RIDGE TRAIL junction (3275-5.6) and a narrow bridge over KENNEDY CREEK. On through brush on a gravel bar is a large campground and the KENNEDY HOT SPRINGS GUARD STATION (3275-
5.9 5.9) and, across the bridge, the LAKE BYRNE-CAMP CREEK RIDGE TRAIL.

Here on the bouldery bar, where some trees have been cut to lighten the forest gloom, are two shelters and privies, but few suitable tent spots. A fine cold spring gushes just back of the Guard Station. The hot spring is across the river, a few yards up from the bridge. Despite its unappealing look, the log-welled tank of steaming brown water provides a warm and refreshing bath, especially refreshing if followed by a plunge, Scandinavian style, into the adjacent White Chuck. There is a small, rustic, doorless dressing room practically on top of the spring.

[38] *The exact origin of these hot springs, as with the other two near Glacier Peak (Notes 3 and 30), is unknown, but it is likely that their heat is a remnant of the furnace which fired up Glacier Peak. The water possibly contains some chemicals that come from deep in the earth,*

but most of the contained chemicals come from rain and snow water which has percolated into the ground and dissolved salts from hot rocks. The salts in the water attract animals, and the hillside above the hot springs is crisscrossed with goat and deer trails.

The White Chuck River Trail leaves the Kennedy Hot Springs campground between the two trail shelters. It again climbs the steep bank cut in White Chuck fill and winds through dense woods to a shady camp near the sunny banks of Sitkum Creek (3850-7.4) and the junction **7.4** of the FIRE CREEK PASS TRAIL (Cascade Crest Trail). The camp is a dusty spot cluttered with the woodwork of countless craftsmen.

The trail crosses SITKUM CREEK and goes through dry woods to CHETWOT CREEK (3700-8.3), which falls over granitic precipices **8.3** into the glacier-carved White Chuck valley. Here is a field of brush, the delivery zone of a great avalanche chute on Black Mountain to the west. The trail reenters dense rain forest and eventually drops over pumice banks to a ford at BAEKOS CREEK (3900-9.2, unlabeled on **9.2** map).

Beyond Baekos Creek are glimpses of a magnificent cliff. This resistant buttress, trimmed off by a glacier, marks the end of the granite seen beneath the lavas from Kennedy Creek to Chetwot Creek. [39]

At the substantial high bridge across the White Chuck River (4000-10.2) is an imposing chasm and thundering rapids. The trail here begins **10.2** a steep climb up switchbacks in woods next to Switchback Creek (local usage) (4250-10.9). At the top it rounds a corner to enter a picturesque rocky ravine, which opens onto a small meadow and Calloused Palms Camp (4750-11.1). Better open meadows for camping are found farther **11.1** up the valley. The trail crosses the creek and winds up through grassy dells, and over streamlined rock mounds. The trees begin to thin out, and views of the surrounding peaks break through.

On the right (west), on nearby steep slopes, are black cliffs of lava. This is not lava from Glacier Peak, but a lava flow of a smaller volcano, the WHITE CHUCK CINDER CONE, probably younger than Glacier Peak. (Notes 58 and 59). The cinders are found in a raw pile at the summit. [40]

At the old and collapsed Glacier Peak shelter (5400-12.4) are fine **12.4** camp spots in the so-called Glacier Peak Meadows. Here begins the DISAPPOINTMENT PEAK HIGH ROUTE.

To reach some of the most glorious camp sites in the White Chuck

area, crawl northwest (right) up a very steep slope of berry bushes to the nearly flat surface on White Chuck Cinder Cone. Glacier Peak rises across the forested valley, rocky ridges of Portal Peak are the backdrop, and parklike heather meadows dotted with clustered trees stretch out from the tent door. Water may be scarce in late summer.

Above the collapsed Glacier Peak shelter the trail swings westward and winds close (5850-13.0) to a high pile of volcanic cinders, an erosional remnant of the White Chuck Cinder Cone, easily climbed straight up to the top. Although snow may obscure the trail above here, con-
14.3 tinue on up the barren valley toward the notch of Red Pass (6450-14.3) and the junction with the BLACK MOUNTAIN HIGH ROUTE and NORTH FORK SAUK TRAIL.

GLACIER RIDGE TRAIL

Not maintained

2650-foot climb

3.2 miles

This lateral leading to the Fire Creek Pass Trail (Cascade Crest Trail) is best avoided if one has an aversion to climbing over logs. However, the trail offers the most direct route from the White Chuck River Road to Fire Creek Pass and is the beginning of one of the climbing routes up Glacier Peak (Appendix).

0.0 Leave the WHITE CHUCK RIVER TRAIL (3450-0.0) on a long switchback climbing the bank cut in the fill by Glacier Creek. The first few logs to be hurdled on this steep slope are the worst. When the trail reaches the flat forested top of the White Chuck fill, it becomes difficult to follow. It goes north around the base of the lava cliffs of Glacier Ridge proper. The tread is good again on switchbacks just north of the cliffs, and except for some of the larger fallen logs, the going is
2.2 excellent. Emerge finally in a brushy clearing (5160-2.2) where a great pile of rotting wood and other interesting artifacts show the site of the old Glacier Ridge fire lookout.

Continue over the ruins eastward to pick up the trail as it drops slightly to a saddle on the ridge crest, then winds up through dense pine thickets. The tread may be easily lost where the trail reaches the

lupine-rich meadows (5500-3.0), but continue up the ridge crest to gain the FIRE CREEK PASS TRAIL (Cascade Crest Trail) (6100-3.2). **3.2**

KENNEDY RIDGE TRAIL

Maintained yearly

875-foot climb

1.1 miles

The Kennedy Ridge Trail provides direct access from Kennedy Hot Springs to the Fire Creek Pass Trail (Cascade Crest Trail), which leads to scenic country near the snout of Kennedy Glacier and traverses timberline meadows to Fire Creek Pass. The ridge trail climbs switchbacks northeastward from the junction of Kennedy Creek and the WHITE CHUCK RIVER TRAIL (3275-0.0) to the crest of Kennedy **0.0**
Ridge. Then it follows the crest in dry woods to the junction (4150-1.1) **1.1**
with the FIRE CREEK PASS TRAIL.

LAKE BYRNE—CAMP CREEK RIDGE TRAIL

Maintained yearly to Lake Byrne

2700-foot climb

3600-foot descent

9 miles

"Another mountain I (Boswell) called 'immense'.
'No,' said he (Johnson), 'but 'tis a considerable protuberance'."
Boswell, *Journal of a tour to the Hebrides*

The short steep climb from Kennedy Hot Springs up to azure Lake Byrne is a must on any but the shortest visit to the upper White Chuck valley. There is a grandstand view of immense Glacier Peak.

0.0 Across the bridge over the WHITE CHUCK RIVER (3275-0.0), the trail starts a steep zigzag climb to the meadowland. After many zigs and zags, the first small patches of heather herald the high country (4800-1.2), and just beyond, the trail swings over a sharp spur into a small and open rocky basin. Up again climbs the trail, past the blueberry bushes to rolling heather slopes. A few final switchbacks climb to the
2.0 edge of deep blue and cliff-walled LAKE BYRNE (5550-2.0). The BLACK MOUNTAIN HIGH ROUTE comes around the west side of the lake to meet the trail here.

Fish are abundant and there is camping at the lake outlet, but a better spot, prettier and more secluded, lies in a nook over the steep heather hump to the south. Crags and ice on Glacier Peak loom up deceptively close across the deep forested valley of the White Chuck. Those with sharp eyes or binoculars can watch climbers creeping up and down the popular summit route on Sitkum Glacier.

From the lake outlet the trail goes steeply up to the top of a cliffy ridge north of the lake and traverses west out onto the rocks and down slightly to a snowy, rocky hollow known by some as "Little Siberia"
2.5 (5950-2.5). A sign post, if not buried in snow, marks a junction: straight ahead off to the west, via Camp Lake and Hardtack Lake, is the LOST CREEK RIDGE TRAIL; off to the north is the CAMP CREEK RIDGE TRAIL.

[41] *The rocks here are especially clean. A spectacular maze of white dikes, ribbons, and streaks cut a somewhat darker gneiss containing scattered flakes of brown mica. In the Glacier Peak quadrangle (see geologic map), this gneiss underlies almost all the area west of the White Chuck River.*

The Camp Creek Ridge Trail traverses northward along the east side of Camp Creek Ridge on heather-carpeted benches between rock fins. At the top of the first spur (5850-2.8), the trail crosses to the Camp Creek side of the main ridge, where it goes down across rock ribs and onto a grassy bench a hundred feet below the ridge crest (trail vague here). It then climbs across the side of knob 5889 to regain the crest, which it follows to the first switchbacks (about 4200). These reach a broad marshy water-course (4400-about 4.7) and go down just west of the water to the sharp brink of the White Chuck valley fill (3200-about
5.8 5.3). The way continues down to the junction (2800-about 5.8) of the OLD WHITE CHUCK RIVER TRAIL.

Just beyond this junction, a lateral trail descends steeply (about 200

feet) to the rushing White Chuck River. If a crossing can be found, the road is easily reached via the main White Chuck River Trail. However, the river crossing may be dangerously difficult or impossible, bidding the hiker continue along the old trail on the south side of the river.

The Old White Chuck Trail goes down river along the brink of the fill where, in places, fallen trees obscure the vague tread. The way becomes a knife-edge spur just before the final steep descent to CAMP CREEK. Feel the way northward through brush along Camp Creek and bear north (right) to reach the WHITE CHUCK RIVER (about 8.8) and the remains of the old bridge. Cross and go directly away from the river; there is a bit of trivial brush here if the trail is lost. Cross a side stream and bear downstream (west). The trail climbs a bank to a flat terrace and crosses to the WHITE CHUCK RIVER ROAD (about 9.0). **9.0**

FIRE CREEK PASS TRAIL (CASCADE CREST TRAIL)

Maintained yearly

3550-foot climb

1050-foot descent

7.9 miles

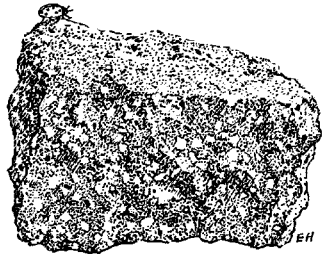


Figure 22

RED OR GRAY LAVA
(Andesite)

This link in the Cascade Crest Trail provides a connecting route for many round-trip hikes from a base at Kennedy Hot Springs or from the end of the White Chuck Road. It has much scenic variety, from the lava cliffs of Kennedy Creek and the ice of Kennedy Glacier to the meadows of Fire Creek Pass.

Leaving the camp and the WHITE CHUCK RIVER TRAIL at Sitkum Creek (3852-0.0), the trail climbs tree-covered gravels. Just before **0.0**
the trail crosses a small stream (4100-0.5) on these gravels is the poorly marked GLACIER PEAK FOOT TRAIL. This climbers' trail is a part of the DISAPPOINTMENT PEAK HIGH ROUTE and offers a quick and relatively easy approach to the high country and the climbing routes on the west side of Glacier Peak (Appendix).

[42] *These gravels are dropped by Sitkum Creek where it races from the steep canyon on the side of Glacier Peak and spreads out onto the flat surface of the White Chuck fill. Such a deposit has a fan shape and is thus called a FAN. (Fig. 49)*

A few hundred yards beyond the stream, the Fire Creek Pass Trail reaches the edge of the White Chuck fill high above Kennedy Creek and begins a long traverse of incredibly steep timbered slopes. Towards the end of this traverse, a huge cedar tree perches on an unstable-looking overhang of biotite granite, directly over the trail. Hurry by to reach
1.3 KENNEDY CREEK (4050-1.3) where a collapsed bridge still allows an easy crossing; a crossing may not be easy in the early summer when the water is high.

[43] *On the traverse into Kennedy Creek are good views of red columnar-jointed lava which makes up Kennedy Ridge across the way.*

When climbing up onto Kennedy Ridge look back (southeast) at gray, columnar-jointed lava, overlying the older, white, and smooth-looking granite seen below on the trail (Fig. 23). The trail itself lies on banks of loose yellow pumice and pebbles of lava; these are part of the White

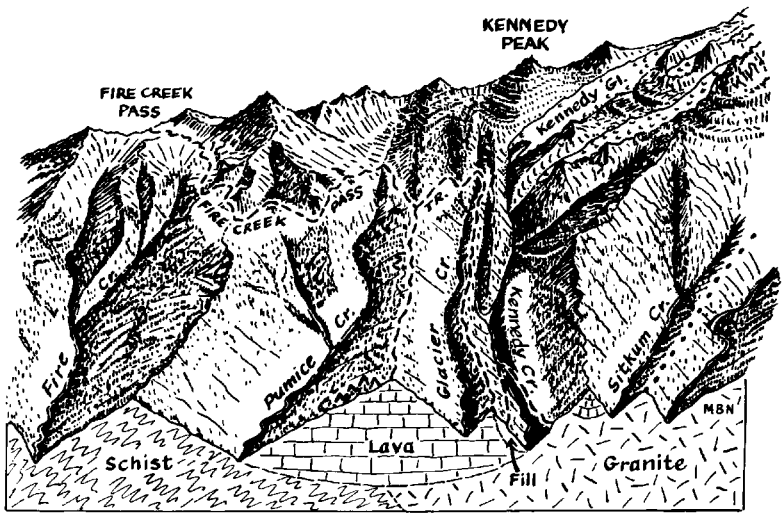


Figure 23. View eastward over Kennedy Hot Springs. The spurs are shown cut off to reveal the rocks below the surface.

Chuck fill (Note 37), all but washed out of Kennedy Creek. Where the trail reaches the crest of Kennedy Ridge, the hiker is back on the top of the fill.

From the junction with the KENNEDY RIDGE TRAIL (4150-1.6), **1.6**
short switchbacks go up between cliffs of red and gray lava, and then on up the ridge crest.

The lava so well-exposed in the cliffs of Kennedy Ridge is called [44]
ANDESITE, named for similar rocks in volcanoes of the Andes. Andesite is the most common lava type from Glacier Peak and all other Cascade volcanoes. It is commonly gray or red and spotted with scattered white feldspar crystals. (Fig. 22) Rectangular crystals of dark-colored hornblende or pyroxene are also common. Volcanic rocks are given different names based mainly on their chemical composition and the proportions of different minerals in them.

Beyond these lava cliffs, there is no more solid rock along the trail—only a blanket of pumice overlying the flows. The sharp ridge further up is composed of moraine deposited by the Kennedy Glacier.

To get a good view of KENNEDY GLACIER, make a short detour where the trail leaves Kennedy Ridge (about 5500-3.4) by continuing on up the ridge through thickets of alpine fir. Beyond the first brush entanglements the going is open, and the glaciophile can slither over loose moraine right up to the ice snout.

At GLACIER CREEK (5650-3.5) there is some flat ground for camp- **3.5**
ing, and desperate souls have used the trail itself. Switchbacks lead up through trees and across a small draw before the final long traverse reaches GLACIER RIDGE and the junction of the GLACIER RIDGE TRAIL (6100-4.1). There is good camping beyond at PUMICE CREEK
(5850-4.6), in nooks near the trail or, better, on heather benches several **4.6**
hundred feet above in the cirque. A side trip directly up Pumice Creek to the saddle at its head provides a fine view of ragged PTARMIGAN GLACIER.

After the hiker leaves Glacier Creek and the lavas of Glacier Peak [45]
(Fig. 23), he sees the bold cliffs of Pumice Creek. A great many dikes of light-colored granite intruded the dark mica schists of this region in all directions. Visible high up in the Pumice Creek cirque, however, are black eroded edges of the lava flows which lie atop these rocks.

Views to the west give the hiker inspiration as he plods the steep meadows and the many ups and downs along the next mile or so of trail. Beyond a sharp spur, the trail drops abruptly through rocks to
6.4 the SOUTH FORK OF FIRE CREEK (5250-6.4) and pleasant camping at little-used Grey Bear Camp. Here begins the final climb on gentle
7.9 switchbacks to plateaulike FIRE CREEK PASS (6350-7.9). There is snow water here until late summer and enough wood for frugal cookery. An easy scramble up the 6914-foot peak to the south, on some maps called the BLACK CAIRN, provides views in all directions. The pass itself marks the end of the MILK CREEK TRAIL, and just beyond is the beginning of the FIRE MOUNTAIN HIGH ROUTE.

FIRE MOUNTAIN HIGH ROUTE

Easy

500-foot climb

1700-foot descent

2 miles

2 hours

x ⅓

Lupine (blue)

This short cross-country trip, which can be utilized well from a base in the White Chuck valley, takes the traveler through enchanting alpine basins.

From FIRE CREEK PASS (6350), go down the Milk Creek Trail to the place where the trail again touches the main ridge crest. Leave the trail here (6175) and descend westward 600 feet down the Fire Creek side on grassy slopes to a talus-filled basin. Traverse northwestward across the cirque at a level slightly above the tree line (about 5500) where benches on the steep hillside save the ankles. Pleasant camping

places are plentiful on these benches amid flowers and heather, and the whole cirque abounds in tumbling brooks rushing over smooth rocks. Colorful schists—red, white, and black—are cut by many crisscrossing white dikes. Fire Mountain can be climbed directly by easy scrambling from most anywhere in the cirque; the best route traverses *above* the rocky pocket described below.

As the south-trending spur of Fire Mountain is approached, traverse up to reach the lip of a hidden rocky pocket (5900). Climb slightly west from the lip before traversing to reach the spur where it is broad (6100). Cross the spur to look over the steep meadow on the southwest side of Fire Mountain.

When this viewpoint is reached, southbound travelers may descend the spur directly into the trees and then angle down to the west to reach the MEADOW MOUNTAIN WAY-FIRE MOUNTAIN WAY (5000-2 hours). Westbound travelers may go down the spur until an easy traverse down and westward meets the trail high on the next spur (5550-2 hours).

DISAPPOINTMENT PEAK HIGH ROUTE

Difficult

3100-foot climb

4400-foot descent

8 miles

10 hours

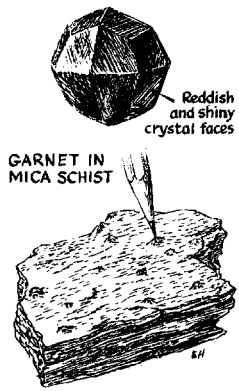


Figure 24

"As the scoriac rivers that roll,
as the lavas that restlessly roll"
Edgar Allen Poe, *Utalume*

This route should not be attempted by hikers unexperienced in difficult alpine scrambling and routefinding. Although arduous, it offers many rewards: flowery alpine meadows and views of the expansive

White Chuck Glacier and the many glacial tongues descending Glacier Peak. In addition, the route leads to an easy climb of Glacier Peak.

From the WHITE CHUCK RIVER TRAIL in the vicinity of the collapsed Glacier Peak shelter (5400; 12.4 from the White Chuck River Road) go east across meadows and climb into the enclosed flat-floored basin (5550) on the southern branch of the White Chuck River. The branch must be crossed either on snow bridges in meadows below the rapids, on rocks in the rapids, or on snow bridges in the flat-floored upper basin. Continue up the north side of the river on heather and on rocky slopes to a higher basin (6250), where a prominent but narrow gully comes in from the north. Go up the bottom or along the eastern side of this gully. At the top is a shallow moraine-filled basin and a lake (6350), and at the toe of the WHITE CHUCK GLACIER, the end of a variation of the LIGHTNING CREEK HIGH ROUTE.

The next section of the route descends about 300 feet to avoid crossing steep bare ice or crevassed glacier. Skirt the lake on the west; just north of it, drop into the narrow and barren chasm containing a long thin tarn.

[46] *There is stagnant ice under moraine at the head of this basin. Scaled to geologic time, the glaciers have retreated from this basin only minutes ago.*

Keep north of the tarn and climb north over smooth glaciated bosses littered with blocks. Below another tongue of the White Chuck Glacier reach another barren basin with a larger lake (6250). This lake drains into great cascades on smooth rock slabs. Crossing the stream above them may be difficult if there are no snow bridges. At the head of the basin a tongue of ice licks around the south side of a 6800-foot knob. Climb northeastward to the notch (6650-4 hours) north of the knob.

[47] *The 6800-foot knob is composed of igneous rock, a small plug that pushed up into the brown and gray mica schists that occur along this route. In much of the schists are small but easily seen globular crystals of reddish GARNET (Fig. 24). Garnets are aluminum silicates. Even though they may contain widely varying amounts of calcium, iron, magnesium, manganese, and chromium, they look very much the same. When large and clear they are semi-precious gems.*

This notch north of the 6800-foot knob can be reached from the White Chuck River Trail by a route that is much more direct but more difficult than the one just described. Well above Calloused Palms Camp and

within sight of the black lavas of the White Chuck Cinder Cone (about 5400; 11.9 from White Chuck River Road), go eastward over small ridges and dales to the White Chuck River. Cross on avalanche snow or logs and climb northeastward up steep and brushy slopes to the branch of the White Chuck that comes down from the notch. Cross the branch (5700) below the great cascades. Climb steep heather slopes several hundred yards north of the falls to reach the basin and lake described above (2½ hours from the White Chuck River Trail).

From the notch (6650) climb east-northeastward up steep snow and loose, unpleasant moraine. Stay off the glacier and head for the broad saddle on the ridge above. From this saddle (7050) is a dazzling view of the White Chuck Glacier and possibly of goats on the nearby crags.

Descend on snow and rock slabs east (right) of a small glacier and pass a small tarn (6275) surrounded by bare moraine at the head of BAEKOS CREEK. Follow the outlet stream to a broad heathery shelf (6100-5½ hours). Here ends the COOL HIGH ROUTE. This is a wonderful camp spot, smothered in lupine in the early summer and always offering a fine view out across the White Chuck valley. Goats and deer abound. From this shelf Glacier Peak may be easily climbed without encountering any glaciers, via the loose scree of Disappointment Peak (Appendix).

If carefully done, the route northward is delightfully easy; a mistake can lead to woeful brush or miserable sidehilling. Leave the heathery shelf below the tarn on game trails that contour (about 6000) steep meadows above the trees, but below outcrops of gray lava. At the crest (about 6150) of a steep, cliffy spur find a game trail where there is a break in slope, with a small landslide scar above and a scattering of seedling fir below. This trail leads down the cliffs of the spur to steep grassy meadows. Go toward the junction of three creeks which meet here; cross two of the creeks above the junction and follow a short way up the third creek (northernmost) to waterfalls. Cross the torrent (5900) here, and on game trails climb 100 feet out of the gully. Go through the narrow fringe of trees at the edge to enter lush meadows and climb straight up to the high shoulder (7300) west of Disappointment Peak.

Look up from this broad shoulder to see layers representing several lava flows on Glacier Peak. These layers are cut off by the unlayered lava of Disappointment Peak (on the right looking up); the rocks of Disappointment Peak are of one great flow that came down a valley cut in the older lavas. [48]

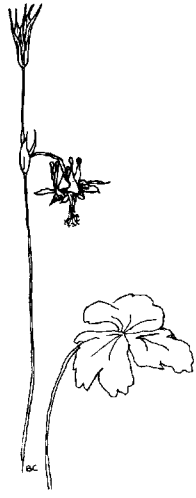
The broad shoulder on which the hiker stands is made of brown- and white-banded schists and gneisses seen to the south; only the top 3,000 feet of 10,541-foot Glacier Peak is made of volcanic rocks, mostly lava.

Go northwestward across the shoulder, descend diagonally to a broad barren pumice-blanketed saddle (6750-8 hours) on the next spur, and look down into Sitkum Creek.

[49] *While looking down into the basin below Sitkum Glacier, notice the dark granite below and to the west (Notes 39 and 43). Lavas of Glacier Peak lie above the saddle to the east. Although now so very different looking, both rocks were once molten, and both were formed deep in the crust, perhaps by melting of schist and gneiss. In the case of the granite, the hot melt moved upwards penetrating fissures, engulfing fragments, and shoving aside the overlying rocks. It did not reach the surface to explode into a volcano, but cooled very slowly, heating and modifying the nearby older rocks. As the liquid cooled, minerals grew in it until the whole mass was a tightly knit group of visible crystals (Figs. 4 and 5). The cooling continued even after the liquid solidified, and as a result cracks formed throughout the mass.*

Many millions of years later, when the cooled granite had been raised up in the North Cascades, stripped of its cover, and cut into by streams and glaciers, another pocket of melted rock formed deep in the earth's crust. This melted rock welled up and actually reached the surface; it flowed forth as LAVA (Note 44). Only tiny crystals and glass could grow in the quickly cooled mass. The lava spilled down over its relative, the granite, as the cone of Glacier Peak was built.

Descend snow and scree to Sitkum Creek basin. Camping is not good, and many a climber has suffered here on the way up one of the most popular climbing routes on Glacier Peak (Appendix). To find the climber's trail, go to the first creek on the south side of the basin and cross (6100). Angle northwestward and down toward scattered alpine fir on a spur just south of the second main creek, which is SITKUM CREEK. Uncomfortable camp spots are found here. Continue down the spur to the crude but well-traveled and blazed climbers' trail (GLACIER PEAK FOOT TRAIL), which plunges down through very steep woods to the FIRE CREEK PASS TRAIL (4100-10 hours; 5 hours from the campsite at the head of Baekos Creek).



x ⅓

Columbine
(aquilegia formosa)

BLACK MOUNTAIN HIGH ROUTE

Difficult

3000-foot climb

3850-foot descent

7 miles

8 hours

This route leads the hiker over many passes and through many high cirques. It is a difficult route to follow and although many variations are possible, the inexperienced rock scrambler had best not stray too far.

From RED PASS (6450) climb directly to the summit of PORTAL PEAK (6999). The view of Glacier Peak and the great glacial basins at the head of the White Chuck is fine. The broad river valley stretches off to the north and the remarkably flat surface of the White Chuck fill in the valley is readily apparent.

At the east base of Portal Peak, the parklike area of rounded hills and dales, scarred by sharp stream cuts, neatly outlines the remains of the White Chuck Cinder Cone. A raw pile of cinders rises up on the south side of the cone. [50]

Descend northwestward along the ridge to a gentle saddle between Red Creek and the White Chuck River. The rounded ridge is carpeted with wild flowers in early summer. Out toward the White Chuck is a basin recently abandoned by ice, an utterly barren land of glacier-quarried blocks and jutting glacier-polished knobs. From the top of the next peak (6910), descend steeply toward Red Creek. When below the cliffs on the western side of the peak, traverse (6450) below them across very steep heather and talus to regain the ridge crest at a rocky saddle

(6350). Work along the ridge, following goat trails around GENDARMES (small pinnacles, i.e., guards of rock on the ridge) of mica schist and gneiss, and climb the easy slopes of SKULLCAP PEAK (6562-4 hours). Pleasant camping places are nearby in the high cirques along the east side of the ridge.

From Skullcap Peak descend the main ridge to the next saddle (6350). To avoid precipices on the west side, contour out on the east side of the ridge and climb steep heather slopes between cliffs to regain the main ridge (about 6750). (BLACK MOUNTAIN can be climbed from here via the northeast ridge, but the step from the broad southern shoulder of this northeast ridge is a bit of a scramble.) Cross the main ridge and descend northwestward into the awesome walled-in basin on the south side of Black Mountain (5750-4 hours). There is fine camping in this unfrequented spot, but there may be much snow until late summer.

[51] *Part of this basin is a filled-in tarn, and across the flat surface, the whispering stream meanders. Even the most casual observer will find the gneisses here quite varied. All around the basin the predominant biotite gneiss is crosscut by white dikes. A GNEISS characteristically looks streaky or layered but is seldom so finely layered as "flaky" schist (see Fig. 4), and gneiss will not split into thin tablets like many schists. This ofttimes subtle difference leads to long arguments among semantic geologists. Look for dark green, hornblende-rich schists in the talus, and compare them with the lighter-colored gneiss.*

Most gneiss is richer in feldspar than schist and this blocky mineral, lacking the flakiness of the mica or the needle-like habit of hornblende, prevents the gneiss from breaking (or looking) like schist. In general, gneisses form under higher temperatures and pressures of metamorphism than does a schist, but they can also form from rocks rich in feldspar to begin with, such as granite, or from any rock to which feldspar constituents have been added by solutions during the metamorphism.

From the walled-in basin, climb the jagged west ridge of Black Mountain. Go up a heather swale which can be seen from the basin extending to a ridge-crest notch (6650). Once across the ridge descend to avoid a cliffy spur of Black Mountain. Below the cliffs contour (6000) northeastward across steep moraine to a passage (5800) through the next small spur—a passage found above brush and trees and below cliffs. From the

passage climb heather to a small basin where there are camp spots. Cross the next spur via a sharp notch (5850) just east of a prominent, white, blocky shoulder and drop into a spacious basin beyond with fine camp spots (5550-8 hours, scarce wood).

The white shoulder just crossed is a large dike of granite extending down into Lost Creek; it is etched out in bold relief because it is particularly resistant to erosion. [52]

Cross the basin and climb northeast up steep grass and rocky slopes and through barriers of alpine fir to emerge on the main ridge (6150). A goat trail follows the narrow ridgetop northwestward over and around the east side of the broad 6200-foot knob overlooking the south end of Lake Byrne. Drop across slabs of clean biotite gneiss to the west side of the lake and swing around the north shore to the LAKE BYRNE-CAMP CREEK RIDGE TRAIL (5600-8 hours).

North Fork of the Sauk River

This gateway to the west-side high country, like the White Chuck River, is reached via the SAUK RIVER ROAD (Mountain Loop Highway; front end paper). From Darrington (0.0), the way is mostly in sec- **0.0**
ond-growth forest. At the crossing of the White Chuck River (11.0) is a **11.0**
Campground (See White Chuck River) and the White Chuck River Road. The Pugh Mountain Road (14.0) climbs a short distance eastward **14.0**
to the beginning of the PUGH MOUNTAIN TRAIL (2000-0.0) and a fair view. This interesting trail goes up via Metam Lake (3250-1.5) to the fire lookout on the summit of rugged PUGH MOUNTAIN (7150-5.0), where the view is really grand. The last part of the "trail" calls for nimble limbs and steady nerves. The junction with the NORTH FORK OF THE SAUK ROAD (18.0) is clearly marked; just beyond it on the **18.0**
Mountain Loop Highway is fairly nice Bedal Campground.

Up the North Fork of the Sauk is a water fall (19.0; sign), reached by a short steep descent via a poor footpath, and beyond the LOST CREEK RIDGE TRAIL (21.0), are views back down the valley of the towering

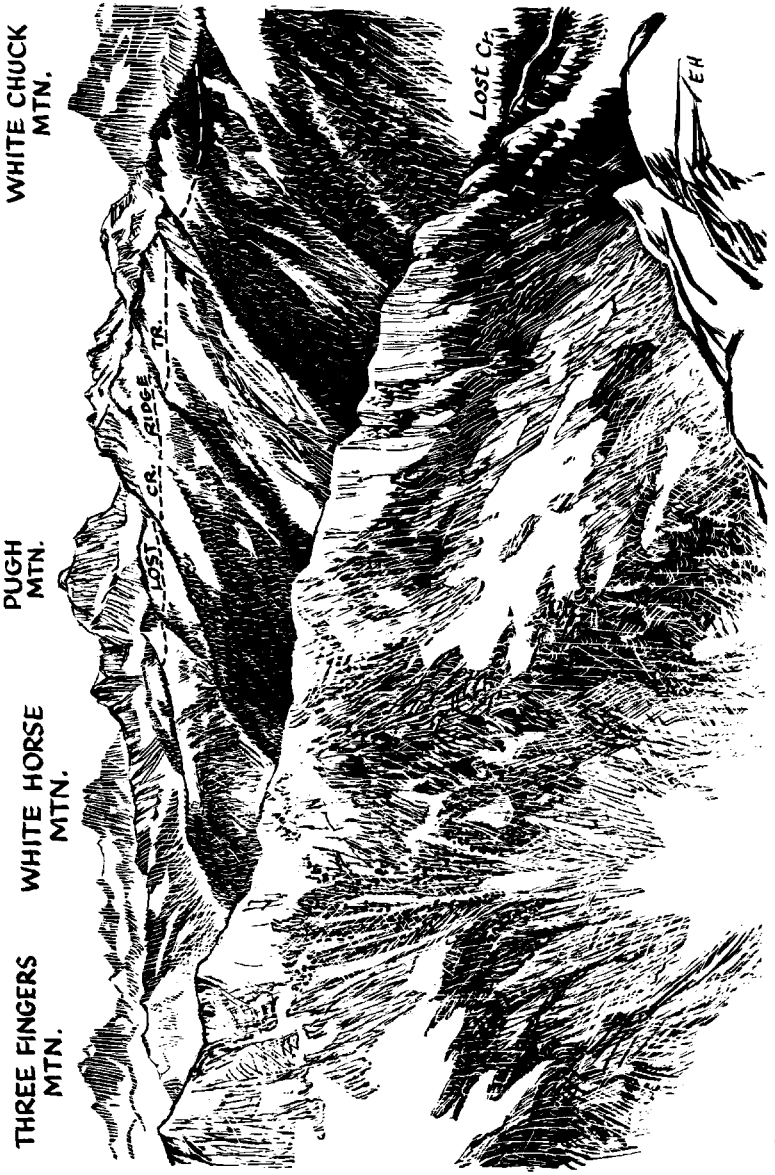

THREE FINGERS MTN.
WHITE HORSE MTN.
PUGH MTN.
WHITE CHUCK MTN.
LOST CR. RIDGE TR.
Lost Cr.
EH

Figure 25

lower cliffs of Pugh Mountain. Across LOST CREEK and just before a bridge over the North Fork is the turnoff to the SLOAN CREEK CAMPGROUND (25.0) and the beginning of the trails. In rainy weather, this **25.0**
camp is dark and muddy. Yet there are tables, privies, and a trail shelter; a grove of shimmering cottonwood provides a pleasant change from the somber evergreens.

Beyond the turnoff to the Sloan Creek campground, the main road crosses the river, goes up Sloan Creek, and climbs high on the hillside to a magnificent view of Sloan Peak and glaciers off to the west. The Forest Service plans to continue the road south to the Skykomish River.

Recommended short trips from the North Fork of the Sauk approach are:

Pugh Mountain Trail to the excellent views near and at the lookout (5.0 miles each way, see above)

Lost Creek Ridge Trail to the timberline meadows and fine views (4.0 miles each way)

North Fork Sauk Trail to savor the rain forest and get a view of Sloan Peak and the cliffs of Red Mountain (2.5 miles each way)

Red Monkey-flower (mimulus Lewisi)

LOST CREEK RIDGE TRAIL

Maintained periodically (to Round Lake)

4300-foot climb

300-foot descent

11.5 miles

This direct route to timberline leads eastward, high on the open and sunny side of Lost Creek Ridge, to Camp Lake and Lake Byrne (Fig. 26). There are continuous fine views and the traveling is easy, but since most of the trail is little used and not maintained, there is a bit of interesting pathfinding. Mileages are approximate.

The trail leaves the NORTH FORK OF THE SAUK ROAD (about

0.0 2000-0.0) on a gravelly tread winding through second-growth forest. It soon begins climbing switchbacks through open woods of western hemlock, Douglas fir, and cedar. Watch out for a false trail leading west to a dead end (1.0). A few brush-choked gullies provide views up the North Fork valley, with Sloan Peak on the west (right) and Red Mountain on the east. The trail reaches the ridge in forested BINGLEY GAP (4425-
3.0 3.0). Here a trail (unsurveyed for this guide but reportedly very brushy) goes down Pugh Creek about 5.5 miles to the long-abandoned old White Chuck River Trail. A short distance up the ridge to the east are views of Mount Pugh (nearest monolith) and White Chuck Mountain (farther off to the northwest, Fig. 25). The route leaves the ridge crest and traverses upwards along the south side to gain the meadows and the
4.5 junction (5550-4.5) with the trail to ROUND LAKE, easily viewed from the nearby ridge crest.

[53] *Round Lake is surrounded by cliffs of red and brown broken volcanic rocks, strikingly different from the white and massive gneiss that makes Mount Pugh, looming up on the west. According to Professor Joseph Vance, these volcanic rocks fill the feeder tube or neck of an old volcano, now largely eroded away. There is good camping here in the once-fiery esophagus.*

The trail contours (about 5600) across lush and steep meadows with views south to Sloan Peak and straight ahead to Glacier Peak. It crosses rocky spurs and smooth slabs to reach a rocky basin. Ducks mark the route east (right) up the basin. A traverse (about 6000) leads slightly down (trail vague) on rocky, heather-topped benches, down a watercourse, and round a rocky spur (5750) beneath slabs and above a small talus. From this rocky spot, the trail traverses the sunny, grassy hillside upward through the tips of the highest tree tongues to a ridge crest
7.0 saddle (about 5800-7.0) and a view north down to a small lake at the head of Fern Creek (camping, see below). The route contours along the south side of the ridge to the next saddle before crossing to the cool north side.

Switchbacks go down talus, bearing east, to a spur (5400). Down this spur, and west across the heather and benches, is a route to lakeside camping. The vague trail traverses up to recross the main ridge (5500), goes across rocky ribs, and climbs to another pass; 50 feet on up the grassy ridge (5750), the trail again crosses to the north side to remain. Across a saddle on the first spur is a barren rock-floored basin in the

Camp Creek drainage that is crossed just above the rocks. On the next spur (5750; on the edge of the Glacier Peak topographic sheet) is a fine view (northwest) of White Chuck Mountain. From this spur the vague tread angles down to the south (right) and traverses a broad open bench (5550) *above* shallow HARDTACK LAKE (5450-9.5; campsites). The 9.5
route is near the uppermost rocks which stick up in the meadow and only 50 feet below the pass south of the lake.

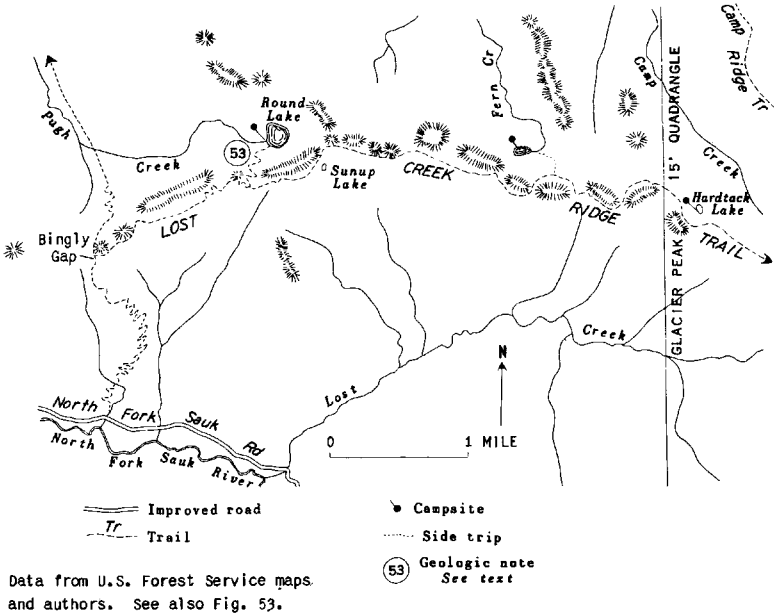


Figure 26. Sketch map of Lost Creek Ridge Trail

After traversing talus and hummocky terrain at the head of Camp Creek, the trail winds up and around, amid coarse blocks fallen from a large granite rib. It traverses again before climbing to the top of the next spur (5800), where there is a view down into CAMP LAKE nestled in a dark cliff-walled hollow. From the outlet (5650-11.0; limited camping 11.0
space) the trail climbs switchbacks to the knob (6000) due north of the lake, and goes down into rock-floored "Little Siberia" and the junction with the LAKE BYRNE-CAMP CREEK RIDGE TRAIL (5950-11.5). 11.5

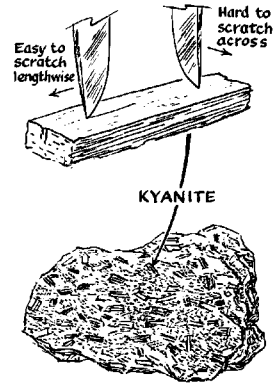


Figure 27

BLUE LAKES TRAIL

Maintained periodically

4000-foot climb

1400-foot descent

13.5 miles

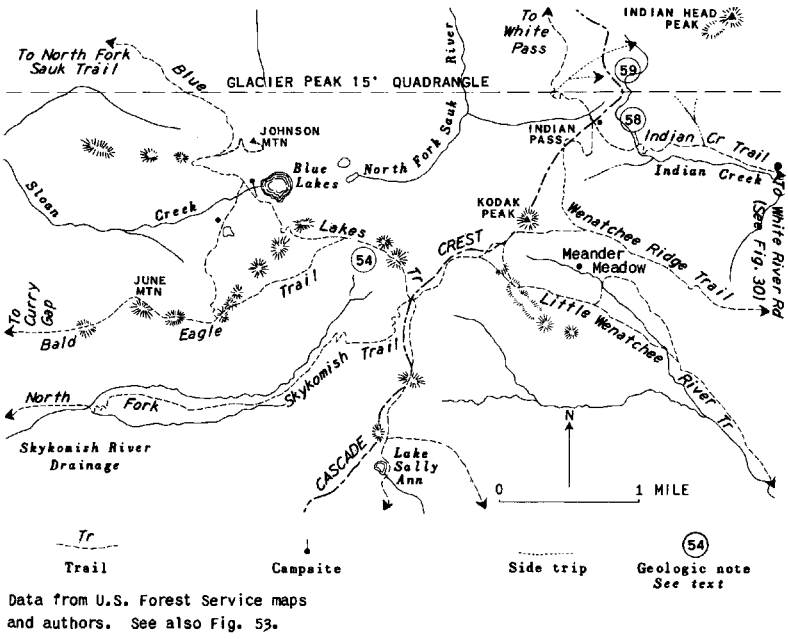
"They are wet with the showers of the mountains,
and embrace the rock for want of a shelter."
Job 24:8

Instead of twice treading the valley-bottom forest and brush on a round trip to White Pass, take this little-used high trail via Indian Pass. Blue Lakes alone are worth the trip. Mileages are approximate. Outside the Glacier Peak quadrangle Figure 28 must be relied on for a map.

From Rainey Camp, 1.7 miles up the NORTH FORK OF THE SAUK
0.0 TRAIL (2450-0.0), a footlog leads across to the switchbacks which go up through the woods. Where the slope eases off (about 4000), the way traverses east up through old moss-covered talus blocks. A few steep spots may be muddy. A final switchback leads back to the ridge crest
3.0 (4650-3.0). The route goes eastward up the ridge then onto the rocky south side. At a bald summit (5300), the trail returns to the ridge (at the west edge of the Glacier Peak topographic map sheet).

For miles the route now follows the ridge up and down, skirting the main knobs high on their south sides. On clear days look for Mount Rainier looming up far to the south. To find a nice camp spot by a tiny
6.5 lake on the north side (6150-6.5), climb over the saddle east of knob 6265. There are nice views here, off across the North Fork to the Red Pass area.

The grassy summit of Johnson Mountain appears ahead as the trail



Data from U.S. Forest Service maps and authors. See also Fig. 53.

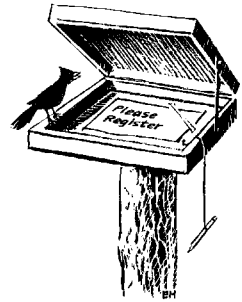
Figure 28. Sketch map of Blue Lakes Trail

traverses out of the Glacier Peak quadrangle (Fig. 28) and through the broad cirque west of the summit. The traverse continues near talus and through rocky ledges to gain the west spur of the mountain. On up the spur a track leads to the summit of JOHNSON MOUNTAIN. A short distance down this spur, the trail turns easterly again and descends on a long grassy traverse. After passing a lateral trail that leads down to the lower lake and beyond, the trail reaches upper BLUE LAKE (5500-
8.5; fine camping). Up to the southeast, over bluffs and heathery benches 8.5
and up switchbacks, is the pass that leads over into the drainage basin of the Skykomish River. A traverse down through rocky meadows and across grassy slopes leads to the junction with the BALD EAGLE TRAIL—a high trail leading west to Curry Gap. On across rocky ribs, gain the Cascade Crest (10.5). Dropping west from here and the junction is the NORTH FORK OF THE SKYKOMISH RIVER TRAIL and coming up from the south along the divide is the Cascade Crest Trail.

[54] *On the long traverse from the pass above Blue Lakes, watch for large bluish crystals of kyanite (Fig. 27) sticking out of the loose blocks of gneiss. Kyanite most commonly forms in shales or sandstones that have been metamorphosed, and even when intense heat and squeezing (metamorphism) have changed the shale into a gneiss like that around Blue Lake (difficult to believe this hard rock was ever mud!), the kyanite helps prove sedimentary origin of the original rock (Note 57).*

Near the Cascade Crest the trail crosses many dark dikes, fingers of igneous rocks that have pushed up into these kyanite gneisses.

The Blue Lakes Trail now follows the Crest Trail to Indian Pass. After it touches the divide in a narrow pass, it reaches a junction with LITTLE WENATCHEE RIVER TRAIL to nearby Meander Meadow (camping) and points south. After making a short detour onto the north side of the crest and passing a branch of the Little Wenatchee River Trail, the trail climbs on a long traverse to cross the unwooded spur of KODAK PEAK (6105), where the WENATCHEE RIDGE TRAIL goes off to the south. Across this open spur, a traverse goes down and north over open slopes and through open woods to the broad meadows of INDIAN PASS
13.5 (5000-13.5).



NORTH FORK OF THE SAUK TRAIL

Maintained yearly

3700-foot climb

8.9 miles

The well-trodden eastern end of the SLOAN CREEK CAMP-
0.0 GROUND narrows to the beginning of the trail (2200-0.0). Up the hill from here is a short lateral to a cabin (about 1.0); the rain forest is superb, but there is little view. The main trail winds along gravel bars amid the forest giants before climbing onto the hillside just above the river. Look back along this steeper stretch for overwhelming views of Sloan Peak (7759). Above, on the left, the extremely rugged hillside of RED MOUNTAIN is impressive too. The way winds along, up and

lown, to Rainy Camp (2450-1.7) and 100 yards beyond to the junction 1.7
vith the BLUE LAKES TRAIL. The North Fork Trail enters the Glacier
'eak quadrangle, climbs slowly but steadily, and wanders from deep
orest to brush at the foot of innumerable avalanche tracks. One of these
:hutes on the precipitous mountain side contains SKALABATS CREEK
2650-2.6). Goats live on the rugged hillside close above.

Just beyond Skalabats Creek, the trail passes a long ridge, a fine [55]
:xample of a terminal moraine (Note 124). Almost every valley in the
Vorth Cascades that heads near the crest has one or more terminal
moraines far below the present-day glaciers. They are usually covered
with trees and harder to recognize than this one.

There is an elaborate trail camp in the forest just before the log
crossing of RED CREEK (2813-3.8). The trail crosses several large
brush patches, finally reaching MAKINAW SHELTER (2950-5.0; also 5.0
called White Mountain Shelter) located below the main trail near the
river.

Beyond the shelter begins a stern climb to the high country. Switchback after switchback leads up through the dry brush and stinging nettles on slopes cleared of forest by winter avalanches. The trail levels off a bit (4200-6.0), then continues up through scattered trees and brush, finally taking a long switchback eastward (5300), above the trees, toward White Pass.

Just above the trail, beyond the beginning of the last switchback to White Pass, is a clump of blazed trees. Here an old sheepherders' path begins to traverse westward to a charming basin below Red Pass. The old trail is hard to follow and wanders up and down to avoid cliffs, but a clever pathfinder can follow it to meadows on Skullcap Peak.

The main trail continues its long tack towards White Pass and the view opens up with each foot gained. It crosses several small streams and reaches a junction (5950-8.4) with the trail to Red Pass (CASCADE
CREST TRAIL). Spacious and meadowy WHITE PASS (5904-8.9) is 8.9
visible a short distance off to the south at the foot of WHITE MOUN-
TAIN. Look for the trail shelter in a swale southwest and below the
actual pass. The summit of White Mountain is an easy walk.

The marker on White Mountain was used by the Geological Survey in [56]
making the modern topographic map of the area. Note on the map the
symbols along the White River Trail labeled "BM," that is "bench mark,"

a point where the elevation has been measured with a level telescope and measuring rods, using a leapfrog technique (Fig. 29). Bench marks are commonly indicated by a brass plaque or an aluminum tag on a tree.

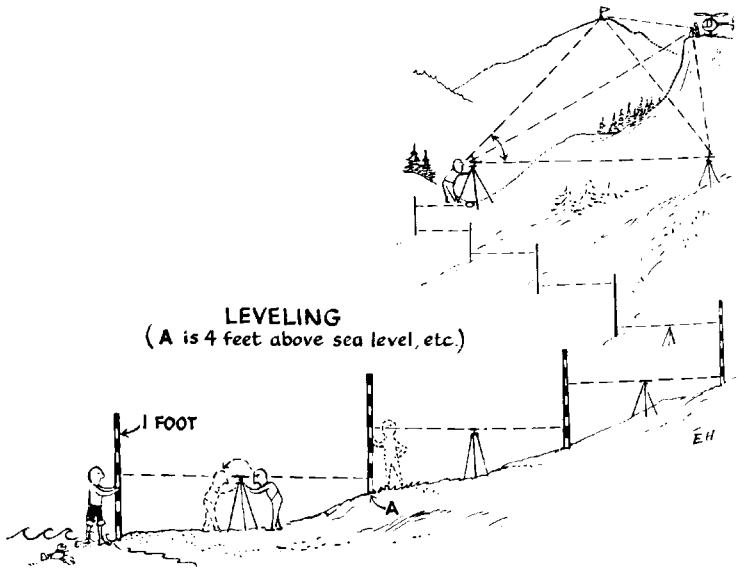


Figure 29

The bench mark on White Mountain, "VABM" on the map, was determined by measuring the vertical angle (VA) to it from some other bench mark, probably the one at White Pass. In valleys and other convenient flat places, the distance between bench marks may be measured with a tape. But over North Cascade mountainsides, such taping is obviously impractical. Instead the surveyor measures the horizontal angles between points with a transit, essentially a telescope mounted on a protractor. From a network of these angles and taped distances, he can calculate distances to remote mountain peaks. Today, electronic devices are being used which measure the distance by noting the exact time it takes a radio beam to travel from one point to the next. Helicopters are now much used also to take men and gadgetry to the mountain tops.

Once the positions of many points within the map area are located (control points), the field work is finished except for a final check of trails, buildings, etc.

Back in the office the control points are located on pairs of aerial photographs which are projected on a table—one photo in green, one in red; the draftsman, wearing red and green glasses, sees the projection in three dimensions. Projected with the photographs is a small dot that appears to the draftsman to be either on the ground or floating above or below it. He moves the dot by adjusting the apparatus (stereo plotter) and makes it appear to stay on the ground. As he moves the dot on the ground at a given elevation, a pen traces out a contour line. Or if he keeps the dot on a stream, the pen traces the stream. Thus the contour lines and drainage are drawn using the control points for reference without so much as a glimpse at the real landscape.

In the good old days of generally poor maps, the topographer, as much artist as surveyor, measured a few control points and then sat on the mountaintops sketching in contours and drainage.

The traverse up to Red Pass is across a very steep and grassy hillside which may offer difficulty in early summer when snowbanks still cover the trail; an ice ax is helpful. At RED PASS (6500-9.8) look for water 9.8
by snowbanks to the north.

Along this hillside the hiker may notice large brown or bluish-gray [57]
rectangular crystals in the chunks of mica schist lying on the trail. These are crystals of KYANITE, an aluminum-rich mineral common in metamorphic rocks derived from mud. Notice that the kyanite is more easily scratched with a knife along its length than across it—a reflection of the arrangement of the atoms in the crystal. (Note 54 and Fig. 27).

EASTERN GATEWAYS

The approach to the North Cascades from the east is far different from the western approach; instead of waterways, lush forests, and green pastures there is a dry barren plateau dotted with wheat fields. Near the mountains, row after row of irrigated fruit trees grow next to rivers which wind through the brown hills and the open yellow pine forest. Only these swift, full rivers suggest the snow and coolness of the high mountains beyond—snow and coolness hard to imagine when the summer sun scorches these barren slopes.

Airlines, trains, and buses serve WENATCHEE (130 miles from Seattle), the "apple metropolis" of the eastern foothills. Buses on main highways connect the gateway towns and crossroads. COLES CORNER and LEAVENWORTH are on U.S. Highway 2 at either end of State Highway 207—a good paved road that leads to the dusty White River and Chiwawa River roads. There is only a restaurant and service station at Coles Corner, but Leavenworth has the usual stores.

ENTIAT and CHELAN on U.S. 97 serve the Entiat River and Lake Chelan drainages respectively. There is *no* public transportation off the main highways into the hinterland except the boat and air service up and down Lake Chelan. Chelan has more tourist facilities and stores than Entiat.

White River

The most rugged portions of the Cascade Crest in the Glacier Peak area are drained on the east by the White River and its main tributary,

the Napeequa. The high routes to the most spectacular parts of the region are for the experienced hiker.

From Coles Corner on U.S. 2 (0.0), go by WENATCHEE LAKE STATE PARK (Rt. 207 and 209) to reach the road end on the White River. On the north side of the lake the main road bypasses lakeshore cottages and small stores and passes the WENATCHEE LAKE RANGER STATION (9.0 miles from U.S. 2). Above Wenatchee Lake, the White River meanders through grassy and forested bottoms. Glance to the east where the road crosses the Napeequa River for a glimpse of the trailless chasm by which this tributary comes down from the heights. At the WHITE RIVER FALLS CAMPGROUND and at the road end a mile beyond (21 miles from U.S. 2), the White River itself is a boiling torrent in a narrow valley.

0.0

9.0

21.0

Scenic short trips from this road end are limited:

Mount David Trail for a strenuous junket to the abandoned lookout and views (6.4 miles each way).

Indian Creek and White River Trails for woodsy walks.

MOUNT DAVID TRAIL

Not maintained

5200-foot climb

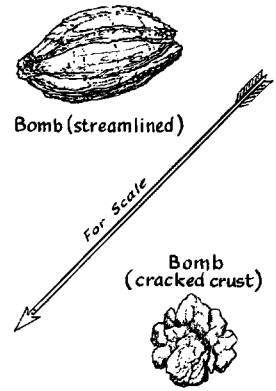
6.4 miles

This trail was not surveyed for this guide above 5000 feet. A foot bridge at the WHITE RIVER FALLS CAMPGROUND (2197-0.0) crosses the river, and a path leads upstream to a junction with a trail along the west bank. Back downstream on this trail is the beginning (about 0.5) of the Mt. David Trail. Endless switchbacks go up through trees, past a trail camp and water (1.5), and on to the ridge crest (about 5000-3.6). The trail follows the ridge upward, dropping to the east side (4.2) before reaching a saddle with a trail camp (about 5500-4.4). Here is a trail branch leading left into meadows. From the saddle the way continues on the rugged ridge via "Wall Street" (4.7) and climbs up to the abandoned lookout on the eastern summit (7431-6.4).

0.0

4.4

6.4



PROJECTILES

INDIAN CREEK TRAIL

Maintained yearly

3100-foot climb

13 miles

This route to the Cascade Crest at Indian Pass begins at the road end and is in the woods all the way (Fig. 30). It is, however, a slightly shorter and a more scenic route to White Pass than the White River Trail. After crossing the boiling waters on a high bridge at the ROAD END (2300-
0.0 0.0) the trail goes past a developed campsite (2321-0.2) and on through trees. Beyond a second developed camp (about 2450-2.0) is a trail branching to the right which leads down to the White River and a ford leading to the White River Trail. The way continues on past an old cabin and the unmanned Indian Creek Guard Station, crosses INDIAN CREEK (2500-2.2) on a bridge, and turns to climb switchbacks. Above
3.8 the climb is a slide and a small meadow. In the trees beyond (3000-3.8) is the beginning of an unmarked route which leads straight up the mountainside to AIRPLANE LAKE and the INDIAN HEAD HIGH ROUTE. On up the trail at the stream draining Airplane Lake (3000-4.2) is camp-
6.9 ing and horse feed. The PAPOOSE CREEK TRAIL (3350-6.9) leads to the ridge crest on the south (WENATCHEE RIDGE), where a trail along the top also goes to Indian Pass. This longer ridge-crest route, not surveyed for this guide, doubtless provides more vistas than the route up Indian Creek.

The Indian Creek Trail continues upstream past the BRYANT
7.9 CREEK TRAIL (about 3600-7.9), another route to Wenatchee Ridge. A small meadow (about 9.3) in brush offers possible camping and a view of Mount David down the valley. Farther on is a mass of alder and Alaskan cedar which ends in bigger meadows announcing the nearby Cascade Crest.

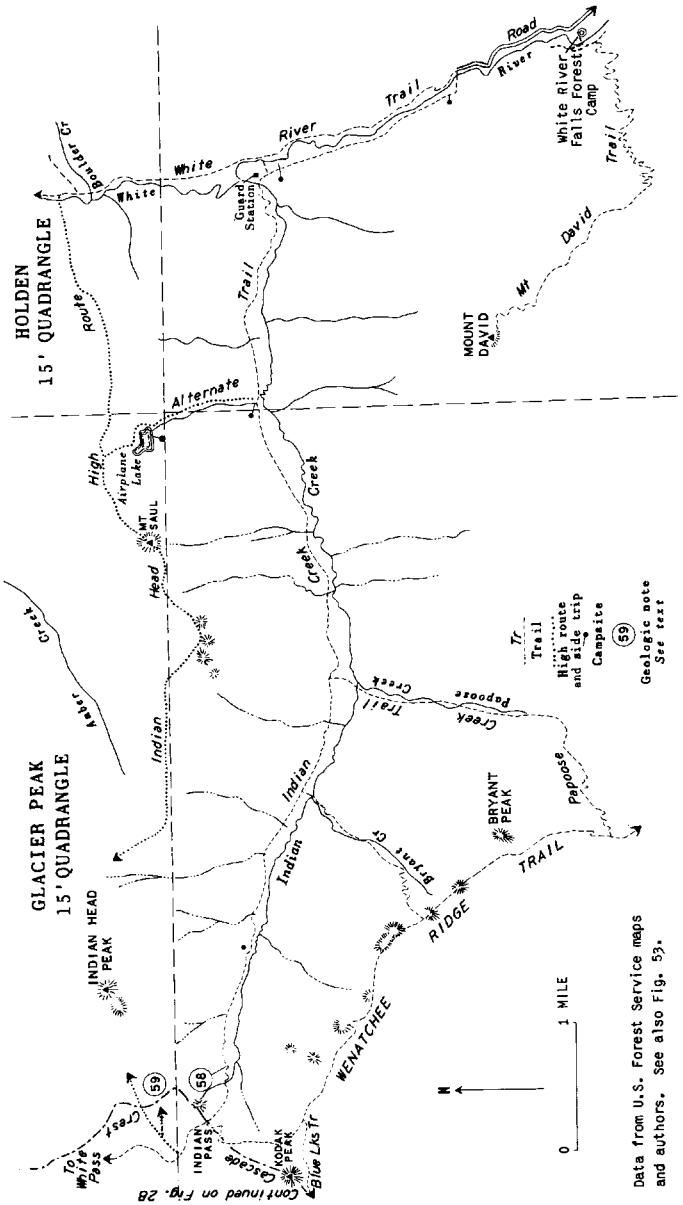


Figure 30. Sketch map of Indian Creek Trail

[58] *These meadows lie on debris washed off a cinder cone, a small volcano on the north (right) side of the valley. The stream gravels contain solidified globs of molten rock and broken bits of molten froth—BOMBS and CINDERS—that were blasted out of the crater. Yellow banks of this material are near the trail. At Indian Pass the drainage has been peculiarly rearranged around the cone. Just north of Indian Pass, above the Cascade Crest Trail (see below), are weirdly shaped remains of this cinder cone.*

The meadows end in open woods on a gentle slope where the trail ascends to the broad saddle and meadows at INDIAN PASS (5000-
11.0 11.0). The peculiar flats here are ideal for camping, but a dry spot may be hard to find in early summer. The route meets the BLUE LAKES TRAIL (Cascade Crest Trail) here and follows it to the White River Trail. At the junction and signs, the tread is vague across the marshy gravel. Go north, cross a stream, and climb upward before traversing
11.3 across steep grass and small brush thickets to a spur crest (5200-11.3).

Up this spur is an easy side trip to INDIAN HEAD PEAK (7442-1.5 miles; 2200-foot climb) and the best view in the Indian Pass area. To climb the peak ascend the spur to timberline (side trip to cinder cone begins here—see below) and traverse up and easterly across vast and very steep meadows. Look for the old tread of a sheepherders' trail. Cross a rocky and steep shoulder 100 feet below its junction with the main ridge. Around this corner a short distance are the summits of Indian Head Peak (the highest on the east) and the promised view.

[59] *A detour near timberline, right and east off the above-mentioned spur, leads to the strangely eroded, rough-textured ribs that are the remains of the cinder cone. The steeply sloping layers were made by successive falls of hot cinders on the steep flanks of the cone. Great fountains of frothed-up lava built this cone. Such fountains up to 1900 feet high accompany eruptions in Hawaii today. The growth and subsequent erosion of the cinder cone altered the stream drainage near Indian Pass. Look down to see how Indian Creek descends practically along the Cascade Crest before turning sharply eastward.*

The Crest Trail leaves the aforementioned spur in trees and crosses a very steep grassy basin. It passes KID POND and follows benches on to a bumpy and parklike saddle and the junction with the WHITE
13.0 RIVER TRAIL (5400-13.0). Below and west of the saddle, secluded camps can be made in delightful heather-carpeted glens.

WHITE RIVER TRAIL

Maintained yearly

3600-foot climb

16.3 miles

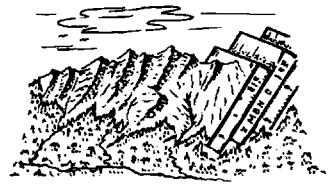


Figure 31

HOGBACKS

Provisions for the ascent at Mont Blanc, Hotel de Londres, Chamonix

6	bottles	Vin Ordinaire	4	packets	prunes
10	do	Bordeaux	4	do	raisins
10	do	St. George	2	do	salt
15	do	St. Jean	4	wax candles	
3	do	Cognac	6	lemons	
1	do	Syrup of razberries	4	legs mutton	
6	do	lemonade	4	shoulders mutton	
2	do	champagne	6	pieces of veal	
20	loaves		1	piece of beef	
10	small cheeses		11	large fowls	
6	packets of chocolate		35	small fowls	
6	do	sugar			

Albert Smith, *Mont Blanc,* quoted by A. C. Spectorsky, *The Book of the Mountains*

The woods along this valley-bottom highway are pleasant, but wide views are few, and the meadows brushy, except in the superlative country along the Cascade Crest. Vary a round trip to the Crest from the road by using the Indian Creek Trail, or, better, one of the high routes. The Napeequa valley offers a variety and a feeling of seclusion not to be found along the White River.

The trail begins at the end of the WHITE RIVER ROAD (2300-0.0). **0.0** Before starting, look at the churning rapids from the high foot bridge that leads to the Indian Creek Trail. The trail follows close to the steep east bank of the river before leaving the roaring of the rapids for the sudden quiet of dense forest. A dry old burn is crossed just before a junction with a side path (2400-2.2) that goes down to the river and a **2.2**

ford to the Indian Creek Trail. The main trail continues on up the White River, weaving through the trees and crossing many draws, to the BOULDER CREEK bridge (2450-3.6). Just beyond the bridge are needle-floored trail camps between huge boulders. A short distance far-
4.0 ther, across a draw, is the junction (2475-4.0) with the BOULDER PASS TRAIL.

Beyond the BOULDER PASS TRAIL the White River Trail leaves the trees for brush and finally enters the first of the extensive meadows
4.5 (2500-4.5) along the foot of Clark Mountain. Cottonwoods and evergreens line the river bank and brush partitions the meadow. Camping is fair—better for the claustrophobe than the woods at Boulder Creek. Here begins the INDIAN HEAD HIGH ROUTE.

On up the White River, bare rock in avalanche-scoured gullies comes down to the very edge of the meadows. Some 6000 feet of arduous and difficult scrambling up these gullies is the summit of Clark Mountain; the summit is much easier to reach from the Clark Mountain High Route. Above the last meadow is the bridge across THUNDER CREEK (2576-6.2; camping) and beyond, through scrubby trees, is a sheep-
6.8 herders' trail leading up the canyonside (2750-6.8); this is the end of the CLARK MOUNTAIN HIGH ROUTE.

The trail now heads west toward the Cascade Crest through forest interspersed with small meadows and brush patches. It climbs switchbacks, passes a camp spot (3000-9.1), and goes on through open woods
9.4 to the bridge at LIGHTNING CREEK (3100-9.4).

[60] *On the approach to Lightning Creek look through the trees to the north (right) for glimpses of black lava cliffs. This lava is the last remnant of a thick flow that at one time may have filled the White River valley. It came from some unknown fissure, possibly located in Lightning Creek or on the divide at the head of the White River. Towering above the lava, east of Lightning Creek, are 3000-foot cliffs of light-colored gneissic granite (Figs. 3 and 36).*

The LIGHTNING CREEK HIGH ROUTE begins in open woods
9.7 just below the first brushy meadow (3180-9.7). The river route goes on through meadows and groves to a bridge over the river (3480-10.9), follows the south bank in fine open forest, and crosses back to the north side just above the mouth of FOAM CREEK (3650-11.5). A short distance farther, the trail zigzags up next to roaring cascades before leveling out in brush (possible, but not good camping). At the NORTH-
12.3 WESTERN FORK of the White River (4000-12.3) there is a bouldery

ford; a better crossing can generally be found via logs downstream from the trail. The trail climbs again through trees.

As the north side of Indian Head Peak comes into full view, one can pick out the benches, cliffs, and lopsided crags forming HOGBACKS which show that the peak is made of layers of rock that slope eastward (Fig. 31). The unevenly eroded layers might be likened to books aslant on a shelf. [61]

A couple of giant switchbacks lead up through thinning trees to the heather. A camp spot on the trail (5300-14.0) announces the divide and the junction with the CASCADE CREST TRAIL (Indian Pass Trail, 5400-14.2). Secluded campsites can be found in tree-enclosed glens **14.2** west and below the divide. Contour north from the trail junction to find, close by on the west side, a very pleasant basin; camp spots here are complete with caves and passages under the huge blocks fallen from a volcanic dike—see below.

The route on to White Pass climbs northward and passes REFLECTION POND (5500-14.5) perched right on the crest; this tiny muddy pool hardly befits the glamorous name. Here trees provide a camp with some protection from mist and rain blown in vigorously from the west.

Just above the pond on the grassy crest is a rocky prong of volcanic rock; this dike of once-molten rock came up along a crack in the surrounding schists. Perhaps it reached the surface and flowed out as lava like that now seen at Lightning Creek in the White River valley (Note 60). [62]

The black schist that pokes up here and there through the meadows weathers to a black soil. The schist and soil are rich in minute specks of black GRAPHITE—a shiny, slippery mineral made of carbon. Originally the rock was a black mud rich in carbon-bearing plant or animal remains—fossils.

The trail rounds a corner (5900-about 15.4) below knob 6203 and crosses steep dirt banks, as pastoral vistas open up across rolling green slopes that extend to White Pass. Groves of fir dot the meadow and the wild flower display, particularly of the yellow glacier lily of early July, is marvelous. At WHITE PASS (5904-16.3) a short branch trail leads **16.3** southwesterly and down a quarter of a mile to a trail shelter (5750). The main trail crosses gradually over to the west side of the crest where it traverses toward Red Pass and the junction with the NORTH FORK

of the SAUK TRAIL. The top of WHITE MOUNTAIN (7030) is an easy stroll from White Pass; keep to the ridge and be prepared for a grand view of Glacier Peak.

[63] *The rolling meadows to the northwest are on the eroded remnant of the White Chuck Cinder Cone (Notes 40 and 50). It was from White Mountain that I. C. Russel, geologist for the Geological Survey, made the first ascent of Glacier Peak in 1898. In those early days Glacier Peak was thought to be a cinder cone also, whereas it proved to be made almost entirely of solid lava flows. (See also Note 56.)*

BOULDER PASS TRAIL

Maintained yearly to Boulder Pass

4700-foot climb

2000-foot descent

11.3 miles

Figure 32. Fault in the Napeequa Valley

"I think" said Christopher Robin,
"that we ought to eat all our
provisions now, so that we won't
have so much to carry."
A. A. Milne, *Winnie the Pooh*

This trail leads to the Napeequa valley and follows it almost to the glacier at its head. High routes from the Napeequa headwaters lead t

rugged cirques and glaciers, charming alpine lakes, and the south slopes of Glacier Peak. Though the high routes are generally difficult, some of the scenic parts can be covered by the less experienced hiker as short side trips from a base in the Napeequa valley.

Switchbacks begin a steep climb north of Boulder Creek and just above the WHITE RIVER TRAIL (2475-0.0), first in timber and then in a burn. In the trees, beyond a very steep and dusty sheep driveway leading straight back down to the river trail, is a camp established by trail crews (3900-1.4). The trail leaves the trees for a rocky and brushy hillside leading to a ford across Boulder Creek (4300-2.0). The patches of grass grow larger and the brush less dense as the trail climbs, and soon there is a view of the cliffs and the summit ridges of Clark Mountain at the valley head. **0.0**

The white granite in the center portion of the cliffs is flanked on either side by dark-colored, older schists. The contact between the two rock types may be examined in closer detail near Boulder Pass. [64]

Past camp spots in the rolling rocky meadows (4750-about 2.7), the trail climbs atop a small moraine (5000-3.2) that parallels the east side of the valley. On this grassy moraine is a trail camp and the beginning of the CLARK MOUNTAIN HIGH ROUTE. From here the old trail can be seen zigzagging up in trees toward Boulder Pass. The new trail goes up the morainal ridge—an old one judging from the big trees on it—and climbs steep meadows toward cliffs at the head of the valley. The tread is a yard wide, the grade gentle, and the turns spacious enough for tent spots. **3.2**

Where the trail comes closest to the cliffs (about 6000–4.0) there is a view of the CONTACT between white granite on the west and dark schist on the east. Narrow white streaks of the granite cut across the schist and surround blocks of schist; such features show that the granite was a fluid or pasty mass when it pushed up (intruded) into the schist from below. They also show that the granite is younger than the schist. These are typical of facts noted by a field geologist. He draws a line on the map showing the location of contacts like this one and then colors the map using a different color for the two different rocks. Where he measures the slope and trend of cracks or layers or elongate minerals in the rocks, he plots the measurements on the map with appropriate symbols. The end result is a GEOLOGIC MAP (Fig. 3). Accompanying the map is an explanation derived from field and laboratory study of the rocks. [65]

Making a geologic map is the basic first step in the attempt to gain knowledge of the earth. But much is to be learned by supplemental work. In the laboratory, the geologist may use X-ray, spectrographs, electron probes, and computers to study rocks and fossils, muds and waters, collected in the field. Measurements of gross properties such as magnetism of the area may be made on the ground or from airplanes. All the gadgetry and concepts of chemistry and physics may be called in to help. Unless he has made a geologic map, however, the geologist cannot relate information gained from study of specimens or from instrument readings back to terra firma. And without this correlation he cannot solve major problems of earth history. Thus geologic mapping is a most fundamental part of the effort to understand the earth.

From the granite contact, the trail continues up and crosses an outcrop of bright green rock (6000-4.1), distinct from either the dark schist or the white granite. This is a small body of PERIDOTITE (named for the mineral olivine which as a gem is called peridote, a rock rich in iron and magnesium and thought to have come up from great depths.

Swales banked with pumice and heather provide high, alpine camp
4.4 spots just west of and below BOULDER PASS (6250-4.4). South of Boulder Pass, WHITE MOUNTAIN forms a long ridge of even height. The many blocky summits made of jointed granite are interesting scrambles. All are reached from the east slope of the mountain which is gained by crawling south, directly up the ridge from Boulder Pass.

[66] *Below, the unusually flat floor of the Napeequa valley, which ends in a granite gorge off to the south, is probably a filled-in lake basin. On the ragged wall of Chiwawa Ridge, rising beyond, innumerable horizontal ledges are conspicuous. They are made by layers of schist sloping gently eastward (Note 84).*

The Boulder Pass Trail starts down from the pass on new switchbacks and bears north towards a cliff where the trail is being blasted out (1962). When completed, the new trail will bypass the old one which swings down to the south (right), where loose talus blocks and late snow make poor footing. At the edge of the flat-topped knoll below are camp
5.0 spots (5700-5.0; wood scarce) at the trailside.

A difficult and vague bit of old trail, bad for stock, begins here; to stray from the route brings peril, for the brushy ramparts are formi-

dable. Go southeasterly down a gully, zigzag through the brush, and cross a watercourse. Stumble down an open nose on rocks and wet, grassy slopes. Continue dropping steeply to the south before turning north (left) and traverse down the broad damp meadows to the broad bench below. In order to slip through the last brushy walls, traverse north across the meadow grasses to a main barrier of trees. Go straight down the steep gully and avalanche track just south of these trees. A gentle grassy swale now leads to the gravels of the Napeequa valley. Camping on the gravels (4275-6.3) or in the trees nearby is fair. **6.3**

To cross the river, head straight for the opposite side of the valley; cross gravel and meadow to a gap in the riverside brush. This point is at the toe of a grassy alluvial fan on the eastern bank. Unless a crude sheepherders' bridge has survived the spring floods, a chilling ford across the NAPEEQUA RIVER (4275-6.4) is necessary. On the opposite side is the junction with the LITTLE GIANT PASS TRAIL (4300-6.5), seen **6.5** going off down-valley below the brush.

Napeequa ford

[67] *South of the Little Giant Trail and the inconspicuous Little Giant Pass, a perfectly straight gash cuts diagonally up the ridge (Fig. 32). This gash is along a FAULT, a crack in the earth's crust where two blocks of rock have slid past one another. Movement of the blocks breaks the rocks and even grinds them to fine powder. Thus in the fault zone the shattered rocks are more easily worn away than are the surrounding unbroken rocks, and the fault becomes a gully—or a whole valley.*

In the meadows here, the trail is vague, but near a large rock perched in the grass, find the tread going up valley, trending away from the river. The trail again swings close to the river, passes a camp spot on a bar (4250-about 7.6), and traverses a sloping meadow to a sprinkling of big white boulders.

[68] *These white blocks of granite have been dropped by a glacier now seen, much shrunken and subdued, above a fantastically brushy cirque and below the crags of Clark Mountain. In the nearby cliff of schist, the white bands are marble.*

Follow ducks on the white blocks and go up through brush toward
9.1 the cascades and falls of LOUIS CREEK (4675-about 9.1). Not far beyond the ford is a narrow gap up through the brush barrier to grassy slopes of the valley side; here begins the LOUIS CREEK HIGH ROUTE.

9.2 A little meadow (4700-about 9.2) that slopes down to the Napeequa marks the route to BUTTERFLY BUTTE, a worthwhile and easy side trip (Fig. 34). To reach the butte cross the Napeequa in the meadow and climb straight up in dense timber to the verdant heather-carpeted paradise. The greenery lies at the edge of a barren cirque overshadowed by crag and glacier. Ascents of Clark Mountain can be made from here.

Nice camp spots are found along the main trail in the next small meadow and beyond on a larger riverside flat (4800-9.6). A little farther
10.3 the cascading stream (4850-about 10.3) which comes down from High Pass must be forded. The stream scoots through the brush on a ramp of white granite—a small mass in the dark schists. About a hundred yards beyond the stream begins the HIGH PASS HIGH ROUTE. The main trail continues on up the valley through trees but soon comes out in open meadows. The meadows end below the valleyhead glacier in piles
11.3 of barren moraine (5200-about 11.3). Here is the beginning of the TEN PEAK HIGH ROUTE and the end of the HONEYCOMB HIGH ROUTE.

CLARK MOUNTAIN HIGH ROUTE

Intermediate

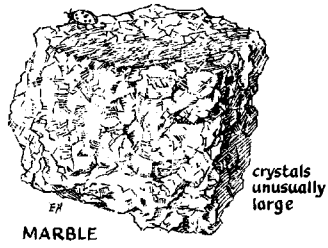
2400-foot climb

4700-foot descent

9.0 miles

8 hours

Figure 33



This route follows a vague sheepherders' trail across four steep cirques on the west side of Clark Mountain. It offers splendid views of the Cascade Crest region and an easy climb of Clark Mountain. The meadows of Thunder Basin, surrounded by towering walls, make an unforgettable camp spot, even better than the ones in upper Boulder Creek. The route is especially good in the early summer when snow may bridge the more difficult brush in Thunder Creek.

In the MEADOWS OF BOULDER CREEK (5000) the sheepherders' trail is vague, but it cuts an apron of brush that lies at the toe of steep red slabs. Contour the basin (5000) and ford the stream to pick up the tread. Follow the trail up through the brush to hummocky meadows and camp spots (about 5800). The trail continues up across pumice banks to a gentle saddle (6150-1 hour) on the ridge between Boulder Creek and the White River. The trail crossing is marked by fire pits on a tree-protected ledge where some hard-pressed wanderers have camped.

The trail leaves the pass on a northwesterly traverse but does not continue as one would expect (hidden cliffs ahead). The way turns back south and starts dropping through the meadows below the pass. It winds down through trees toward the White River and finally turns to the northwest and crosses a draw (5600). Continue traversing down across steep rocky meadows dotted with trees and round the corner of a cliffy spur (5350). Enter here the FIRST OF FOUR CIRQUES crossed by this high route. Go through splendid lush brush and traverse up steep meadow (tread vague) and a few switchbacks to the first watercourse (5800). Go up a grassy nose west of talus and snow in this watercourse

and traverse up and across the next rill. Cross the sharp spur beyond at a flat spot dotted with snags (6300-2½ hours).

To climb CLARK MOUNTAIN and increase the expanse of the already fine view, go directly up this spur to the summit (2000 feet of climbing in about 1 mile of easy going). On the northeast side of the peak, the cool whiteness of the glaciers nestled in the shadows of the summit ridge comes as a sudden contrast to the green grass and sunny expanses on the southwest side.

To cross the SECOND CIRQUE go down steeply from the spur through trees and rocks, traverse across steep meadow to the toe of the lowest talus (6000), and reach the next spur crest (6300-3 hours) at the highest trees. Clark Mountain towers above and may be easily climbed directly up this spur also.

[69] *East, in the cliffs, are many white streaks; these are layers of micaceous marble, a metamorphic rock formed from a muddy limestone. Marble is made of the mineral calcite or dolomite, which is characteristically soft; ice ax or knife point will easily scratch the occasional block of marble found in the rubble along the trail (Fig. 33).*

Most of the other rock on Clark Mountain is the reddish and yellowish quartz schist seen in the cliffs above the trail. The mineral making up most of the rock is QUARTZ, a hard glassy mineral made of silicon and oxygen (Fig. 40). Quartz cannot be scratched with a knife. With the quartz are a few shiny flakes of soft mica. Quartz grains make up most of present-day sands; thus this schist, like the marble, was once an old sediment. Also common along the trail is a black schist containing tiny needles of black hornblende (Fig. 43). Lava flows, layers of volcanic cinders, as well as limy muds may be transformed into hornblende schist by metamorphism.

Continue traversing the steep meadow on the broad end of the spur to a trail junction (6250-3½ hours). The sheepherders' trail going down (the main one with the best tread) switchbacks steeply through the trees, then swings northwest to become lost in the brush just above Thunder Creek. It crosses Thunder Creek (about 3650) and climbs onto the nose west of the creek, where it goes down through an old burn to the White River Trail (2750-5 hours).

It is much pleasanter to continue traversing northwestward towards Thunder Basin. There is scenic camping in a rocky, grassy basin (5950)

the center of the next and THIRD CIRQUE. From here head for the west rocks on the spur to the northwest (6150-4 hours). Glacier peaks to view. Contour the FOURTH CIRQUE, the largest, at about the 200-foot level, crossing many cascading streams by delightful campsites. All traces of a tread are gone here. Reach the last spur at a point here the meadows pinch out between woods and brush below and the rocky crest above (6000-5 hours). Go down the spur crest. Just before reaching a vertical step (6000), look down a rocky gully on the west and note a grassy ledge which will be reached eventually. Do not descend the steep and dangerous gully but go down the steep grass on the opposite side of the spur. Bear right of a tongue of brush and contour across steep grass and rock ribs. Reach the nose of the spur just below the above-mentioned vertical step (5700) where rubbly dirt ledges lead around to the grassy ledge seen from above. Traverse the steep grass as the ledge widens. Keep above slabs and close to the cliffs above but follow a slightly dropping course. Continue through or around several narrow but formidable barriers of alder brush, through gaps and on game trails. This broad grassy ledge is high above the meadows of lower Thunder Creek. Descend gradually the steep meadows where they merge with the flat and now welcome floor of THUNDER BASIN (5150-6 hours).

In this spectacular cliff-walled basin, the snow may be deep until late July. The white and grey walls, the spires of Tenpeak Mountain and all the ridge summits to the west are carved in a gneissic granite. To reach an excellent view of Glacier Peak above the vast expanse of the Suiattle and Honeycomb Glaciers, hike up the steep gully next to the falls on the west side of the basin. Pass over rounded bosses and by two small tarns and climb straight up to the 7450-foot saddle west of Tenpeak. The climb of TENPEAK requires rope work; it may be approached from the above-mentioned saddle or from the col east of the summit (Appendix).

The LIGHTNING CREEK CUTOFF connects the Clark Mountain High Route with the Lightning Creek High Route without descending to the White River Trail. This passage is difficult and is not recommended for inexperienced hikers; a rope should be available for the descent to Lightning Creek. Begin in THUNDER BASIN (5150) by climbing up the small spur which extends west from the lip of the basin —not obviously a spur as seen from the basin floor. Then traverse (5550) southwest through some small trees and brush and below talus. When cliffs 100- to 150-feet high are reached, drop straight down the hillside almost 200 feet, and climb westward along their base. Cross rocky

meadows, circumvent brush patches, and gain open heather and meadows which lead to a saddle (6050) at the head of the western tributary of Thunder Creek. From here descend a cliffy, very steep gully (averages over 45° at the upper end and contains dense brush and mossy wet rock) to LIGHTNING CREEK (3 hours from Thunder Basin, 9 hours from Boulder Creek).

To descend to the White River from THUNDER BASIN (5150), climb the small ridge just west of the creek to the grassy draw hidden behind it. Down the draw, a short plunge through dense brush leads to a steep tongue of rocky meadow (4500). Go down the tongue to flat meadows near the crossing of the west fork of Thunder Creek (4200; good camping). Keep in the woods on the west side of the valley for about half a mile, then, at the southern edge of the woods, go once again through brush; stay as close as convenient to the steep valley side and head for barely visible talus. Cross this talus to more-or-less open woods on the shoulder between Thunder Creek and the White River. On this shoulder (about 4000) the old sheepherders' trail mentioned above zigzags down through thick brush in an old burn to the WHITE RIVER TRAIL (2750-2 hours from Thunder Basin; 8 hours from Boulder Creek).

LOUIS CREEK HIGH ROUTE

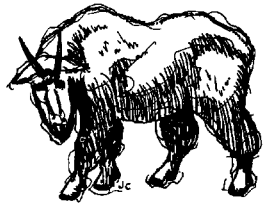
Easy

3100-foot climb

1000-foot descent

3½ miles

3 hours



Mountain goat

This alternate route to High Pass crosses the unique pumice desert of upper Louis Creek and offers a short easy climb of Buck Mountain.

From the gap in the brush just up the BOULDER PASS TRAIL from Louis Creek (4675), ascend steep meadow and continue under the silvery dead snags which dot the hillside. A camp spot on the creek above the upper falls (6400) has a wonderful view of Clark Mountain. Barren,

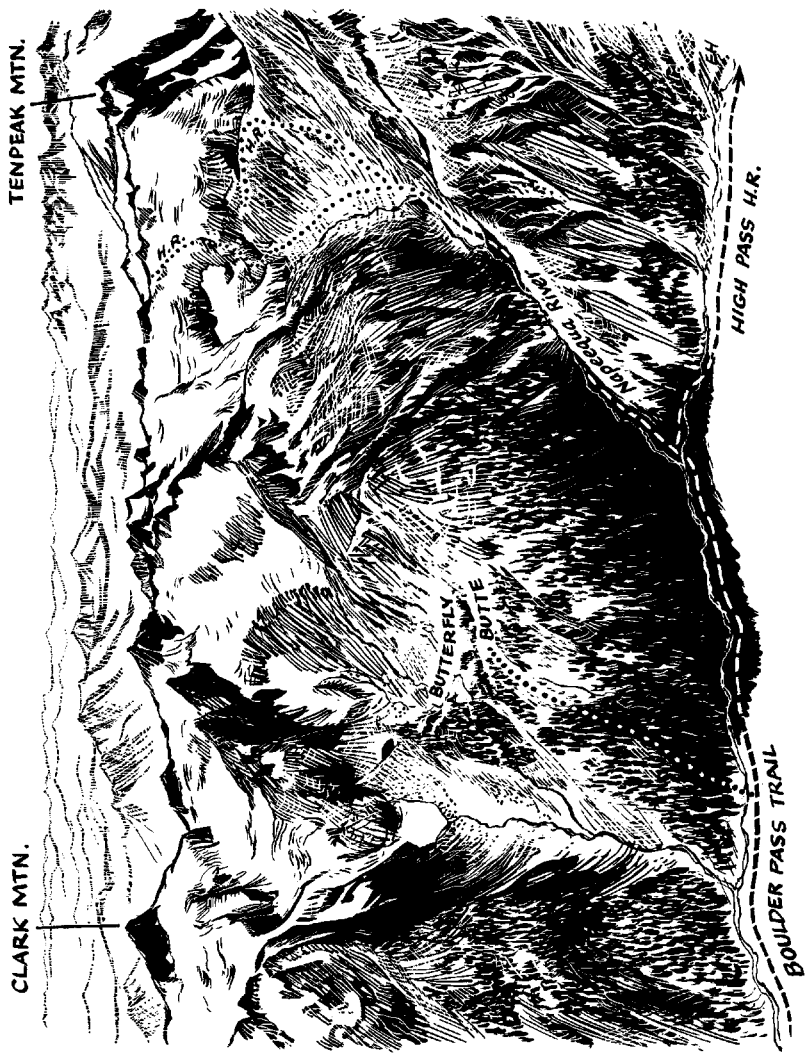


Figure 34. View west across the upper Napeequa

gullied pumice, carried from erupting Glacier Peak to the adjacent hillsides by winds and there flushed off, fills the broad rolling reaches of upper Louis Creek. Mountain goats have wallowed in the pumice, and the shaggy beasts may be seen at home on the steep north face of Buck Mountain. Cock the camera and approach the cliff-top steathily. To reach the summit of Buck Mountain, go well up into the Louis Creek basin and climb up the black schists to the top.

To reach High Pass, go west up easy pumice slopes to the flat spur-crest (7800) and follow the spur north to the saddle below peak 7953. Go northwesterly and down to join the HIGH PASS HIGH ROUTE just below the moraine-rimmed lake (6750-3½ hours) south of High Pass. If the descent bears too far north (right), cliffs and a glacier obstruct the way.

Harebell x ⅓

HIGH PASS HIGH ROUTE

Intermediate

2800-foot climb

1900-foot descent

5 miles

5 hours

This route connects the enclosed green valley of the Napeequa River with the flowered rooftops of Buck Creek Pass. It crosses High Pass (6950), offers fine views of Glacier Peak, of icebergs in a mountain lake, and follows the actual Cascade Crest for about 2 miles. Eventually the Forest Service plans to build a trail along this route.

From a point on the BOULDER PASS TRAIL (4850) about 100 yards above the creek draining High Pass, an old and poor trail zigzags steeply up through an alder patch west of the stream. Above the alder, the trail continues through an old burn, just below a conspicuous clump of dead snags. It comes out at a beautiful camp spot (5550) on an open

grassy knoll at the lip of the hanging valley. To the south Clark Mountain rises above Butterfly Butte and the glaciers.

Looking down to the flat lower end of the Napeequa valley, one can see a conspicuous fault-controlled gully (Note 67) slicing up the valley side. [70]

On the opposite side of the High Pass valley, layers of white marble streak the dark schist, certain testimony to the existence of some ancient sea. Up toward High Pass the schist and marble give way abruptly to a white and massive biotite granite that forms blocky cliffs. On the steep north face of Buck Mountain this same granite mass is seen from the Buck Creek side as a great white band formed when a thick wedge of molten rock forced its way (intruded) between layers of the schist (Note 92).

The vague trail follows along the west bank of the stream for about half a mile before disappearing, but the way is open and easy. Keep near the stream to avoid numerous gullies cut in loose yellow pumice. *Do not* go toward the obvious grassy pass appearing ahead. Where bluffs and rocks begin near the stream (6300), go up steep heather just next to the torrent. Above, where the moraine begins (about 6750), the LOUIS CREEK HIGH ROUTE comes down the hill. Climb north here up a heather-carpeted draw to avoid the poor footing on the moraine in the barren upper reaches of the creek and make an easy traverse on pumice and snow to HIGH PASS (6876-2 hours).

Climb onto humps of white granite poking through the pumice blanket for a view of Mount Baker volcano, far off to the north, and part of Glacier Peak nearby. These two cones are part of a chain of volcanos which includes peaks from Mount Lassen in California to Mount Fuji in Japan. Indeed, the chain extends around the entire Pacific Ocean. An understanding of one cone is but a tiny part of much larger and complex puzzles. [71]

Steep hard snow can make the next part of the route nerve-wracking (at the least) to hikers without an ice ax. Go to the northernmost saddle at High Pass and drop down to the snow or adjacent rock. A steep snow gully about 50 feet wide must be crossed farther down to reach easy talus beyond. The lake below may be reached by descending from here. Cross the talus and climb to the ridge above Buck Creek (7150). Descend

along the ridge to a broad saddle (6800). To reach camp sites go straight down steep grass and heather to the basin below the lake.

Continue along the ridge crest over rocky points 7276 and 6909 to the saddle (6450-4½ hours) just south of LIBERTY CAP. The weaving and scrambling necessary to follow the approximate crest is probably easier than traversing the very steep grass, snow, and rocks on either side. To the west across the remarkably broad valley of the Suiattle River (Note 21) is an unexcelled view of Glacier Peak.

At the saddle (6450) south of Liberty Cap find an old trail leading into a small basin on the Buck Creek side. Follow the welcome tread northward around the upper part of the basin, turn sharply close under cliffs, and traverse straight toward Buck Creek Pass. Reach a broad grassy swale where there are fine camp spots away from the possible congestion at the pass. Follow the rolling top of the swale and drop the last 50 feet to a fallen cabin, a picnic table, garbage pits, and toilets —unusual bits of civilization so far from a road. Cross a small stream and reach BUCK CREEK PASS (5787-5 hours) with its cluster of signs, more tables, and main trails.

TENPEAK HIGH ROUTE

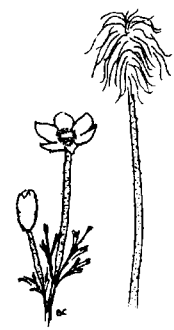
Difficult

2500-foot climb

2600-foot descent

3.5 miles

4 hours



x ⅓

Western Anemone

This route, a difficult backpack even for the experienced hiker, is the climax of a 3- to 4-day journey beginning and ending at the White River Road, a trip that takes one into the remote meadows along the Napeequa as well as over the rugged walls surrounding Thunder Basin.

Start at the head of the Napeequa valley, where the BOULDER PASS TRAIL runs out on the meadow, and the moraine begins (5250). Continue up the moraine to the head of the valley. From here to the

ridge crest, routefinding is crucial. Scramble up rounded outcrops of gneiss near the ice to gentler rock slabs above. Bearing west (right), mount the slabs and snow thereon; head for the obvious broad saddle west of the valley glacier. This saddle (7750-2½ hours) is the lowest point in the ridge and is usually marked by a snow cornice on the east. Glaciers lie on either side of the route; deviation will lead onto crevassed ice (Fig. 34).

From the saddle (7750) go down a broad slope, bearing southwest (left) to avoid a line of cliffs which prevents a direct descent; do not be tempted to go down west-trending gullies and ribs in this cliff. Continue down southerly until the broad slope narrows and becomes a spur. The steep open slopes to the left appear to offer an easy way down but end in precipices. Turn west here (7000) and pick a way carefully down rocky gullies and steep snow to wide ledges (6500) below the aforementioned line of cliffs. The way must be carefully found; it should never be attempted in storm or darkness.

With the cliffs successfully past, drop down diagonally west (right) before winding through the lower cliffs which guard the level floor of THUNDER BASIN (5150-4 hours).

INDIAN HEAD HIGH ROUTE

Difficult

7000-foot climb

4000-foot descent

10 miles

11 hours

This route passes Airplane Lake, goes over the top of Mount Saul, crosses extensive meadows providing a variety of alpine views, and affords a climb of Indian Head Peak.

Leave the WHITE RIVER TRAIL (2545-4.5) in the first meadows and cross the river where cottonwoods line the east bank and where the river meanders close against the forest of evergreens opposite. The ford

may be difficult if no log can be found. Keep south of a fair-sized stream gully and climb up steep timbered slopes to a basin filled with talus blocks (5000-2 hours). Climb westerly up the talus beneath small cliffs to a heathery spur (5950). Drop off the spur to more talus and traverse to a broad saddle (5750) just north of Airplane Lake.

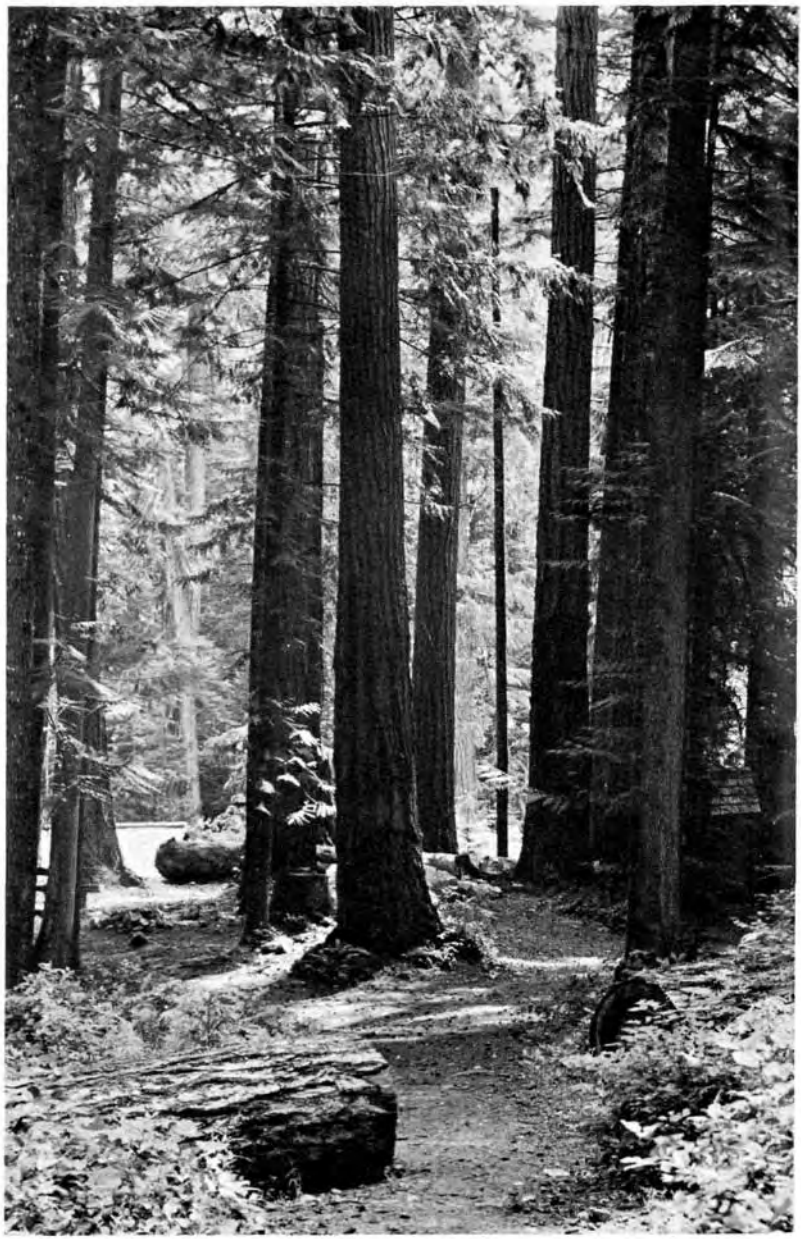
AIRPLANE LAKE, surrounded by white walls and heather benches, provides scenic camping and fishing. Reach it by dropping straight down from the saddle. It is possible to descend from the lake to the Indian Creek Trail along the east side of the outlet stream.

[72] *Widely spaced cracks, called JOINTS, cut the massive cliffs of granite around the lake (Fig. 35). Much granite is characterized by such joints*

Figure 35. Talus and joints. Note that largest blocks are at bottom of pile.

which more or less dice the rock on a giant scale. When the hot rock, once buried deep in the earth, was raised up to the surface, it shrank and cracked as it cooled. Doming of a whole mountain range or release

1. Clark Mountain from the High Pass High Route. (Dick Brooks)



2. Roadside forest along the Suiattle River. (Dick Brooks)

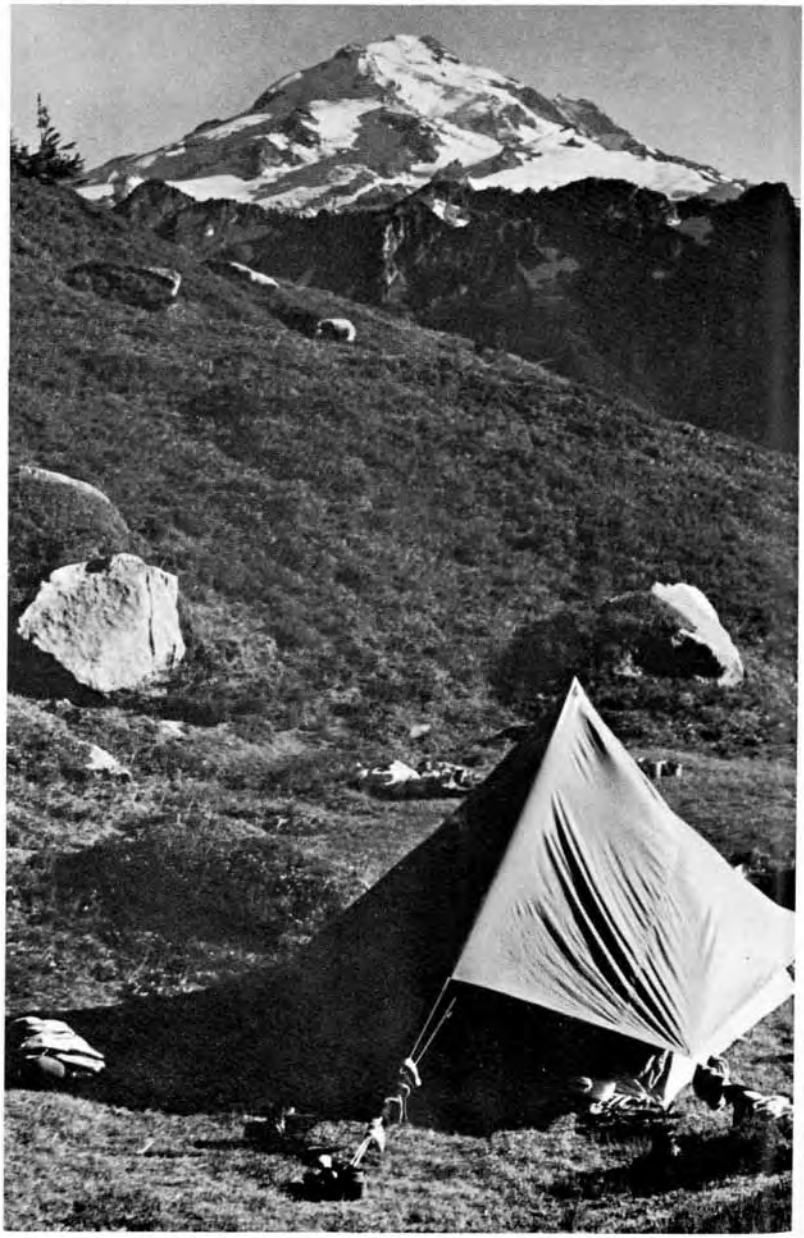
3. Mountain goats near Disappointment Peak High Route. (U.S.G.S., Rowland Tabor)

4. Buck Creek Pass. (John Warth)

5. Upper Suiattle River and Glacier Peak. (Austin Post)

6. Upper Railroad Creek from Rubin Creek side trip. (David Simons)

7. Rocks and authors. (Bob and Ira Spring)



8. Glacier Peak from the alternate to the Bath Lakes High Route. (U.S.G.S., Rowland Tabor)

of pressure as overlying rocks are stripped away by erosion can also produce such joints. In places, water trickles down the cracks, wearing away the rock so that the joint is widened to a deep gully or a dark chimney. Elsewhere water freezes and expands in cracks or plant roots swell in them so that a block is wedged out. If on a hillside, the block rolls down to the talus below leaving the smooth faces and sharp corners that characterize granite terrain in the North Cascades.

From the saddle (5750) to the north of Airplane Lake, climb the ridge to the summit of MOUNT SAUL (7311-5 hours). From here the climb west along the ridge involves much scrambling over moderately steep rock and should not be undertaken by inexperienced hikers. From the top follow a sloping rubbly ledge (a joint surface) on the north side of the summit pyramid and drop into a notch (7000) between the main summit and a sharp gendarme on the west, a secondary summit pinnacle. Descend 250 feet down the south side of the ridge in a steep gully (possibly snow-filled), then traverse scree-covered ledges around the gendarme to reach the gentler rocks farther west.

Traverse to gain the crest again (about 6000) and follow it until it levels out and can be easily crossed (5800-6 hours). Drop into the horseshoe basin at the head of AMBER CREEK where pleasant camp spots abound.

The rocks in this cirque are mica schists, and their crumbly nature [73]
contrasts markedly with the resistant gneissic granite of Mount Saul. To the east, the imposing wall bounding the basin is the edge of a thick tablet of granite between layers of schist. The contact between the two rocks can also be seen across Amber Creek where the resistant white granite stands out in bold cliffs sweeping diagonally up the slope above gullied, crumbly brown schists. The Tenpeak massif is composed of gneissic granite also (Fig. 36). The reason for the gneissic look or streakiness of this granite is not perfectly clear, although it appears that the granite penetrated (intruded) between layers of schist while the rocks were being squeezed during metamorphism.

The cirque at the head of Amber Creek is decked with old moraines covered with vegetation. The swales amid the piles of glacier-laid rubble provide pleasant camping places.

Contour the basin of Amber Creek and climb to reach the saddle at

its head (5900-7 hours). From the saddle, climb up the ridge to the base (6950) of a 7131-foot knob.

[74] *This knob and others like it on the ridge stand out because the tilted layers of rock composing them are more resistant to erosion than the rocks around them. This selective erosion etches out the layers, emphasizing them in the flatiron- or hogback-shape of the knobs and spurs (Note 61 and Fig. 31).*

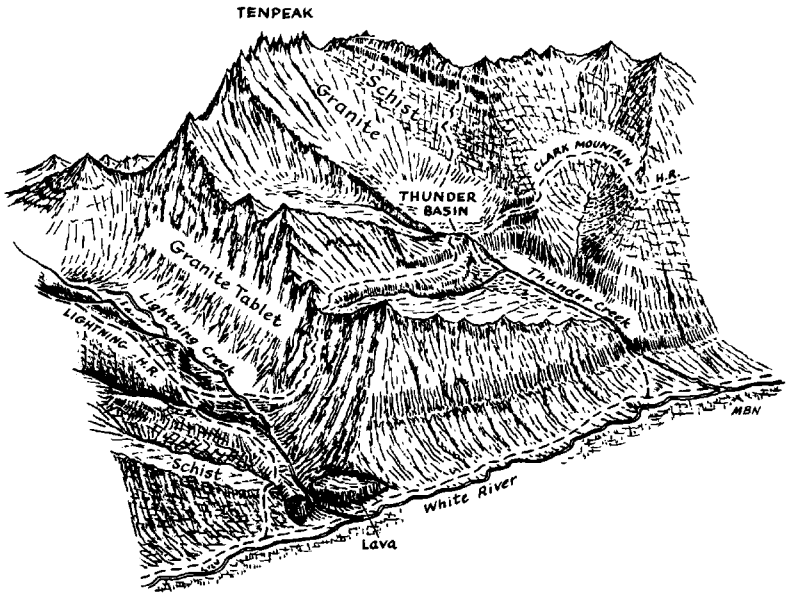


Figure 36. View northeast across the White River to granite tablet

To make an easy ascent of INDIAN HEAD PEAK from this point, traverse about a mile along the south side of the ridge crest to the main summit (7442).

From just east of the 7131 knob, descend to the north side of the main ridge. Follow close along a sharp spur coming down from the knob. Traverse westward (about 6500), scrambling down steep rocky gullies to the base of the spur. Continue to the hummocky meadows on partly eroded old moraine (5550-9 hours) that lies just below fresh moraine.

To continue on to the Cascade Crest, traverse to a small tree-covered saddle (5450) on the main spur of Indian Head Peak. Here find a blazed sheepherders' trail which goes down through trees on the west side. At about 4900 the trail turns southwestward and up through trees, talus, and meadows (difficult to follow in the meadows, but look for blazed trees up and across the open places). It finally disappears in the vast grassy hillsides that extend around the west branch of the White River to White Pass and beyond. While traversing, keep on the heather-covered benches and on snow where the going looks best; stay above the brush. Join the INDIAN CREEK TRAIL (Cascade Crest Trail) and the WHITE RIVER TRAIL at the low point on the crest (5378-11 hours).

LIGHTNING CREEK HIGH ROUTE

Intermediate

4500-foot climb

1000-foot descent

8 miles

7 hours

Figure 37

From the meadows of upper Lightning Creek, over bleak moraine and glacial-polished rock to the broad expanses of wild flowers at White Pass, this route encompasses a complete spectrum of alpine scenery. Coupled with the Clark Mountain High Route the resulting high traverse is a rewarding challenge to any hiker.

From the WHITE RIVER TRAIL (3180; 9.7 from the White River Road) climb north up steep timbered slopes and cross a rather sharp nose and a side stream (3800). Then climb northeasterly in timber toward Lightning Creek and across (4300) its northwest tributary just above the great brush patch that surrounds the junction. Climb up a tree-covered spur between the main creek and the tributary. On the west side of this spur is an old burn where thick blueberry bushes hide the blackened logs. On up the spur are big trees on cliffy humps (4900-1½ hours) that lie just west and above the lip of the flat floor of upper Lightning Creek.

From this lower end of the flat valley, experienced hikers can reach Thunder Basin by the Lightning Creek Cutoff—see Clark Mountain High Route. Open meadows and camp spots are farther up the valley. Reach them by going down to the creek and up along its west side across talus and small meadows. For the rock climber, the upper basin of Lightning Creek serves as a base for much challenging rock work on the great granite wall. Those experienced and equipped for travel on glaciers may cross the divide northwest of Lightning Creek and travel on glacier to the upper White Chuck River.

[75] *The valley of Lightning Creek, lying between resistant gneissic granite on the east and less resistant schists on the west (Fig. 36), is a typical HANGING VALLEY (Fig. 37) carved by glaciers. The White River Glacier in the main valley eroded much deeper than its small tributary glacier in Lightning Creek. There may have been a lake in the upper, "hanging," part of the Lightning Creek valley after the glaciers melted away. Sand and mud, brought into the lake by streams, have filled it in and left the level floor seen today.*

To continue on the route without a stopover in Lightning Creek, climb from the humps at the lip of the hanging valley on up the spur through trees and open slopes to timberline. Then traverse westerly into the aforementioned northwest tributary of Lightning Creek (6200-3 hours). A spectacular camp spot can be found on a small hump at timberline a few hundred feet west of this tributary. Climb the spur immediately above the camp spot to a rolling rock ridge just south of a small unnamed glacier. Continue along this moraine-sprinkled ridge, detouring steep rock, to the top (7150) of a cliff. Below is the narrow snout of the White River Glacier. Drop several hundred feet to the southwest to find gullies breaching the cliff and cross the stream below the glacier terminus. Then climb a rounded rock dome west of the stream. A traverse of rubbly slopes immediately beneath rock slabs goes to a passageway that leads to the glacier. Contour on snow at the very edge of the ice around the side of a rock prominence. Beware of crevasses. This snow leads to the southwestern terminus of the glacier (6800-4 hours) where a broad platform is crossed by the glacial discharge stream. (An ALTERNATE ROUTE to White Pass begins here—see below.

Go west from the platform down steep heather and snow to ledges and down a narrow passage breaching the cliffs along the east side of

the Foam Creek cirque. Drop nearly 500 feet before starting the traverse of the cirque.

The rocks between Lightning and Foam Creeks are schists—some rich in flakes of mica and a few in black prisms of hornblende. In places tiny red garnets are easily found (Fig. 24). The schists are locally streaked by light-colored ribbons—dikes of various sorts. In the center of the Foam Creek cirque, more or less dividing it, is a light-colored rib of resistant granite extending up to a fortresslike summit (7587) (Fig. 3). The blocky look of the rock is due to the coarse jointing. [76]

Traverse the granite (6300) below the mightiest precipices and descend where necessary to avoid small cliffs. White-walled, heather-carpeted camping places are abundant. Once beyond the white cliffs of the granite, the going is easy. Near timberline (6000) on the spur between Foam Creek and the northwest branch of the White River, an old sheep trail contours westward to White Pass (5904-7 hours) over steep fields of lupine.

The ALTERNATE ROUTE to White Pass begins on the platform at the southwest terminus (6850) of the White River Glacier. Go up rock and scree on the spur leading to the 7700-foot peak on the Cascade Crest. Rock and snow and ice of the White Chuck Glacier and Glacier Peak dominate the view to the north. From the summit drop westward on the Crest to a saddle (7250) just east of the granite of Foam Creek mentioned in the standard route. It is an easy scramble along the divide to the summit of the granite peak (7587). From the saddle (7250) descend steep snow diagonally northwestward. Stay on the steep slopes above the flats of the crevassed White Chuck Glacier, and at the same time avoid possible crevices between the step snow and the rock. Drop below cliffs (about 7000) of the granite peak and descend into a high, moraine-filled basin (snow until late July) containing the lake at the terminus of WHITE CHUCK GLACIER. The DISAPPOINTMENT PEAK HIGH ROUTE can be joined near the lake.

On the north side of the granite peak, the contact between white granite and red and black mica schist is strikingly displayed. [77]

Continue around beneath the cliffs of the granite peak and climb back across the Cascade Crest at a saddle (6150) west of it. From the saddle drop to join (6000) the standard route described above.

Chiwawa River

The Entiat Mountains on the east and Chiwawa Ridge on the west join at the headwaters of the Chiwawa River in an arc of splendid high peaks, all relatively close to the road. The best scenery is in upper Phelps Creek and near Buck Creek Pass. The Little Giant Trail provides direct access to the remote Napeequa valley, although the longer Boulder Pass Trail from the White River is the better tread. Road mileages that follow are approximate. See Fig. 53 for availability of helpful surrounding maps.

Leave U.S. 2 at Coles Corner on State Highway 207 or travel north from Leavenworth on paved State Highway 209. The route from Leavenworth, although slower, is more varied and offers a glimpse of snowy peaks across the pastoral vale of Plain.

0.0 The beginning of the CHIWAWA RIVER ROAD (0.0) is just east of the highway bridge where State 209 crosses the Chiwawa River. Not far from the highway, the dusty road rounds a bluff that offers the only view of the lower Chiwawa, an area of rolling hills stretching out toward Lake Wenatchee.

[78] *Glaciers extending down the narrow valleys to the west and north once spread out and merged together over these hills.*

3.0 At DEEP CREEK (1.6) and GOOSE CREEK (3.0, forest camp) are lateral dirt roads which join and lead east over into the Entiat valley. Beyond, the Chiwawa River Road usually climbs steeply to detour a washout near river level; it then drops back down to Grouse Creek
8.4 Forest Camp (8.4).

[79] *At the washout on the main road, the river sparkles at the foot of a cliff of sandstone and black SHALE. Most shales form from muds deposited in the sea, but this shale formed in a lake, or swamp, for it contains here in these roadcuts the fossil leaves of trees and shrubs.*

The thick forest along the way, interrupted by logging roads and a large manmade meadow at Chickamin Creek (9.8), continues on to

the ROCK CREEK GUARD STATION (13.6) and a shady forest camp. **13.6**
From here a trail not surveyed for this guide climbs east via Basalt Peak to the scenic Shetipo-Garland-Pomas Trail along the crest of the Entiat Mountains. Behind the Guard Station is a wide view from a fine meadow, and on the banks of the Chiwawa River is the beginning of the SCHAEFER LAKE TRAIL (maintained yearly; approximately 3000-foot climb; 4.5 miles). From the meadows this trail winds along the bank to a crossing at a log jam. It follows the bottoms a short distance before traversing up the valleyside and climbing steeply up along Schaefer Creek to the lake.

Boulder-strewn flats announce Rock Creek Crossing Forest Camp (15.2) and the bridge over Rock Creek. The low route to the hinterland, **15.2**
the ROCK CREEK TRAIL, begins just downstream from the bridge; the high route, the ESTES BUTTE TRAIL, begins just above the bridge. Schaefer Forest Camp, on up the road, offers more campsites and beyond is the boundary of the Holden quadrangle (16.8).

The first glimpses of the alps, now close at hand, are from the pleasant riverside meadow at Atchison Flat (private). The road continues past a short lateral (19.1) that leads across the river to Maple Creek Forest Camp and the LITTLE GIANT TRAIL.

The PHELPS CREEK ROAD (22.2) climbs up northeastward about **22.2**
2 miles into the throat of the Phelps Creek valley and the beginning of the PHELPS CREEK TRAIL. Clear-cut logging near the end of this lateral road has opened up vistas of the crags of Chiwawa Ridge and Buck Mountain; this is by far the best view of the Chiwawa high country to be had from the road.

The spacious Phelps Creek Forest Camp (22.6) preludes the end of the main public road at the bridge over Phelps Creek (22.9). The public right-of-way continues across the creek and through private lands to the edge of the Glacier Peak Wilderness (24.4) and beginning of the **24.4**
CHIWAWA RIVER TRAIL. Along this stretch of private road are the ruins of Trinity and great banks of loose yellowish pumice.

The pumice has been flushed off nearby mountain sides where it [80]
showered during eruptions of Glacier Peak.

According to newspaper reports, Trinity was promoted by entrepreneurs in a copper mining venture. A tunnel 2 miles long was bored through Phelps Ridge (see the dump of biotite gneiss above the road), and a mill was built to concentrate copper ore, which was never produced in quantity. Since this splurge of optimism in the 1920s, the

mill has been smashed by the weight of winter snow. In the winter of 1953-54, for instance, 64 feet of snow fell on the flats here; enough to bury the houses and put the powerlines within a man's reach. Water from Phelps Creek powers the electric lights which burn day and night; James Creek is piped to fire hydrants that stand forlornly in the dusty field. Since 1950 a 70-year-old Vermonter has been looking after the property. At times he rents one of the few weatherbeaten houses to travelers. The caretaker has spent many winters here, snowed in and alone from November to May.

The best short trip from the Chiwawa River Road is a visit to scenic Spider Meadow via the Phelps Creek Trail—an easy 10 miles, round trip. The more ambitious can try steeper trails:

Estes Butte Trail to Estes Butte for grand views (5.2 miles round trip).

Carne Mountain Trail to Carne Mountain for geologic sights and good views (6.8 miles round trip).

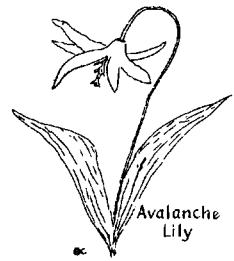
Little Giant Trail for an unusually varied route, drawing the persevering on to high meadows or even a view of the Napeequa valley from Little Giant Pass (9.6 miles round trip).

ROCK CREEK TRAIL

Maintained yearly (to about 8 miles)

4000-foot climb

10.7 miles



x ⅓

Only the last 3 miles of this forest-deep trail offer wide views and varied hiking. The first 2.9 miles of trail are not on the enclosed topographic maps. (See Fig. 53.)

The trail leaves the CHIWAWA RIVER ROAD just south of the
0.0 road bridge over Rock Creek (2515-0.0), switchbacks up the steep wooded hillside, and traverses along the precipitous wooded slope high above white water. Beyond a sheep driveway (going off to the right) and a stream with a woodsy camp spot, is the junction with the BASALT
2.3 PEAK TRAIL (about 3400-2.3), a route unsurveyed for this guide that leads up to the Shetipo-Garland-Pomas Trail along the crest of Entiat

Mountains. The main trail leaves the gorge of Rock Creek and enters the forested bottom of the hanging valley (3500-about 3.1). Camp spots have been scratched out of the duff where creeks come down through the woods. Past the sheep driveway (which reappears about 3600-5.3), the trail begins to climb steeply to reach the footbridge crossing of ROCK CREEK (4100-6.5). Here large glacier-carried boulders covered **6.5**
with fern and moss crouch in the dim forest. Small meadows appear as the trail climbs to the second Rock Creek crossing and a camp spot (4300-7.1). The meadows become larger, although somewhat brushy, and offer good camping, especially on the banks of Rock Creek (4600-about 8.4) where avalanches have cleared a good view of rocky Pomas **8.4**
Pass.

The good tread winds through wood and meadow until it reaches a jackstraw pile of small trees (about 5500-9.5); it may be hard to find a way through this avalanche track, but go west towards the low point at the head of the valley and cross Rock Creek (5700-about 10.0) for the last time. Switchbacks lead up to a traverse (6200) of grassy slopes below rock ribs; here a connecting route to Pomas Pass goes off to the east. More switchbacks lead up to the CARNE MOUNTAIN-LEROY CREEK TRAIL (6500-10.7). **10.7**

ESTES BUTTE TRAIL

Maintained yearly to the
Lookout on Estes Butte
5300-foot climb
1300-foot descent
8.3 miles

Figure 38

Cooling lava shrinks in direction of arrows.

"We are dancing on a volcano"
Comte de Salvanchy, 1830

Good views and geologic sights along this ridge-crest route to upper Rock Creek recommend it over the Rock Creek Trail.

0.0 From the CHIWAWA RIVER ROAD (2515-0.0), just north of the road bridge over ROCK CREEK, the trail crosses the bouldery valley floor before beginning a steep and rocky zigzag ascent. When the trail reaches the gentler ridge crest, (about 5000) it winds through open pine
2.6 woods to ESTES BUTTE LOOKOUT (5942-2.6), which is manned in July and August. From the saddle north of the lookout (water, down to the east) the trail becomes vague but continues up and down along the ridge to reach the base of the summit crags of OLD GIB MOUN-
4.6 TAIN (6000-4.6). The summit is an easy scramble up the ridge.

[81] *Out to the west, Chiwawa Ridge is scalloped by a row of bowl-shaped basins called CIRQUES. At one time glaciers filled these cirques, and at their heads, water freezing in cracks continually wedged out blocks which were incorporated into the glacier ice and carried away.*

The trail skirts the west side of Old Gib in trees and drops into a pleasant basin with campsites (6100-6.3) at the head of Willow Creek and below cliffs.

[82] *Old Gib is the neck of an ancient volcano (Note 86). The volcanic rocks of the summit spine are fractured and altered, suggesting the violence of eruption and activity of fiery gasses which once filled the red-hot throat of the volcano. Beautifully displayed in the lower cliffs of Old Gib are vertical rock columns. The joints bounding the columns formed when the molten rock cooled and shrank (Fig. 38).*

From the north end of Old Gib, the trail climbs nearly to the top of the ridge again and makes a long traverse toward Carne Mountain. It crosses a saddle in a major spur ridge and drops a few feet to the junc-
8.3 tion with the CARNE MOUNTAIN-LEROY CREEK TRAIL (6500-8.3).

LITTLE GIANT TRAIL

Not maintained

3900-foot climb

2300-foot descent

6.5 miles

This is a poor trail for horses but is a varied and scenic footpath to the Napeequa valley. It offers more spectacular views than does the Boulder Pass Trail. Mileages are approximate.

From the MAPLE CREEK FOREST CAMP (2650-0.0) the trail crosses dry gravels to the base of the mountainside. Long switchbacks soon give way to a steep track leading up to gentle slopes (4000-2.0) covered with huckleberry bushes. **0.0**

The gentle slopes mark the crossing of a broad linear zone of crushed and broken rocks along a fault (Fig. 3) that follows the western side of a graben along the Chiwawa valley (Note 86). [83]

A traverse and a steep rutted descent leads to LITTLE GIANT CREEK (4025-2.5) where brushy meadows offer tolerable camping. **2.5** From the crossing the trail climbs steeply in switchbacks through dense brush and trees to a rocky spur that leads plodding hikers or stumbling horses up to a small grassy nook and a campsite (5150-3.0). The trail here bears southwesterly and climbs up steep muddy ruts, finally escaping the highest trees. Long switchbacks lead up the grass to LITTLE GIANT PASS (6409-4.8) and views. Over Old Gib Mountain, to the **4.8** east, rise the snow-specked Entiat Mountains, and on the west is the deep-green recess of the Napeequa valley.

Rocks at the pass are red and brown schists and thin yellow and white layers of hard dense QUARTZITE (quartz sandstone). The Chiwawa Ridge crossed here at the pass is made of layers all sloping east—a hogback (Note 61). Note the many steps formed by the broken edge of [84]

the layers above the Napeequa and the smooth gentle slopes where the flat surfaces face the Chiwawa.

From the pass the trail winds down through cliffs. The flat upper reaches of the Napeequa valley, which may represent a filled-in lake, give way downstream to a narrow gorge where granite walls tower. On reaching the bottom of the mountain, the trail descends gradually northward across a conspicuous alluvial fan to meet the BOULDER
6.5 PASS TRAIL near the river bank (4275-6.5).

CARNE MOUNTAIN–LEROY CREEK TRAIL

Not maintained

4500-foot climb

3850-foot descent

10 miles

Half a dozen delightful timberline basins lie along this route; each has camp spots, meadows, westward views, and short scrambles to summit peaks along the Entiat Mountains. The Carne Mountain area offers much to the geology enthusiast. A short side trip to high Ice Lakes is feasible. Mileages are estimated beyond Rock Creek Trail.

0.0 The route leaves the PHELPS CREEK TRAIL (4600-0.0) just after it crosses a creek 0.2 mile above the end of the Phelps Creek Road. Switchbacks lead up through the woods and out (about 4500-1.5) on to rocky, south-facing slopes where there are glimpses of craggy Chiwawa Ridge through the shiny-leaved ceanothus. It may be hot here. As the last brush gives way to grass, the trail traverses to a stream and a substandard campsite (5600-2.1).

[85] *Before reaching the stream and campsite, the trail crosses outcrops of CONGLOMERATE that make small knobby bluffs above the trail (too small for the geologic map, Fig. 3). This sedimentary rock is made of sand and cobbles derived from the gneisses and granites that comprise the Entiat Mountains; cobbles and sand like these are found today in swift streams like the Chiwawa. In lower James Creek, which can*

be seen beyond Trinity, is a similar conglomerate and sandstone containing thin layers of COAL. Coal forms by burial of the mat of vegetation that accumulates in swamps; hence, swift streams from bygone mountains must have spread sand and cobbles over streamside swamps.

A few switchbacks lead from the stream up to a small meadow and a fine campsite (7150-2.4) nestled in the lap of Carne Mountain. Across the meadow, the trail skirts east of a larch grove where stands a monarch larch 6 feet through. Just below a saddle in the nearby spur to the south is the junction (6500-3.1) with the ESTES BUTTE TRAIL. 3.1
The geologic buff must climb to the saddle in this spur; others should go for the view. From the saddle, the unsurveyed and unused Old Carne Mountain Trail continues off to the southwest.

To the south, the rocky pillar of Old Gib rises from wooded slopes [86]
(Note 82). This now solid pillar of volcanic rock was the feeder tube of an old volcano and is called a VOLCANIC NECK. The old cone has been stripped away long ago.

The saddle here, and the one just west of Carne Mountain, were formed by erosion along a major fault—the longest one known in the region (Fig. 3). The rupture extends from just east of the sharp tooth, seen to the north at the head of Phelps Creek, through the saddles here on Carne Mountain, through the saddle just east of Old Gib more or less down Gib Creek, and on south through a whole line of saddles and valleys to Wenatchee 50 miles away. Just above the large mass of con-

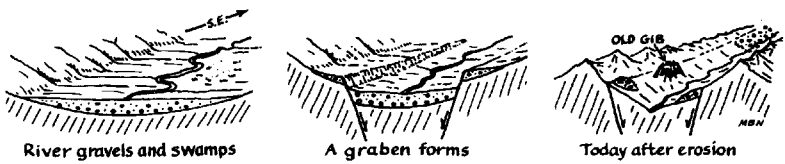


Figure 39

glomerate and sandstone that is seen as smooth tan cliffs low on the west side of the Chiwawa valley is another major fault (Note 83). This one extends to Leavenworth. The 50-mile-long block between these two major faults has been dropped down thousands of feet, and the down-dropped block is called a GRABEN (from the German for trench; Figs. 3 and 39). General erosion, denuding the land, takes longer to strip

away the sedimentary rocks in the lower and thus protected trench than it does the same sedimentary rocks which may have been outside it.

From the junction with the Estes Butte Trail, the Carne Mountain-Leroy Creek Trail traverses north, passes the junction of a trail leading 0.3 mile to a destroyed lookout, and ascends rocks to the PASS (6750-
3.4 3.4) south of Carne Mountain. The view from the mountain top is even better.

[87] *The movements along a major fault like the one just crossed are distributed over a broad zone. The granite here is laced with dark streaks; each streak is pulverized rock.*

Switchbacks lead down across steep meadows and under larch trees to a narrow gully with possible camping nearby. Coming up a steep
3.7 nose next to the gully is the ROCK CREEK TRAIL (6200-3.7). The main trail traverses up to the long flat divide between Rock Creek and Box Creek (6550-3.8).

North of this divide the Carne Mountain-Leroy Creek Trail is in poor condition and is in places better called an easy High Route. Descend through cool grass and larch at the base of talus and traverse the steep meadow to round a rocky nose (about 6400). Glacier Peak is now visible to the west. Go down to a rocky basin (6250-4.7) and up its lower edge to find blazes and vague tread leading down again into woods. Traverse a loose, rocky slope to a fork of Box Creek and camping (6200-
5.4 5.4). The route now climbs north in meadow up the basin of Box Creek. Ascend the west (left) side of the nose that bisects the basin and reach more fine meadows and camping (6500-5.6). Cross the main northernmost fork of BOX CREEK here and climb up through pumice-filled pockets to a saddle (7050-5.9) leading to Chipmunk Creek.

Tread remnants traverse slightly down to cross precipitous CHIP-
6.2 MUNK CREEK (6900-6.2). Below in the flat meadow (at 6600) is fine camping, and more fine spots are hidden near the stream 200 feet lower. The ICE LAKES HIGH ROUTE goes up Chipmunk Creek, while the Carne Mountain-Leroy Creek Trail rounds the next rocky spur (between 6700 and 6900). Do not go astray here by following false trails and blazes that lead on down from this spur to boggy meadows below. Continue instead on a high traverse across larch-studded and pumice-strewn slopes with abundant campsites to the next spur, where a high saddle
7.2 (6850-7.2) leads to Leroy Creek. Another branch of the ICE LAKES HIGH ROUTE joins here.

Descend steep heather and bouldery slopes on vague tread to a field of large blocks. Go down gullies and heather, bearing northerly to a lower bouldery meadow. Vague trails may go on down hill, but only the brush enthusiast is advised to follow these. Staying high above bluffs and brush, traverse northward across the talus fringing the cliffs of Mount Maude and up across heather and rocky knolls dotted with small trees. Continue to a grove of larger trees and descend through them to the flat-floored basin at the head of Leroy Creek (6000-8.4). **8.4**

There are some interesting side trips from nice campsites here: (1) directly up the creek to the pass (7250) looking over to Big Creek, to view the most inaccessible corner of the guidebook area and the giant cliffs of Mount Fernow—the third-highest nonvolcanic peak in the North Cascades; (2) up an easy rubbley ramp to the summit of Seven-fingered Jack (9077) and a breathtaking view of the upper Entiat basin (Note 99); and (3) a 2-mile hike to the northwest over the nearby spur (6900) and down to fine campsites in open timberline meadows (about 6700). Above the meadows a high lake (7250) lies hidden amid huge blocks and cliffs.

To descend to Phelps Creek, follow patchy meadows on a ridge along the south side of Leroy Creek past several campsites and pick up the ever-improving trail. Beyond the LEROY CREEK crossing (about 5400-9.0), a traverse leads out to rocks north of the creek and switchbacks lead steeply down to the junction with PHELPS CREEK TRAIL (4150-10.0). **10.0**

PHELPS CREEK TRAIL

Maintained yearly to Spider Meadow

3500-foot climb

7.8 miles

Spider Meadow, a mile long and encircled by variegated cliffs, lies at the end of this route; above the meadow, a rocky trail leads up to Spider Glacier, views, and high route connections. The route follows the old Phelps Creek Road much of the way.

The trail leaves the end of the improved PHELPS CREEK ROAD

0.0 (3500-0.0), drops across a stream and climbs into forest to the junction with the CARNE MOUNTAIN-LEROY CREEK TRAIL (3500-0.2). Beyond the crossing of Box Creek (3700-1.1), the gentle grade reaches Chipmunk Creek (3800-1.7), where a side road goes down to Phelps Creek and a fair camp spot. A mine shaft on the nearby hillside pierced down 1000 feet to reach a tunnel from Trinity. Tolerable camp spots are at the end of the old Phelps Creek Road near the banks of LEROY CREEK; the junction with the CARNE MOUNTAIN-
3.5 LEROY CREEK TRAIL (4175-3.5) is just across gravel bar and creek.

The valley trail, now in deep woods, reaches the vague PHELPS
3.7 RIDGE TRAIL (4180-3.7) near a large trailside boulder. It continues, rutted and steeper now, climbing up rocky meadows and crossing a stream (4500-4.9) before reaching campsites at the lower end of SPIDER
5.2 MEADOW (4700-5.2). The vast meadow stretches off toward a tooth-like crag and the cliffs of Red Mountain. The trail goes straight up the meadow to cross PHELPS CREEK (5000-6.1) and climb past a collapsed cabin (5100-6.3). Just above the cabin, where the main trail leaves the creek bank and climbs to the nearby cliff face, a path continues near the stream to abandoned prospect pits in the cliff-walled head of the Phelps Creek valley. The main trail adroitly winds up through the cliffs above the cabin and ends in the narrow rocky basin at the snout of
6.9 SPIDER GLACIER (6200-6.9). From the lip of this basin there projects a rocky, larch-dotted knob, offering some spectacular views and small camp spots; wood is scarce. There is no trail from here on, but a good route reaches Lyman Lake. Instead of plodding directly up the narrow snow-covered glacier in its dark defile, scramble up the crest of the low spur to the east and enjoy the view of the rugged Entiat Mountains. The
7.8 spur leads directly to the PASS TO RAILROAD CREEK (7050-7.8) and the junction with the FORTRESS HIGH ROUTE and the LYMAN GLACIER HIGH ROUTE.

[88] *The rocks on the spur just east of Spider Glacier display a most intricate web of white granites occurring in dark-colored gneiss. The light- and dark-colored ribbons of rock in places are swirled, and layers of dark gneiss within the white granite have pulled apart into trains of streamlined lenses. When the rocks formed deep in the earth, the dark layers behaved as if embedded in hot plastic dough.*

PHELPS RIDGE TRAIL

Not maintained

2500-foot climb

700-foot descent

5.5 miles

Marmot

The scenic camping near the top of Phelps Ridge and the grand views westward have been enjoyed mostly by herds of sheep that occasionally infest the route. The old trail is obscure but the route is easy to find. Mileages are approximate.

The trail leaves the PHELPS CREEK TRAIL (4180-0.0) and descends **0.0**
to Phelps Creek; a ford may be necessary. Then, in the fashion of a true sheepherders' trail, it switchbacks steeply straight up the mountain. Eventually it bears north (5350-1.0), still climbing, and leaves the trees for a narrow, rocky meadow on the west side of a stream. The tread becomes vague and follows up the rill to very pleasant camp spots (about 6000-2.0) just below a flat meadow (6150-2.2). From the upper end of the meadow, the trail, though here difficult to find, goes directly west
up to the crest of PHELPS RIDGE (6650-3.0). **3.0**

From the ridge crest, indistinct tread goes straight down the mountain to a sheepherders' camp (6300-3.2) tucked behind a screen of trees on a verdant bench. The route then contours north across steep meadow, drops to round the end of a rocky timbered spur (5900-3.9), and traverses more meadow to a derelict cabin. A short climb through trees leads to a grassy bench, past campsites, and to an abandoned road (6000-5.0). The road, a recent (1955) wound in these high meadows, traverses up to
the junction with the CHIWAWA RIVER TRAIL (6300-5.5), and goes **5.5**
on another 200 yards to its end against a red, rocky spur (6400-5.6) of Red Mountain. Easily reached from here is the FORTRESS HIGH ROUTE that traverses the nearby slopes of Chiwawa Mountain.

FORTRESS HIGH ROUTE

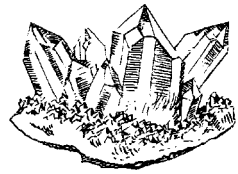
Intermediate

1800-foot climb

2800-foot descent

5 miles

3½ hours



Quartz crystals on Red Mountain — form rarely developed unless crystals grew in a cavity.

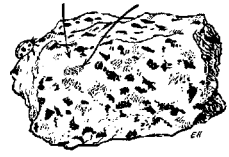


Figure 40

This route crosses the smooth rock benches round the head of the Chiwawa River and picks a way over the craggy south ridge of Fortress Mountain.

From the pass (7050) at the head of Spider Glacier (PHELPS CREEK TRAIL), climb up steep snow southward to rubble slopes. Cross talus, snow, and one rock rib on a traverse leading up to two sharp teeth on the ridge (7350-¾ hour) north of RED MOUNTAIN. The distant CHIWAWA RIVER TRAIL, a vague dent in red talus, can be seen far below where it climbs to small dumps next to prospect pits. The easiest route down to the west is found by going along the ridge a short distance toward Red Mountain.

[89] *Red Mountain is a mixture of breccia, granite, and black lavalike rocks spotted with square crystals of feldspar. These rocks are thought to protrude from the top of the large mass of granite lying beneath the surface here but exposed around Lyman Lake. As this granite cooled, molten rock and gases came up through cracks in the Red Mountain area and may indeed have reached the surface. Minute amounts of iron sulphide deposited by the gases promote weathering to a rusty red. Also deposited was quartz to be seen as small but nearly perfect prisms in open cracks (Fig. 40).*

To continue westward, descend to slopes above the small shelf (6300-1½ hour; possible camping) where streams converge to form the east

fork of the Chiwawa River. The Chiwawa River Trail can be reached from here by following a traverse that keeps above the tangled growth and leads southeast.

The Fortress High Route crosses (about 6400) the clean, smooth outcrops on the slopes of Chiwawa Mountain, where a feeling of spaciousness is given by the view down the broad valley. Campsites abound on grassy benches. Drop to round small rock ribs, but climb to cross (about 6700) the main SOUTH SPUR OF CHIWAWA MOUNTAIN. The southwestern slopes of this spur may be easily climbed to the summit and a fine view.

Ahead, a large broad spur divides the Chiwawa headwaters; cross this spur at the flat (6600-2 hours) where it joins the main slopes. From this elevation a likely looking route contours to an apparent passage around the end of cliffs swinging down in a long diagonal bend from the south ridge of Fortress Mountain. It is a good route for fully equipped rock climbers, but an impossible one for hikers. However, the deceptive passage is a good marker for the easy route which passes just below it. To proceed, descend southwesterly some 700 feet to the base of cliffs at the head of Chiwawa River west fork. There is camping below in a flat basin. Contour the ankle-twisting slopes (about 5900) below cirque cliffs and climb westerly at their base up steep grass to just below the above-mentioned false passage (6500-2½ hours).

Turn south here to climb up and across moraine and then steep heather. Head toward two sloping grassy ledges in the spur ahead, go up along the lower one, and climb 50 feet up a steep heather gully to the spur top. Climb straight up rocky draws or adjacent heather to a large talus hidden just above. From the top of the talus, climb to the top of the cliffy spur that bounds this talus on the south. Go up the heather-carpeted spur crest and traverse a heather-covered bench south to the low pass (7200-3 hours).

The weathered red of schist and gneiss on Phelps Ridge (Note 89) contrasts strongly with the grey granite of the high summits of the Entiat Mountains far to the east. [90]

Descend now in Buck Creek drainage, straight down the grassy slopes, across talus, and down draws to the MASSIE LAKE HIGH ROUTE which crosses the big meadows below (6050-3½ hours).

x ⅓

Gentian (blue)

CHIWAWA RIVER TRAIL

Not maintained

3800-foot climb

6.0 miles

The lower end of this trunkline is confused and spoiled by roads. There is nice camping near the end of the trail and the route serves to reach several scenic high routes.

0.0 From the end of the CHIWAWA RIVER ROAD (3094-0.0), about 1.5 miles above Trinity, the trail follows a primitive road closed to motor vehicles and enters the Glacier Peak Wilderness. A fork of this road branches up the hillside (3175-0.3) and goes on to rejoin the Chiwawa River Trail near its very end on Red Mountain. The road was built in 1955 to allow intensive prospecting on mining claims; this has never been done.

Beyond the prospecting road, the trail crosses many steep draws cutting the fern-carpeted forest and reaches the junction with the BUCK
1.4 CREEK TRAIL (3350-1.4). Go down a short distance to the Chiwawa River bridge and enjoy the cool and rushing water before returning to climb steeply up into the upper Chiwawa valley. Above the steep climb the trail passes just below the prospecting road before reaching a brushy meadow (4000-2.3; poor camping). Here, beneath the awesome brush on the slopes of Phelps Ridge, the trail passes close to a rock slot where rapids boil. On upstream, across grassy hillsides, is the junction with
3.3 MASSIE LAKE HIGH ROUTE (4250-3.3). The way becomes steeper and the forest thicker. A grassy bench at the foot of a sloping meadow (4925-4.6) offers fine camping overlooking the brushy, boggy river bot-

toms. The ramparts of Fortress Mountain and Chiwawa Mountain are close.

The trail climbs across the sloping meadow into the trees, switchbacks past a prospector's shack and foul campsites and on up open, rocky meadow to the prospector's road (6850-6.0). The road ends 200 yards **6.0** further on against a ruddy rib of Red Mountain. The PHELPS RIDGE TRAIL leaves the road half a mile to the south and leads directly to nice camp spots. Westbound travelers on the FORTRESS HIGH ROUTE (and those looking for nearby camping) should round the spur on the rubbly trail and climb slightly. A traverse leads north-northwest above brushy bluffs to reach tiny basins (6900). Eastbound traffic can climb on up the trail past prospect pits directly toward a conspicuous tooth in the ridge above.

BUCK CREEK TRAIL

Maintained yearly

2500-foot climb

6.2 miles

> "And oh if there be an Elysian on earth,
> It is this, it is this!"
>
> Thomas Moore, *The Loves of Angels*

The roof gardens on the Cascade Crest at Buck Creek Pass are a sudden and splendid climax to this valley-bottom route.

From the end of the Chiwawa River Road take the Chiwawa River Trail to its junction with the Buck Creek Trail, which drops directly to the bridge over CHIWAWA RIVER (3300-0.0). The trail winds up over **0.0** glacier-rounded rock and forest-covered hummocks, across a stream (bridge and tolerable camp at 1.2) and up to a brushy meadow (4250-1.9). Here is a view of the black north face of Buck Mountain, often seeming with mountain goats near the tiny glaciers. The forest continues most of the way to the first crossing of BUCK CREEK (4500-3.6). Beyond are two more crossings and numerous small meadows. The trail leaves the last one (4900-5.0) and begins an earnest climb.

The small trickle of Buck Creek winds through the hummocky green park of the pass and round the groves of dark somber evergreens. Where

5.9 the trail enters the park and comes to the edge of this rill (5650-5.9) is MASSIE LAKE HIGH ROUTE descending from trees to the northeast. The main trail leads on up (past a branch trail that ascends northward
6.2 on its way to Middle Ridge) to reach BUCK CREEK PASS (5800-6.2), marked by a bevy of signs and a table and junctions with HIGH PASS HIGH ROUTE, TRIAD CREEK TRAIL, and MINERS CREEK TRAIL. The High Pass High Route begins as a good tread going south. It leads in a few yards across a stream (camping), by tables and an old cabin, and on to other campsites below Liberty Cap.

If beset with blowing fog at Buck Creek Pass, the chances are excellent that it is a thin tongue shooting out from a vast sea of cloud to the west. To behold this sight and chance a wide view in sunshine, climb up Liberty Cap or Helmet Butte. For a most impressive view of Glacier Peak, stroll out along the Miners Creek Trail and out onto Flower Dome.

[91] *The rock on Liberty Cap is black hornblende schist. Look closely for minutely crinkled layers attesting to intense compression. The rock on Helmet Butte is old white granite that was not crinkled by compression but streaked-out into a gneiss.*

MASSIE LAKE HIGH ROUTE

Intermediate

1400-foot climb

2300-foot descent

6 miles

4 hours

Sheepherder's Camp

The tread along the old trail followed by this route is poor but does help guide the way. Along it are south-facing meadows not so often

dampened by mists as those near Buck Creek Pass; they are lushest early in the season.

Begin where the BUCK CREEK TRAIL (5650) reaches the small stream just below Buck Creek Pass. Ascend steeply eastward through the trees and traverse up to the rocky south shoulder of Helmet Butte. Cross the shoulder (5900) just below the rocks and descend a tongue of steep meadow. Near the lower end of the open slopes, a traverse (5600) leads through a gap in a string of big trees and on below patches of alder and above talus. The vague tread soon climbs directly toward the craggy summit of Fortress Mountain and follows a watercourse to the large meadows (5800-1 hour) below Pass No Pass. If the name seems inappropriate, climb to the brink overlooking Small Creek.

From the meadows, ascend grassy slopes eastward and traverse (6100) the steep, rocky hillside. Pass below cliffs and descend slightly to an extensive meadowed bench (about 6050-1½ hours) bisected by a grove of trees and offering campsites. The FORTRESS HIGH ROUTE ends here.

At the south end of the meadowed bench, cross the grassy spur ridge between bluffs (6050). Go southward, straight down through trees to a slide and a stream crossing (5800). Climb out past a tolerable campsite and round the next broad spur (5850) in an old burn. The vague tread leads past the next small basin and campsite (5950-2½ hours) and up by a prominent ROCK KNOB (with a campsite nestled close below). Climb up behind the knob to a rock-strewn basin (6100) and the last good camp on the south side of the main ridge. Cross the rocky basin and traverse steep meadows to the base of small cliffs. Blazes by confused pathfinders contour along the hillside from here. The best route climbs up a broad brush ramp bounded by rock ribs. This route through the cliffs emerges on grassy slopes and traverses (about 6500) to the crossing of the MAIN RIDGE (6500-3 hours), south of Massie Lake.

Looking at the black schist cliffs of Buck Mountain, one can easily pick out a distinct white layer flanked by smaller white layers. These layers, large and small, are of granite that, when molten, squeezed in between the schist layers. Such an intrusion, parallel to layers in its host, is called a SILL. Out to the west, near High Pass, the granite has engulfed or pushed aside the schist altogether, forming a large irregular stock (Fig. 3). [92]

Traverse north on the side of the ridge, down meadow, and turn more steeply down the side of the nearby spur. To reach Massie Lake, cross

this spur on a vague tread in rocks (6100). After crossing a stretch of heather-carpeted woods, the vague side trail drops to the small meadow leading north to campsites near the outlet of MASSIE LAKE (5950-3½ hours).

The main route to the Chiwawa River goes southwestward from the aforementioned spur straight down a steep meadow. Drop into a steep stream course on the south (5750) and descend it to reach open woods where the tread may be found. Descend through the woods just north of a giant brush slope. On reaching boggy bottoms the trail turns upstream to cross the CHIWAWA RIVER and joins the CHIWAWA RIVER TRAIL (4750-4 hours) on the opposite bank.

Entiat River

0.0 The town of ENTIAT (0.0) at the junction of the Entiat River Road and U.S. 97 has service stations, limited shopping, and ENTIAT DISTRICT HEADQUARTERS of the FOREST SERVICE.

The valley of the lower Entiat River is flat and broad, sustaining irrigated farms and orchards; dry pine-forested hills rise up on either side. There is a service station near the lumber mill at ARDENVOIR (9.4). Several spur roads and many lateral trails along the road are all well marked by the Forest Service. The pavement ends at 19 miles. BRIEF (21.7) is just that.

28.5 The LAKE CREEK ROAD (28.5) goes over Chelan Summit via innumerable hairpin curves to reach the Twenty-Five Mile Creek Boat Dock on Lake Chelan (28.0 from the Entiat). From Shady Pass (8.0) at the summit, a road leads north (left) to PYRAMID MOUNTAIN TRAIL and Big Hill Lookout. At the junction on the Entiat, the Forest Service has provided an attractive sign and a map of recreational byways, and there is a view of the Entiat Mountains.

Silver Falls Forest Camp (29.5) is large and shady. Take a short hike on SILVER FALLS TRAIL (0.8) for a cooling ramble over picturesque bridges in a woodsy glen. Silver Creek tumbles over polished white granite which makes up the cliffs along much of this valley side.

The North Fork Forest Camp is at the junction of the NORTH FORK

ENTIAT RIVER ROAD (32.4). This road, probably the dustiest in the North Cascades, delivers the hiker to trail heads: POPE RIDGE TRAIL and NORTH FORK OF THE ENTIAT RIVER TRAIL. **32.4**

The Entiat Road crosses the NORTH FORK (32.5) and passes the DUNCAN HILL TRAIL (32.7; look sharp for the sign is hard to see). **32.7** Beyond, on the west side (left), are the beginnings of the Klone Peak Trail and Three Creek Trail (33.7); either can be used to gain the Entiat Mountains. The road passes on to shady Spruce Grove Forest Camp (34.4) and Three Creeks Forest Camp (35.0). A view of Devils Smoke Stack opens up on the left as the road descends by banks of pumice to COTTONWOOD FOREST CAMP (37.0). Here, among small pines on **37.0** gravelly flats, are numerous sites, each with tap water, tables, fireplaces, and toilets. The gentle Entiat River flows through the middle, and the COTTONWOOD GUARD STATION with telephone is nearby. The SHETIPO-GARLAND-POMAS TRAIL begins here.

The dry pine forests of the lower elevations in the Entiat Mountains merge into more Elysian larch groves higher up. The following one-day trips take the hiker into larch and mountain meadows:

Pyramid Mountain Trail out from Big Hill Lookout for an easy hike of any length offering many views.

Duncan Hill Lookout via the Anthem Creek Trail for a good view after a long climb (5.3 miles each way).

Cow Creek Trail to the meadows or Cow Creek Pass for pastoral or alpine views (about 2.5 miles each way).

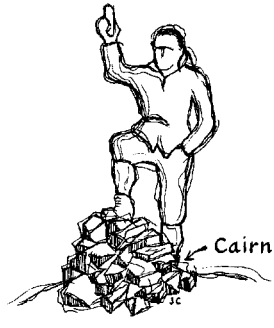
PYRAMID MOUNTAIN TRAIL

Maintained periodically

3700-foot climb

4450-foot descent

16.5 miles



Many high meadows, larch groves, and expansive views make this route along the crest of the Chelan Mountains one of the finest in the Entiat watershed. Several summits of the Chelan Mountain crest are easy scrambles from the trail, which nowhere drops below an elevation

of 5700 feet. Try a round-trip tour including Emerald Park, Lucerne, and a boat trip on Lake Chelan. The trail begins southeast of the Lucern quadrangle. (See Front end paper.)

0.0 The trail leaves the road to BIG HILL LOOKOUT (6500-0.0) on the next to the last switchback, about 0.2 mile below the top, and traverses grassy hillsides to the ridge crest (6550-0.4) at the head of Silver Creek. Here is a junction with the first of several abandoned trails—see below. The way continues to the junction with the POPE RIDGE TRAIL,
2.0 reached just before a saddle in the crest (6900-2.0) at the head of Crow Creek. To the east, 900 feet below in Corral Creek, is a sheltered meadow for camping.

[93] *Here the rocks are dark, hornblende-bearing schists, and in them, just up the crest to the east, is a marble layer. These schists extend far to the north (Note 94 and Fig. 3) as a narrow band. To the west and south is a large granite mass—note the white rock shining on nearby Silver Ridge. The rounded granite summits have not necessarily been glaciated. In dry climates such as this, granular rocks like granite disintegrate into coarse sand, and sharp corners (bounded by joints) become rounded off.*

Beyond the saddle, the trail traverses the grassy slope of CROW HILL; switchbacks descend to a spur on the west where the marked
3.3 but poorly defined BUTTE CREEK TRAIL (6425-3.3) heads off through meadows down a spur.

Between the road and the Butte Creek Trail junction, several abandoned trails marked by old signs and vague treads join the route. The Corral Creek Trail (a direct route in forest down to Lake Chelan at 0.4) is rarely maintained; escalading explorers should get off the Lake Chelan boat at Corral Creek. The Silver Ridge Trail (1.7) and Crow Creek Trail (2.0) that come up from the Entiat side are abandoned and blocked by hideous brush and blowdowns.

Beyond the Butte Creek Trail junction, the trail ambles through scattered groves (past a branch of the abandoned Corral Creek Trail—see above) to reach the first good campsite (6450-4.2) and the first water since the road. Beyond another camp spot, the way climbs rubble slopes almost to the top of GRAHAM MOUNTAIN (7292), passes the abandoned Graham Harbor Creek Trail (another unexplored route to Lake Chelan lost in blowdown, labeled: "Lake Chelan 8") and descends to the ridge crest (6650-5.8); here is a startling view down to Lake Chelan. The trail passes meadows and camp spots (6650-6.1) and traverses

rubble to the junction with PYRAMID MOUNTAIN LOOKOUT TRAIL (6850-6.7). Down the main trail and just across a small creek (6100-7.5) is the junction with an unmarked lateral (poor tread) that leads straight up to join this lookout trail in meadows. **6.7**

The Lookout Trail goes to meadows with camp spots (6700-0.7 mile from either junction) and climbs bare rocky slopes to the grand viewpoint at the abandoned lookout on PYRAMID MOUNTAIN (8245-about 2.3 from junction). A fine secluded camp spot on Pyramid Creek overlooking Lake Chelan is a little over a mile from the meadows. To reach it, climb northwest from the meadows to the saddle on the crest (6850) and then up the crest toward Pyramid Mountain to a flat (7050). Descend straight down the steep rocky gully leading north to reach the camp spot (5050) suspended far above the lake.

On meadowed hillside, the main trail descends to uninviting Three-Spruce Camp (5840-7.9) on South Pyramid Creek. The SOUTH PYRAMID CREEK TRAIL comes up the valley some 75 yards below the camp. **7.9**

The trail winds up along the south fork to ever-improving meadow and scenery. It crosses the creek (5900) at pleasant Skookum Camp, goes on to Camp Ann (6250-8.9), and ascends amid billowy outcrops to a small flat meadow. Where the stream exists the meadow, the PUGH RIDGE TRAIL (6500-9.3) goes off to the southwest on larch-studded benches. Northeast (right) across the meadow, the Pyramid Mountain Trail climbs to the summit of PUGH RIDGE (7150-9.9). **9.3** **9.9**

To reach another splendid camp spot, perched a vertical mile above Lake Chelan, traverse north from the summit of Pugh Ridge (7150) to a narrow saddle (7190) at the crest of the Chelan Mountains. Descend northeasterly to gentle slopes (6600) and bear east down to the meadows on a branch of the SOUTH FORK BEAR CREEK (6150; about 2 miles from the summit of Pugh Ridge).

From Pugh Ridge the trail drops to GROUSE CREEK (6600-10.8) and a campsite just beyond. A traverse leads to a sharp spur with views down the timbered valley, then across a dry and rocky hillside of dark schist, past dreary Devils Camp and finally to the junction with NORTH FORK OF THE ENTIAT TRAIL (6550-12.6). Now at hand on the west side of CARDINAL PEAK are broad meadowed benches and many splendid campsites. The trail climbs (6100-13.6) in woods, and through the rocks near tinkling cascades, to a tiny rocky meadow (6850-13.8 camping) nestled between Saska Peak and Emerald Peak. **12.6**

Over the crest nestles another gem of a high basin, below Emerald Peak and hard by the fangs of Bearcat Ridge. It can be reached in an

hour from the trail by climbing east to a crest saddle (7650) and dropping down to the extensive flats (7000).

On up across meadow, stream, and boulder-strewn grass is the divide (7450-14.6) to Snow Brushy Creek. Down to the northwest, across a rock slide and west down a watercourse, is Snow Brushy Creek, and across
16.5 it is the SNOW BRUSHY CREEK TRAIL (5760-16.5).

POPE RIDGE TRAIL

Not maintained

2500-foot climb

About 3.0 miles

Even though logging has obliterated its lower end, this trail is still one of the best direct routes from the Entiat River to the crest of the Chelan Mountains.

From just below the end of the NORTH FORK ENTIAT ROAD, a logging road (do not stray onto the steep laterals) leads via three switchbacks to about 4500 feet on the nose of POPE RIDGE. Go straight up through the slash to open yellow pine and search for the trail tread
0.0 (about 4600-0.0). The switchbacks lead easterly to round the nose (5250-0.7) and traverse steadily up to the broad crest of Pope Ridge (6100-1.8). Up along the crest through the scattered trees and granite outcrops is
3.0 the junction with the PYRAMID MOUNTAIN TRAIL (6950-3.0).

NORTH FORK OF THE ENTIAT TRAIL

Maintained yearly

2600-foot climb

8.1 miles

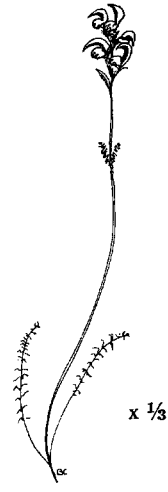
The upper reaches of this trail provide some pretty mountain scenery and access to rarely visited Fern Lake.

0.0 From the parking space at the end (3950-0.0) of the NORTH FORK ENTIAT ROAD, the trail descends steeply into CROW CREEK (0.1)

and climbs the northern bank to the abandoned Crow Creek Trail (marked with a metal sign). Travelers insistent on climbing to the Chelan summit along the Crow Creek route had best go straight up through brush and windfall rather than follow the old switchbacks through even more brush and windfall.

The North Fork of the Entiat Trail continues through second-growth forest to South Pyramid Creek (3975-1.1) and climbs to a junction with the SOUTH PYRAMID CREEK TRAIL (4050-1.2). The North Fork of 1.2
the Entiat Trail then continues steadily up past a small stream and trail camp (4350-2.7) to the PUGH RIDGE TRAIL junction (4350-2.8).

The small meadows that now begin to dot the route are a welcome relief from the dense, dry woods below. The trail passes Camp Isabel in trees a little off to the west and reaches GROUSE CREEK crossing (5050-5.4) in dismal, dead forest. An occasional meadow continues to delight, but fair campsites are few and fine ones absent. To reach FERN LAKE, cross the North Fork at a meadow opposite the outlet stream (5250-6.3) and go straight up steep slopes just north of the stream on 6.3
a fair trail. The North Fork of the Entiat Trail climbs switchbacks (5650-7.3) through trees to the junction with PYRAMID MOUNTAIN TRAIL (6550-8.1). The hiker who has persevered this far will find large mead- 8.1
ows and views a short distance north along this trail.



"Birdsbeak" pedicularis

SOUTH PYRAMID CREEK TRAIL

Maintained yearly

2800-foot climb

3.9 miles

There is little but thickets of small trees along the lower parts of this trail, but it is a shorter route to scenic high meadows than the North

Fork of the Entiat Trail, and it is the most direct route from the Entiat River to the fine viewpoint on Pyramid Mountain. The name South Pyramid Creek is confusing, for this creek joins the Entiat River while Pyramid Creek drains into Lake Chelan.

0.0 From the NORTH FORK OF THE ENTIAT TRAIL (4050-0.0), the South Pyramid Creek Trail climbs up a rocky alluvial fan and traverses a dry hillside thickly furred with pine. Across South Pyramid Creek (4600-1.2), the tree thickets continue to BUTTE CREEK (4850-about 1.7).
1.9 Nearby the dusty draw of the BUTTE CREEK TRAIL (4850-1.9) leads up.

The trail crosses South Pyramid Creek again, then climbs steadily to reach a small bouldery meadow and sheepherders' camp (about 4900-2.2). Beyond a second South Pyramid Creek crossing is a meadow at the base of a large avalanche track coming down from the west (about 5200-2.7). A mudhole (3.0) must be negotiated to reach Eyraud Sheep Camp (5500-3.2) in meadow and brush, and finally patchy meadows and
3.9 the junction of the PYRAMID MOUNTAIN TRAIL (6850-3.9).

BUTTE CREEK TRAIL

Maintained periodically

1600-foot climb

3 miles

This trail climbs rapidly to the crest of the Chelan Mountains and, except for the Pope Ridge Trail, is the most direct route to the meadows along the Chelan summit.

The trail cuts back to the southeast as it leaves the SOUTH PYRA-
0.0 MID CREEK TRAIL (4850-0.0); there are many sheep-worn paths through the dry woods. The way enters an old burn and ascends loose pumice along Butte Creek. There may be a few logs down here. Across BUTTE CREEK (5050-0.5; no camping) the trail is steep and gullied in open woods. Once on the spur crest (6075-2.0) the way becomes rocky, and, after winding a short way up the exact crest over shattered ribs of biotite schist and marble, goes onto the south side (6400-about 2.5)

where it may be hard to find. Look for blazes and continue climbing gradually across meadows and through small clumps of trees to the saddle (possible camping) where the PYRAMID MOUNTAIN TRAIL (6450-3.0) crosses the spur. **3.0**

PUGH RIDGE TRAIL

Maintained periodically

2750-foot climb

600-foot descent

5 miles

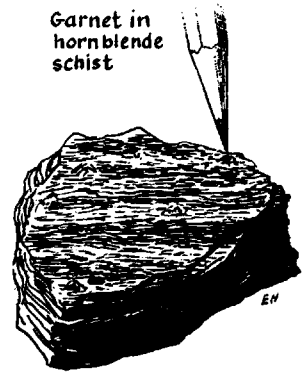


Figure 41

For the ridge lover, this trail offers a better route to the high meadows, albeit with more ups and downs, than the North Fork of the Entiat Trail or South Pyramid Creek Trail. It crosses some interesting rocks.

From the NORTH FORK OF THE ENTIAT TRAIL (4350-0.0) the route starts up switchbacks through a dead pine thicket. A cool creek at the end of the switchbacks (5100-1.0) parallels the trail up a partially meadowed basin (last water) leading to the ridge top (6600-3.1). **0.0**

The trail follows the rocky ridge crest, traversing reddish-brown biotite schist (Note 93) with thin beds of dark hornblende schist (Fig. 41) and rounded ribs of whitish marble (Fig. 33). These metamorphosed sedimentary rocks, once sands and muds, are cut by many light-colored dikes which stand out as bold ribs on the east side of the ridge. [94]

The way continues along the exact crest, then down a short descent (7000-4.6) into the meadowed cirque of South Pyramid Creek and the junction in a small flat meadow with the PYRAMID MOUNTAIN TRAIL (6500-5.0). **5.0**

DUNCAN HILL TRAIL

Maintained periodically

6200-foot climb

3800-foot descent

16.5 miles

x ⅓

Bistort

"Rough quarries, rocks and hills
whose heads touch heaven."
Shakespeare, *Othello*

This is a long but rewarding trip; it can be shortened via the Anthem Creek Trail. Small and large meadows offer a variety of splendid campsites, and from Duncan Hill Lookout, a short side trip, the view is unique. The trail starts south of the Lucerne quadrangle.

0.0 The trail leaves the ENTIAT RIVER ROAD (about 2600-0.0) and climbs a comfortable steady grade on switchbacks through open ponderosa pine forest carpeted with grass and fern. There will be no water for nearly 7 uphill miles. Zigzags near some rounded outcrops of gray granite climb onto the flat ridge crest (4700-2.7).

The trail wanders up and down along the ridge through thickets and through an old burn (5100; down trees). Now and then the Entiat Mountains show through the trees. A small waterless meadow (5325-4.8) heralds switchbacks climbing to the first good VIEWPOINT (5849-5.5). On up the dry ridge top, the trail swings to the west (left) to reach,
6.6 at last, a large meadow with camping by WATER (6050-6.6). In late fall, water can be found beyond the first expanse of meadow in a trenchlike channel beneath scattered trees. The tread is hard to follow across the meadow; look for blazes on the far side, to the right and near an old grey log.

The way climbs slightly, trending west, to another meadow and a larger stream (6200-6.9). Pass west of this meadow in thin forest to find switchbacks on a rocky hillside where myriad game trails make the

tread hard to follow. Continue up the rounded shoulder; scattered, gnarled trees are blazed. The top of Duncan Hill, crowned by the lookout, will soon appear. At a prominent shoulder (7300-8.4) under the **8.4**
rocky summit pyramid, the trail leaves the ridge and cuts in airy switchbacks across the precipitous southwest face.

Here dark-colored rocks rich in hornblende contrast sharply with the light-colored granite. Northwest on gentler slopes is the DUNCAN HILL LOOKOUT TRAIL (7400-9.0) which leads to the summit and a **9.0**
fine panorama. The lookout is manned July to August and during the hunting season.

In the first pronounced gully (9.1), just north of the lookout trail junction and slightly below the trail, is the lookout's water supply. Below, where the trail switchbacks near the same gully (6800-9.7), are lofty campsites on small rocky ledges. Farther down, the trail enters a grove and swings north on a long dusty tack to the ANTHEM CREEK TRAIL junction (5900-10.7). **10.7**

The Duncan Hill Trail descends past a stream (5800-11.0) and tent spot and traverses to ANTHEM CREEK (5950-11.8), which flows between grassy banks. Here are fair campsites in the bumpy meadows. Up the creek some 150 yards, the trail strikes up to a slide where it vanishes. Above is the saddle (6850-13.0) leading over to Choral Creek. **13.0**

To reach isolated upper Anthem Creek and views into FERN LAKE or CHORAL LAKE, leave the trail below the saddle (about 6500) and traverse to the east, skirting talus; climb easy slopes to the saddles above the lakes.

The steep Duncan Hill Trail descends from the saddle above Choral Creek to a bench below talus; the heather thrives under the larches on this cool north-facing slope. The way drops just west of a steep wet meadow until it crosses the waterway and enters trees opposite. A traverse leads down to the CHORAL CREEK crossing (5950-14.2) in narrow meadows. The best campsites are in a big meadow at the next crossing below (5850-14.7). The trail crosses Choral Creek a third time and descends switchbacks east of the roaring creek; locally it is wet and boggy. Across Snow Brushy Creek (4950-16.4), a switchback climbs the steep bank to the SNOW BRUSHY CREEK TRAIL (5000-16.5). **16.5**

SHETIPO–GARLAND–POMAS TRAIL

Maintained yearly
6800-foot climb
5600-foot descent
21.3 miles

Figure 42

PUMICE FRAGMENT
(mostly holes)

Although the long climb to the divide of the Entiat Mountains is tedious, once there, this route rambles along the crest near timberline providing wonderful vistas for many miles. Lateral trails can be used to shorten a full circuit back to the Entiat Road. Several summits, including Garland Peak and Fifth of July Mountain, can be climbed from this ridge-crest route. Part of the route is south of the Lucerne quadrangle.

The Shetipo Creek Trail leaves the COTTONWOOD FOREST
0.0 CAMP (3075-0.0) just west of the bridge. It climbs an alluvial fan before crossing Shetipo Creek and switchbacking up through dry thickets. Several seasonal streams are crossed before a good drink (4400-1.9) is reached. Just above, the trail leaves the Lucerne quadrangle. Beyond another stream and past an avalanche scar with new trees is SHETIPO
3.5 CREEK (about 5200-3.5). Across it is a barely adequate camp spot near patchy meadows. Above a few muddy stretches (made worse by trail scooters) the trees thin and the larch appears as the trail reaches mead-
4.5 ows (4.2) and finally the junction with the divide trail (about 6300-4.5; MAD RIVER TRAIL to the south; GARLAND PEAK TRAIL, to the north, right).

Up along the Garland Peak Trail on a gravelly ridge top (Note 93), snow-covered peaks to the west are on view: Clark Mountain left, and Glacier Peak right. To the southwest the forested Mad River valley wanders off in the haze; northwest are the upper reaches of Rock Creek. The trail descends into a saddle, then climbs up and across a rocky slope of granite.

[95] *The granite here contains greenish hornblende, and much of the rock has a rather greenish, sickly hue. This is an elongate mass of rock, per-*

haps intruded during metamorphism. The original hornblende has been altered to the green mica, chlorite.

The trail leaves (about 6500-6.7) the rocky open slope and descends through pine and larch to a dry saddle (6125-7.0; southern edge of Lucerne quadrangle) overlooking Garland Creek to the east. About 100 yards west of this saddle (several beaten paths) is Pinto Camp: a scrubby meadow, a muddy unappealing spring, and plenty of wood for a fire. 7.0

Dusty switchbacks begin (6200-7.5) and climb to a long traverse of GARLAND PEAK, which is an easy scramble from the trail. The views to the west continue to compensate for the many dry miles. Back to the southwest the Chiwawa and Wenatchee River valleys are in full display. Some 900 feet below on the west are flat grassy meadows for camping. An abandoned trail down to them is hard to find, but the meadows are easily reached without it.

The trail descends to a saddle (7000-9.0) west of Garland Peak, then climbs again up tiresome raveling slopes of pumice, spotted with tangles of alpine trees. Keep on the ridge crest and the tread will appear as the ridge levels out into a great desert of pumice (9.7).

Here is a truly marvelous accumulation of pumice (Fig. 42) considering the distance (19 miles) the fragments have been blown from Glacier Peak volcano. [96]

On a flat summit, the highest point on this route, is the marked junction with the BASALT PEAK TRAIL (7450-9.8). North across the flat the trail is obscure until it descends northwest (left) in a few short switchbacks. Sharp and rugged DEVILS SMOKE STACK is now in view. Just past the Stack, a short detour to the ridge crest (7100-10.5) brings a view of the awesome north face. Note the huge accumulation of talus at the base. RAMPART MOUNTAIN is an easy climb from here. 9.8

The trail goes westward along the south side of Rampart Mountain and drops slightly to a sheepherders' camp (7000-10.9), high and dry on a spur. In early summer small gullies below may contain water. The trail zigzags down this spur, then swings north under cliffs, and finally pulls into a secluded and pleasant meadowed basin: Ravens Roost Camp (5850-12.0). Here is the first good stream for many miles. From the meadow the trail climbs on gentle switchbacks through scattered larch to reach COW CREEK PASS (6950-about 13.5). 13.5

The tiring 1100-foot descent on the west side of Rampart Mountain can be avoided with a bit of cross-country scrambling. This bypass is not

a route for heavy pack or tender foot. From above the sheep camp (7100-10.9), climb up scree and talus to the notched western shoulder of Rampart Mountain. A deep notch (about 7450) on this shoulder leads to steep scree and talus that can be descended to reach glacier-carved benches below the northwest face of the peak. Traverse northward on these benches to the ridge crest and descend to regain the trail at Cow Creek Pass.

From the pass the trail is obscure. Do not descend directly to the Cow Creek side, but climb the ridge northward 150 feet; the tread becomes better where the trail leaves the ridge (7100). FIFTH OF JULY MOUNTAIN is an easy walk up the crest and will complete any of the 360° view missed so far.

The trail goes down rocky ledges of hornblende gneiss and traverses
14.1 in trees to the junction with the COW CREEK TRAIL (6500-14.1). On the spur and near the trail just below this junction are limited camp spots (plentiful water and wood). A long traverse to a short climb onto a spur (6350-14.9) brings a tantalizing view of upper Larch Lake. Down the spur, the trail turns west to the meadowed basin above UPPER LARCH LAKE and reaches the junction with the LARCH LAKES
15.9 TRAIL (5750-15.9).

The trail climbs to a small streamcrossing and on to a pleasant meadow (6050-16.4; camping). It enters trees and begins a steeper climb that ends in three long switchbacks going up precipitous meadow to LARCH LAKES PASS (6450-about 16.9) atop the Entiat Mountains. The track leading south from the pass on the east side of the ridge goes nowhere.

Switchbacks lead north up the ridge to a grassy traverse (about 7000) just below the crest. Here is another grandstand view of far-away, ice-clad Clark Mountain, and Glacier Peak showing up behind the black tooth of Buck Mountain. The trail descends (17.6) and traverses across a rocky hillside, sliced by gullies eroded out along pink dikes, before entering heather-carpeted woods to reach narrow POMAS PASS (6350-
18.8 18.8). The trail to Ice Creek via Pomas Creek does not descend talus directly below Pomas Pass, but traverses north above cliffs before descending the rocky meadow in switchbacks (poor tread).

Those bent on continuing the traverse of the Entiat Mountains can climb west, back to the crest from where the trail starts down the above-mentioned rocky meadow. Begin now a traverse westward (about 6200). For about 1 mile the way must be slowly and carefully picked across rocky rib and gully and across narrow and steep grassy slope or snow-

bank; this is a time-consuming passage; for experienced backpackers only. Easy going and camping is reached in an open, sloping basin (1-2 hours). Here the scrub brush in the center is circumvented by climbing above it to the base of talus (about 6500). Contour around the end of the rocky spur to the west and traverse down to a small pocket (6350; possible camping). To avoid brush and scrambling, climb up again to cross ROCK CREEK (about 6600) and traverse the steep meadow southward to the junction with the ROCK CREEK TRAIL (6200-3 hours from Pomas Pass).

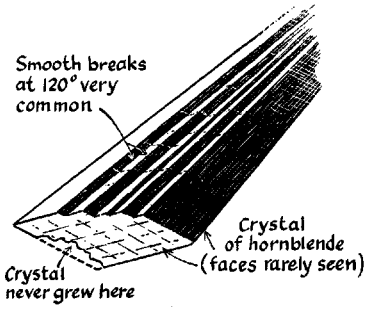


Figure 43

The darkest patches of rock near Pomas Pass are made of hornblende [97]
(Fig. 43) and are given the rock name of HORNBLENDITE. Special circumstances are required to concentrate any one mineral. Whether the mineral be valuable ore or useless hornblendite, the concentration is an oddity and so is of particular interest to a geologist. These hornblendites occur where the nearby granite, as a molten mass, pushed its way into the engulfed chunks of hornblende schist. The fluids and heat of the granite helped segregate the hornblende of the schist into hornblendite.

The trail follows the log-strewn, rocky meadow adjacent to Pomas Creek. It enters trees, passes a dingy camp spot where it leaves the stream, and finally reaches the nose of the ridge (5450-20.6) to the north. The Forest Service plans a new trail which will traverse into upper Ice Creek from here, but at present the trail goes abruptly down the nose to a woodsy streamside camp and across Ice Creek to the ICE CREEK TRAIL (4250-about 21.3). **21.3**

Hanging glacier on Mount Maude (Entiat Glacier)

ENTIAT RIVER TRAIL

Maintained yearly

2350-foot climb

15 miles

Figure 44

"The hills,
Rock-ribbed, and ancient as the sun."
William Cullen Bryant, *Thanatopsis*

This valley bottom arterial is worthwhile not for its own charms, which are scarce, but for the access it provides to higher, finer scenery. It is a long trip into the upper Entiat, but the flowered meadows, surrounded by the glacier-plastered walls of Mount Maude, Seven-fingered Jack, and Mount Fernow, commonly spotted with goats, reward the weary traveler. Use one of the higher trails on the way out to relieve the monotony.

0.0 At the ENTIAT ROAD END (3144-0.0) prepare for a long sustained pace and hit the wide, smooth but dusty trail. Look out for trail scooters on weekends; this is a high-speed scooterway. The trail winds through dry bushy flats where a few openings give views of the steep valley walls. At the first dry wash (1.4) the steep slopes of Duncan Hill topped by the lookout can be seen to the east. The way continues on through dry forest
2.5 to the junction with the ANTHEM CREEK TRAIL (3500-2.5). Beyond glacier-smoothed outcrops is a view straight up the Devils Smoke Stack. At ANTHEM CREEK (3500-2.8) are dusty camp spots in the trees. The trail continues through the dry woods to the junction with the COW
4.0 CREEK MEADOWS TRAIL (3750-4.0) and past a small meadowy opening (4.2) that gives a view of Devils Smoke Stack, Rampart Mountain, and Fifth of July Mountain. Past a pasture gate, the trail continues
5.0 through trees to junction with the LARCH LAKES TRAIL (3750-5.0).

Here is a trail crew camp, but a nicer woodsy camp is on the gravelly outwash fan of SNOW BRUSHY CREEK (3750-5.4) where a fine rustic table stands in the cool shade. Hop boulders to cross the creek and continue to the junction with SNOW BRUSHY CREEK TRAIL (Emerald Park Trail; 3944-6.4). Just 50 yards below (south of) this junction, a **6.4** short trail marked by a few old signs leads down to the SNOW BRUSHY MEADOWS along the Entiat. Here it is open and sunny, and a campsite has a view of Spectacle Buttes to the north and the giant causeway that brings winter avalanches down to clear the meadow of encroaching forest.

The river trail begins a more tortuous route of downs and especially ups. Many dry washes, and several creeks with bridges (Jenny Creek at 7.2) add nominal interest. The vegetation becomes thicker. Beyond puncheon over swamp (4050-7.3), the trail climbs gradually to the GLACIER PEAK WILDERNESS boundary sign (4250-8.0).

The climb takes the trail (and river) out of the broad valley of the [98] *lower Entiat and into a narrower upper valley. Here a glacier from the Upper Entiat was joined by one descending Ice Creek and they combined their erosive power to broaden and deepen the main valley. This is well-shown on the topographic map.*

Just up trail from the wilderness boundary, a sign points to the 45 MILE SHEEP DRIVEWAY (4250-8.1), and a short distance beyond is **8.1** a grassy camp spot (water and wood). Close by is the junction with ICE LAKES TRAIL (4300-8.3), and 50 yards down it is one of the region's nicest trail shelters. The Entiat River Trail dogs steadily along across Aurora Creek (4300-8.4), several unnamed creeks (bridges), Pinnacle Creek (4350-9.3), more unnamed creeks, Candy Creek (4400-9.6), and finally reaches the ENTIAT MEADOWS (4550-10.5). **10.5**

There are many possibilities for camping in the extensive Entiat Meadows, including Seleen Camp (4600-11.3), Brown Bear Camp (5000-12.8), and McKensie Camp (5150-13.2) at the foot of BUCKSKIN MOUNTAIN. The No See Em Sheep Driveway (unsurveyed for this guide) takes off (about 10.5) to parts unknown, and at McKensie Camp the poorly marked and unmaintained Cool Creek Trail goes off to the south (left). Dole Lakes are an easy 2- to 3-hour trip from the meadows via the DOLE LAKES HIGH ROUTE (junction about 4700-12.0). **12.0**

Go on up the Entiat River Trail for an ever-expanding view. Past Grou Camp (5300-14.1) is the junction with COPPER CREEK HIGH **14.1**

ROUTE and the ICE LAKES HIGH ROUTE at the edge of the last thick woods. Close above is the END OF THE TRAIL (about 5500-
15.0 15.0). Goats may dot the gray cliffs; they have pioneered a tortuous way for skilled scramblers, not backpackers, through the cliffs to the pass between Mount Maude and Seven-fingered Jack.

[99] *An unhindered view of the marvelous cirque opens up here: a cliffy amphitheater highlighted with HANGING GLACIERS (Fig. 44), the last remnants of the once-mighty Entiat Glacier. A glacier forms wherever the snow accumulated each winter is greater than the melt of the summer. Here in the Entiat, during or before the Ice Age, a great pile of snow grew until the snow crystals at the bottom were crushed together and recrystallized into a coherent mass of ice. As the snow piled higher, the weight of the increasing mass of ice forced the lowermost material to flow like stiff taffy and the Entiat Glacier began its long trip down the valley. Eventually a change in climate—general warming or a decrease in snowfall, or both—brought retreat, and the glacier melted.*

Below the hanging glaciers, graceful concentric arcs of terminal moraines nose downvalley, fresh and raw at the upper end, becoming more grassy on succeeding older arcs lower down. These terminal moraines show the last halting points of the ever-retreating ice.

The ragged summits of Mount Maude, Seven-fingered Jack, and Mount Fernow towering above are composed of gneiss and gneissic granite speckled with black crystals of hornblende. Pieces of the rock in the moraine can be easily studied.

ANTHEM CREEK TRAIL

Maintained periodically

2400-foot climb

3.5 miles

x ⅓

Jeffrey Shooting Star

This is the short route up Duncan Hill.

The trail leaves the ENTIAT RIVER TRAIL (3500-0.0) and climbs

very gentle and long switchbacks through small trees. An open brush patch (about 4000-0.6) offers a trickle of water; beyond, a slope of gneiss rich in swirled dark streaks offers the first open view.

The way leads up over several steplike benches carved by the Entiat Glacier; the Entiat is an excellent example of a U-shaped glacial valley. Different hardness of layers in the gneiss produced the giant steps on the valley side. [100]

At a switchback pointed south, a blazed trail (about 5100-2.0; near an old 1.8-mile marker) leads off 200 feet to a dingy campsite (possible water). More switchbacks lead up to the junction with the DUNCAN HILL TRAIL (5900-3.5).

COW CREEK TRAIL

Maintained yearly

2800-foot climb

4 miles

Many weekend hikers use this route, but generally only as far as Myrtle Lake. Farther up are the Cow Creek Meadows with splendid camps, alpine views, and perhaps an incredible swarm of mosquitoes. This is a good alternate route to Larch Lakes.

From the junction with the ENTIAT RIVER TRAIL (3750-0.0) the **0.0**
Cow Creek Trail drops to the Entiat River, passes tolerable campsites, and crosses a firm bridge. The way climbs up around a rock spur to
reach MYRTLE LAKE (3740-0.4) amid trees in a deep, glacier-cut hole. **0.4**
Fishing enthusiasts may want to camp here. Rainbows are small but numerous.

Switchbacks climb onto a glacier-smoothed shoulder where the trail angles up through open woods, passes a cold spring (1.3), and goes on
up to cross COW CREEK (5100-2.3). About 100 yards beyond the **2.3**
creek are poorly defined paths to the south (left) leading to the COW CREEK MEADOWS, huge and magnificent in contrast to the woody confines of the Entiat bottoms. Rampart Mountain towers above.

The trail continues through trees before reaching views from steep

airy switchbacks on a rocky slope. The way continues up to larch and heather on a spur crest (camping) and the SHETIPO-GARLAND-
4.0 POMAS TRAIL junction (6550-4.0).

LARCH LAKES TRAIL

Maintained yearly

2000-foot climb

2.8 miles

Larch Lakes and surrounding fine meadows help compensate for an otherwise grim route through an old burn.

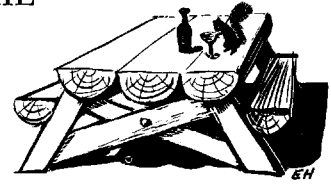
0.0 Just beyond the ENTIAT RIVER TRAIL junction (3760-0.0), the trail crosses a substantial bridge over the sparkling, glass-clear Entiat River and starts climbing through forest. It enters an old burn (about 4500-0.7) and climbs to a traverse at the base of a snag-covered rocky knob. Past a leaping cascade and around a rocky corner, the trail comes abruptly upon the shores of lower Larch Lake. The LARCH LAKES SHELTER (5650-2.6) and camping spots are here in the meadows. Up a meadowy draw in the trees is the junction with the SHETIPO-GAR-
2.8 LAND-POMAS TRAIL (5750-2.8).

SNOW BRUSHY CREEK TRAIL

Maintained yearly

2700-foot climb

6.0 miles



There is little to recommend along much of this trail, although parts of it make useful connecting links in ambitious alpine tours. It is the best horse route over the Chelan crest, and the upper portions provide some limited views of nearby peaks.

The route climbs in trees from the ENTIAT RIVER TRAIL (3944-0.0) to the DUNCAN HILL TRAIL (5000-1.7). It passes a developed 0.0
camp (about 5300-2.5) and enters a big slide area with views of nearby aspen and Saska Peak. Beyond Gate Meadows Camp (about 5500-2.9) are alternating groves and meadows with plentiful campsites and finally the junction with the PYRAMID MOUNTAIN TRAIL (5750-3.5), which begins in a small clearing next to the creek. The way now lies through pleasant open woods up past the junction with the 45-MILE SHEEP DRIVEWAY (about 6000-about 4.0) and a developed camp un- 4.0
der the cliffs of SASKA PEAK. It climbs more steeply to reach the defile of MILHAM PASS (6663-6.0). Through a picturesque foreground 6.0
of larch, talus, and cliffs rise the pinnacles of Bearcat Ridge. The EMERALD PARK TRAIL descends to Lucerne.

45-MILE SHEEP DRIVEWAY

Maintained periodically

3400-foot climb

1650-foot descent

5.6 miles

Ducks

"What joy to climb the mountain's holy solitude
alone in its clear air, a bay leaf in your teeth,
to hear the blood pound in your veins up from your heels
and speed on past your knees and loins to reach your throat
and there spread like a river to wash your mind's roots."

Nikos Kazantzakes, *The Odyssey, A Modern Sequel*
(trans. Kimon Friar)

Although out of the way and little used, this is one of the most scenic routes in the Chelan Mountains. On a cross-Cascade junket, it is far preferable to Snow Brushy Creek Trail. Mileages are estimated.

Leaving no doubt as to its serious intention, the trail begins a very steep switchback course up the mountain from the ENTIAT RIVER
0.0 TRAIL (4250-0.0). Over this first rise is a little surprise basin and meadow (4850-0.5; camp spot, but water may be scarce) at the foot of a cliffy avalanche track on BOREALIS RIDGE. The trail goes straight across the meadow well north of the brush and climbs steeply through dense forest. Up a gentle, tree-dotted, grassy slope is the crossing of
1.5 AURORA CREEK (5700-1.5) where unexciting camp spots have been scratched out of the rocky turf.

[101] *The trail here skirts coarse talus of very gneissic granite rich in biotite. The streaking-out of the rock occurred when a narrow part of the once-molten rock was squeezed between adjacent rocks. Farther to the southeast where the granite mass is thicker, the rock is streaked out only near its margins.*

Leave the partial meadows for parklike forest and continue by a pretty grassy nook (6200-2.2; camping). Just beyond this nook there is a view of red cliffs above a talus.

[102] *The schists and gneisses making these red cliffs are conspicuous by their color and pronounced layers. They represent shales, sandstones, and volcanic rocks, altered by metamorphism and very different from the more solid-looking gneissic granites near them. Look closely to see small flakes of red-brown biotite and tiny red garnets. This narrow band of metamorphosed sediments stretches from southeast of the Lucerne quadrangle to the Cascade River, 30 miles to the northwest. (Notes 93, 94, 118 and Fig. 3).*

Beyond the talus the trail bears west (left) to a meadow and crosses (bearing 350°) to blazes on the opposite side. It then climbs through open larch woods to a narrow grassy basin (6550-3.0) and a crossing of the next brook, where a nice campsite has Pinnacle Mountain as a backdrop.

The elusive tread, guarded by a few ducks, continues up the narrow basin. Where the meadow narrows and the talus begins, the trail keeps to the north (left) and then climbs a small draw to a crossing of the
3.3 main branch of cascading PINNACLE CREEK (6850-3.3). Up the rocky hillside north of the creek is another basin (7250-3.7) where a unique camp spot on grassy greens (try a few putts) is surrounded by rocky

bluffs. The hazy blue ridges of the Entiat Mountains fade off in the western distance.

From this basin it is possible to reach cliff-bound Mirror Lake, although the passage is rough. Climb northeasterly up the rocky draw at the head of the basin to a remarkably flat, narrow gutter where snow may lie. Continue up talus to the steep south base of Pinnacle Mountain, where a notch (7850) marks the crossing of the main divide. PINNACLE MOUNTAIN (8402) is an easy scramble from here. Descend the very steep talus and scree in the narrow gully to a talus- and snow-filled basin (7200) at the head of Tumble Creek.

Several graceful concentric terminal moraines limit the lower end of this basin. [103]

Continue on down steep talus and grass to larch forest and cross (about 6000) to the east side of TUMBLE CREEK. Continue on down the creek through the lovely woods to join the crude trail (5750; 2 hours from the driveway) leading to the lake from the pass northwest of Emerald Park.

Explorers may pioneer a route on along the well-watered north side of the Chelan Mountain crest to idyllic Dole Lakes. Try this: from the upper Pinnacle Creek basin, contour north (7200) across grass-floored woods toward prominent cliffs seen crowning the nearby spur. Turn northeast up the bumpy basin (possible camping) at the foot of these cliffs and climb to cross the spur (7825) high on Pinnacle Mountain and northeast of a real pinnacle. Traverse north on talus, down and up, to the crossing of the main crest (7400) where talus leads to a notch. Descend talus to the lovely pond and campsite below (6850; 2 hours from the driveway). Descend the pond drain as it skirts talus; where the stream turns north and drops to Railroad Creek, cross the talus below cliffs (about 6300) and go up timbered slopes to a small basin (6250; camping) close beneath the crest. Traverse north (about 6100) crossing spurs on talus ramps to grassy woods and meadow on the uniquely flat spur between Klone and Sevenmile Creeks (6300; possible camping). Go along (about 6200) a narrow grassy walkway, skirting ridgecrest talus. Enter open woods leading to yet another basin (6200; camping). Cross the main crest above the Entiat (6450) at the head of this basin.

Traverse gradually up the sunny, dry, south-facing slopes to reach the DOLE LAKES HIGH ROUTE (7050) near Tinpan Mountain or putter down the mountain to the Entiat River Trail. The high route leads down talus to Dole Lakes (about 5 hours from the driveway).

From the meadows in the basin of upper Pinnacle Creek, the 45-Mile Sheep Driveway is obscure. Head for the flattish crest of Borealis Ridge directly east of the basin. The trail may be found where it makes one long switchback across the basin head. It ascends slopes of loose yellow pumice under timberline larch and passes cliffs of schist to reach the
4.2 rocky but level ridgetop (7650-4.2). The tread crosses just north of pinnacles and a large red hump of debris.

Descend eastward on a ramp through small cliffs and drop onto a pumice-covered platform. Bear sharply to the south (right) to find traces of the tread leading down steep heather and talus to a sheltered basin (6950-4.7). Camp here with a good view of Emerald Peak. From the northeastern corner of the basin, the trail traverses easterly across several rocky gullies above a main stream before dropping straight down a bouldery and steep grassy slope to a tree-covered but rocky rib. Anastomosing sheep trails descend southwesterly to meadows. Near the end of a rocky spur, cross the stream and climb the bank to the edge of thick forest and a level clearing (6500-5.2; camping). Leave the trail here if necessary to avoid innumerable fallen logs and descend straight
5.6 down to the SNOW BRUSHY CREEK TRAIL (6000-5.6).

ICE LAKES TRAIL

Maintained yearly

3000-foot climb

150-foot descent

7.0 miles

Goat

Deer

Ice Lakes, two blue gems, lie amid glacier-sculptured bosses shaded by feathery larch rooted to banks of yellow pumice. This remarkable

spot rewards both hiker and fisherman. Wood is scarce. Mundane in name but mighty in height is Mount Maude (9082), an easy climb from the lakes. Try it on a moonlit night.

From the ENTIAT RIVER TRAIL (4300-0.0), a short walk leads **0.0**
down to the river where the new SHELTER with modern conveniences awaits occupants. This is a fine base for many trips in the area. The fall colors are gorgeous on Spectacle Buttes. Across the bridge, the unmarked but partly brushed-out COOL CREEK TRAIL climbs to the big basin at the head of the creek. Enterprising souls might try to follow the trail on to upper Entiat Meadows.

From the bridge, the Ice Lakes Trail goes along in trees and descends to the banks of Ice Creek and the junction with the POMAS CREEK TRAIL (4250-1.3). It continues upward in the trees past springs, bogs, **1.3**
mudholes, side streams, and meadows made by small avalanches to the ICE CREEK crossing (4790-3.1). Here a great slide from the glaciers high in the cliffs to the west creates meadow and brush; at the upper edge of the slide area is the boundary of the GLACIER PEAK WILDERNESS and a developed camp. The trail crosses Ice Creek (5080-4.0) again and emerges in a rocky meadow at Camp Long (5200-4.5), where it all but disappears. This camp spot has a view of falls cascading down form the upper Ice Lake and of shattered, ruddy, iron-stained cliffs of gneiss to the west.

To reach the lakes, ascend the hummocky, ever-steepening, rocky meadows along the east side of Ice Creek. Cross the eastern branch (about 5400); recross (about 6000), and go up very steep meadow to the LOWER ICE LAKE outlet (6800-6.0) and camping. The ICE LAKES **6.0**
HIGH ROUTE skirts the north shore.

Turn southwest and go below bluffs in narrow pumice-choked swale to reach ponds (6900-6.8; camp spots) and the stream from the upper lake. Scramble up the east side of the stream to reach the rock-walled outlet of UPPER ICE LAKE (7150-7.0) and the junction with ICE **7.0**
LAKE HIGH ROUTE. The rubbley slopes of Mount Maude may be easily climbed to the summit.

ICE LAKES HIGH ROUTE

Difficult

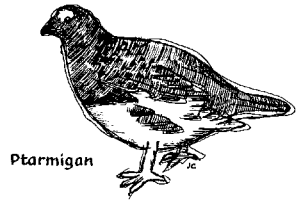
3100-foot climb

1400-foot descent

4 miles

4 hours

x 1/6



To season the miles of Entiat valley bottom, add a dash of this alpine route connecting the Entiat Meadows to the Entiat Mountain crest via Ice Lakes.

Near GROU CAMP on the Entiat River Trail (5200-14.1), pick a route down through trees and meadow to the Entiat River. Ford and climb southward, bearing slightly upriver to the largest and most brush-free gully. The western wall of the gully curves around in a line of cliffs to form the prominent wall above the Entiat. The rock in the gully is steep and crumbly, but careful boulder-hopping and side-clinging will bring the hiker safe and dry to a block-filled pocket (7000) below the cliffs. Climb southward, cross bare rubble slopes, and gain the broad flattish ridge crest (7450-2 hours) that extends southeast to the northernmost Spectacle Buttes (8070). The broad summit is an easy scramble directly up the ridge.

[104] *The rock of the flat ridge is shattered and the rock fragments are bleached white. This is a zone of movement in the hard, brittle rocks—a fault zone; hot, watery solutions working up in the cracked rocks have altered the minerals.*

Weave around larches and outcrops of gneiss and drop down pumice slopes to reach the shore of LOWER ICE LAKE (6825). At the outlet is camping (wood scarce) and connection with the ICE LAKES TRAIL. Skirt the north shore of the lake and climb to reach the southern shores of UPPER ICE LAKE. Wonderfully rounded, glaciated swells of rock poke up through the yellow pumice. The yellow pumice, so far from

Lower Ice Lake

Glacier Peak volcano, contrasts enchantingly with the blue waters. Plod through the froth to the rock-walled slot at the lake outlet (7150). Cross and scramble up to view the pass to the west. Skirt the flats where the lake has been partially filled—these lakes never last long, geologically speaking—and ascend talus and gentle slopes of snow and ice to a fine view of far-off Glacier Peak at the pass (7650-3½ hours).

From the pass, southbound traffic should traverse south and gradually down on ledges to cross the high saddle (7350) in the nearby spur; continue south down a broad gully of talus that gives way to heather and leads to the CARNE MOUNTAIN-LEROY CREEK TRAIL (6800-4 hours). Northbound traffic can reach this high route in the broad, pumice-filled saddle overlooking Leroy Creek; descend steep, unstable talus with great care and then traverse northwesterly down to the saddle (6850-4 hours).

Lake Chelan

"Lake Chelan is a slender body of water 65 miles long, whose southeastern end lies open to the sky between the grass-grown hills of the outer Columbia Valley, while its northwestern lies in shadow between precipitous mountains in the heart of the Cascade Range. There are sandy shallows near its outlet, but beneath the cliffs of its upper course the water is profoundly deep." (Bailey Willis, 1903, *U.S. Geological Survey Professional Paper 19.*)

At the lower end of this fjordlike lake is the town of CHELAN where the "grass-grown hills" and sagebrush make most alpine pedestrians eager to be off "uplake." At Chelan are many stores, tourist accommodations, the CHELAN DISTRICT RANGER STATION, and, in the spring, scenic Chelan Falls. Two shady parks, one on each side of the lake, feature swimming here at the *warm* shallow end. The Chelan Boat Company's *The Lady of the Lake* or *Speedway* dock at the west end of

Main Street; the boat enthusiast may want to sail from here, but the most efficient hikers park and board at Twenty-Five Mile Creek.*

The campgrounds most convenient to Chelan are reached via a paved road along the south shore of the lake. LAKE CHELAN STATE PARK (9 miles from Chelan) has large lawns, playgrounds, and swimming, but is crowded on summer weekends. There is a private campground on the banks of TWENTY-FIVE MILE CREEK (19.5 miles from Chelan), but no other accommodations. From just across Twenty-Five Mile Creek a Forest Service gravel road climbs west to the Entiat River Road (28 miles) over the summit of the Chelan Mountains; near the summit begins the PYRAMID MOUNTAIN TRAIL along the crest. The TWENTY-FIVE MILE CREEK BOAT DOCK and FOREST SERVICE GUARD STATION are at the end of the road (20 miles from Chelan).

**Lake Chelan Boat Company,* Chelan, Washington

	Daily May 15 to September 30				Sun., Mon., Wed., Fri. Oct. 1 to May 15			
Chelan City dock	Lv	8:30 AM	Ar	6:00 PM	Lv	8:30 AM	Ar	3:45 PM
State Park		9:05 [f]		[f]		[f]		[f]
Twenty-five Mile Creek		10:00		4:30		9:45		2:00
Meadow Creek		11:50		[f]		[f]		[f]
Lucerne		12:00 PM		2:20		11:25		12:30
Stehekin		12:45	Lv	1:45 PM	Ar	12:00 PM	Lv	12:10 PM

[f] Flag stop.

No Sunday boat November 1 to April 15.

No reservations but groups of 25 or more should write in advance. Baggage allowance 100 pounds per ticket, extra $1.35 per 100 pounds. Present (1965) round-trip fares: Chelan-Stehekin $6.50; Twenty-five-Mile Cr.-Stehekin $5.50; Chelan-Lucerne $4.20. Barge for cars, stock, and large freight shipments: one round trip weekly—Lv. Chelan Wed., return Thurs.; cars $0.45 per 100 pounds each way. Write for barge rates on other items.

Chelan Airways, Chelan, Washington

Operates 2-3 passenger charter pontoon planes. Approximate rates (1965) to Stehekin $12 per person with $25 minimum from Chelan, $125 from Lake Union in Seattle, and $24 from Columbia River in Wenatchee. Write for reservations and details. Even in good weather, rough water can prevent a landing. No landing permitted in the Glacier Peak Wilderness.

The best view of lower Lake Chelan is from 3900-foot CHELAN BUTTE just south of town. Go about 2 miles west on US. 97; turn up the hill on a marked road opposite a city park and wind up 4 miles of ruts to the view on top of the butte. Eastward is the edge of the brown, semi-arid plateau that stretches across the whole of eastern Washington to the foothills of the Rocky Mountains. Westward, Lake Chelan disappears mysteriously into the lofty and snowcapped mountains. Wrapped closely around Chelan Butte is the deep canyon of the Columbia River.

[105] *For hundreds of miles the Columbia River gorge separates the plateau of basalt lava from mountains of schist, gneiss, and granite. The basalt began oozing from cracks in the earth's crust some 20 million years ago. Gradually, over millions of years, flow after flow of molten rock drowned valleys and overtopped all but a few hills. The rivers, dammed time and time again by the encroaching lava, were forced northwestward against the foothills of the mountains. Here the Columbia flows today along the base of Chelan Butte, trapped between the lava and the bordering granitic mountains (Fig. 45).*

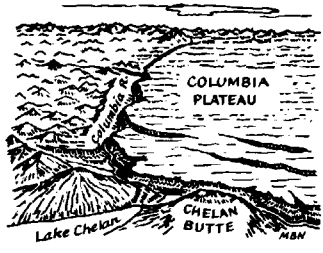


Figure 45

There are uplake resorts at Meadow Creek, Lucerne, and Stehekin. For information, write the Chelan Chamber of Commerce. Reservations are essential if the group is large or the stay long. Casual peripatetics may be able to find shelter and meals without prearrangement, but it is safest to be self-sufficient. On arrangement the resorts provide *short-haul boat service, car rental, and taxi service.* Stehekin, at the north end of the lake, is a unique year-round mountain community, complete with post office, reached only by boat, plane, horse, or foot. Holden, once a mining town, is now a Lutheran summer camp where accommodations for organized groups of other churches are available by written

prearrangement. The post office operates from June to October, and the telephones connect with an instrument in the Lucerne Guard Station that is, however, often unmanned. Telephones at Lucerne and Stehekin sometimes connect with "outside" and can be good exercise for voice, ears, and patience.

The best short trip is, of course, the boat trip on Lake Chelan. The scenery improves steadily toward Stehekin. As Bailey Willis said, "The walls of the canyon, bare, grey and desolate, the mountain sides and cloud-draped peaks are very impressive."

The rounded bluffs and huge grooves on the rock slopes are ample evidence that a glacier has sculptured this valley. The ice scooped down to sea level along much of the lake and in places gouged some 300 to 400 feet below sea level. Boating along on a hot day, the traveler will find it difficult to visualize the 5000-foot thickness of ice that once filled the canyon. The only toehold man has established on the steep shores are on gravelly fans built by debauching streams (Fig. 49). [106]

Camping on the shores of Lake Chelan beyond the roadheads allows isolation as well as luxury. The daily boat will not only stop at, but will deliver mail and groceries to, any reasonable landing spot along the lake. Leave one mail sack at the Chelan post office and trade another for it at delivery time. Arrange for groceries with a Chelan grocer; an order sent in by mail one day will be delivered 2 days hence. There are several Forest Service campgrounds and many other campsites on shelves and bluffs. The lake water is potable and used without treatment by Chelan. The southwest side of the Lake Chelan canyon is very steep and is trailless; shade comes early in the day. Northeast side camping spots are sunny and are connected by the Lakeshore Trail. The Prince Creek campground is the most spacious.

By planning transportation with care, the following trips can be squeezed into the 26 hours between boats:

From Lucerne:

Domke Lake for woods and fair-to-poor fishing (6 miles round trip).

Domke Mountain for views of Lake Chelan (8 miles round trip).

Emerald Park for alpine meadows and crags (16 miles round trip).

From Holden:

Tenmile Pass for larch woods and meadows (6 miles round trip).

Holden Lake for views of nearby glaciers (6 miles round trip).

Hart Lake for possibly good fishing and modest views (7 miles round trip).

Upper Copper Creek for alpine meadow and towering cliffs (6 miles round trip).

From any feasible lakeshore landing point:

Lakeshore Trail for what is missed from the boat deck. Choose any portion but arrange pickup with the boat pilot.

The Pyramid Mountain Trail (Entiat drainage) or the Summit Trail on the east side of Lake Chelan offer fine scenery on the return trip downlake but take more than one night out.

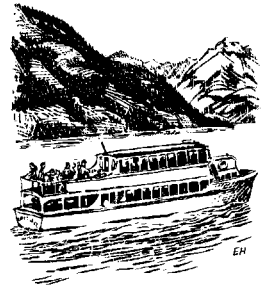
LAKESHORE TRAIL

Maintained yearly

2500-foot climb

2500-foot descent

17.6 miles



"Like a black wall the mountain steeps appear."
Wordsworth, *An Evening Walk*

Along the northeast shore of Lake Chelan winds the Lakeshore Trail from slopes of tawny grass burning hot in the afternoon sun, across rounded, gray bluffs frowning on dark waters, to cool, breezy headlands above whitecaps tossed up by a downlake squall. The valley walls soar up 7,000 feet from the water's edge. Stroll along among ruddy pillars of yellow pine and through spring-fed groves of aspen. Try lateral trails leading up a few steep miles to the timberline meadows. On hot days watch for rattlesnakes in the shade. Do not forget to arrange with the boat captain for pickup in unscheduled harbors or on promontories. The two ends of the trail are not shown on the Lucerne quadrangle but on the sketch map, Figure 46.

At PRINCE CREEK there is a shaded and grassy campground with all the usual campground amenities. In 1947 a flash flood roared down

the creek and buried under boulders an elaborate Forest Service work camp on the Prince Creek fan; the fan is being built by just such floods as these. The Lakeshore Trail begins (1096-0.0) amid the barren gravels, 0.0
crosses Prince Creek, and soon passes the junction with the PRINCE CREEK TRAIL (0.3); this trail, unsurveyed for this guide, climbs gradually from the lake up to the Summit Trail (10.8). Travelers wishing to reach that part of the Summit Trail described in this guide will have to continue north along it without assistance for another 1.8 miles to the junction of the Horton Butte Trail.

Beyond the Prince Creek Trail junction, the Lakeshore Trail soon leaves the barren gravels of the Prince Creek fan, climbs on to the cliffy slopes of the Lake Chelan trough, and enters the area of the Lucerne quadrangle. It winds in and out of several rocky gullies (intermittent streams) and past artifacts (about 1.7)—remains of the powerline to once-thriving Holden. Beyond these relics and below the trail are flat benches (1100-about 2.1), which make fine lakeside campsites under the pines. The trail descends to the water's edge to avoid the cliffs, then climbs and traverses to REX CREEK (1500-3.8). The SHEL- 3.8
TER here is adequate but back in the brush and without a view.

Beyond PIONEER CREEK (1250-4.3) lake views begin again. The trail rambles on to CASCADE CREEK (1450-6.0), where water is plentiful but the hillside too steep for camping. A promontory (1500-6.6) with only scattered trees offers a good view up and down the lake. The poorly marked junction with the BLUE JAY TRAIL (1450-6.9) comes 6.9
up where the trail turns and descends around a corner to MEADOW CREEK (1400-7.1). The trail SHELTER here is in dry woods and is 7.1
seldom used. Just beyond the shelter a path leads down to private MEADOW CREEK LODGE on the lake shore. The main trail goes on to open grassy slopes and the junction with the HORTON BUTTE TRAIL (1350-7.5). 7.5

The Lakeshore Trail crosses many intermittent streams and reaches a selectively logged patch of yellow pine where it follows up the logging road. The logging is on private land secured years ago from the public lands for a homestead. The property at Meadow Creek Lodge was secured as a millsite for a mine that never materialized. The way leaves the road to cross a swale behind knobs, streamlined when the Chelan Glacier scraped over ROUND MOUNTAIN, and descends switchbacks to the man-made meadows at MOORE. The trail skirts the upper edge of the clearing to reach FISH CREEK (1250-10.9), where a path leads 10.9
down to private buildings at the lakeshore. Moore, which is private property, began as a homestead and grew into a successful resort spot until

Lake shore trail

ıe lodge burned. Across the Fish Creek Bridge is the FISH CREEK
'RAIL junction and Shelter (1270-11.0). 11.0

The Lakeshore Trail climbs rocky slopes from Fish Creek to skirt
IUNTS BLUFF. It leaves the area of the Lucerne quadrangle (see Fig.
6) and then descends again to reach the Lakeshore Trail Shelter
l100-14.1). Along the precipitous valley side, the way wanders across 14.1
'lick Creek (14.8), Fourmile Creek (15.4), and finally Hazard Creek
l7.2) to reach the STEHEKIN GUARD STATION (17.6) and the
ınction with the PURPLE CREEK TRAIL. The Stehekin valley road 17.6
egins here, and a short distance beyond the guard station is STEHEKIN
nd the boat landing.

Three unsurveyed trails (see Fig. 53 for topographic maps) lead
·om near Stehekin back to the Railroad Creek drainage, and the realm
f this guide:

AGNES CREEK TRAIL (16.9 to Railroad Creek Trail; maintained
early). A walk in marvelous forest most of the way.* To begin, taxi
0 miles up the Stehekin Road to High Bridge Campground and the
:ail head.

COMPANY CREEK TRAIL (11.2 to Hilgard Cr. divide; maintained
eriodically). Wide views much of the way. To begin, go 4.5 miles
p the Stehekin Valley Road, cross the Stehekin River on a road bridge,
nd go half a mile upstream on the road next to the airstrip. The ter-
ıinus of the trail is just across the bridge over Company Creek.

DEVORE CREEK TRAIL (12.8 miles to Tenmile Pass; maintained
early). Scenic climb up lakeside bluffs at the beginning, and meadows
f Fourth of July Basin near the end (10.6). Pick up the trail at the south
nd of the above-mentioned airstrip. To save 2.8 miles, boat to Weaver
'oint Camp across Lake Chelan from Stehekin and go up a short spur
rail to Devore Creek; find the main trail just across the creek.

*Short excerpt from U.S. Forest Service trail log:
"14.40—Spruce campsite
14.50—21 ft. bridge (1954)
14.60—25 ft. puncheon (1954)
14.61—12 ft. puncheon (1940)
14.62—20 ft. puncheon (1946)
14.64—36 ft. puncheon (1946)
14.68—48 ft. puncheon (1954)
14.70—12 ft. bridge and 80 ft. ditch (1956)
. . ."

Yellow Pine

BLUE JAY TRAIL

Not maintained

5400-foot climb

5.0 miles

This route and the Purple Creek Trail vie for honors in grand unob structed views out over the Lake Chelan trench. Be sure to fill up oı water before starting; the climb is long and there are no campsite: before the ridgetop, a vertical mile above Lake Chelan. This little-usec trail is not recommended for horses. Mileages are estimated.

0.0 On the LAKESHORE TRAIL (1450-0.0), just above the corne where the trail turns down to Meadow Creek, look for the Blue Ja: Trail blanketed with needles. The old tread climbs steep switchback under yellow pine and goes up damp draws under shimmering asper The vague tread goes (about 2300) easterly across the top of a clearin that permits sweeping views of the Milham Pass area in the Chela Mountains. Onward and upward, switchbacks lead to a traverse (400(2.4) across two rocky gullies where slabs of rock partially block the wa) Via a short rocky climb and traverse, reach the BLUE JAY prospector

2.7 cabin (4300-2.7) perched precariously on the hillside. From here th passenger boat on Lake Chelan is a tiny white speck on the sinuoı dark ribbon. The dripping mine prospect may be explored with car

[107] *PYRRHOTITE, a magnetic iron sulfide of dull brassy gray color, an CHALCOPYRITE may be seen in the narrow vein exposed in the worı ings. The chalcopyrite is a brassy color and composed of iron, sulfu and copper; it is one of the most common ore minerals of copper.*

To find the trail again, climb up and slightly east (right) on steep grass to the main spur crest (4750-3.0). The trail goes straight up the spur and is worth finding where it leaves the ridge top to avoid rocks and brittle, dry brush. It creeps up to timberline (about 6200-4.0), and the tread finally disappears entirely. Continue straight up the grassy slopes. Stay west (left) of rocks and rubble. Cross a rocky swale (6750-4.4), where a camp with water might be made early in the season, and traverse slightly east (right) to the ridge crest (6850-4.6). The vague 4.6
tread of the HORTON BUTTE TRAIL comes in along the ridge from the northwest between the ridge crest and the rocky swale. From the saddle this trail descends steep dirt banks to woods and camping in the basin to the north.

HORTON BUTTE TRAIL

Not maintained

7500-foot climb

2500-foot descent

12.0 miles

Up to timberline, much of the view from this trail is blocked by Round Mountain. The Blue Jay Trail is much the better route for view-hungry backpackers. Mileages are estimated. See Figure 46 for a map of the route outside the Lucerne quadrangle.

From the LAKESHORE TRAIL (1400-0.0) near Meadow Creek, the trail ascends the dry slopes and rocks of Round Mountain to a crossing of MEADOW CREEK (3025-1.5) and the junction (3200-1.8) with a 1.5
trail to boggy, mosquito-infested, forest-pocketed ROUND LAKE. Long switchbacks up the dry hillside beyond lead through crackling brush to steep meadows. The trail crosses a shallow grassy gully (6150-4.5) where a shelf in a grove of trees just below provides limited space for a camp. Above, where the trail reaches the ridge crest (6600-5.5), a path 5.5
leads north (left) to the lookout site on Horton Butte, abandoned in spite of the view.

Follow vague tread along the ridge southerly over or just west of

tops 7009 and 7125 to a saddle and the junction with the route of the
7.0 BLUE JAY TRAIL (6850-7.0). Take a last westward look at the mountain panorama and the blue-black snake of Lake Chelan a mile below before descending steep dirt to gentle wooded slopes (about 6600) in the basin to the north (camping). The Lucerne quadrangle is now left behind (Fig. 46). Traverse eastward and up on grass, wonderfully cool and green compared to the sunny slopes facing Lake Chelan, and reach
8.0 a rocky saddle (6800-8.0) and old trail signs.

The tread, now evident again, descends eastward to a watercourse (fine camping on flats just across the stream and above) and turns sharply down to the north (left) to reach the junction with the INDIAN HEAD SPUR TRAIL (about 6000-9.5). This lateral leads down 1.5 miles to the Fish Creek Trail. The main trail crosses meadows below extensive bogs, rounds a rocky spur, and crosses a fork of Fish Creek. The upper valley of this stream is a wide, beautiful meadow dotted with larch (many camp spots). At the valley head, the trail goes up a shallow draw of rubble to the pass (about 7200-10.0) to Prince Creek drainage. Here is a view of Surprise Lake and peaks carved in granite.

[108] *If this area is at all typical of most such terrains, careful mapping and study will probably show there are many different types of granite intricately intermixed. The differences between granites in many places are so subtle that they often go undetected until two are seen together in a single outcrop or many specimens are examined and analyzed in the laboratory.*

The trail traverses northward down a rocky hillside high above swampy ponds to the junction with the SURPRISE LAKE TRAIL (about 6700-
11.0 11.0). To reach this fishing hole in the trees, descend one switchback toward the swampy ponds west of the lake before heading eastward down the steep hillside to the meadows (camping) at the upper end of SURPRISE LAKE (6000-1 mile from junction).

Beyond the Surprise Lake junction, the Horton Butte Trail continues on a high traverse far above the lake to a spur and a view of the spacious PRINCE CREEK NORTH FORK. It then descends through the larch and on wet slopes around the upper part of the nearby meadows before dropping through trees to the junction with the SUMMIT TRAIL (about
12.5 6400-12.5) and MULE SHOE CAMP.

SUMMIT TRAIL

Maintained yearly
2600-foot climb
2300-foot descent
12.5 miles

"Come live with me and be my love,
And we will all the pleasures prove
That hills and valleys, dales and fields,
Woods or steepy mountain yields.

And we will sit upon the rocks,"

Christopher Marlowe,
The Passionate Shepard to his Love

This ridge route along the crest of the Sawtooth Ridge, the Methow Mountains, and northeast of Lake Chelan is delightful and different from ridge routes farther west. It is more pastoral and less snowy and craggy. The trail is described northward from the North Fork of Prince Creek only. Southward, it is 15.8 miles to the terminus at the SOUTH NAVARRE FOREST CAMP on the COOPER MOUNTAIN ROAD. The route is shown on Figure 46. (See also Fig. 53.)

From the junction with the HORTON BUTTE TRAIL (about 6500-0.0), the Summit Trail goes up through dry forest into larch and sloping **0.0**
meadows, to the bare pass (7200-1.0) leading over to the East Fork of Fish Creek. It then descends steeply to a grassy fringe at the toe of sparkling white talus and traverses down the grass to a pleasant basin with camping. Here the junction with the FISH CREEK TRAIL (about
6800-1.7; signed and maintained by the Forest Service but not on their **1.7**
maps) is on the south bank of the EAST FORK OF FISH CREEK. On the north bank is the Buttermilk Trail, unsurveyed for this guide, leading eastward over the main divide via Fish Creek Pass.

The trail contours the hillside northward by stark gray snags draped with yellow lichen, bold against Glacier Peak and innumerable lesser peaks in the hazy western distance. It rounds a rocky corner and de-
3.7 scends dirt slopes to HORSESHOE CREEK (6800-3.7). Camping in the basin here, ringed by a sawtooth ridge and shadowed by Grey Peak, is

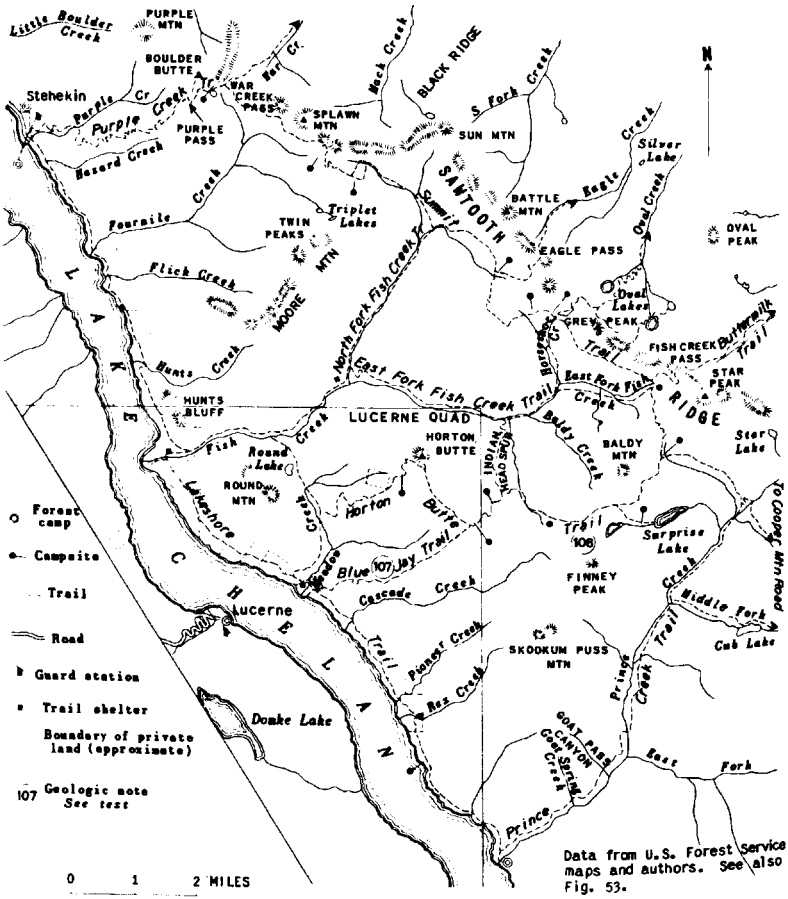


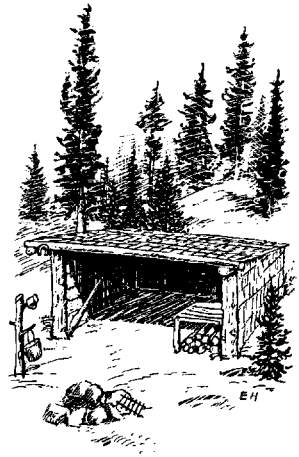
Figure 46. Sketch map of Summit and Lakeshore Trails

splendid. The HORSESHOE CREEK SPUR TRAIL begins to the south on the Fish Creek Trail, crosses the Summit Trail just south of Horseshoe Creek and, though poorly marked, goes on east over the main divide to Oval Creek.

The Summit Trail, marked by cairns, traverses grassy benches, crosses gurgling rills under the larches, and climbs to the spur crest (7200-5.3) 5.3
between the two forks of Fish Creek; the view is grand. A traverse out onto a side spur leads to a crossing and a steep descent to meadows with fair camping amid humps of moraine. Across a stream is the junction (6350-5.8) with the unsurveyed Eagle Creek Trail coming over from 5.8
the Twisp River. The main trail swings down along the stream into trees, past dark, dry Ten Tree Camp and on down across small rocky meadows in the woods to the junction with the NORTH FORK OF FISH CREEK TRAIL (5500-7.3). 7.3

It is a grim tramp along in the dry woods, across several streams, before the trail finally breaks free into a large steep meadow where the way winds up through rocks and flowers. Keep watch for a trail branching west (left) which crosses a stream and goes through trees to woody Camp Comfort (5800-9.0) close by a brook under white cliffs of granite. 9.0
An alternate trail goes on uphill to the tip of a boggy meadow before it turns west (left), crosses a stream, and, marked only by blazes, joins the main branch ascending steeply from Camp Comfort. From this junction the main route goes up parallel to cliffs and stream to the spurcrest above Fourmile Creek (6300-10.1).

Follow cairns northerly along the spurcrest before turning down gravelly slopes on a poor tread; look sharp for the trail traversing out to the north (right). A few hundred feet below the beginning of this traverse is an old burn and campsite. The trail makes a long traverse of the steep grassy hillside below the uppermost rocks of SPLAWN MOUNTAIN. It finally ascends a few steep switchbacks to a spur top and traverses through trees and rocks to emerge in the sloping meadows above LAKE JUANITA and just below WAR CREEK PASS. Here is the junction with the PURPLE CREEK TRAIL (6800-12.5). 12.5



FISH CREEK TRAIL

Maintained yearly

Via East Fork

4400-foot climb

9.2 miles

Via North Fork

5800-foot climb

6.6 miles

This valley-bottom route is in the trees all the way from the lake to the Summit Trail. Sketch map (Fig. 46) shows part of the route not in the Lucerne quadrange.

0.0 From the LAKESHORE TRAIL (1270-0.0) the route ascends the fan built where Fish Creek dumps its load into the lake. Beyond an irrigation ditch that taps the creek is the junction of a lateral trail
1.7 (2400-1.7) that crosses Fish Creek and climbs switchbacks to ROUND LAKE. The main trail climbs steeply where the creek has sawed through a plug of gravel—seen standing in a wall on the opposite bank—and reaches a SHELTER (3.3) and the junction with the NORTH FORK OF FISH CREEK TRAIL (3.5). The North Fork of Fish Creek Trail goes up through woods, crosses the creek (4.7), and, still in the woods, reaches the junction with the SUMMIT TRAIL (5500-6.6).

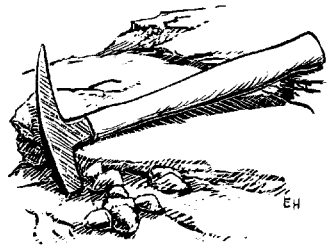
The main Fish Creek Trail (East Fork) crosses the North Fork and
6.3 goes up to the crossing of the EAST FORK (6.3). Beyond is the junction with the INDIAN HEAD SPUR TRAIL (6.5); this trail leads southward 1.3 miles up to the Horton Butte Trail. Continue on the main trail to
7.8 the HORSESHOE CREEK SPUR TRAIL (7.8); this trail goes north (left) 1.5 miles to reach grand meadows and the SUMMIT TRAIL. Up the main trail similar pleasant meadows and the SUMMIT TRAIL
9.2 (6900-9.2) are a little closer.

PURPLE CREEK TRAIL

Maintained yearly

5800-foot climb

8.1 miles



This excellent trail climbs on countless well-graded switchbacks from Stehekin to the Summit Trail at War Creek Pass. The only camping is at tiny Lake Juanita near the pass, but the views along most of the route are magnificent. For a map use Figure 46. Available topographic maps are shown on Figure 53.

Above the STEHEKIN GUARD STATION (1100-0.0), the trail passes **0.0**
a gate and crosses PURPLE CREEK to ascend in dusty switchbacks. The roofs of Stehekin fall away. The trail swings into the narrow slot of Purple Creek (1.9) and traverses out to airy bluffs. It goes up through yellow pine on slopes facing Hazard Creek, to reach the nose of a spur (5700-5.9) where views open up. Sinister cliffs and crags surround the route along upper Purple Creek but are left behind at PURPLE PASS
(7000-7.4). **7.4**

A traverse up from the pass leads to the unmarked junction of the BOULDER BUTTE TRAIL (7200-7.6; 0.5 to the summit). The main trail descends across the larch-dotted hillside to a sod hut (about 6800-7.9) and stream, where campsites are plentiful. Near the stream, the summit route, abandoned and unsurveyed for this guide, goes off to the north. Around the north shore of LAKE JUANITA (about 6800-8.0), two trails climb to the junction with the SUMMIT TRAIL (about 6900-
8.1). Just above is WAR CREEK PASS and a view of the forested head- **8.1**
waters of WAR CREEK. A trail from here goes down to the Twisp River Road.

x ½

Alaskan Spirea

EMERALD PARK TRAIL

Maintained yearly

5600-foot climb

10 miles

"The mountains grow unnoticed
Their purple figures rise."
Emily Dickinson,
The Mountains Grow Unnoticed

Emerald Park, Milham Pass, and the side trip to Mirror Lake are well worth the climb. Mileages are estimated.

From the road behind the main cluster of buildings at LUCERNE
0.0 (1100-0.0), the trail strikes out southward across the bouldery fan to steep rocky slopes of gneiss and climbs to a good viewpoint just above the rooftops (1400-0.5). Beyond are switchbacks in trees to a spring, and above, the DOMKE MOUNTAIN TRAIL (1620-1.0). Where the
2.0 main trail levels out, a spur trail (2182-2.0) takes off to DOMKE LAKE. Along this spur is a hermitage on the lake (0.5) where fishermen can rent boats from the resident. At the end of the spur is a Forest Service camp (2192-0.7); south across the lake is another Forest Service camp, best reached by boat.

The main trail continues on extensive flats through groves of huge cedars to a creek and dark, woodsy, and mosquito-infested Cedar Camp at the junction with the OLD RAILROAD CREEK TRAIL (2350-2.6). This old trail is utterly abandoned and offers no sights that warrant hurdling the uncountable small logs across the trail. The Emerald Park Trail climbs again in switchbacks on grassy slopes in open woods and crosses several slabby exposures of granite before reaching the spur
4.0 adjacent to Emerald Park Creek (3100-4.0). A steady traverse up and across the dry, brushy, and rocky hillside brings ever-improving views. The way passes through a brushy meadow and skirts piles of big rocks
8.0 —moraine. Beyond a few trees, marvelous EMERALD PARK (5400-8.0)

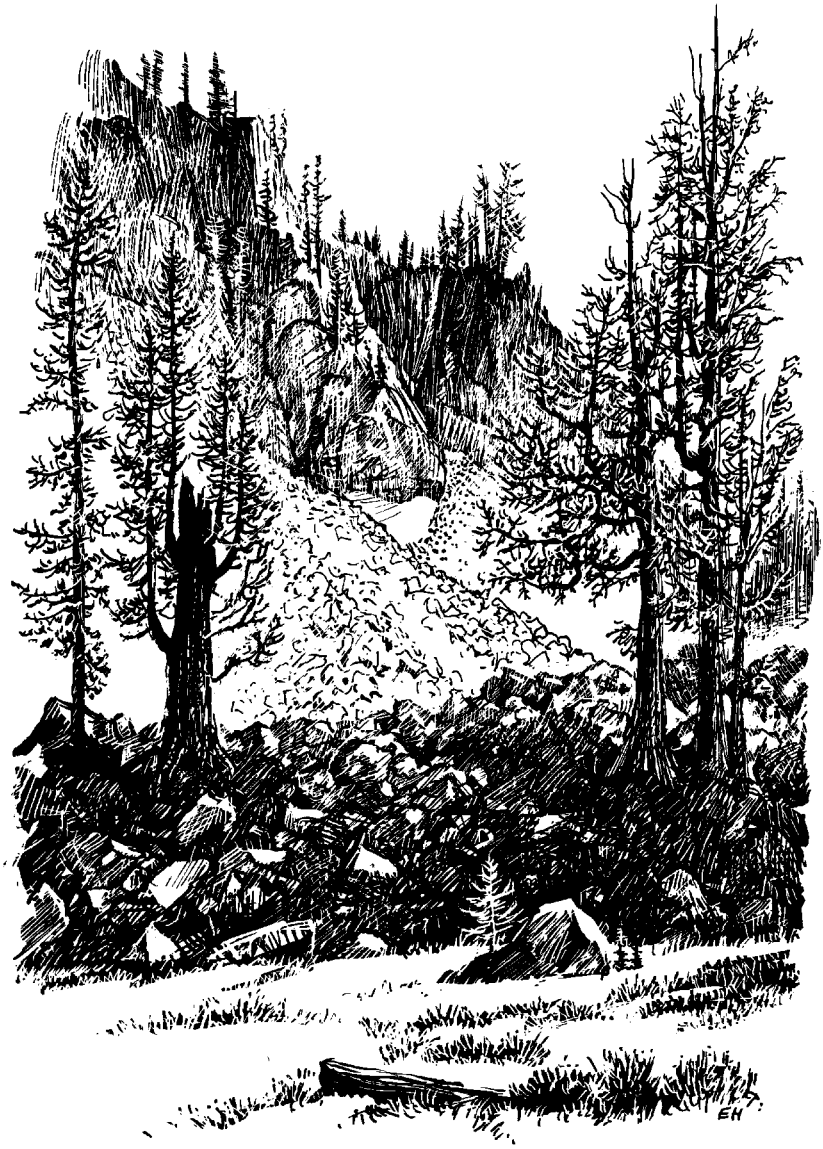
suddenly expands. The crags of Emerald Peak and Bearcat Ridge tower above. Water can be found southwest of the well-used camp place (bearing 230° from the trail signs); the spring is in bushes and rocks at the edge of a meadowy and bouldery avalanche slope.

The side trip to Mirror Lake begins here. From the trees at the lower end of EMERALD PARK, go northwest up the tongue of grass that extends to the low pass (6750) directly above (northeast). Descend straight down to TUMBLE CREEK (the connection leading to the 45-MILE SHEEP DRIVEWAY is here), and follow the creek down this lovely narrow, cliff-walled valley, through many small meadows to the upper end of MIRROR LAKE (5500-2 hrs.). Fishing is good for rainbows of all sizes up to 18 inches. Most of the catch will run 10 to 14 inches.

Back on the head wall of Tumble Creek, sharp fins of rock buttress the pinnacles on the ridgetop. The slots between these fins are dikes of less resistant igneous rock and zones of faulting. [109]

Milham Pass is worth visiting. The trail weaves around the brush patches at the lower end of Emerald Park, crosses the meadow, and ascends switchbacks over talus of annoying small red stones. The way climbs high before traversing into a gully and onto two tiny but exquisite meadows set in the larches and surrounded by ridges of coarse talus blocks. Narrow MILHAM PASS is just above (6663-10.0). **10.0**

Geologists define TALUS as the slope made by rock rubble at the base of a disintegrating cliff (Figs. 35 and 47). SCREE is essentially the same thing, but to British and American mountain climbers, scree is rubble of small stones on a slope; a sliding descent on it is called "screeing." [110]



View near Milham Pass

Figure 47

DOMKE MOUNTAIN TRAIL

Maintained yearly

2400-foot climb

4 miles

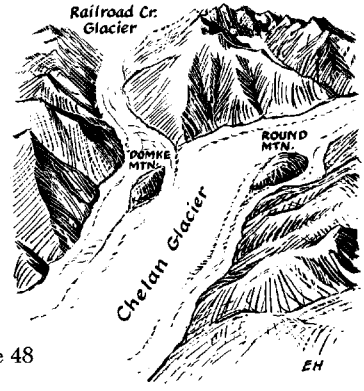


Figure 48

This is a short hike for nice views of Lake Chelan and Domke Lake. On top is a fire lookout.

From EMERALD PARK TRAIL junction (1620-0.0), the trail climbs switchbacks through open pine forest on the very steep hillside. The trail climbs from one glacier-carved bench to another. These make pleasant level spots for picnicking and contemplating the blue of Lake Chelan. At the summit (4050-4.0), visit the fire lookout. **0.0** **4.0**

The lookout is a good spot to conjure images of the glacier which carved the basins of Domke Lake and Round Lake and the trench of Lake Chelan. The summits of both Domke Mountain (4000) and Round Mountain (4379), across the lake, are rounded and smoothed by the ice, indicating the Railroad Creek, Fish Creek, and Lake Chelan glaciers filled the valleys to an elevation above these summits (Fig. 48). The ice was very thick indeed! [111]

RAILROAD CREEK ROAD

To Holden

2200-foot climb

10.4 miles

To Road End

2300-foot climb

11.8 miles

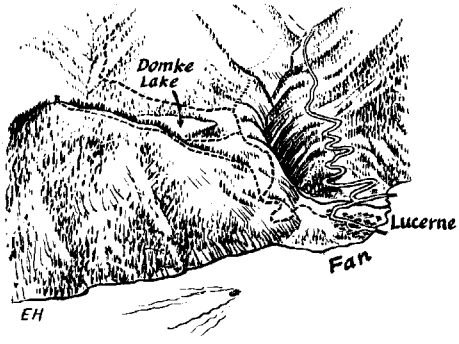


Figure 49

"Surely there is a vein for the silver, and a place for the gold where they fine it."

Job 28:1

On the gravel fan of Railroad Creek are the shacks and cabins of
0.0 LUCERNE, clustered around the Chelan boat dock (1100-0.0 miles). Taxi or car rental to Holden may be arranged here with the resort owner. A Forest Service GUARD STATION is along the shore to the east, and on the cove beyond is a Forest Service CAMPGROUND. The road to Holden passes the terminus of the EMERALD PARK TRAIL about 300 yards from the lake shore. Across Railroad Creek is the HOLDEN MINE DOCK (about 0.4).

.12] *The rock from the Holden mine was pulverized in the mill at Holden, the ore minerals removed, and the refuse spread in huge piles of tailing near the mill. Great buckets of the ore concentrate, containing copper, some zinc, and a little free gold were trucked down to this dock and placed on barges. The concentrate was put on trains in Chelan and taken to Tacoma for refining. The mining company gave the dock and Holden buildings, which are on public land, to a Christian church group; now the dock serves busloads of souls bound for summer camp.*

Above Holden dock the good gravel road zigzags up to the lip of hanging Railroad Creek valley, 1000 feet above the lake (Note 75). Railroad Creek is deep in a gorge cut since the glaciers retreated (Fig.

48). Above the last dusty switchback is the lower terminus of the RIDDLE PEAKS TRAIL (2150-about 2.5). Beyond, a narrow shelf for the road has been blasted in granite. Just above NINEMILE CREEK is the upper terminus of the RIDDLE PEAKS TRAIL (3093-about 8.5) **8.5** near the brushy clearings for the now defunct power line. Just beyond TENMILE CREEK begins the TENMILE HIGH ROUTE (3190-about 10.1). A towering bank of orange mine tailing appears here, and the road suddenly breaks from the trees into Holden (3290-about 10.4). **10.4** Past a cul-de-sac, lined with homes for the mine administrative staff, and the weather-beaten shingled two-story dormitories, is the turnoff to the mine, across the bridge over Railroad Creek (about 10.7). The **10.7** COPPER CREEK HIGH ROUTE and the DOLE LAKES HIGH ROUTE begin here.

Holden Mine and Tailing

Holden prospered for about 20 years as the miners drilled and blasted [113]
in the flanks of Copper Peak. The mine closed and the people left in 1957, not because the metals ran out, but because of excessive mining costs. The deepest mine workings are a half-mile below creek level. The labyrinth of passageways and the huge caverns where blocks of ore were

removed are now filled with water. High on the mountainside above the remains of buildings at the main entrance level, small yellow dumps mark entrances to the uppermost and still-dry galleries. The huge amount of rock removed and pulverized is best appreciated by contemplating the volume of the tailing dumps. Chemicals used to separate the ore minerals make the tailing barren. The wind lifts clouds of this pulverized rock and dusts it over the valley, while Railroad Creek carries the slime to Lake Chelan to color the boulders there a striking rusty orange. Hopefully, toxic chemicals will be slowly leached out and the piles of loose debris overgrown before floods send masses of orange mud down to Lake Chelan.

The main road crosses an overgrown avalanche track that bisects Holden. On the other side of the track is an area of demolished and looted private homes where the wilderness is returning. The road drops to cross the old ball park and to pass a CAMPGROUND (about 11.7) beneath tall cottonwoods. Beyond some tight turns and bumps is the
11.8 beginning of the RAILROAD CREEK TRAIL (3375-about 11.8).

RIDDLE PEAKS TRAIL

Not maintained

5000-foot climb

5900-foot descent

11.1 miles

The small meadows of upper Riddle Creek are only a few hours hike from the Holden Road.

0.0 The trail leaves the HOLDEN ROAD (3093-0.0) about a quarter of a mile above Ninemile Creek. From the narrow strip of trees along the road, it crosses the overgrown powerline swath and climbs gradually through trees and brush to the base of the rocky canyon wall. Switchbacks galore lead directly up to the crossing of NINEMILE CREEK (4800-2.0) and on up a rocky hillside to a prospect pit, the Edil mine (5800-3.0).

The hornblende in the very dark gneissic granite in this general area is concentrated in layers—a most difficult feature to explain if this rock was once molten. Hornblende crystals may have snowed down into layers as they formed in the molten mass during flurries of crystalization. [114]

From the prospect, the trail traverses many rock ribs to cross the ridge crest (6450-3.5) and descends cool green slopes on the north. After skirting white granite talus, it goes down through woods to cross RIDDLE CREEK (5500-4.5). Good campsites in the valley bottom are 4.5
half a mile or so upstream. The best ones are up to the north in basins at about 7,000 feet on the ridge of Flora Mountain and over the ridge at the head of Castle Creek (about 6500).

The Riddle Peaks Trail goes down the north side of the creek to recross (5100-5.2) and starts the climb back to Railroad Creek. The 5.2
forest dwindles out at a small basin (5550-6.3, camping), and the way continues up past a small pond and campsite located just north of the trail (6250-6.6). Just above the pond, the trail switchbacks to cross rocky LUCERNE MOUNTAIN (6750-7.1). Behold Lake Chelan! A 7.1
direct descent and rocky traverse (about 6000) lead to the ridge crest (6100-7.6) overlooking Railroad Creek. The trail goes down, down the steep dry crest, down through fine open forest of yellow pine where the grass is usually green, and down smoothly glaciated granite bosses on the gentler arm above the dusty Holden Road (2150-11.1). 11.1

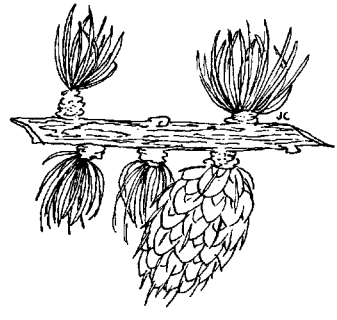
TENMILE HIGH ROUTE

Intermediate

3500-foot climb

3 hours

5 miles



Larch twig

Take this short route to make connections with the Stehekin valley via little-used trails down Devore, Hilgard, or Company Creeks. Some very large larch trees grow below the pass to Devore Creek.

Leave the HOLDEN ROAD (3180) at the lower (eastern) end of the mine tailing. Climb north-northeast over granite ledges and through patches of dry brush to the nose of Martin Ridge. Just below cliffs of Martin Ridge, broad timbered ledges high above the rocky gash of Tenmile Creek (about 4300) lead into the valley. Keep in trees west of the creek, traverse some talus and small brush patches, and cross the creek (4400-1½ hours) to reach continuous woods. Proceed straight up the valley through the woods to meadows and camping (5500-2 hours); keep watch for an old trail which links the Company Creek and Hilgard Creek Trails. Climb northward across steep meadows to the pass (6650-3 hours) leading over to Hilgard Creek. The Stehekin valley road is about 11.2 miles down the valley on the COMPANY CREEK TRAIL. West along the ridge from the pass is a route over strikingly banded rocks—layers of schist and gneissic granite—to the tarn that lies in a barren basin below the red cliffs of Martin Peak.

To reach Tenmile Pass between Tenmile Creek and Devore Creek, leave the main route at about 4700, just after crossing Tenmile Creek. Go northeasterly and straight up the hillside near the watercourse leading up to the pass; keep watch for the old trail. Continue through the thinning evergreens to magnificent groves of larch and fine camping (about 6300-3 hours). The larch is a timberline conifer which grows in the dryer eastern parts of the North Cascades. The twigs are covered with characteristic woody beads, and the needles, soft as feathers, change from light green to blazing gold before they fall in autumn. Above, to the north, is TENMILE PASS (6550), and over it are more meadows and groves in FOURTH OF JULY BASIN. About 12.8 miles down the DEVORE CREEK TRAIL is the Stehekin valley.

15] *In places near the pass, the granites are strongly banded; white layers of feldspar alternate with black layers of hornblende (Note 114).*

COPPER CREEK HIGH ROUTE

Intermediate

4000-foot climb

2000-foot descent

5.5 miles

5 hours

The route near the ruins of the Holden mine is a little difficult to find, but the spectacular cliff-walled cirque at Copper Creek is an ideal base for ascents of Copper Peak, Mount Fernow, and Buckskin Mountain, and provides a much more interesting approach to Entiat Meadows than the long Entiat River Trail.

Cross RAILROAD CREEK (3250) on the road to the ruined mine buildings at Holden and take the first fork that leads downstream below the dismantled mill and close above the tailing piles. Just across COPPER CREEK (3300), search the dry dirt roadcut for a tread leading straight up through the tree thickets—thickets that lie above a narrow rim of brush at the creek's edge. Look for blazes.

Above (about 4800), the rocky trail traverses up at the edge of a vast brush sea in lower Copper Creek. Before reaching the cliffs crossed by the cascading creek, it switchbacks up into red-stained gullies coming down the crumbling ridge of Buckskin Mountain. Rock ribs covered with larch and heather stick up between the raw red gashes. Higher up, a traverse leads into the alpine flora, a welcome change from the harsh gullies. The trail goes gradually down to meadow and campsites along meandering Copper Creek (5550-2 hours).

The gneiss that makes the towering cliffs of Copper Peak is cut by a conspicuous band of black hornblende schist. [116]

Follow Copper Creek to the end of the meadows. Turn southeast here and climb gullies through brushy slopes to the talus below the soaring cliffs of Buckskin Mountain. Straight south from the toe of this

talus a tongue of stones leads to the ridge crest SADDLE (7250-4 hours). The awesome glacier-draped north face of Mount Maude seems deceptively close across bare moraine of the upper Entiat. Approach the saddle with caution to surprise a goat. A rubble-filled draw leads south down the steep hillside, and grassy slopes below extend to Grou Camp on the ENTIAT RIVER TRAIL (5300-5 hours).

DOLE LAKES HIGH ROUTE

Difficult

3900-foot ascent

2400-foot descent

6 hours

8 miles

There is no nook on Railroad Creek more scenic than that around the three Dole Lakes. However, in spite of its nearness to Holden, it rates honors for brushy access.

Cross RAILROAD CREEK (3250) at Holden, on the road to the mine, and take the first fork that leads downstream below the dismantled mill and close above the tailing. Cross COPPER CREEK (3300) and pass the junction with the COPPER CREEK HIGH ROUTE. Follow the road, which eventually becomes the old and abandoned Railroad Creek Trail. Go through the woods, past obstruction caused by logging, past WILSON CREEK, and on to DOLE CREEK (3250-1½ hours), a small cascade draped with brush. Cross the creek and ascend straight up the east side through the thinnest brush and trees, well away from the tangles near the creek. The first few hundred feet are the worst. Continue straight up to a rocky, narrowing nose which finally leads to open woods and heather slopes (6000). Bear west (right) through the delightful openness to the shore of the lowest of the DOLE LAKES (6150-4½ hours) and fine camping. Rainbows to 18 inches long are scarce but catchable.

The rest of the route over to the Entiat Meadows is easy. Skirt the

west side of the two lower lakes and ascend talus past the upper lake (6550) to the saddle (7070) nearest TINPAN MOUNTAIN. Here on the Chelan Mountains a possible route goes off along the crest—see 45-Mile Sheep Driveway. Putter straight down the hillside to reach the ENTIAT RIVER TRAIL (4700-6½ hours).

HOLDEN LAKE TRAIL

Maintained yearly

1700-foot climb

3 miles

The cirque of Holden Lake provides a fine close-up of Bonanza Peak and a U-shaped frame for Copper Peak. Those wanting wider horizons might try the high-route return to Holden via the crest of Martin Ridge (2400-foot climb, 4500-foot descent, 5 miles from the lake). Mileages are approximate.

One mile beyond the ball park on the RAILROAD CREEK TRAIL (3600-0.0), the Holden Lake Trail cuts through the brush on an ava- **0.0**
lanche slope and climbs to the base of the rocks of Martin Ridge. Beyond a rocky gully (about 4000-0.4), the trail climbs steeply before beginning the long traverse into the Holden Creek valley. Views up and across Railroad Creek are unobstructed. After crossing more avalanche tracks (logs), the route enters big trees and wanders to the edge of HOLDEN LAKE (5250-3.0). Camp spots are near the lake shore and **3.0**
in glens below the lake. Fishing is poor.

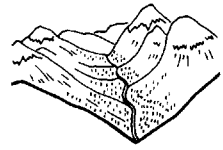
The immense glacier-draped wall of Bonanza Peak rises from the far shore. The main and easiest route to the top requires ice axes, ropes, and experience, for the route crosses to the top of the glacier directly toward the summit pyramid, and ascends the steep exposed rock to the north.

Between the top of the glacier and the rock or snowfield above, a [117
BERGSCHRUND (deep crack) forms where the glacier pulls away from the cirque wall. Often the crack is snow covered, but commonly it is exposed and difficult to cross.

To return to Holden via the easy high route over MARTIN RIDGE, go east from the lake shore up steep meadow; bear southeast beneath the lowest cliffs of Martin Peak and up grass and red scree to the broad saddle east of the peak (7450; 2 hours from the lake). Beyond summit 7685, stroll down the ridge crest toward Holden. The wild walls up Big Creek are most impressive from here.

[18] *Much of the schist and gneiss on Martin Ridge was once sedimentary rock. Along the crest, note the thin brittle flags of red schist, reminiscent of the mud layers from which it was derived. The red color is iron oxide (rust) from weathering of iron minerals in the rock, particularly tiny brass-colored cubes of pyrite. PYRITE, a compound of iron and sulfur, is common in rocks formed from mud which was deposited in stagnant bottoms. (Notes 93 and 94).*

Begin a direct descent to Holden at elevation 6850 feet, following a broad band of white gneiss (possibly metamorphosed gravelly sand) east of the red schist. The bearing from this point to Copper Peak is 196°. Go south down the slope to the ruins of the westernmost homes at Holden and squirm through a little brush to the uppermost "street." (3350-5 hours from Holden Lake)



RAILROAD CREEK TRAIL

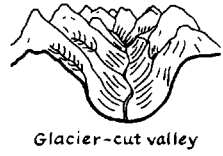
Maintained yearly

3200-foot climb

1000-foot descent

10.4 miles

Figure 50



It takes but half a day to reach timberline near Lyman Lake and Cloudy Pass via this excellent trail. The way is varied and features brush fields and views of waterfalls and rugged cliffs.

The trail begins at the upper end of the HOLDEN BALL PARK

(3350-0.0). It follows a jeep track to the remains of a corral (3450-0.4) **0.0**
and the first of many log walks (puncheons) and bridges that cross the boggy bottoms along Railroad Creek.

The swath through the brush leads up to the junction with the HOLDEN LAKE TRAIL (3600-1.0) and continues through jungle before **1.0**
reaching woods and the bridge over HOLDEN CREEK (3525-1.7). Camping here is dark. Beyond some beaver ponds, the faint jeep tracks end as the trail begins climbing. Down the valley, views of Copper Peak and Holden appear, and close below are grand cascades.

The U-shape of the valley indicates that it was partly cut by a [119]
glacier. A glacier is wide and massive and erodes as a broad chisel or gouge, thus cutting a wide vertical-walled trench. On the other hand, a mountain stream erodes into the rock as a saw; the loose material on the valley sides slumps and creeps to the stream and is carried away; the valley profile becomes a V (Fig. 50).

The trail winds amid blocks of rock at the base of a 2000-foot cliff and then descends to the shore of HART LAKE (3960-3.4), where cot- **3.4**
tonwoods grow amid boulders of gneissic granite. Tent spots are few, small, and rocky. Cutthroat up to 14 inches long are hard to approach because impenetrable brush walls two sides of the lake and the creek; nevertheless, fishing may be good. Notice the fingerlike delta of Railroad Creek. Beyond Hart Lake the trail climbs to reveal the cliffs of Bonanza Peak.

The smooth open slope here is on a symmetrical fan of debris dropped [120]
by the stream that comes cascading down from a glacier far above.

The cliffs just west of the stream are made of a dense black rock akin to lava, that is, quickly cooled molten rock. A close look at weathered surfaces shows that angular black fragments are in a cement of the same rock. This fused breccia is not a lava such as flowed on the surface but molten material which intruded a crack in the crust (a DIKE). Evidently the molten rock began to solidify when renewed movements of more molten material broke up the chilled portion and engulfed the pieces.

The trail descends to low boggy ground and crosses many bridges to reach Rebel Campsite (3989-4.4), where there is more wood and **4.4**
flatter camping than at Hart Lake. The trail finally climbs above the

valley bottoms, and views of nearby CROWN POINT FALLS and Hart Lake reward the hiker.

[121] *On a rocky ledge the trail passes a dripping entrance to a prospector's ADIT—a horizontal passageway. On the cliffs just south of Crown Point Falls more adits may be seen above telltale piles of freshly broken rock. These adits were driven in about 1901 along veins of quartz that contain silvery, metallic flakes of MOLYBDENITE. This exceedingly soft mineral (scratch it with a fingernail) is an ore of the metal molybdenum which is used as an alloy to make special steels.*

The trail rounds a corner and crosses below rock slabs. In the snag-dotted meadow below, Railroad Creek swings in wide meanders before leaping over the falls. At the end of several switchbacks is LYMAN
7.7 CABIN (5510-7.7), owned by a power company and used by surveyors who come in the spring to measure the depth of the snow and its water content. LYMAN LAKE is just beyond, and the outlet creek spills down
7.8 long and shining granite aprons. Just above the lake outlet (5587-7.8), a branch trail leads off along the west shore to Lyman Lake Campground. Skirt either shore of the lake to begin the LYMAN GLACIER HIGH ROUTE and to reach more secluded camping spots. Fishing is not particularly good.

The Railroad Creek Trail climbs from the shore of Lyman Lake through thinning trees across several rills and past sloping trailside campsites. The open slopes above, renowned for their wildflowers in mid-July, are scarred by a multitude of ruts made by thoughtless individuals
9.0 climbing on diverse routes to CLOUDY PASS (6438-9.0). To reach splendid open meadows and innumerable sunny camp spots (wood scarce) on the south slopes of Cloudy Peak and North Star Mountain, contour eastward at the elevation of the pass.

[122] *On the south shoulder of Cloudy Peak (about 6500) look about for a spectacular rock composed of round "eggs" of gneiss and dark granite set in cement of white granite. The origin of this breccia is an enigma.*

The main trail descends from Cloudy Pass to the fringe of talus which it follows to the lower end. Here a FOOT TRAIL TO SUIATTLE PASS leaves the main route. The foot trail traverses the talus and steep rocky meadow to reach the base of a cliff. It traverses the cliff base to the crossing at Suiattle Pass and then drops slightly on the west side to regain the main route. The main horsepack route goes down timbered

slopes on switchbacks to the crossing of the SOUTH FORK AGNES CREEK (5550-10.4). Here in a wet meadow (possible camping) is the junction with the SUIATTLE PASS TRAIL and with the AGNES CREEK TRAIL (Cascade Crest Trail) which goes 16.9 miles in forest to the Stehekin River Road at High Bridge.

LYMAN GLACIER HIGH ROUTE

Easy

1600-foot climb

4 miles

2 hours

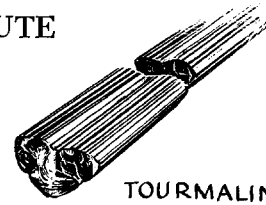


Figure 51

> ". . . and atop the moraine looked down on a very pig of a glacier, rooting in boulders, stagnant and buried in its own debris."
>
> Will Thompson, quoted by Harvey Manning in *The Mountaineer, 1958.*

Along this route the alpine greenery contrasts strongly with the raw landscape just emerged from retreating Lyman Glacier. There are many pleasant camp spots.

Cross Railroad Creek on logs at the OUTLET OF LYMAN LAKE (5587) and follow fisherman trails up and down through the brush, below bluffs near the lakeshore. Halfway along the lake, traverse upward to a small stream and find a trail leading eastward to the broad ridge crest (5850) east of Lyman Lake.

On this ridge the granite is unusually white, for the familiar black [123]
specks of biotite and hornblende are nearly absent. What has happened to these darker minerals is revealed under the microscope: small pieces of biotite and hornblende are seen engulfed in large crystals of white feldspar. When the more normal, spotted granite in this area was nearly solid, it was apparently permeated by gas and watery solutions stream-

ing up from the cooling melt below; the early crystallized black minerals were dissolved and replaced by this later-formed white feldspar carried by the emanations.

From the ridge east of Lyman Lake, a side track leads eastward by granite bluffs and past some tiny lakes (camping). The expert pathfinder will be able to follow it down a bushy burn to a large dilapidated cabin (fair shelter) just across Rubin Creek (about 4900 feet).

The high route, however, goes south through hummocky terrain and rolling green meadow to a collapsed CABIN (5950-¾ hour) and fine camping (wood scarce) on the edge of the barrens of upper Railroad Creek.

[124] *Here, near the old cabin, is a mound of fresh red rock debris, a TERMINAL MORAINE (Fig. 52). A terminal moraine forms at the lower end of a glacier. Here the melting is just compensated for by ice flowing down from the upper end. The snout remains stationary and debris carried in the flowing ice is thus delivered to the terminus as from a conveyor belt. Above the red terminal moraine at Lyman Lake, an expanse of barren gravels is laced with milky streams from Lyman Glacier and dotted with shallow tarns; below it a thin film of alpine flora has already spread over similar features. Here is a graphic example of a rapidly changing natural environment.*

From the cabin a fair trail leads southeast, parallel to an old grass-covered moraine, passing trailside camps and larch trees before leading onto the top of the fresh red moraine. Go along the top of the moraine, heading straight for the obvious pass to the southeast. Views of Lyman Glacier nestled below Chiwawa Mountain and of Sitting Bull Mountain rising through the vale of Cloudy Pass can be enjoyed. Continue up along a stream flowing through moraine and through a steep hummocky basin. The route ascends southerly to the toe of a rocky rib coming down from the pass, crosses the rib (about 6600) to a snow tongue and tiny glacier, and climbs the snow close to the rocks on the east to avoid crevasses and moats (cracks between snow and rock). In the narrow rocky pass (7050-2 hours), at the head of the narrow defile that shelters Spider Glacier, is the junction with the FORTRESS HIGH ROUTE and PHELPS CREEK TRAIL.

125] *Looking toward Lyman Lake, note how the rust-colored gneiss blocks from Chiwawa Mountain that have been carried by Lyman Glacier lie*

against the white granite on the east. Blocks of granite fallen from the white cliffs are mixed with the red moraine—a sharp line as seen from this distance but one quite diffuse when seen at close range along the route.

Figure 52. Looking south across Lyman Lake to terminal moraine and Lyman Glacier

Nests or large masses of radiating black needles can be found in the brown biotite gneiss at the pass. These are needles of TOURMALINE (Fig. 51). Flawless crystals, when cut and polished, are semiprecious gems. The granite examined at Lyman Lake extends south here under a roof of gneiss (Fig. 3), and as the once-molten rock cooled, emanations entered this fractured roof and deposited the tourmaline (Note 89).

ANNOTATED BIBLIOGRAPHY

Aerial Photographs

See Introduction (maps and photographs). The standard size of photographs is 9″ x 9″, but enlargements are available. To obtain, write the appropriate agency and ask for exact costs and ordering information. Specify exactly, preferably on a map, the area of interest and whether or not stereo coverage is wanted.

The U.S. Forest Service has the best photographs of the Glacier Peak and Holden quadrangles. Write U.S. Forest Service, P.O. Box 3623, Portland, Oregon 97208.

The U.S. Geological Survey has the best photographs of the Lucerne quadrangle. Write Topographic Division, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025.

Equipment and Technique

Information pertinent to travel in the North Cascades has been given in the Introduction; a thorough reading of the following books will prepare the reader for other aspects of wilderness travel.

American Alpine Club, *Accidents in American Mountaineering*. New York.

This annual pamphlet is educational as well as chilling: a grim but effective way to learn about alpine hazards and what to do to avoid them.

Brower, David, ed., *Going Light with Backpack or Burro*. The Sierra Club, San Francisco, 1958, 152 p. This concise little book contains, per gram, more pertinent and reliable advice than any other book.

Manning, Harvey, ed., *Mountaineering, The Freedom of the Hills*. The Mountaineers, Seattle, 1960, 430 p. Most of this textbook was written

by people personally acquainted with travel in the North Cascades; hence it is of particular value to the newcomer to the Northwest. Although primarily for climbers, there is much of interest and value for the hiker, especially for those who travel the high routes between Glacier Peak and Lake Chelan. Chapter 20 deals with mountain geology and was written with the North Cascades in mind.

Geology

Cloos, Hans, *Conversation with the Earth.* Alfred A. Knopf, New York, 1953, 413 p. A stimulating book for geologist and layman. Not only tells a great deal about the earth, but tells what makes a great geologist.

Gilluly, James, Waters, A. C., and Woodford, A. O., *Principles of Geology.* W. H. Freeman and Co., San Francisco, 1951, 631 p. An excellent textbook stressing concepts; the photographs and drawings alone provide a basic geologic education.

Hunt, Charles B., *How to Collect Mountains!* W. H. Freeman and Co., San Francisco, 1958, 38 p. A spoof guaranteed not to clarify anything.

Mackin, J. Hoover, and Cary, Allen S., *Origin of Cascade Landscapes:* Div. Mines and Geology Inf. Circ. no. 41, Washington State Dept. of Conservation, 1965, 35 p. This small booklet gives a remarkably clear explanation of how Cascade scenery developed. The lucid presentation of the geologic evidence demonstrates how geologists think and makes earth history vivid. Order from the publisher, Olympia, Washington, 98501. Price, 50 cents.

Misch, Peter, Geology of the Northern Cascades of Washington: *The Mountaineer,* v. 45, no. 13, 1952, p. 5-22. A mountain-climbing geologist describes his work in wilderness north of the area of this guide. Although some concepts of North Cascade geologic history have changed since publication of this classic reference, unfortunately out of print, many of the basic ideas of rock formation are as timely as ever, and they are enthusiastically described.

Read, H. H., *Geology; an Introduction to Earth History.* Oxford University Press, London, 1949, 248 p. This well-written small textbook traces the history of geologic concepts and describes controversies that still rage.

Thornbury, W. D., *Principles of Geomorphology.* John Wiley and Sons, Inc., New York, 1954, 618 p. See particularly the chapters on glaciers (p. 354-383) and on volcanoes (p. 488-514).

U.S. Geological Survey, *Geologic map of the Glacier Peak quadrangle,*

Snohomish and Chelan Counties, Washington, Geologic Quadrangle (GQ) Map 473 (In press); *Geologic map of the Holden quadrangle, Snohomish and Chelan Counties, Washington;* and *Geologic map of the Lucerne quadrangle, Chelan County, Washington.* These colorful geologic maps are in the final stages of preparation. They will be too expensive for wallpaper (about $1.25 each), but the geology buff will want them as a companion en route. They will say more about the geology than many pages of text and will make the notes in this guide much more meaningful. Purchase when available, with check, money order, or cash, from U.S. Geological Survey, Federal Center, Denver, Colo., 80225.

Washington Department of Conservation, *Geologic Map of Washington,* 1961. This large map is suitable for wall decoration *and* careful study. Order from the publisher, Olympia, Washington 98501. Price, $3.00.

Maps

See Introduction (Maps and Photographs) for recommendations.

Army Map Service, *Plastic relief maps:* Order the Concrete and the Wenatchee sheets from the Commanding Officer, Army Map Service, San Antonio Field Office, Building 4011, Fort Sam Houston, Texas 78234. $4 each in money order or cashier's check.

Martin, George W. and Pargeter, Richard A., *The North Central Cascades, A Pictorial Relief Map:* [n.p.] c. 1964.

U.S. Forest Service, *Planimetric maps:* Order these free maps (Forest Series, ½ inch = 1 mile) from the Forest headquarters or pick them up in the district offices—see Introduction (Management). For information on cost of the larger scale (1 inch = 1 mile) planimetric maps of 15′ quadrangles, which are excellent for drainage details, write the U.S. Forest Service, P.O. Box 3623, Portland, Oregon 97208.

U.S. Geological Survey, *Topographic maps:* Order topographic maps from the U.S. Geological Survey, Federal Center, Denver, Colorado 80225 or Washington, D.C. 20242. A state index map is given free on request and also, if requested, a leaflet showing status of current mapping and available manuscript material. Figure 53 shows available maps around the quadrangles included in this guide. Standard quadrangles, 30 cents (indicate if the green woodland overlay is *not* wanted); special shaded relief edition of Holden quadrangle, 30 cents; United States Series, 1 inch = 4 miles, 50 cents. Make payment to the U.S. Geological Survey by check, money order, or cash. Geological

Survey offices in Los Angeles, California; Menlo Park, California; San Francisco, California; Washington, D.C.; and Spokane, Washington have maps of the North Cascades for over-the-counter sale. Some private businesses carry the Geological Survey's topographic maps—some are listed in the free index mentioned above.

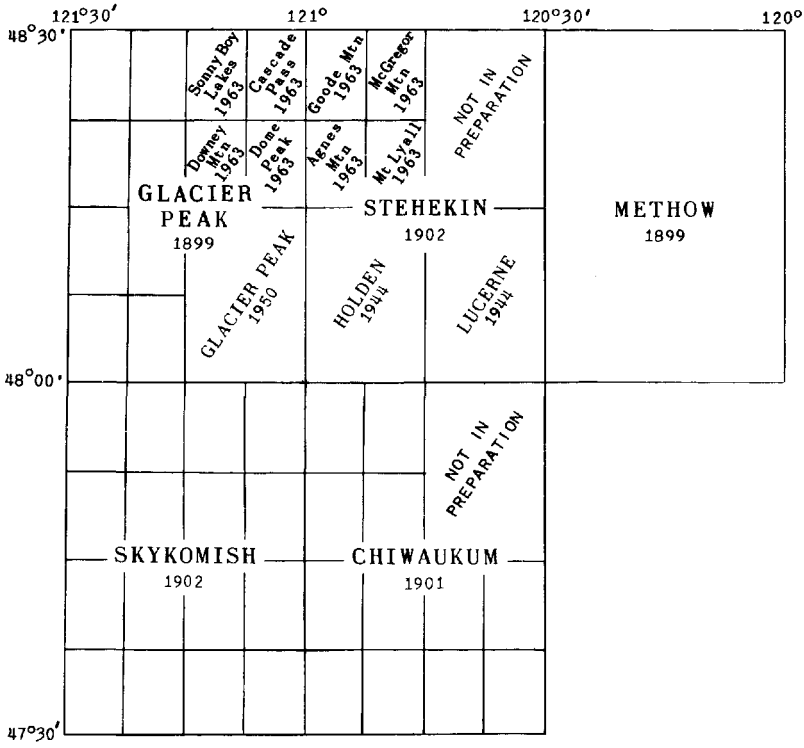


Figure 53. Geological Survey topographic maps surrounding the guidebook area. Named quadrangles are available as of July 1965. Write for information on the availability of the unnamed 7½′ quadrangles, which are in preparation.

North Cascades

A much longer but unselected bibliography of the area of this guide is given in the 1958 annual issue of *The Mountaineer* listed below.

American Alpine Club, *Climbers' Guide to the Cascade and Olympic*

Mountains of Washington. Boston, 1961, 386 p. The peak-bagger's bible. Those pages describing ascents of peaks between Glacier Peak and Lake Chelan are here reproduced in the Appendix.

Brockman, C. Frank, *Flora of Mount Rainier National Park.* U.S. Government Printing Office, Washington, 1947, 170 p., $1.25. An excellent illustrated description and key to flora in the North Cascades as a whole, written for the layman. The Mountaineer annual cited below contains a short chapter dealing specifically with the flora of the Glacier Peak Wilderness.

Manning, H., *Wild Cascades: Forgotten Parkland.* Sierra Club, San Francisco, 1965 (in press). This picture book includes work by Ansel Adams and others and does not neglect the water and greenery that grace the snow and rock. The text by Manning that hikes us through the whole spectrum rings fresh and true. A contour map (interval 1000 feet, scale 1 inch = 1 mile) shows boundaries of all proposed Wilderness areas as well as of the proposed National Park.

Miller, T., Manning, H., and Molenaar, D., *The North Cascades.* The Mountaineers, Seattle, 1964, p. 95. This book does justice to North Cascade peaks and glaciers with photographs by Miller and a chatty text by Manning and gives a resounding argument for a North Cascades National Park.

Mountaineers, *The Mountaineer:* Published monthly by The Mountaineers, Seattle. The annual magazine issue which appears in the spring almost always contains articles about the North Cascades. See, in particular, v. 51, no. 4, 1958, which is devoted mostly to the Glacier Peak Wilderness.

Walcott, E. E., *Lakes of Washington,* Vol. 1 *Western Washington.* Washington State Div. Water Resources, Water-Supply Paper 14, Olympia, 1961, 619 p.

———, *Lakes of Washington,* Vol. 2 *Eastern Washington.* Washington State Div. Water Resources, Water-Supply Paper 14, Olympia, 1964, 650 p. Monumental compilations with some fine aerial photographs in the guidebook area on which to junket vicariously.

Wills, R. H., *High Trails, A Guide to the Cascade Crest Trail.* University of Washington Press, Seattle, 1962, 157 p. Describes the Pacific Crest Trail in Washington. Pages 51-63 discuss the trail in the area between Glacier Peak and Lake Chelan.

APPENDIX

MOUNTAIN CLIMBING

Most summits between Glacier Peak and Lake Chelan are easy scrambles. In the text (see Index) are directions for easy ascents if they begin on a nearby trail or high route. Additional information on other routes and on routes up Bonanza Peak, Glacier Peak and Tenpeak Mountain, which offer some difficulty, are given below as quoted from *Climber's Guide to the Cascade and Olympic Mountains of Washington,* Boston, 1961, 386 p., with the permission of the publishers, the American Alpine Club. The authors take no responsibility for the accuracy of this material; the climber must look after himself. The sketches are by Dee Molenaar; those of Glacier Peak have been redrawn for this guide.

Bonanza Peak *(9511)*

Located on the Company-Railroad-S. Fork Agnes Creek divide 1½ miles N. of Hart Lake.

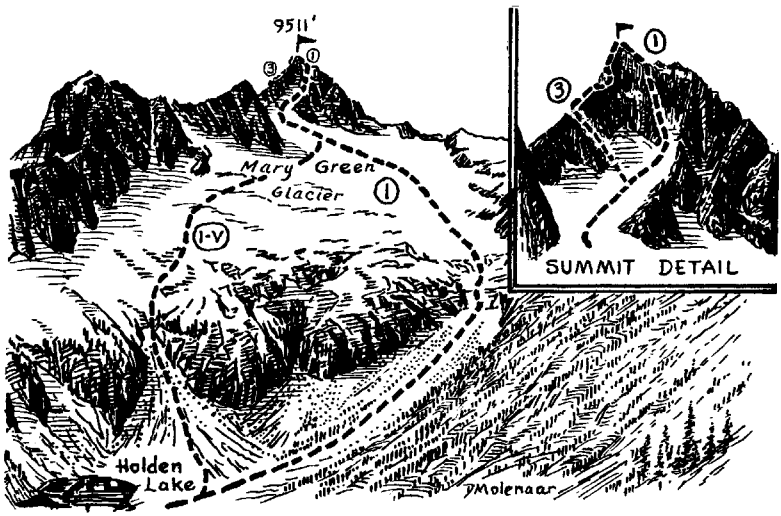
First ascent 1937 by J. Leuthold, C. I. James, and B. James.

Route 1. From 1½ miles W. of Holden take the 2-mile brushy trail to 5200-ft. Holden Lake where camp can be made. Climb N. up talus and snow toward Holden Pass (6400), bearing W. onto the Mary Green Glacier. Just before reaching the pass, ascend diagonally left under the cliffy summit structure and climb an ice apron to its upper right hand corner. Ascend slabby rock up and to the left, reaching the ridge at a prominent notch 100 yards N.E. of the summit. The ridge is easily followed to the summit. The upper rocks are class 3 when free from snow, but before August, with snow on the face, the climb becomes difficult and dangerous. Time: 8-10 hours up.

A shorter route through the Mary Green Glacier ascends the large talus cone just N. of Holden Lake to near its tip where a 20-ft. pitch on the right side gives easy access to the slabs below the glacier. Ascend directly up the glacier to the ice apron.

Route 2. First ascent by L. Penberthy and H. Altenfelder.

The summit of Bonanza may also be reached from the W. Peak (ca. 9400, sometimes called Number 2), which was first ascended by the original Bonanza party. From Holden follow Railroad Creek 4 miles to Hart Lake (3956). From the upper end of this lake go through cliffs to a camp at the foot of a moraine below the Isella Glacier. Climb the W. side of the glacier and enter a 1000-ft. steep, hidden snow chute on the W. side of a buttress descending from the W. Peak. The chute ends just S. of the peak. Bonanza is reached by a long traverse of the narrow and exposed connecting ridge. The first part traverses the S. side of the ridge, then continues on the crest. The last gendarme is by-passed on the N. side.



Climbing routes on Bonanza Peak

Route 3. (Southeast or Holden Ridge) First ascent 1956 by J. Burrows and D. Isles.

Follow Route 1 almost to the highest point on the Mary Green Glacier, then traverse S. onto the Holden Ridge. Shattered rock and debris make access to the ridge crest difficult. Once on the crest climb easy rock to a smooth tower which is passed on the right by traversing almost horizontally, then climbing a difficult pitch with small holds. Another ledge

permits traversing to a chimney filled with quartz crystals which is climbed to the ridge crest. The summit is then 3 long leads away over steep, difficult rock where belay stances are found. Anchor pitons were used, especially on the contours and on the last section. Time: 10 hours up.

Route 4. (Northwest Ridge) The complex N. side may be reached by 2 approaches. The first is via Holden Pass, then across heather slopes to a pass at the foot of the N.E. ridge, then onto the E. edge of the Company Creek Glacier which is confined by the various ridges of the N. face.

The second approach is via the Company Creek trail which extends 5 miles to Hilgard Creek. From Hilgard Creek (4000) travel S.W. along the W. fork 2½ miles to 4500 ft., where the creek again forks. Take the left fork (Sable Creek) and camp at timberline. This camp is a suitable base for climbs of the N.E. face (formed by the N.E. and N. ridges) or the N. face. Company Creek may be followed for a camp at the foot of the glacier. Both these approaches join the Holden Pass approach to the N. side.

The N.W. ridge at the W. side of the Company Creek Glacier was first climbed to the W. Peak by J. Leuthold, C. I. James, and B. James. This is a moderate snow and rock climb. See Route 2 for the traverse from the W. Peak to the summit.

Route 5. (North Face) First ascent by L. Penberthy and H. Altenfelder.

See Route 4 for approaches. The party climbed halfway up the glacier and then onto the face. This route merges with Route 1 at the crest of the N.E. ridge. The rock is solid.

Route 6. (West Face) The W. face above Glacier Creek is reported to be rotten. The best route is on the N. end of the face, reached from the creek.

References: 1937 Mazama; 1950 and 1951 Mountaineer.

Buck Mountain *(8573)*

Located 3 miles W.N.W. of Trinity.

Route. Just beyond Buck Creek (3373), 3 miles N.W. of Trinity, cross the Chiwawa River bridge. Leave the trail in a few hundred yards, cross Buck Creek, and climb through brush on the S. side of the creek descending from King Lake. Climb past the lake and the small glacier to the rocky upper face. The climb is fairly rugged, though not too difficult. Time: 6 hours up. By climbing the valley 1 mile W. of the Buck

Creek-Chiwawa River junction on the N. side of the peak, a 6700-ft. pass on the N.W. side is reached from where the ascent can be made. There are several unnamed high summits on the main divide to the N.W. and S. of Buck Mountain.

Buckskin Mountain *(8100)*

Located on the Railroad Creek-Entiat River divide 1¾ miles E. of Mt. Fernow.

Route. From 1 mile E. of Holden, ascend the Copper Creek trail and slopes above to the 7200-ft. ridge between Mt. Fernow and Buckskin Mountain. Climb E. to the summit. Time: 6-7 hours. The best approach from Entiat Meadows is the E. ridge. The S. ridge from the meadows offers some class 4 rock.

Cardinal Peak *(8595)*

Located on the N. Fork Entiat River-N. Fork Bear Creek divide.

Route. Leave the Entiat River road at the 34-mile post (2600), and follow the N. Fork trail to 6800 ft. opposite the W. side of the mountain (10 miles). The final ascent from here is not difficult. Between this peak and Pyramid Mountain there are several high summits.

Castle Peak (Castle Rock) *(8300)*

Located between Castle and Riddle Creeks 3 miles E. of Lake Chelan.

First ascent 1917 by U. S. G. S.

Route. From upper Devore Creek at 6000 ft. (4th of July Basin) climb E. to 7800 ft. and follow a 2-mile ridge that leads to a long scree slope on the W. side of the summit. Time: 3-4 hours. Riddle Peak and Mt. Flora can also easily be climbed on the same day.

Reference: 1940 Mazama.

Chiwawa Mountain *(8459)*

Located 2 miles S. of Lyman Lakes.

Route. From Lyman Lakes, climb to the S.W. corner of the lower Lyman Glacier. Ascend steep névé slopes around the N. side of the central rocky island to the upper glacier which is ascended to its extreme S.W. tip. Easy rock is followed to the summit. The ascent can be made via the upper Chiwawa River trail from Trinity Mine.

References: 1921 and 1938 Mazama; 1921 Mountaineer.

Clark Mountain *(8576)*

Located on the White River-Napeequa River divide.

Route 1. From the end of the White River road, travel 4 miles N. on the trail and turn right on the trail up Boulder Creek. About 3 miles

up this trail, take the left branch and continue W. to the high country S.E. of the peak. Contour W. on the S. side of the divide and then climb N. to the rocky summit.

Route 2. From Maple Creek Camp (2600) on the Chiwawa River road, take the trail 4 miles to Little Giant Pass (6409) and descend 2 miles into the picturesque Napeequa Valley (4300). This point may also be reached in 10 miles from the White River road end (2400) by the trail up Boulder Creek and over a 6300-ft. pass.

About 2½ miles up the Napeequa trail, ford to the S. side of the river and ascend S.W. through open timber to a small lake at 5700 ft. near a meadow S. of Butterfly Butte. Climb S. to the glacier snout. Early season ascents with crevasses well bridged may be made up the left-hand glacier and thence to the summit by the E. ridge. Otherwise, ascend the right side of the righthand glacier to a col on the N.W. ridge. Traverse to the S.W. ridge, and ascend easy rocks to the summit.

Reference: 1958 Mountaineer.

Copper Peak ***(8966)***

Located on the N. side of Mt. Fernow.

Route. From Holden (3262), climb S. for 1000 ft. via a mine trail, and then climb W.S.W. to the summit. Time: 7 hours.

Dumbell Mountain ***(8421)***

Located between upper Railroad and Big Creeks, 2¼ miles E.S.E. of Lyman Lakes.

First ascent 1938 by 2 miners.

Route. Climb directly S.E. from Lyman Lakes along the ridge on the left side of the glacier to the 7400-ft. ridge connecting Chiwawa and Dumbell Mountains. Cross just E. of a small rock peak and drop several hundred feet on the S. side. Cross a dry cirque E. and ascend to the far summit. There is a N.E. summit on the ridge between Big Creek and Hart Lake. Time: 4-5 hours. The ascent is also possible from upper Phelps Creek.

Devil's Smokestack ***(7720)***

Located 1 mile N.W. of Garland Peak.

First ascent by R. Grant, M. Hane, and D. LaViolet.

Route. Use same approach as for Garland Peak; route is on the "backside." Class 3.

Devore Peak ***(8300)***

Located on the Highland-Devore Creek divide 5¼ miles S.W. of Stehekin.

First ascent 1940 by E. Darr and Mrs. E. Darr.

Route. From Devore Creek ascend the S.E. ridge, or from Marie Lake on the S. side of the peak, make the ascent from the saddle above. Time: 1½ hours from the saddle.

References: 1940, 1941 Mazama.

Emerald Peak *(8422)*

Located 1 mile S.E. of Milham Pass.

Route. The route is similar to that of Saska Peak. On either approach, climb more to the E. in the latter part of the ascent.

Fortress Mountain *(8674)*

Located in the Chiwawa Range 1¾ miles N.E. of Buck Creek Pass.

Route. From Buck Creek Pass, climb around the W. side of Helmet Butte to 6900-ft. Pass No Pass, from where the S.W. side of the peak is an easy climb. Time: 4-5 hours. The E. side can be climbed from the Fortress-Chiwawa Mountain saddle, reached via the upper Chiwawa River trail, which branches from the main trail 3 miles from Trinity Mine.

Glacier Peak *(10528)*

Located on the Suiattle-White Chuck River divide.

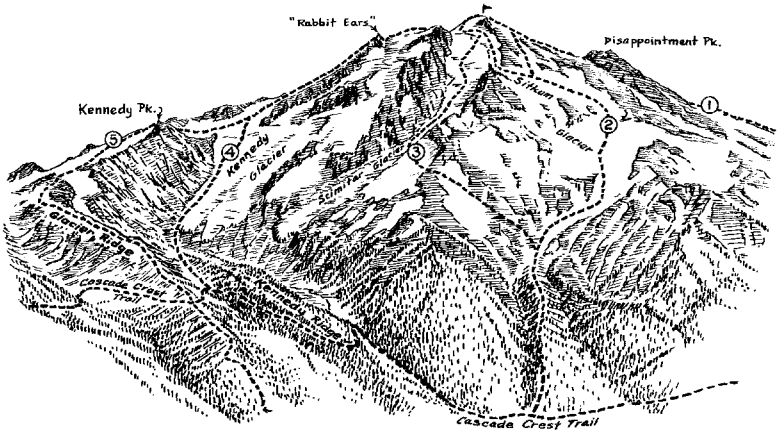
First ascent 1898 by T. G. Gerdine (U. S. G. S.) and 4 others.

Route 1. (South side) From the end of the N. Fork Sauk River road at Sloan Creek, take the trail 9½ miles to White Pass (5904), where camp may be made at the shelter. There is another shelter, Mackinaw, 5½ miles up the trail. From the pass, travel N.E. around the E. side of White Mountain, and climb to the 6500-ft. ridge beyond. Follow the ridge N.E. ca. 1 mile and descend N. to the White Chuck Glacier.

A longer approach to the glacier is by the trail from the end of the White Chuck River road. This approach offers pleasant meadow scenery and passes Kennedy Hot Springs (6 miles). Take the trail an additional 7 miles past Kennedy Hot Springs to where the old Glacier shelter stood in the last clump of timber by the trail, in the meadowland near the head of the White Chuck River. This point offers a view of the route to the glacier; however, a nicer camp can be made by a stream in the meadows 1 mile back on the trail. From the old shelter site, travel E. to the White Chuck River; cross and take the left (N.) branch up to the White Chuck Glacier.

Climb N.E. up the 1½-mile long glacier, finally ascending a snow finger to the ridge adjoining the Suiattle Glacier. Follow the gentle pumice ridge N. to a point where the Suiattle Glacier on the E. comes

high on the ridge. Leave the ridge and contour E. above a rock island and below a glare ice field. Climb directly through minor seracs, keeping E. of Disappointment Peak, and climb left to the col between it and the upper slopes. Easy pumice ridges and a snow finger lead directly to the summit. Time: 6-10 hours up; 3-5 hours down.



Glacier Peak from the west

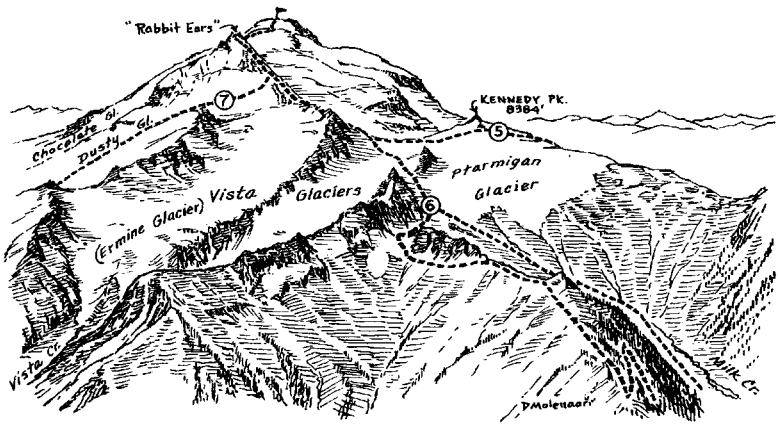
Route 2. (Sitkum Glacier) From the end of the White Chuck River road, take the trail 6 miles to Kennedy Hot Springs and ca. 2 miles past to a junction with the Cascade Crest trail at Sitkum Creek. Follow the Crest trail back to the left (N.) up Sitkum Creek ca. ½ mile and then follow a blazed trail up a steep wooded ridge to a boulder basin at timberline. Camp can be made at Kennedy Hot Springs or on the heather ridge to the right (S.) of the boulder basin. Ascend the snow fields of the Sitkum Glacier directly toward the summit rock spire. On the upper portion of the glacier, work left into the snow saddle immediately above a sharp, prominent rock spire on the ridge to the N. Ascend the pumice ridge to the summit rock, working to the left around the summit rock to reach the summit snow crest. The summit may also be reached from the upper Sitkum Glacier by snow and scree slopes to the right of the rock tower. Time: 7-9 hours up from Kennedy Hot Springs.

Route 3. (Scimitar Glacier) First ascent 1957 by B. Prater and party. Approach as for Route 2 and ascend the shoulder just S. of Sitkum Creek to 5500 ft., where camp may be made. Climb up and left to cross

a rocky ridge at 7200 ft., from where a traverse can be made to the Scimitar Glacier. Ascend to the saddle (10100) just N. of the summit, and bear right to the summit. Time: 6-8 hours up from camp.

Route 4. (Kennedy Ridge) From the end of the White Chuck River road, take the trail toward Kennedy Hot Springs 5 miles and turn left up the Kennedy Ridge trail, following this to the head of a boulder-strewn basin. Bear right, around the head of the basin, remaining on the N. side of Kennedy Creek, to the base of the main ridge at ca. 5500 ft. Follow rock, pumice, and snow slopes to the crater rim. Bear right, following the rim to the summit ¼ mile S. Time: 6-8 hours up from trail.

Route 5. (Glacier Ridge) From the end of the White Chuck River road, take the trail toward Kennedy Hot Springs 4¾ miles, turning left on the Glacier Ridge trail. Follow past the old lookout to junction with the Cascade Crest trail (7 miles in from the road). There, leave the trail and continue up Glacier Ridge, where good camp spots can be found ca. ½ mile above the trail. Ascend S.E. on Glacier Ridge to 8000 ft., where a huge rock buttress (Kennedy Peak) is passed on the Ptarmigan Glacier to the left. Descend 300 ft. to a col and climb S.E. to the N. cleaver, joining Route 6 from here to the summit. Time: 5 hours up from high camp.



Glacier Peak from the north

Route 6. (Milk Creek) At the end of the Suiattle River road (1650), take the Milk Creek trail S. 6 miles to a fork at 4000 ft. and follow the

left branch of the trail switchbacking steeply up to the ridge E. of Milk Creek. Ascend S. up the ridge to the last shrubs and contour the E. side, finally climbing right to a pass beyond the first buttress on the ridge. Travel S.S.W. on the Ptarmigan Glacier on the W. side of the divide to a second pass (1 mile). This pass is also commonly reached by continuing from the trail fork to the head of Milk Creek valley and directly up Ptarmigan Glacier.

From the pass climb S. on the E. side of the main divide, keeping left of Kennedy Peak at the head of the glacier. The prominent N. cleaver above offers a good route to its end just beneath the N.E. summit. Continue up to this false summit, and pass between the prominent "Rabbit Ears," make a short descent to the S., and climb to the N. rim of the crater. The broken S. rim ¼ mile distant is the summit. Time: 5-8 hours up from a high camp either at the head of Milk Creek valley or on the ridge to the E.

This route can be varied by climbing the Kennedy Glacier from the col S.E. of Kennedy Peak as for Route 4.

Note: Routes 7, 8, and 9 are not always dependable, because they take the climber over glacial terrain which is frequently broken up. These routes may be approached either from the end of the Suiattle River road by the trail up the Suiattle River, or from the end of the Chiwawa River road past Trinity by the trail over Buck Creek Pass and down to the Suiattle trail.

Route 7. (Gamma Ridge) Take the Gamma Ridge trail, S. of Gamma Creek, up to the Dusty Glacier. Continue up the right side of the glacier, and join Route 6 below the N.E. summit.

Route 8. (Chocolate Glacier) From the end of the "Glacier Peak" trail S. of Dusty Creek, ascend the left icefalls of the Chocolate Glacier. Climb to the saddle left of the summit cleaver, and continue to the summit as for Route 1.

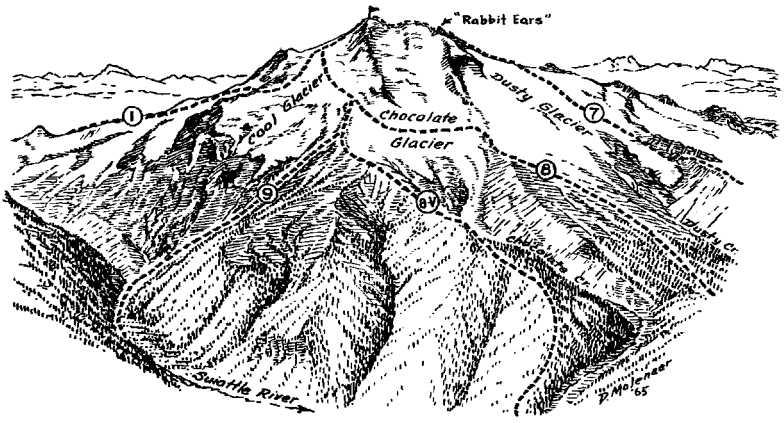
Route 9. (Cool Glacier) From the Suiattle River trail ca. 4 miles S. from its intersection with the Buck Creek Pass trail, climb W. to the Cool Glacier snout. Ascend the glacier W. to the saddle left of the summit cleaver, and continue to the summit as for Route 1.

References: 1910, 1921, 1928, 1931, 1937, and 1948 Mountaineer; 1921, 1926, and 1938 Mazama; 1912 Sierra Club Bulletin.

Marmot Pyramid ***(8500)***

Located E. of Mt. Maude and connected to it by a snow col.

First ascent by D. Moody, C. Franklin, and V. Rogers. The pyramid



Glacier Peak from the east

can be climbed from Ice Lakes or from Entiat Meadows via a rock gully at the E. corner to the E. ridge. Class 3.

Martin Peak ***(8511)***

Located on the Company Creek-Holden Lake-Ten Mile Creek divide.

First ascent 1936 by Mrs. E. Darr.

Route. From Holden Lake climb N. to the prominent mine dumps near the base of the W. ridge. Keeping on the S. side of the ridge, but near its crest, climb up and to the right through a gully system to the summit. Time: 4 hours up. Several deep notches make the ascent of the S.E. ridge more difficult.

Mt. Fernow ***(9249)***

Located on the Entiat River-Big Creek divide 2 miles N. of Mt. Maude.

First ascent 1933 by H. F. Ulrichs and S. Schmerling.

Route 1. First ascent 1957 by C. Magnusson and J. Burrows (S.W. approach).

From Leroy Creek basin (see Mt. Maude), climb the water course of the left fork N.N.E. to a 7700-ft. col. Descend to the glacier and cross to a rock wall where a diagonal ledge (2 pitons) leads to heather slopes

above. An easier variation is to descend the glacier 500 ft. to rock ledges leading up to the heather slopes. Contour N. on heather and loose rock ¾ mile to a deep gully which is climbed on the right side to a snowfield. Here a rock gully leads N.E. to the summit, or one may climb E. and cross the sharp S. ridge to easy ledges on the E. side. A gully to the E. ridge leads to the summit. Time: 4-5 hours from camp.

Route 2. From 5500-ft. Entiat Meadows, 14 miles from the Entiat River road, climb W.N.W. across ice and rocky slopes to the 8900-ft. S. ridge, continuing from there to the summit. By climbing W.N.W. up steep gullies, the E. ridge can be reached at ca. 8000 ft.

Route 3. From 1 mile E. of Holden take the short Copper Creek trail to its end, and climb S. to the 6500-ft. upper basin. Climb S.W. to the E. ridge, following it to the rocky summit.

Mt. Flora ***(8100)***

Located on the Castle-Riddle Creek divide 1½ miles W. of Castle Peak.

First ascent 1940 by J. Leuthold and E. Metzger.

Route. From the 4th of July Basin at the head of Devore Creek travel E. toward Castle Peak 1½ miles to the S. side of Mt. Flora. Climb above the head of Castle Creek basin and onto the E. ridge of the peak. Cross to the N. side and ascend easy gullies to the summit. Time: 2-3 hours.

Reference: 1940 Mountaineer.

Mt. Maude ***(9082)***

Located on the Entiat River-Ice Creek divide 1 mile N.W. of Ice Lakes.

First ascent 1932 by H. F. Ulrichs and J. Burnett.

Route 1. One-half mile S. of Trinity on the Chiwawa River, a road (passable only to four-wheel drive vehicles) goes up Phelps Creek 5 miles to Leroy Creek (4300). Take a trail here to a campsite in meadows at the head of the basin (6000) under Mt. Maude and Seven Fingered Jack. Traverse S.E. above the right fork of Leroy Creek and take an easy 2000-ft. couloir on the W. face to the summit. The easier S. shoulder can be reached by traversing farther to the S.E. end of the basin and climbing up a scree slope. By continuing over the shoulder on this latter route, Ice Lakes can easily be reached for an ascent of the E. or N. face. These lakes are 14 miles from the end of the Entiat River road, or 9 miles from the Chiwawa River road near Trinity.

Route 2. (North Face) First ascent 1957 by F. Beckey, J. Rupley, H. Staley, and D. Claunch.

From Ice Lakes (see Route 1), cross the ridge N. to the Entiat Glacier and contour W. to the N. face, which offers 2000 ft. of snow or ice (40°-50°). The face can also be reached from Entiat Meadows.

Reference: 1958 Mountaineer.

The North Tower (8700) of Mt. Maude can be climbed from the Leroy basin and the 8000-ft. gap between the tower and Seven Fingered Jack. Class 3. Time: 3 hours. The traverse of the tower and the N. ridge of Mt. Maude is interesting and is a recommended route to Mt. Maude.

North Star Mountain ***(8068)***

Located 1¾ miles N.E. of Cloudy Peak.

Route. From the Cloudy Pass trail at 6200 ft., ca. 1 mile E. of the pass, climb N. up rockslides, keeping right (E.) of Cloudy Peak. Time: 2 hours from trail.

Pinnacle Mountain ***(8402)***

Located 1¼ miles N.W. of Milham Pass (6663).

Route. From Milham Pass (see Saska Peak), climb N.W. 1¼ miles to the summit, contouring around intermediate summits. A trail leads to the W. side of the peak, leaving Snow Brushy Creek trail ca. 2 miles S.W. of Milham Pass.

Red Mountain ***(6930)***

Located between Lost Creek and the N. Fork Sauk River.

Route. From the end of the N. Fork Sauk River road at Sloan Creek, take the trail N.E. to the lookout on the 5500-ft. S.W. summit. Continue N.E. and climb to the main summit, less than 1 mile away.

Riddle Peak ***(8100)***

Located between Riddle, Devore, and Ten Mile Creeks.

First ascent 1940 by J. Leuthold, E. Metzger, E. Darr, and Mrs. E. Darr.

Route. From the camp 6½ miles up Devore Creek go 4 miles beyond via trail through 4th of July Basin to Ten Mile Pass (6700). The summit is in the center of the Riddle Peaks and is 1 mile E. of this pass, the ascent being via a long, easy ridge. The N. Peak is a better climb.

References: 1940, 1941 Mazama.

Saska Peak ***(8404)***

Located 1 mile S. of Milham Pass.

Route. From Milham Pass, climb S. keeping W. of the first minor peak. The pass is 13 miles from the Entiat River road via Snow Brushy Creek and ca. 8 miles from Lucerne. The N. Fork Entiat River trail can be used to reach the S. side of the peak (12 miles).

Seven Fingered Jack *(9077)*

Located between Mt. Fernow and Mt. Maude.

First ascent 1932 by R. Alt and G. Fahey.

Route. From camp in Leroy Creek basin (see Mt. Maude), climb N.E. on heather and rock slides to the summit, which is the northernmost point seen from the basin. Time: 3 hours. There are several pointed towers to the S.; the 3 southernmost (class 3-4) can be climbed by gullies on the W. face. There are also several towers of unknown difficulty to the N. of the summit.

Spectacle Buttes *(8392)*

Located on the Ice Creek-Entiat River divide.

Route. Base camp at 7000-ft. Ice Lakes is 9 miles from the Chiwawa River road. The 6-mile trail on Ice Creek extends to just S. of the lakes. The highest peak is 1¼ miles E. of the lakes. Contour E. 1 mile to the 7200-ft. col between the 8000-ft. N.W. peak and the higher S.E. summit, from where either can be climbed.

Tenpeak Mountain *(8281)*

A long ridge of peaks located on the Suiattle River-Thunder Creek divide; most of the peaks range over 8000 ft. in elevation. The highest peak is a 300-ft. granite tower which culminates the mass near the center of the ridge.

First ascent 1940 by T. T. Campbell and L. Anderson (highest and W. peaks).

Route. From the end of the White river road, follow the trail 7½ miles to Thunder Creek (2700). Leave the trail and travel along the left bank of Thunder Creek to the upper meadows for camp. From the col E. of the highest peak (at the valley head), climb the rock couloir to its left via loose rock. From its end 150 ft. below the summit, climb a face and then a 65-ft. crack. The route spirals from E. to N., ending via a steep slab. Take several safety pitons. Class 4.

An interesting route might be possible from the Napeequa Valley head by climbing S. and W. on the glacier and open slopes above to a 7700-ft. col 1¼ miles S.E., of the highest peak. Cross to the S. side of the ridge, and traverse W. to a point S. of the summit. Complete the ascent as for ascent from Thunder Creek.

The W. peak is climbed via Lightning Creek from 3 miles farther W. on the White River trail.

Reference: 1940 and 1958 Mountaineer.

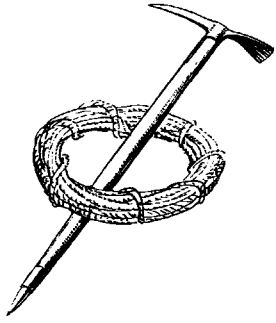
Tupshin Peak *(8300)*

Located on the Company-Devore Creek divide, 4 miles W. of Stehekin.

First ascent 1940 by J. Leuthold, E. Metzger, E. Darr, and Mrs. E. Darr.

Route. From 1½ miles N. of Stehekin at the head of the lake, cross the river (1000) and go up the Devore Creek trail (32 switchbacks). Camp can be made 6½ miles in at 5200 ft., or 2 miles W. up a branch creek in the basin between Devore and Tupshin Peaks at 6200 ft. in the flat, alpine ridge with small lakes. Reach the peak via the long and ragged S.W. ridge (7600) which takes ca. 3 hours to traverse. Bypass the main towers and traverse across the W. face of the peak on narrow ledges. Ascend a long, steep chimney to a cleft between the highest and second highest summits. From the cleft cross to the E. face, work up steep and rotten granite, and cross a narrow ledge to the left where an easy chimney leads to the top. Take rock shoes. Class 4-5. Time: 7½ hours up.

References: 1940, 1941 Mazama.



INDEX

Boldface type locates a definition of a term or the principal description of a trail, high route, or road. Pages numbered in italics (e.g. *78*) bear an illustration showing the entry. EP = Front end paper. The use of letter and numeral (e.g. H2) shows where to look on the topographic maps—see the map envelope for details.

A

Accidents in American Mountaineering, 201
adit, **196**
Agnes Creek Trail (South Fork), H3, 48, 173
Agnes Mountain quadrangle topographic map, *204*
air service, 167
Airplane Lake, G7, 96, *97*, 116
Alaskan spirea, *182*
Alpine Creek, H8
altimeter, 6
Amber Creek, G7, 117
American Alpine Club, 201, 204, 206
andesite, *15*, 53, 58, 73, **75**
Anemone, western, *114*
animals
  bears, 3
  beaver, 195
  deer, 3, *162*
  grouse, 10
  hunting of, 9–10
  marmot, *134*
  ptarmigan, *164*
  rattlesnakes, 170
  salmon, 62
  tracks, *162*
  troubles with, 3
  see also fish, goat, sheep
Anthem Creek Trail, L9, 141, **156–7**
Aquilegia formosa (columbine), *81*
Ardenvoir, EP, 140
Arlington, EP, 18, *19*
Army Map Service (Plastic maps), 203
asbestos, **28**
ash, **16**, 33
Atchison Flat, H7, 123
Aurora Creek, L4, 160
avalanche, 2, 29, 37, 46–7, 69, 100, 155
avalanche lily, *124*

B

backpacking, 2, 3, 6, 201
Baekos Creek, G5 (unlabeled on map), 69

Bald Eagle Trail, 89, *89*
Baldy Mountain, *178*
Barlow Pass, 18
basalt, **58**
Basalt Peak Trail, EP, L9, 123, 151
Bath
  Creek, G2, 23, *24*
  Lake (s), G1, *24*, 25
  High Route, G1–2, Plate 8, **22–8**
baths, hot, 55, 68
Battle Mountain, *178*
Bear Creek Mining Co., 42, 47
Bear Creek, South Fork, L6, 143
Bearcat Ridge, L5–6, 143
bears, 3
beaver, 195
Beckey, Fred, vii
Bedal Campground, EP, 83
beds, **12**
bench mark, **91–2**, *137*
benches, rock, 21, 22, 157, 169
bergschrund, **193**
Big Creek, H1, 131
Big Hill Lookout, EP, 142
Bingley Gap, 86, *87*
biotite, *28*, **30–1**, 50, 72, 121, 160; see also schist and gneiss
birds
  grouse, 10
  ptarmigan, *164*
bird's beak (*Pedicularis*), *145*
bistort, *148*
Bjornstad, Fred, vii
Black Cairn, G5 (unlabeled on map), 76
Black Mountain, G9, 82
  High Route, G9, **81–3**
blaze, 8, *8*
Blue Jay Trail and shack, L1, **174–5**, *178*
Blue Lakes Trail, **88–90**, *89*
blueberries, 30, 119
bombs, *96*, **98**
Bonanza Peak, H2, 51, 193; climb of, 206–08
boots, 2, 6
Borealis Ridge, L4, 160, 162
Boulder Butte Trail, *178*, **181**
Boulder
  Creek, H9, 103
  Pass Trail, H9, 102–06, *111*
Box Creek, H6, 130
Box Mountain, G3
  Lakes, G3, 38
  Road, G3, EP, 20
breccia, 17, 32, *33*, *34*, **35**, 37, 195, 196
Brief, EP, 140
Brockman, C. Frank, 205
Brower, David, 201
brush, 8, *191*
Bryant Creek Trail, 96, *97*
Buck
  Creek (Suiattle drainage), EP, 20
  Creek (Chiwawa drainage), H4
    Pass, H4, Plate 4, 53, 114, 122, 138
    Trail, H4, Plate 4, **137–8**
  Mountain, H5, Plate 4; climb of, 112, 208–9
Buckskin Mountain, H6, 191; climb of, 209
Burn Creek, L2
burros, 9, 201
Butte Creek Trail, L7, **146–7**
Butterfly Butte, H9, 106, *111*
Buttermilk Trail, 177, *178*

C

cabins, see shelters
cairn, *141*
calcite, **40**, 108
Camp
  Creek, G4, *63*, 68, *87*
  Creek Ridge Trail, G4, 66, **72–3**
  Lake, G4, 72, *87*
Candy Creek, L4, 155
Canyon
  Creek and shelter G1, 40
  Lake Trail, H3, 28, **49–51**
Cardinal Peak, L5, 143; climb of, 209
Carne Mountain, H6, 124, 128, 130
Carne Mountain-Leroy Creek Trail, H6, **128–31**
Cary, Allen S., 202
Cascade Creek, L1, 171

Cascade Crest Trail, 5
building of, 7, 31
guide to, 205
route of (sequence listed indicates route south to north), 89–90, 98, 91–3, 73–6, 30–2, 53–4, 41, 46–8
Cascades, see North Cascades
Cassiope (white heather), 46
Castle
Creek, L3, 189
Peak (or Rock); climb of, 209
Cedar Camp, L2
chalcopyrite, **174**
Chelan
Butte, EP, 167–8, *168*
Falls, 166
glacier, 17, 169, *185*
town of, EP, 94, 167; Chamber of Commerce, 168
Mountains, L4–5–6, 5, 161
see also Lake Chelan
Chetwot Creek, G4, 69
Chickamin Creek (Chiwawa drainage), EP, 122
Chikamin Creek (North Fork Sauk drainage), G9
chimneys along dikes, 51
Chipmunk Creek, H6, 130
Chiwawa
Mountain, H5; climb of, 135, 209
Ridge, H8, 104
River drainage basin, H5–7, EP, 122–40
shelters in, 124 (Trinity), 133, 137
River Road, EP, H7, **122–4,** 136
River Trail, H5, **136–7**
Chiwaukum quadrangle topographic map, *204*
chlorite, **31,** 150–1
Chocolate
Creek Trail, G6, 45, 58
Glacier, G6, Plate 5, 36, 57, *215;* route up Glacier Peak, 214, *215*
Choral
Creek Trail, L4, **149;** see Duncan Hill Trail
Lake, L5, 149
cinder cone, *65,* **98**
at Indian Pass, 98
on White Chuck River, 69, 70, 81
cinders, 69, **98**
cirque, **126,** 193
Clark Mountain, H9, Plate 1, *111;* climb of, 108, 209–10
High Route, H9, G7, Plate 1, **107–10,** *118*
Clear Creek Campground, EP, 18
Climbers' Guide to the Cascade and Olympic Mountains of Washington, 204–5, 206–19
climbing
clubs, 10
methods, book on, 201–2 (Manning)
mountains in guidebook area, 206–19
rock, 60, 120
climbs, moonlit, 163
Cloos, Hans, 202
Cloudy
Pass, H3, 14–15, 196
Peak, H2, 196
clubs, climbing and hiking, 10
coal, **129**
Coles Corner, EP, 94
Columbia River (diversion of) and Plateau, EP, 168, *168*
columbine (*Aquilegia formosa*), *81*
columnar joints, 58, *125,* 126
Company
Creek Trail, **173**
Glacier H2, 208
compass, 6
Concrete sheet topographic map, 7, 203
conglomerate, **12,** *31,* 33, *34,* 35, 55, **128,** 129
contact, 58, 60, 61, 75, **103,** 117, 121
Conversation with the Earth, 202
Cool, Colonel, 57
Cool
Creek Trail, L4, 155, 163
Glacier and route up Glacier Peak, Plate 5, G5, 214, *215*
High Route, G5–6, Plate 5, **57–9**
Cooper Mountain Road, EP, 177
copper, 47, 123, 174, 186–8

Copper
Creek, H1, 170
High Route, H1, **191–2**
Peak, H1, 191; climb of, 210
Corral Creek Trail, L7, 142
Cottonwood forest camp and Guard Station, EP, L8, 141
Cow Creek, L9, 157
Meadows, L9, 157
Pass, L9, 141, 151
Trail, L9, 141, **157–8**
Crest Trail—see Cascade Crest Trail
Crow
Creek Trail, L7, 142, 145
Hill, L7, 142
Crown Point Falls, H2, 196
Crystal
Creek, road up, *63*
Creek, shelter near mouth of, 62, *63*
Lake, *63*
crystals, **12,** 46, 93, 189; see also minerals, varieties of
Curry Gap, 89
Cutoff (Lightning Creek), **109–10,** *118*

D

Darrington, EP, 18–19
Deep Creek, 122
deer, 10, 69, *162*
Devils Smoke Stack, L9, 151; climb of, 210
Devore
Creek Trail, H1, L3, 173
Peak; climb of, 210–11
Diamond Lake, G3, 64
dike, 50, 51, 66, 72, 75 and Plate 7, 83, 90, 101, 121, 147, 183, **195**
Disappointment Peak, G5, 59, 79, *212*
High Route, G5, **77–80,** *212* (shows only part of route and terrain)
route up Glacier Peak, 211–12 ("south side route")
Dole
Creek, L3, 192
Lakes, L3, 161, 162, 192
High Route, L3, **192**
Dolly Creek, G2, 31–2
Dolly-Dusty High Route, G5, 30, 31–**6,** *215* (shows terrain, not route)
dolomite, 108
Dome Peak, 50; quadrangle topographic map, *204*
Domke
Creek and Falls, L6
Lake Trail and Mountain Trail, L1–2, 169, 182, **185,** *186*
Downey
Creek Campground, EP, 20
Mountain quadrangle topographic map, *204*
ducks, *159*
Dumbell Mountain, H2; climb of, 210
Duncan
Creek, L8
Hill Trail, L8, **148–9**
dust storms, 57, 188
Dusty
Creek, G6, 35, *43,* 44, 57
Trail, G6, 44, **56–7,** *215*
Glacier, G5, *34, 215*

E

Eagle Creek Trail, *178,* 179
East Fork
of Fish Creek Trail, *178,* **180**
of Milk Creek, G2, 29, 32
Edil mine, L3, 188
Emerald Lake, G3, *63,* 64
Emerald
Park, L5, 169, 183
Trail, L5, 169, **182–4**
Peak, L5, 143; climb of, 211
Entiat
Glacier, H6, *154*
Meadows, L4, H6, 155, 191
Mountains, L9, H6, 5, 135
River drainage basin, L4, L9, H6, EP, **140–66**
shelters in, L9, 158; L4, 164
see also North Fork Entiat River
River Trail, L4, L9, H6, **154–6,** 191
town of and Ranger Station, EP, 93, 140
equipment, 2, 3, 6, 201

Ermine Glacier, see Vista Glaciers
erosion, **12, 14,** 16, 17, 22, 27, 37–8, 51, 53, *54,* 81, 83, 117; see also fault, glacier, Great Fill, hogbacks, stream
Estes Butte Trail, H7, 124, **125–6**
Everett, EP, 18

F

fan, 74, 169, *186,* 195
fauna, see animals
fault, 14, *102,* **106,** 127, 129–30, 183
  alteration along, 164
  erosion on, 106, 113, 127, 129–30, 183
feldspar, 12, *49,* 50, 58, 75, 82
Fern
  Creek, 86, *87*
  Lake, L8, 145, 149
Fifth of July Mountain, L9, 152
fill, in White Chuck valley, 66–7, 74, *74;* see also Great Fill
Finney Peak, *178*
Fire
  Creek Pass Trail, G5, 31, **73–6,** *74, 212*
  Creek Way, G4, **65,** *67*
  Mountain, G3, 65, 77
    High Route, G4, **76–7**
Fish Creek
  Trail and shelters on (E. Fork, N. Fork), L1, 173, *178,* **180**
  Pass, 177, *178*
fish (and fishing), 9, 25, 36, 37, 62, 157, 169, 170, 195, 196
Flick Creek, 173, *178*
floods, 41, 44, 45, 170–1, 188
Flora of Mt. Rainier National Park, 205
Flower Dome, H4, 52
flowers, see plants
Flora Mountain, L3, 189; climb of, 216
Foam Creek, G8, 121
Ford, A. B., 66
Forest Service, U. S.
  campgrounds, EP
  headquarters (and Ranger Stations), EP, 9
  maps, 6, 7, 203
  photographs, 201
  rescue, 7
  see also Guard Station, lookout
Forks Creek, L6
Fortress
  High Route, H5, **134–5**
  Mountain, H4; climb of, 211
fossils, **13,** 101, 122, 128–9; lack of, **42**
Fourmile Creek, 173, *178*
Fourteenmile Creek and shelter, G4, 68
Fourth of July Basin, H1, 190

G

Gamma
  Hot Springs, G6, 17, 55, 68–9
  Peak, G6, 33–4, 35, 55
  Ridge Trail, G6, 33, *34,* 35, 42, **54–5**
  Ridge route up Glacier Peak, 214
Garland Peak Trail, L9, 150, 151
garnet, 30, 77, **78,** 121, *147,* 160
gems, 30, 50, 77, 78, 104, 199
gendarmes, **82**
gentian, *136*
Geological Survey, U. S.
  discoveries by, 55, 102
  flag, *57*
  geologic
    mapping, 103–04, 167
    maps, 202–03
  topographic
    mapping, 91–3, 137
    maps, 203, 204
  investigations of, v, ix, 102
  offices, 203, 204
  photographs, 201
  purpose, v
Geology, An Introduction to Earth History, 202
Geology of the Northern Cascades of Washington, 202
geology, 11
  history and principles, 11–17
  maps, 12, 103–04, 202–03
  methods of study, 11, 103–04, 197–8, 202 (Cloos, Gilluly, Mackin, Read)
  references, recommended, 202–03

Gib Creek, H7
Gilluly, James, 202
glacier
boulders, 66, 106, 125, 198–9
diversion of streams by, 118
erosion by, 21, 22, 38, *54*, 69, 120, 126, 155, 157, 169, 185, *194*, 195
formation of, 38, 156, 193
hanging, *154*, 156
merging, 122, *185*
stagnant, 78
valleys, 29, 155, 156, 157, 169, *194*
see also moraine
Glacier
Creek (Suiattle drainage), G4, *74*, 75
Creek (Lake Chelan drainage), H2, 208
Peak, G5
climbs of, 59, 73, 79, 80, 211–14
erosion of, 18, 19, 79
first ascent and early studies, 102
first visit to east side, 57
foot trail, 73, 80
formation of, 17, 42, *43*, 53, *54*, 60, 66, 67, 79, 80, 113
future eruptions, 17
hike around, 5
meadows, 69
"Mines", H3, 46
pictures of, cover, Plates 5, 8, *74*, *212*, *213*, *215*
quadrangle maps, *204*
Ridge Trail, 30, 32
shelter, 69, 78
views of near roads, 20, 62
Wilderness, vi, 9, 47
see also, breccia, floods, Great Fill, hot springs, lava, tuff
Ridge
Trail, G4, **70–71**, *212*
route up Glacier Peak, *212*, 213
gneiss, **12**, *13*, 23, 52, *82*, 86
in conglomerate and breccia, 32, 33, 35
swirled, 50, 132
varieties of, 27
biotite gneiss, 28, 50, 66, 72
kyanite gneiss, 90
where found, 11 (geologic map)
see also granite, varieties of
goat, Plate 3, 55, 58, 69, 91, *110*, 112, 156, *162*, 192
Going Light with Backpack and Burro, 201
gold, 186
Goode Mountain quadrangle topographic map, *204*
Goose Creek, EP, 122
Gopher Mountain, L5
graben, 14, 127, *129*, **129–30**
Graham
Harbor Creek Trail, L7, 142
Mountain, L7, 142
granite, 12, **13–16**, *22*, 23, *49*, *74*, 80, 121, 169
occurrences of, 11 (geologic map)
dike, 83
in breccia, 37
in conglomerate, 33
sill, 139
tablet, 117, *118*
origin, 14–16, 80
processes involving
alteration of, 151
cooling of, 116–17
disintegration of, 27, 41, 142
gases and fluids from, 52, 134, 197–8, 199
replacement of, 197, 198
squeezing of, 23, 160
see intrusion
references on, 202 (Gilluly, Misch, Read, especially Read)
relation to prospecting, 52, 134, 153
varieties of, 14, 176, 113
gneissic, 23, 27, 61, 82, 100, 117, 138, 160
layered, 189, 190
mixed with gneiss, 132
Grant Glacier, H2
graphite, **101**
Grassy Point, G2, side trips up, 29, **32**
Great Fill, 17, 35, 40, **42**, *43*, 57
erosion and water from, 19, 42, 43
views of, Plate 5, 52–3
where found, 11 (geologic map)
Great Wall, G1, 22, *26*, 27
Green Mountain Pasture, EP, 20

Grey Peak, *178*
Grou Camp, H6, 155
Grouse Creek, L8, 143
Guard Station
  Cottonwood, **L8, 141**
  Indian Creek, EP, 96, *97*
  Kennedy, G4, 66, 68
  Lucerne, L2, 186
  Rock Creek, EP, 122
  Stehekin, EP, 173, *178*
  Suiattle, EP, 20
  Twenty Five Mile Creek, EP, 167
guides to
  Cascade Crest Trail, 205
  Puget Sound country, **vii**
  rock climbing, vii
Guide to Leavenworth Rock Climbing Areas, vii

H

hanging
  glacier, *154,* 156
  valley, 29, *119,* **120**
Hardtack Lake, G4, 72, *87*
harebell, *112*
Hart Lake, Plate 6, H2, 170, 195
Hazard Creek, 173, *178*
heather, *46*
helicopter, 42, 47, 92
Helmet Butte, H4, 138
High
  Bridge campground, 173
  Pass High Route, H4, *111,* **112–14**
High Trails, a Guide to the Cascade Crest Trail, 205
Hilgard Creek, H1, 190, 208
hogback, 27, *47, 99,* **101,** 118, 127
Holden
  Creek, H1
  Lake Trail, H1, 169, **193–4**
  Mine, H1
    dock, L2, 186
    operation of, 186–8
    powerline to, 171, 188
  quadrangle topographic map, 6, 203, *204*
  Village, H1, 187–8
    campground, 188
    services at, 168
    short trips from, 169–70
Honeycomb Glacier and High Route, Plate 5, G7, 45, **59–61,** *111*
hornblende, 30, 75, 108, 121, *153,* 189; see also schist
hornblendite, **153**
horses, availability of, 9
Horseshoe Creek Spur Trail, *178,* 179, 180
Horton Butte Trail, L1, **175–6,** *178*
hot springs, 17, 68–9
  Gamma, G6, 55
  Kennedy, G4, 68
  Sulphur, 21
huckleberries, 30
Hunt, Charles B., 202
hunting, 10
Hunts
  Bluff, L2, 173
  Creek, *178*

I

ice, see glacier
ice ax, 2, *219*
Ice
  Creek, H6, L4; shelter, L4, 164
  Lakes Trail, H6, L4, **162–3,** *165*
  Lakes High Route, H6, **164–6**
igneous rock, **13,** 23, 32, 78, 80, 90, 189
  varieties of, see ash, bombs, breccia, cinders, dike, granite, lava, pumice
  where found, 11 (geologic map)
Image Lake and Alternate to, G1, H3, 46, **48–9**
Indian
  Creek Trail, **96–8,** *97;* ford to, 99–100
  Head
    High Route, G7, *97,* **115–19**
    Peak, G8, 98; climb of, 98, 118
    Spur Trail, 176, *178,* 180
  Pass, *97,* 98
insects, 3
intrusion, 32, 103, 113, 117, 139, 195
iron sulphide, 134
Isella Glacier, H2, 207

J

James Creek, H8, 124, 128

Jeffrey shooting star, *156*
Jenny Creek, 155
Johnson Mountain, 88, *89*
joints, 23, 41, 51–2, *52*, 116, *116*, 121, 142
  columnar, 33, 58, 74, *125*, 126
  erosion along, 117

K

Kennedy
  Creek, G4, 74
  Glacier, G5, *74*, 75, *212*
  Hot Springs and Guard Station, G4, 17, 66, 68–9
  Peak, G5, *74*, *212*
  Ridge
    route up Glacier Peak, *212*, 213
    Trail, G4, 68, 71
Kid Pond, 98
King Lake, H5, 208
Klone
  Creek, L4, 161
  Peak Trail, 141
Kodak Peak, *89*, 90
kyanite, 89, 90, *93*

L

Lady of the Lake, 166, *170*
lakes
  filled-in, 29, 104, 120, 166
  formation of, 37–8
  in Washington, 205
Lake Byrne, G4, 72
Lake Byrne-Camp Creek Ridge Trail, G4, 71–2
Lake Chelan (see also Chelan)
  accommodations and transportation on, 167–8
  boat trip, 166–9
  camping on, EP, 167, 169
  drainage basin, L1–3, 5, 6, EP, 166–99, *178*
    shelters in, L1, 171; L2, 173; 174; *178*; H2, 198
  origin of, 17, 169
  short trips between boats, 169–71
  view of, best, 167–8
Lake Creek Road, EP, 140, 167
Lake Juanita, 179, 181
Lake Sally Ann, *89*
Lakes of Washington, 205
Lakeshore Trail, L1, **170–3**, *172*, *178*
landslide
  on Chocolate Creek, 44
  on Vista Ridge, 41
Larch Lakes, Creek, Pass, shelter, Trail, L9, 152, **158**
larch tree, *165*, *184*, *189*, 190
lava, *15*, **15**, 33, 34, *73*, *74*, **80**
  diverting rivers, 168, *168*
  erosion of, 53, *54*, 80
  in cinder cone, 69
  joints and cooling, 58, 74, *125*, 126
  landslide of, 41
  relation to older rock, *31*, 33, 35, 55
  remnants (outliers), 32, *34*, 100, *118*
  varieties of, 58, 75
  see also igneous, volcano
Leavenworth, EP, vii, 94
Leroy Creek Trail, H6, 131
leveling, in map making, *92*
Liberty Cap, H4, 114, 138
Lightning
  Creek (Lake Chelan drainage), L2, 12
  Creek (White River drainage), G7, *118*
    Cutoff, G7, 109–10, *118*
    High Route, G8, *118*, 119–21; alternate of, 121
Lime
  Creek Road, EP, 20
  Lake, Mountain, Ridge, G3, 37–8
limestone, 40
Little
  Creek, L6
  Giant
    Creek, H8, 127
    Pass Trail, H8, *102*, 124, 127–8
  Siberia, *72*
  Wenatchee River Trail, *89*, 90
logging, 9, 20, 171
lookout, Forest Service
  abandoned, 90, 95, 130, 143, 175
  used, 48, 83, 126, 142, 185
Lookout Lake, G2, 23
Lost Creek Ridge Trail, G4, *84*, 85–7, *87*
Louis Creek High Route, H9, 110, 112

Lucerne
Mountain, L3, 189
quadrangle topographic map, *204*
town of, L2, 186, *186*
services at, 168–9
short trips from, 169
lupine, *76*
Lyman
Camp, G1, 42
Lake, H2, 196, *199*
Glacier High Route, H2, **197–99**, *199*, 209

M

Mackin, J. H., 202
Manning, Harvey, 201, 205
Maple Creek, H7
maps
geologic (showing rocks), 11, 202–03; making, 103–04
planimetric and topographic (showing geography)
recommended, 6–7
around guidebook area, *204*
making, 91–3
sources, 203–04
marble, **40**, 106, *107*, 108, 113, 142, 147
Mariner, Wastl, vii
marmot, *133*
Marmot Pyramid; climb of, 214
Marshall, Louise, vii
Martin, G. W., 7, 203
Martin
Peak, H1, 193, 194; climb of, 215
Ridge, Plate 6, H1, 190
Mary Green Glacier, H2, 206, *207*
Massie Lake and High Route, H4–5, **138–40**
McGregor Mountain quadrangle topographic map, *204*
McKensie Camp, H6, 155
Meadow Creek Lodge and shelter, L1, 171
Meadow Mountain Way, G3, 62, **63–5**, *63*
Meander Meadow, *89*
metamorphism and metamorphic rock, 12, *13*, 23, 82, 90, 132, 150–1, 160; see also marble, gneiss, granite (gneissic), schist
Methow
Mountains, EP, 5, 177–9, *178*
quadrangle topographic map, *204*
mica, 12, 30–1, 108; see also biotite, chlorite, muscovite, schist
Mica Lake, G5, 30
Middle Ridge Trail, G1, H3, 41, 51
Milham Pass, 159, 183, *184*
Milk
Creek Trail, G2, 20, 22, **28–31**
Creek route up Glacier Peak, 214
Creek, East Fork, G2, 29, 32
Lakes, G3, 37
Miller, Tom, vii, 205
Mimulus lewisi (red monkey-flower), *85*
mineral, **11–12**
cleavage, 50
reference, recommended, 202 (Gulluly)
replacement and alteration, 164, 197–8
varieties, see biotite, chalcopyrite, chlorite, feldspar, garnet, graphite, hornblende, kyanite, mica, molybdenite, muscovite, pyrite, pyroxene, pyrrhotite, quartz, tourmaline
see also mining
Miners
Creek and shelter, G1–H3, 41
Creek Trail, H3, 46, **51–3**
Ridge, G1–H3, *52*
lookout, G1, *47*, 48
crest route on, 49
prospecting, recent, 42, 47
prospecting, old, 46
mining
claims and prospects, 9, 28, 47, 49, 50, 134, 136–7, 174, 188
Glacier Peak "Mines", H3, 46
ore, minerals
formation of, 153, 174
relation to granite, 52, 134, 153
Red Mountain "Mine," H8, 123–4, 132

mining (*continued*)
securing public lands for, 171
see also Holden Mine, Miners Ridge
Mirror Lake, L5, 161, 183
Misch, Peter, 202
Molenaar, D., 205, 206
molybdenite, **196**
monkey-flower, red (*Mimulus lewisi*), *85*
Moore, L2, 171
Mountain, *178*
moraine, *34*, 75, 117
terminal, 91, 156, 161, **198**, *199*
mosquitoes, 3
Mount
David Trail, **95**, *97*
Fernow, H6, 131; climb of, 215
Lyall quadrangle topographic map, *204*
Maude, *154*, 156; climb of, 163, 216
Saul, G7, 117
mountain
building, **14**, **16**, **17**, 202 (especially Mackin); see also cinder cone, erosion, Glacier Peak
climbing, see climbing
goat, see goat
Mountain Loop Highway, EP, 18, 62, 83
Mountain Medicine, vii
Mountain Rescue Techniques, vii
Mountaineering, Freedom of the Hills, 201
mountaineering, ski, 2, 46; see also climbing
Mountaineers, The
activities, vi
address, vi
books of, vii
journal of, 205
purpose, v
muscovite, 31, 50
Myrtle Lake, L9, 157

N

Napeequa River valley, H9, 61, *102*, 124
high routes to, 59–61, 112–14, 114–15
trails to and in, 102–06, 122, 127–8
neck, volcanic, 86, 126, 129
Ninemile Creek, L3, 188
No See Em Sheep Driveway, 155
The North Cascades, 205
North Cascades
books on, vii, 204–5
character, general (location, weather, altitude and relief, snowfall), 1–3
on east, 94
on west, 18
landscape development, 14, 16, 17, 202 (Mackin)
maps of, regional, 6–7, 203
photographs of, 205 (Miller et al and Manning)
rocks, 11–17, 202 (Mackin and Misch)
trip across (sequence listed indicates a recommended route east to west), 182–4, 159–62, 155, 164–6, 132, 134–5, 112–14, 106, 114–15, 109–10, 119–21, 91–3, 81–3, 85–7
North Fork of Entiat Road and Trail, EP, L7–8, 140–1, **144–5**
North Fork of Fish Creek Trail, *178*, **180**
North Fork Sauk River, G9, EP, 83–93
shelters, EP, 85; G9, 91; G8, 101
Road, EP, **83**, **85**, *87*
Trail, G9, **90–3**
waterfall, EP, 83
North Fork of Skykomish River Trail, 89, *89*
North Star Mountain, H2, 196; climb of, 217
Northwest Fork White River, G8, 100
nunatak, **60**

O

Old Gib Mountain, H7, 15, 126, 129
ore, see mining
Origin of Cascade Landscapes, 202
outlier, *32*, **53**
Oval Creek, Lakes, Trail, *178*, 179

P

packers, 9

Papoose Creek Trail, 96, *97*
Pargeter, R. A., 7, 203
Pass No Pass, H4, 139
Pedicularis (bird's beak), *145*
pegmatite, **50**
Phelps
  Creek, H5, 132
    Road, H8, **123**
    Trail, H5, **131–2**
  Ridge Trail, H5, **133**, 135
photographs, aerial
  in map making, 93
  of lakes, 205 (Walcott)
  sources, 201
  use of, 7
photographs, scenic, of North Cascades, 205 (Miller, et al., and Manning)
pine, yellow, *172, 174*
Pinnacle
  Creek, L4, 160
  Mountain, L4, 161; climb of, 217
Pioneer Creek, L1, 171
Plain, EP, 122
plants
  brush, 8, *191*
  establishing footholds, 198
  flowers, common, Alaskan spirea, *182; Anemone,* western, *114;* avalanche lily, *124;* bird's beak (*Pedicularis*), *145;* bistort, *148; Cassiope* (white heather), *46,* columbine (*Aquilegia formosa*), *81;* gentian, *136;* harebell, *112;* Jeffrey shooting star, *156;* lupine, *76;* red monkey-flower (*Mimulus lewisi*), *85;* red mountain heath (red heather), *46;* speedwell (*Veronica*), *36*
  guide to, recommended, 205 (Brockman)
  poisonous, 3
  trees, Plate 2; larch, *165, 184, 189,* 190; yellow pine, *172, 174*
Plummer Mountain, H3, 49, *52*
plutonic rocks, **13**
Pomas
  Creek, H6, 153
  Pass and alternate route near, H6, 152
Pope
  Creek, L7
  Ridge Trail, L7, **144**
Portal Peak, G9, 81
Prince Creek, EP, 170, *178*
  campground, 169
  floods of, 171
  North Fork of, 176
  Trail, 171
Principles of Geology, 202
Principles of Geomorphology, 202
prospect, see mining
ptarmigan, *164*
Ptarmigan Glacier, cover photo, G5, 75, *213*
Pugh
  Creek Trail, 86, *87*
  Mountain Road and Trail, 83, *84,* 85
  Ridge Trail, L8, 147
pumice, **16**, 18, 75, 112, 123, *150,* 151
Pumice Creek, G4, *67,* 75; gorge, 67
puncheon, 173, **195**
Purple Creek Trail, *178,* **181**
Pyramid
  Creek, L6, 143
  Mountain Trail, L7, **141–44**, 170
pyrite, **194**
pyroxene, *22,* **23**, 75
pyrrhotite, **174**

Q

quartz, *15,* 23, **108**, *134;* veins, 196
quartzite, **127**

R

"Rabbit Ears," *212, 213*
Railroad Creek
  Road, L2–3, H1, **186–88**
  Trail, H2, Plate 6, **194–97**
  Trail, old, 182, 192
Rampart Mountain and alternate route near, L9, 151–2
Ranger Stations, 9; see also Guard Stations and lookouts
rattlesnakes, 170
Read, H. H., 202

Red Mountain (Chiwawa drainage), H5, 134
climb of, 217
"Mine," H8, 123–4
Red Mountain and Creek (North Fork Sauk drainage), G9, 91
Red Pass, G9, 93
red rocks, cause of, 134, 194
Reflection Pond, G8, 101
rescue, mountain, vii, 7, 201
Rex Creek and shelter, L1, 171
Riddle
Creek, L3
Peak, climb of, 217
Peaks Trail, L3, **188–9**
Ridge Creek, L7
Rivord Lake High Route, G3, **36–8**
roads, short trips near, see short trips
rock, **12**
changes in, see weathering, metamorphism
distribution of types, see 11 (geologic map) and maps, geologic
structures in, see joint, fault, hogback
study of, see geology, Geological Survey
varieties of, see sedimentary, igneous, metamorphic
Rock
Creek Trail, H7, **124–5**
Creek Guard Station and campgrounds, EP, 122, 123
Round
Lake (Lake Chelan drainage), L1, 175
Lake (White Chuck River drainage), 86, *87*
Mountain, L1, 171, *185*
routes
around Glacier Peak, 5; sketches for, *212, 213, 215*
classification of, 4
finding of, 7, 8, *191*
mountain climbing, 206–19
recommended, 5, 66; and see short trips and North Cascades, trip across
trails, sheepherders', 8
see also Cascade Crest Trail
Rubin Creek and cabin, Plate 6, H2, 198
Rusk, C. A., 57
Russel, I. C., 102

S

salmon, 62
sandstone, **12**, 90, 108, 122, 127, 129
Saska Peak, L5, 143; climb of, 211, *217*
Sauk River, EP, *19*
diversion of, 18–19
Road, **62**, **83**
Trail, see North Fork of Sauk
Sawtooth Ridge (Methow Mountains), *178*
Schaefer Lake Trail, EP, **123**
schist, **12**, *13*, 21, **30–1**, 32, *33*, 82, 106, 113, 121
distribution of, 11 (geologic map), 142, 160
in other rocks, 32, 33, 35, 37, 61
origin of, 108, 138
soils, 101
varieties of
biotite (and mica) schist, 21, 77, 117, 147
hornblende schist, 21, 82, 108, 138, *147*, *153*, 191
red schist, 194
Scimitar Glacier, G5, *212*; route up Glacier Peak, 212–13
scooter, 63, 154
scree, **183**
sedimentary rocks and sediments, **12**, 14; see also coal, conglomerate, limestone, sandstone, shale
serpentine, **28**
Seven-fingered Jack, H6, 156; climb of, 131, 217
Sevenmile Creek, L3, 161
Shady Pass, EP, 140
shale, **12**, 90, *122*
sheep
grazing, 9, 133
herders' camp, *138*
trails, 7, 8, 103
Sheep Creek, L7

shelters (Forest Service and other), *180;* see main drainages, e.g. Suiattle River drainage basin, shelters in
Shetipo Creek Trail, L8, **150**
Shetipo-Garland-Pomas Trail, **150–3**
alternate near Pomas Pass, 152–3
alternate near Rampart Mountain, 151–2
shooting star, Jeffrey, *156*
short trips near roads and towns, 5
Chelan, 197–8
Chiwawa River, 124
Entiat River, 141
Holden, 169–70
Lake Chelan, 169–70
Lucerne, 169
North Fork Sauk River, 85
Stehekin, 169, 181
Suiattle River, 20
White Chuck River, 62
White River, 95
sill, **139**
Silver
Falls Trail, EP, 140
Ridge Trail, L7, 142
Sitkum
Creek, G4, 74
Glacier, G5, *212;* route up Glacier Peak, G5, 212
Sitting Bull Mountain, H3, 50
Sixmile Creek, L3
Skagit River, *19*
Skalabats Creek, G9, **91**
ski mountaineering, 2, 46; see also climbing
Skookum Puss Mountain, *178*
Skullcap Peak, G9, 82
Skykomish
quadrangle topographic map, *204*
River, North Fork, *89,* 89
Skyline Bridge, G1, 41, 42, 44
Sloan Peak, Creek and campground, EP, 85, 90
Small Creek, H4, 42, 52
snakes, 170
Snow Brushy
Creek Trail, L4, **158–9**
Meadows, 155
snowfall, 2
Sonny Boy Lakes quadrangle topographic map, *204*
South Fork Agnes Creek, H3, 48
South Fork of Bear Creek, L6, 143
South Lake Creek, L6
South Navarre forest camp, EP, 177
South Pyramid Creek and Trail, L7, **145–6**
South Side Road, G3, EP, 19, **20**
Spectacle Buttes, H6, 164; climb of, 218
Speedway, 166
speedwell (*Veronica*), *36*
Spider Meadow and Glacier, H5, 124, 132
spirea, Alaskan, *182*
Splawn Mountain, *178,* 179
Squire Creek, 18
Star Peak, *178*
Stehekin, EP, 173, *178*
airstrip, 173
Guard Station, 173, *178*
quadrangle topographic map, *204*
service at, 168
Stillaguamish River, 18–19, *19*
stock, 9, 139
strata, **12;** see hogback
stream
erosion, 39, *194,* 195
deposition by, 39, 74
diversion, 18–19, 42, 44–5, 98, 168
Suiattle
Glacier, Plate 5, G8, 45, 59, 60
Guard Station, EP, 20
Pass Trail, G1–H3, **46–8,** 52, 196
River drainage basin, G1–3, 6, EP, 19–61
shelters in; G3, 39; G2, 40; G1, 41, 42, 48; H3, 46
River
Road, **19–20**
Trail, G1–3, 6, **39–45;** old, G1, 42, 61
Sulphur
Creek, campground and Trail, EP, G3, **20–1**
Hot Springs, 17, 20, 21, 68–9
Mountain, G2, 22
Lake, 23
unnamed lakes near, G2, 25

Sulphur, Mountain (*continued*)
Way, G3, 20, **21–2**
Summit Trail (Methow Mountains—Sawtooth Ridge), EP, 170, **177–9**, *178*
Sun Mountain, *178*
Sunup Lake, *87*
Surprise Lake Trail, **176**, *178*
Switchback Creek, 69

T

Tahlak Creek, G9
talus, 30, *116*, **183**, *184*
tarn, **37–8**
Tenas Creek, L3
Tenmile Creek, Pass, and High Route, H1, 169, **189–90**
Tenpeak
Mountain, G7, 58, 60, 61, 109, *111*, 117, *118*; climb of, 218
High Route, H9–G7, *111*, **114–15**, *118*
tents, 3, 6
terminal moraine, 91, 156, 161, **198**
terrace, **39**, 45, 66; see also benches
Thornbury, W. D., 202
Three Creek Trail, L8, 141
Three-Fingers Mountain, *84*
Thunder Creek and Basin, G7, 107, 109, *118*
Tinpan Mountain, L4, 162
Totem Pass, G1, 28, 50
tourmaline, *197*, 199
tours, see routes
trails, see routes
trees, see plants
Triad Creek Trail, H4, 44, **56**
Trinity, H8, 123–4
Triplet Lakes, *178*
trips, recommended, 5; see also routes
tuff, 17, **33**, *34*, 35; welded, **66–7**
Tumble Creek, L2, 161, 183
Tupshin Peak, climb of, 218
Twenty-five Mile Creek and boat dock, EP, 167
Twin Harbor and Creek, L6
Twin Lakes, G3, 37
Twisp River, 179

U

U. S. Forest Service--see Forest Service
U. S. Geological Survey--see Geological Survey

V

VABM, **92**
valley, formation of, see glacier, graben, hanging valley, stream
Van Lake, G9
Vance, Joseph, 18, 86
Veronica (speedwell), *36*
vesicles, 16
Vista
Creek Trail, G1, 32, **53–4**
Glaciers, G5, *213*
Ridge, G1, 53
volcanic rock, 14–15, 75, 80
forms of, see dike, neck, outlier, volcano
structures in, see joints, columnar
varieties of, **15–16**; see andesite, ash, basalt, bombs, breccia, cinders, lava, pumice, tuff
volcanoes
old, 86, 126, 129
small, see cinder cone
see also Glacier Peak

W

Walcott, E. E., 205
Walking the Hills and Valleys; 100 Trail Trips, vii
War Creek Pass, *178*, 181
Washington, State of
Department of Conservation, geologic map, 203
Division of Water Resources, books about lakes, 205
State Parks, EP, 95, 167
Waters, A. C., 202
weather, 2–3, 53; exposure to, 38, 108, 176
weathering, red, 134, 135, 194
Weaver Point Camp, 173
Wenatchee
Lake and State Park, EP, 95
quadrangle map sheet, 7, 203

Ridge, 96, *97*
Trail, *89*, 90, *97*
River (Little), *89*, 90
town, EP, 94
western *Anemone*, *114*
White Chuck
cinder cone, G8, 69, 70, 81, 102
Glacier, G8, 78
Mountain, *84*
River drainage basin, G4, EP, *63*, 62–83
shelters in, 62, *63*, 64, 65; G4, 68
River
fill along, 66, *67*, *74*, 74, 75, 81
Road, EP, 62, *63*
Trail, G4, **65–70**; old, G4, *63*, 66, *68*, **72–3**
tuff along, 66–7
White Horse Mountain, 18
White
Mountain (on Cascade Crest), G8, 91, 102
Mountain (near Boulder Pass), H9, 104
Pass, G8, 91, 101
River drainage basin, G7–8, H9, EP, 94–121
River
Glacier, G8, 120
Northwest Fork, G8, 100
Road, EP, **95**, *97*; rapids, 99
Trail, G7–H9, *97*, **99–102**
Wild Cascades: Forgotten Parkland, 205
Wilderness, Glacier Peak, vi, 9, 47
Wilkerson, James A., vii
Willis, Bailey, 167
Wills, R. H., 205
Wilson Creek, L3, 192
Wolverine Creek, L2
Woodford, A. O., 202

Y

yellow pine, *172*, *174*

Z

zinc, 186

NOTE

Forested areas are colored green on the maps. The gradation from dense forest and wet weather west of the Cascade Crest to open woods and sunnier skies east of the crest is depicted by the change from dark green to light green.

Places and routes referred to in the Index (as Lyman Lake H2 for example) may be located on the maps by using the grid system numbered as shown below. The corners of the grid (5 minutes of latitude by 5 minutes of longitude) are marked by + marks within the map and by tick marks on some margins. H = Holden, G = Glacier Peak, L = Lucerne.

```
+   +   +   +
  3   2   1
+   +   +   +
  4   5   6
+   +   +   +
  9   8   7
+   +   +   +
```