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THIRTY-TWO PAGES OF ILLUSTRATIONS

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Sierra Club Bulletin



Preserving Dinosaur Unimpaired

By DAVID R. BROWER

A statement for the Sierra Club and the Federation of Western Outdoor Clubs, presented at hearings on the proposed Upper Colorado River Storage Project held by the Subcommittee on Irrigation, Committee on Interior and Insular Affairs, House of Representatives, in Washington, D.C., January 18-28, 1954.

I AM executive director of the Sierra Club, a national conservation organization of 8,000 members founded in 1892 by John Muir, Warren Olney, and colleagues to explore, enjoy and protect the nation's scenic assets. The club's headquarters are in San Francisco; its members live in 46 states, the District of Columbia, the territories, and fifteen foreign countries.

I have also been asked to speak in behalf of the Federation of Western Outdoor Clubs, a group of 31 organizations in the States of Washington, Oregon, California, and Utah whose total membership exceeds 21,000. (That 21,000 includes the Sierra Club, which is a member of the Federation.)

As a citizen and taxpayer, I have been very much interested in the testimony here, technical though much of it has been. I have been impressed by the mass of detail that has been compiled and made available by the Department of the Interior. I hope the 1946 survey of Recreational Resources of the Colorado River Basin is in your file. I must say that I wish, in my capacity as a citizen bystander here, that I could have heard more

from objective experts, government and private, on engineering, agriculture, and economics, for it has occurred to me that the first two and one-half days' testimony has consisted in large part of a single Bureau's looking upon its own work and pronouncing it good.

But I feel sure that this Committee, before it makes up its own mind on this tremendous project, will have received and considered such testimony.

As a citizen of a state which contributes 8 per cent of the federal government's income (that would be about \$125,000,000 of the federal expenditure envisioned for the total Upper Colorado River Project as estimated a year ago), I have no objection to seeing the federal government find some means for authorizing such a project, but I do hope that ample time will be allowed for the very thorough scrutiny such a proposal needs before the nation as a whole commits itself to the very complicated and necessarily costly project which is before you. I am sure there is time for the thorough review we need. In spite of all the study to date, the project is not yet shaken down.

I should like to address myself to some matters that concern ideals and principles and their relation to America the beautiful—the America we are all very happy to step outside into after such sessions as these. We all have an interest in America's beauty. The Congress itself, beginning back in Lincoln's administration and continuing to this moment, has diligently sought means of assuring that the best of our scenery is not to be sold, or given, or destroyed, or altered. It is to be preserved unimpaired for the enjoyment of this and future generations—one of the finest steps in land-use administration ever devised in the history of the world.

Congress set Yosemite Valley aside for the nation 90 years ago, Yellowstone eight years later. The number of scenic reservations increased, and their use, too. About 300 people visited Yosemite in the year 1893. Last year there were just a few less than a million—probably thirty million in all the parks. Many people have not seen any parks, and possibly never will; but they are happy to have them there to take care of those people who like that sort of thing.

Who are those people? Perhaps not everyone here. There are probably quite a few, for example, who would not care to rough it to see any of the parks' back country, who wouldn't care to climb into a rubber boat and float down the rapid and calm stretches of Dinosaur's beautiful canyons. But to some people this very trip has been the finest scenic experience they ever had. Two of my kids and I feel that way. We were there.

Many of you won't feel that way—but will still defend the right of

others to have a chance to. Even if we did not like opera, we should hesitate to close the best opera house—or to alter it so that you still had some of the house, but couldn't hear the music.

Who are the people who fight for this right—the present-day Thoreaus and Leopolds and Marshalls?

Look at the Sierra Club, for instance, which wants to persuade you to protect Dinosaur and the parks, just as other Congresses have done for so long. What kind of people are in it? Teen-age kids, out to climb, hike, and ski; office workers, teachers, professional men—we even have a mailman who comes on our Sierra outings to walk 90 or 100 miles during two weeks in the wilderness. Strange people, slightly odd? Some, perhaps. But also the past president of the American Society of Civil Engineers, the current president of the American Society of Radio Engineers, the next president of the American Chemical Society, the president of a major pharmaceutical house, of a major railroad, of a major mining firm, an Assistant U.S. Attorney General. We have these, too. All of them, whether kids getting away from too much homework or executives getting away from too many telephones ringing on one desk, all have this in common—a love for the beautiful, unspoiled places—places they work hard (at no pay) to preserve, and long after they themselves can no longer enjoy them.

It is a noble human endeavor that leads them to do this. It is this type of endeavor I am hoping I can communicate to you as something every bit as important as the type of enterprise so earnestly supported here—and entirely laudable in its place—the urge to produce, to grow, to develop, to profit, and to spend. This Sierra Club is a good organization, devoted to idealism, and I am proud of it. It is but one of many, all just as good. I wish you were all members. It would cost you only \$3.50 per year.

Here are three questions which we feel have not been answered properly yet.

1. What are the important park values in Dinosaur?
2. Would they be destroyed by the Echo Park and Split Mountain dams?
3. Can Dinosaur's scenery be made accessible without dams?

As you may have guessed, our answer is that this area has superlative park values. They would indeed be destroyed by the proposed dams. And the dams are not needed to make this area accessible. Briefly, this is why:

What about the park values?

I am tempted to set myself up as an expert on this. I have seen a lot of outstanding scenery in the last 35 years, in this and other countries. In

Dinosaur I have been out to the Quarry, on Harper's Corner, and up on Round Top, and with two of my boys, 9 and 7 years old, I have floated 86 miles across the Monument, from Lily Park through Split Mountain Gorge, camping at Anderson Hole, Bull Park, Mantle's Ranch, Echo Park, and Jones Hole. *I have never had a scenic experience to equal that one*—and as a native Californian I fully expect to be hanged from a yard-arm in San Francisco Bay for saying so. To me, and to the 200 other Sierra Club members who took the same trip last summer, it is a magnificent place.

If you haven't been all the way through the canyons or haven't seen one of the four color movies now available that show the trip, you can not begin to appreciate why we are so determined in wanting to preserve it.

I should like to try to give you a quick account of what the trip is like and how it makes you feel about the place. I will if you ask me to. But to spare your time, I'll ask you just to take my word for it that this is a totally wonderful place, certainly the equal of any canyon park except Grand Canyon—and it beats Grand Canyon all hollow in the ease with which you can effortlessly see the best of it from the bottom looking up, riding those rainbow rivers.

Would the dams destroy the park values? My own opinion is that the values which now give this area its great natural significance would indeed be destroyed and that if you should be led into the mistake of authorizing those dams, you should at the same time throw the area out of the Park System. We should, if that tragedy came about, let the states develop the recreation area, chiefly of local value, that would be left. And that should be the rule, we submit, for reservoir recreation throughout the Upper Basin Project and elsewhere. Develop and administer it at state expense.

I have seen in the Utah papers the claim that the dams would improve the canyons, which seem to these writers (if they have seen the canyons) to be a collection of ugly snags and quicksand. They are entitled to their opinion, but we do not accept that as a disinterested opinion. When I am sick I go to a doctor, not an engineer, and when I want studied opinion on park values, I go to people who have made the study of those values a career (reserving the right to disagree). I think we do well here to quote the Park Service, which has said in writing that the effects of these dams upon irreplaceable values of national significance would be deplorable. This statement is quoted in House Document 419. Deplorable is a mild word to describe what would happen to the scenery in Dinosaur were we to permit these dams to be built there. The Echo Park project alone calls for a dam 525 feet high, backing up 107 miles of reservoir, inundating the

intimate, close-up scenes and living space with nearly 6½ million acre feet of water. There would be construction roads in the canyon and above it, tunnels, the whole power installation and transmission lines, the rapid build-up of silt at the upper end of the reservoirs, and the periodic draw-downs of the reservoir to enable it to fulfill its function—a fluctuation that would play hob with fish and wildlife. The piñon pines, the Douglas firs, the maples and cottonwoods, the grasses and other flora that line the banks, the green living things that shine in the sun against the rich colors of the cliffs—these would all go. The river, its surge and its sound, the living sculptor of this place, would be silent forever, and all the fascination of its movement and the fun of riding it, quietly gliding through these cathedral corridors of stone—all done in for good. The tops of the cliffs you could still see, of course. As reservoirs go, it would be a handsome one—but remember the 251 other reservoir sites in the upper basin and the hundreds of reservoir sites elsewhere in the country. We don't want Dinosaur to be just another reservoir. We want it to remain the *only* Dinosaur, which it is now.

If we should accept the amazing statement that Echo Park dam would not destroy Dinosaur, but would only alter Dinosaur, we should also accept such statements as these:

1. A dam from El Capitan to Bridalveil Fall would not destroy Yosemite, but just alter it.
2. Other dams would only alter Yellowstone, Glacier National Park, Mammoth Caves National Park, Kings Canyon National Park.
3. Removal of the rain forest would only alter Olympic National Park.
4. Cutting the 3,000-year-old Big Trees and making them into grapestakes would only alter Sequoia National Park. After all, the ground would still be there, and the sky, and the distant views. All you would have done is alter it, that is, take away its reason for being.

Maybe "alter" isn't the word. Maybe we should just come out with it and say "cut the heart out."

Those who have been working to help save the parks for future generations for all these years can understand how people who have not yet had the privilege of enjoying the great scenic parks would think that a dam might improve Dinosaur. We can understand it, but we *completely* disagree. We cannot, however, hide our grave apprehension at finding that federal department officials charged by law with protecting our parks show such poor appreciation of them as to call this destruction "altering."

It certainly argues that those of us who appreciate the national-park idea—the members of Congress who through the decades have steadfastly

supported the park idea, and the others who selflessly volunteer their services on behalf of people not yet born—all of us need to do a better job of helping to explain to those who do not know, how important a spiritual and inspirational asset we do have in our national park system.

Perhaps Undersecretary of the Interior Ralph Tudor would have felt differently about the impact of the dams upon this irreplaceable asset of Dinosaur had he been able to devote more time to looking at it. You will recall his telling you that he flew over some of the proposed alternate damsites and was in the Monument three days. But I gather that he was able to see little of the canyons themselves on the ground—or rather, on the river.

Echo Park, which he did see, is a magnificent place, alone worthy of being preserved inviolate. However, the Dinosaur canyons reach their scenic climax, not at Echo, but above and below it. The best of the Yampa is the stretch from Bull Park down to Echo, which our party took two days to float through, and where I should like to spend a week, exploring for Indian signs and little things under those great, noble cliffs. The Canyon of Lodore—from the Gates of Lodore down to Echo—is the best of the best. But you can't just fly over it and have the foggiest idea of its beauty. You need to ride the river and camp along the way. Two or three days ought to be allowed, although you can race through if you feel you must.

Arrangements could easily be made for a smooth, quiet glide around the charming winding canyon from Mantle's Ranch to Echo. You could leave U.S. Highway 40, take this ride, and be back on the highway the same day, much richer for this superb wilderness experience. You could, that is, if they would fix the roads just a little—and if the people of Vernal did not warn you, "Don't waste your time there—there's nothing to see and it's treacherous"—an unbelievable lack of understanding of the facts.

A climax of its own special kind is the ride through the spire-walled Split Mountain Gorge—a roller-coaster ride that takes only 2 or 3 hours and leaves you wanting more right now. And you can do it for the price of a couple of tickets to a football game. But wear your Levis; you may get splashed a little. And try to be there before too late in October, for the river may get too low then.

That upper Yampa corridor has one of the most awesome spectacles in all the world. I call it the Grand Overhang (it's in the *Sierra Club Bulletin* you have before you; it should have a much better name, and you can only appreciate it if you see it yourself or get Cinerama to photograph it in color). The Yampa River really did a job here, in the course of some

90 million years, entrenching itself in a giant meander right in the heart of the Uinta Mountains.

I am afraid Mr. Tudor, in addition to missing the entire corridor, Lodore, and Split Mountain Gorge, could not have seen this beetling overhang from above. Once you get close enough to the edge to look down, it's too late. It's a terrific drop. It would take you about 12 slow seconds to complete the fall, and you'd land on the opposite bank of the Yampa River.

You just can't go down that river—all of it—and come out with a statement that a dam would only alter it. You come off that trip convinced that a dam would be the tragedy of our generation.

And Mr. Tudor would have you trade all this for what he has been told might be 100,000 to 200,000 acre-feet of water! Very recently they were saying 350,000 acre-feet officially. It makes a friend of mine wonder how much lower they can go—and *still be wrong*.

I have some statements that I think we ought to start the rest of this discussion with. We have been quite concerned with the reliability, although we want to rely on them, of the Bureau's figures, the Interior figures. I think I can demonstrate, if you will follow the arithmetic, what folly it is to follow those figures.

Mr. Tudor in his testimony on Monday said, for one thing, "The most important single factor in favor of the recommended plan, as contrasted to suggested alternates, is its comparatively smaller water wastage through evaporation."

Then he said on page 23 [of the transcript]: "The fourth alternative [one that he rejected] would be the high Glen Canyon dam, which is considerably more elevation, 3,750 feet. It would then have a gross storage capacity of 31,700,000 acre-feet. The exposed reservoir surface is 186,000 acres and the evaporation is 691,000 acre-feet per year. Again, that figure must not be compared with the evaporation from Echo Park but with the combined evaporation of Echo Park and lower Glen Canyon." He concluded that paragraph saying, "So the net difference is 165,000 acre-feet."

Then he made a statement later, on page 26: "In the final analysis, the increased losses of water by evaporation from the alternate sites is the fundamental issue upon which the Department has felt it necessary to give any consideration to the Echo Park dam and reservoir."

On page 33, just as a footnote for what I am going to carry on with, he said, "The difference between Echo Park and the other most favorable dam site is about 108,000 acre-feet."

From Mr. Tudor's own figures—or the figures someone worked out for

him—it can be shown that one of the alternates he investigated does not evaporate 165,000 acre-feet more than Echo Park dam, as he testified, but 2,610 acre-feet *less*, while storing some 700,000 acre-feet more. It is hard to believe, I know, but if I am wrong, it must surely be because *he* is wrong, and he is not supposed to be wrong in engineering matters or figures.

But I submit that he made three big errors and one little one in this one matter alone. I refer to the comparison between Echo and Little Glen and Big Glen, as I call it. All the evidence you need is on pages 12, 13, and 14 of his opening testimony, which I did not check carefully during his reading of it. I should have checked sooner, because editors are trained to check, even if they do not know engineering. They are supposed to know 9th grade arithmetic. I shall be glad to do the arithmetic, if you wish, but for now will just mention the four errors that might have cost us our park.

[Adjournment for the day, on January 27, interrupted the demonstration of the errors, which was resumed the following morning, a blackboard being provided upon request. It had also been arranged to have Mr. C. B. Jacobson, Engineer in charge of Colorado River Storage Project Studies, Bureau of Reclamation (Salt Lake office), on hand to comment upon the demonstration of errors, which, together with the question period, occupies 11 pages of the published hearings.

[Briefly, the errors are these: (1) Mr. Tudor, in claiming a 165,000 acre-foot evaporation loss from the use of the High Glen Canyon dam as an alternative, forgot to subtract the Echo Park-Split Mountain evaporation of 95,000 a.f. (2) His High Glen Canyon dam was 15 feet higher than conceivably necessary. (3) The reservoir area for High Glen was based on the error in height. (4) The evaporation loss was therefore calculated on the wrong reservoir area. (5) Reference was further given to pages 166–167 of House Document 419, Reclamation's comprehensive 1947 study of the Colorado River, which showed that a High Glen dam 25 feet *lower* than Mr. Tudor's figure would store 2,300,000 a.f. more water than needed for a substitute for Echo Park and Split Mountain dams. The first four errors indicated that Mr. Tudor's 165,000 a.f. was 185,000 a.f. too high. High Glen would *save* water.

Mr. Jacobson, in his rebuttal, was silent on errors (1) and (5). He admitted that (2) was a typographical error. He denied the validity of (3) and (4), and pointed out that evaporation was calculated with reference to operating levels of reservoirs, and not the maximum levels, which were all that had been provided the committee.

[Mr. Tudor, on March 9, changed his testimony to correct errors (1)

and (2). Mr. Floyd Dominy, Acting Assistant Reclamation Commissioner, corrected error (3) in a letter dated April 16. Letters in late April from the Assistant Commissioner and the Commissioner revealed important inconsistencies in Reclamation data on evaporation rates and operating levels which indicate that High Glen would evaporate still less water than Echo and Split.

[Error (5) brought forth no official answer. Mr. Jacobson replied informally on January 28 that the 1947 document's High Glen figure was based upon a preliminary study which didn't mean anything.]

Before I worry about the "serious difficulty of protecting Rainbow Bridge" that Mr. Tudor worried about, I should like to sit back to see what happens if they go over their pages of figures with a well-oiled slide rule to see if there are as many critical errors on the other pages.

It would be nice to think that whoever it is who audits the arithmetic will change his approach to one of protecting, and not altering, the Park System, which we all want to preserve for future generations for the beautiful thing it is, and Dinosaur along with it. I know, and I'll bet Reclamation knows, that if the river disappeared in its course through Dinosaur, or was somehow unavailable, a sound Upper Colorado Storage Project could be developed elsewhere. The axiom for protecting the Park System is to consider that it is dedicated country, hallowed ground to leave as beautiful as we have found it, and not country in which man should be so impressed with himself that he tries to improve God's handiwork.

As it is, so it can be enjoyed. Mr. Dawson,* in a letter to all the members of the House, you used the word "treacherous" to describe the rivers. I think that the 200 Sierra Club members who went down them over the course of a single month last summer would like me to disagree with your application of the word. It could be used far better to describe Highway 40. We were all delighted to get off that treacherous highway and to settle back and relax in those safe boats on a thrilling but not treacherous river, to watch the trees, the wildlife and the cliffs go by as we trailed our hands in the water, and now and then jumped out to float quietly along with the boats into the middle of the most amazing river wilderness I know.

Take that ride with us next summer and I'll bet that you'll agree with me. Between now and next June, if somehow you can persuade your colleagues to persuade the Department of the Interior to spend 10% of the \$21,000,000 Mr. McKay has proposed to spend on helping Dinosaur, after it's been spoiled, it will be easier, a whole lot easier, to get from

* Committee member William A. Dawson, of Utah.

U.S. 40 to the river's edge, where life really becomes simple and fun, and you can feel your nerves relaxing one by one—so long as you don't mind a few nights out in a sleeping bag on an air mattress.

Right now, as you probably know, it is pretty hard to get to Mantle's Ranch or to Echo Park. For those of the committee who do not know, let me say that last summer, when we hit Echo Park on our fourth afternoon down the river from Lily Park, we had planned to have a truck take us up for that view from Harper's Corner, back at where we had been and down to where we were headed. But there had been a heavy rain five days before and Bus Hatch, our boatman, said we couldn't take the truck up. "I checked with Doug Chew, about the road," Bus said (Doug owns the ranch at Echo), "and he said it was pretty rough. And when he says it's rough, I'd hesitate to fly a kite over it."

Gentlemen, I hope you all meet Bus—and I especially hope you leave him the chance to make the thousands of people happy who have just begun to learn about those wonderful wilderness river trails of Dinosaur, and the bobbing rubber boats that should still be riding those trails—perhaps with a patch or two—when the next century rolls around.

Hetch Hetchy—Once Is Too Often

By ROBERT K. CUTTER

AN OFTEN-REPEATED reason for the recommendation to build Echo Park dam in Dinosaur National Monument appears in a paragraph of Under Secretary Ralph Tudor's recommendation to Secretary of the Interior Douglas McKay:

It is a matter of personal opinion as to the extent of harm that may be created by this reservoir. My own feeling is the alteration will be substantial and if conflicting interests did not exist, I would prefer to see the monument remain in its natural state. However, I do feel that if the dam is built, the beauty of the park will by no means be destroyed and it will remain an area of great attraction to many people.

We have evidence in California to refute this type of reasoning once and for all.

When I was a boy, there were three beautiful glacial canyons in California, Yosemite, Kings River, and Hetch Hetchy. Owing to the inaccessibility of the Kings River Canyon and Hetch Hetchy, very few people saw all three before Hetch Hetchy was flooded.

Since the year was lost when my father didn't get his sons into the mountains by pack train, I was one of the lucky few. We went into Hetch Hetchy in 1910, when the Hetch Hetchy dam was being considered and the conservationists of that day were fighting a losing battle. San Francisco needed the water, and this was six years before the National Park System was established. (Indeed, the loss of Hetch Hetchy was one of the chief reasons for setting up the National Park System, to make such areas presumably inviolate.) The argument that really won out was that Hetch Hetchy Valley with a lake would be even more beautiful and would provide greater recreation for more people.

At the time, some of the overzealous claimed that Hetch Hetchy was more beautiful than Yosemite. It definitely was not. However, it surpassed Kings River Canyon just as much as Yosemite surpassed Hetch Hetchy. Had Yosemite not existed, Hetch Hetchy would certainly have deserved, and would have received, the admiration and attention that we shower on Yosemite. Like Yosemite, it was a beautiful, forested, broad, flat, glacier-carved valley bordered by towering granite cliffs, with a clear river flowing through it and with the final touch of waterfalls pouring over the rim.

And what is Hetch Hetchy now? Just another dammed artificial lake.

Those of you who have only seen it since it was flooded will refuse to believe that it ever approached Kings River Canyon in beauty, let alone Yosemite. Hetch Hetchy now isn't worth a 35mm Kodachrome film. So much for beauty.

Now what about it as an area for recreation? Of the three canyons, Hetch Hetchy is the nearest to the central California center of population, and there is a beautiful paved road leading right to it. If it were of equal recreational value there would be ten visitors to every one at Kings River Canyon, which is the most distant. But are there? No, it's just the opposite.

Why should anyone want to go to Hetch Hetchy now?

Before it was flooded, the flowing water and the valley vegetation cooled it and the trees gave shade and relief from the heat reflected from the granite walls. Now, with the grass and trees all gone, there is nothing but a narrow body of monotonous water with an ugly shore line (typical of all reservoirs where the water level shifts), surrounded by stark stone walls. It is hot and uninviting. The falls, as seen through trees from the floor of the valley, were beautiful, but now, with the setting gone, they are about as interesting as the spillway over the dam.

Thus, we do not have to guess or debate. Hetch Hetchy teaches us that Under Secretary Tudor is right when he advises that in flooding Dinosaur "the alteration will be substantial," and wrong when he advises that "the beauty of the park will by no means be destroyed and it will remain an area of great attraction."

Photographers for following sixteen pages: Joseph N. LeConte, 1, 2, 3, 4, 5; David R. Brower, 6, 7, 10 (upper), 12, 15 (left); Martin Litton, 8, 9, 13 (lower), 14, 15 (right), 16; Neal Harlow, 10 (lower), 11; Philip Hyde, 13 (upper).



ONCE IS TOO OFTEN: *A PICTURE STORY*

1. This *Was* Hetch Hetchy
2. This *Is* Dinosaur

IN THE early part of the century the late J. N. LeConte, explorer and hydraulic engineer, made a remarkable series of photographs of Hetch Hetchy Valley, in Yosemite National Park, before water and power seekers of San Francisco sought to improve it.

Hetch Hetchy was not quite so beautiful as its neighbor, Yosemite Valley, but it had much of Yosemite's charm and living space—great oaks, verdant meadows, tree-framed waterfalls, and one of the finest streams in all the Sierra Nevada. Kolano Rock was one of the handsome landmarks under which hundreds of thousands might have camped in these days of overcrowding in our parks.

The following four photographs give a sample of the beauty that existed—the spacious floor, the cascades, Wapama Falls, and the living setting for spectacular glacier-carved walls.







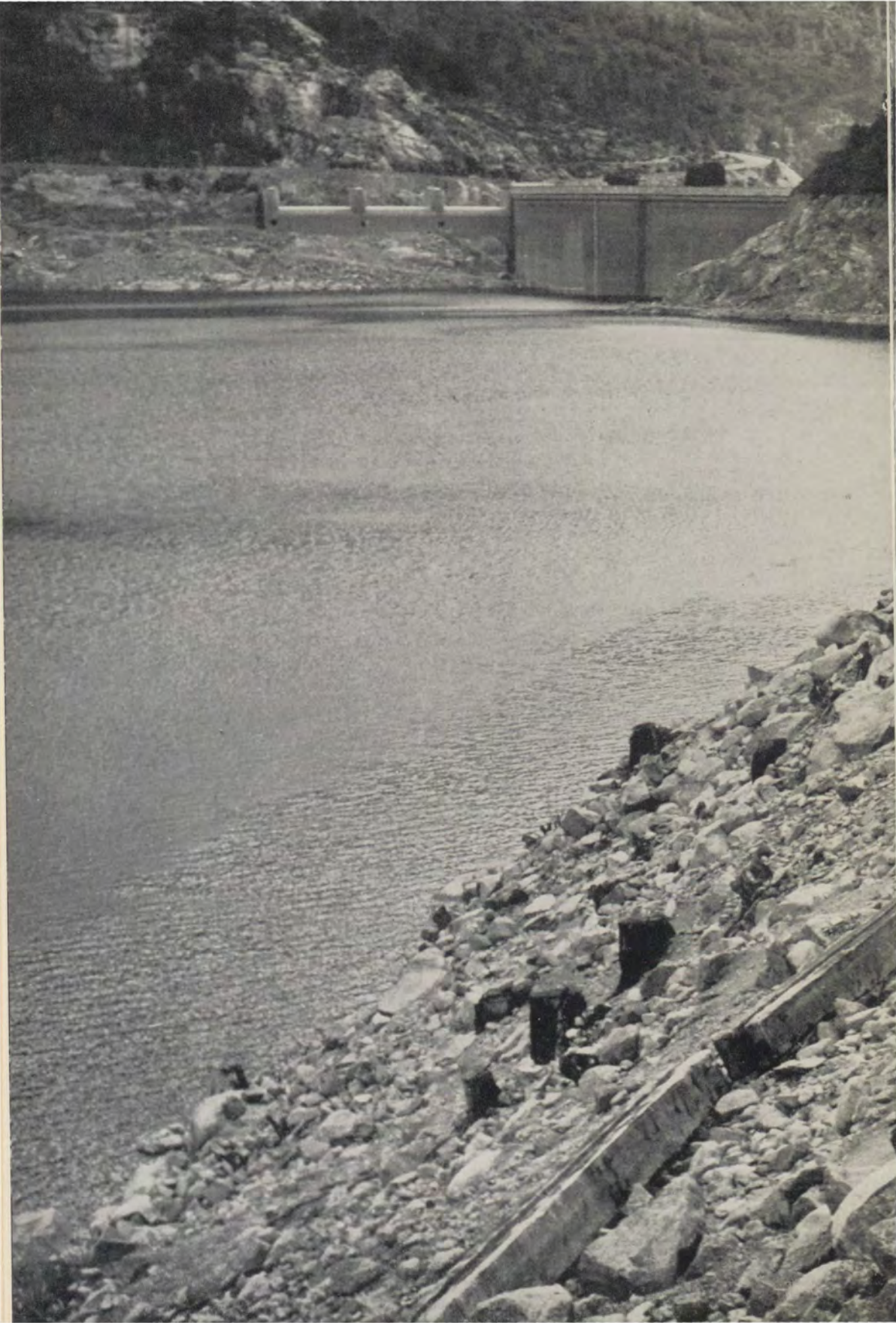


. . . Yes, This *Was* Hetch Hetchy

But it had a good dam site. True, others existed downstream—and still exist today—and the water would flow down to them, for diversion to a distant, growing city. Hetch Hetchy, though, was at a higher elevation, and the greater height could produce a little more power. A great battle waged, but there was not yet a National Park Service, and conservation organizations were few. As James D. Phelan wrote in 1911, espousing the dam in this valley, “. . . its beauty will be enhanced . . . making the valley more sightly and accessible. . . . There can be no question but that the beauty of the scene, with a dam easily concealed by grasses and vines, will be enhanced by the effect of the lake reflecting all above it and about it and will be in itself a great and attractive natural object.”

The Valley was made more accessible, but now for every million who come to Yosemite Valley to stay, a mere thousand come to Hetch Hetchy reservoir to turn around and leave.

*See it now, in mid-May of 1953—Hetch Hetchy in the spring.
And see Dinosaur now—Echo Park, in the autumn of 1953.*











This Is Dinosaur
A RIVER JOURNAL

Change of Pace: When you put in at Lily Park, just east of the Dinosaur boundary, you'd hardly suspect the existence of spectacular canyon





country. But a short glide takes you to the gates of the Yampa, where colorful walls rise abruptly. At times the river accelerates, but most of

the time you drift through an ever-changing panorama, the 100,000,000-year masterpiece of the surging river which you feel beneath you.





Land of Surprises: It's hard to predict where the river will turn next; at times you'd think there was no place for it to go.

In quiet water at Echo Park, children enjoy changing boats and trying a hand at the paddle—under the eye of an expert folbater. There's wilderness experience too, for those whose trail days are far behind them.





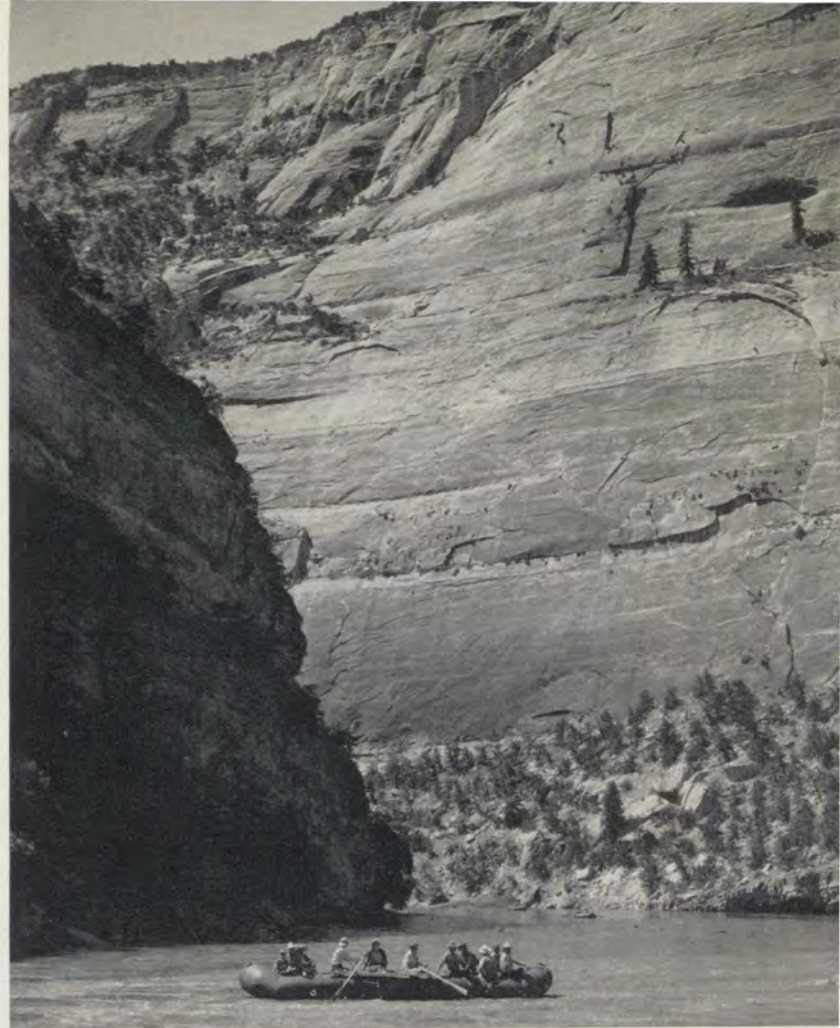
The Parks: "Holes," some of the early explorers called them—charming places, abounding in camp sites, where the river channel broadens, where the trees and grass come close. Echo Park and Castle Park are two of the most beautiful. Steamboat Rock is one of the great scenic wonders



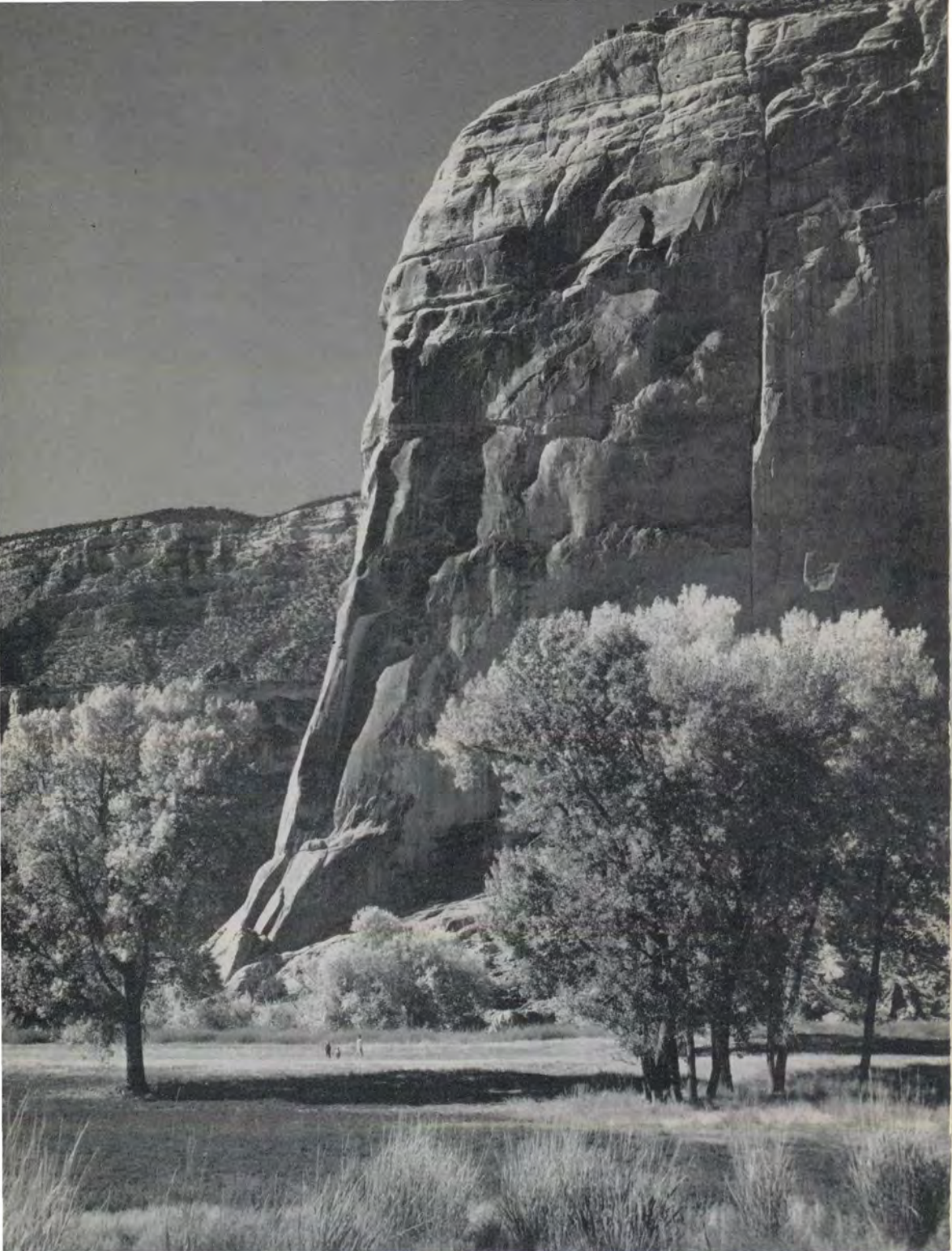




The River Bends: Glide under the colorfully stained undercuts, the grand overhang where a stone dropped from the top strikes the opposite bank; drift around the great oxbows, and try to read the billion-year geological story the river has opened to you; marvel at the rugged Douglas firs that



cling to firm sandstone precipices that have taken on granite-like forms from the river's chisel—the river still at its wondrous work, taking you effortlessly through its storied canyon-land, unequalled in all the Colorado River system. Nowhere else is such primeval grandeur so accessible.



Steamboat Rock. Not the highest, but certainly one of the most amazing of the world's exhibits of river sculpture. It can remain one of the world's great scenes, typical of the Dinosaur canyon spectacle; or 500 of its 700 feet can be lost in a fluctuating reservoir, and eventually in silt—needlessly. It is your land, unimpaired, part of your National Park System, now. It can so remain.



From a special Washington edition of the San Francisco Examiner (December 2, 1913) laid on the desk of every member of the U.S. Senate the day the final vote was taken on the Raker Act, which would presumably create "this beautiful lake" in the Hetch Hetchy Yosemite.

Footnote to Hetch Hetchy

JUST AS IN Dinosaur, it was not necessary in Hetch Hetchy to choose between water or scenery. Water flows downhill, and there were *and there still are* sites for storage reservoirs from which waters of the Tuolumne could be diverted to San Francisco. A lower diversion point meant a lower power head, but this was not at issue, and there is indication that San Francisco would have been better off financially had it not gone to the added expense of going high for power. Certainly there were alternate sources of power then, and thermal-generated steam is the predominant power source in California now, even with many streams still undeveloped.

Former San Francisco Mayor James D. Phelan, writing in *Out West* for February 1911, went so far as to imply that the Hetch Hetchy invasion would supply water not only for San Francisco, but East Bay cities as well, and would improve scenery and access for all.

His crystal ball was clouded. Starting years after San Francisco, the East Bay Municipal Utility District kept out of the National Park System, developed its water two streams north—on the Mokelumne River—and completed its project and was exporting water to San Francisco before Hetch Hetchy water could reach San Francisco mains.

One cannot say for certain what the full recreational potential of Hetch

Hetchy reservoir may be. In spite of provisions of the Raker Act, the area is operated somewhat as a private lake. Even so, the setting is obliterated, the fishing is not good, and there is no place to camp. Seventeen years after the addition of 85 feet to the dam, there is still construction clutter around the dam, which is not "concealed by grasses and vines." There is no possibility of enjoying the type of human experience national parks were set aside to perpetuate.

Today, were it unimpaired, Hetch Hetchy Valley could be carrying part of Yosemite Valley's overload, and be enjoyed for itself, too, while those who preferred the real values of reservoir recreation were dispersing themselves upon the many available reservoirs. Instead, San Francisco's gain (probably at an inordinate financial burden) became the nation's loss—a loss that is constantly increasing as the progress of our culture brings more population, more leisure, and more of the strains that national-park recreation helps so wonderfully to ease.

Mr. Phelan, troubled by the application of the word "vandalism" to those who would invade Hetch Hetchy, commented that "people who have a bad case use harsh words." In the cold light of hindsight, we can now see whose was the bad case—and remember that the kindest term the "vandals" had for the opposition was "nature lover." That term, now being called forth again for its overtones of derision, served then, as now, more to becloud than to clarify. Those who felt a reverence toward their natural heritage also seem to have been in closer touch with logic, their insight free of myopia. Their crystal ball, we now know, was clear.

Mr. Phelan had a building named after him in San Francisco, a monument with numbered days. The memorial, to his efforts and others, which will be enduring is the one that need not have been, the dam across Hetch Hetchy, on which an imposing brass plaque bears its burden of encomium. A new plaque, less pretentious, might well say:

HERE, NEEDLESSLY BURIED FOREVER
LIES THE HETCH HETCHY YOSEMITE
FOR HERE PROGRESS STUMBLLED

If we heed the lesson learned from the tragedy of the misplaced dam in Hetch Hetchy, we can prevent a far more disastrous stumble in Dinosaur National Monument.

DAVID R. BROWER

River Journal

Yampa and Green Rivers, 1953

By AUGUST FRUGÉ

The following is from notes made on the third Sierra Club Dinosaur trip. I traveled with Neal Harlow of British Columbia who had come to California for other reasons but was easily persuaded to change his plans and head for eastern Utah. Leaving Berkeley in the afternoon, we crossed the Sierra, drove a hot, shirtless night across Nevada, breakfasted in Salt Lake City, traversed the high, green valleys of the Wasatch, and the desert beyond. Vernal was reached July 4 and the trip began the next morning.

JULY 5. We gather at the house of Bus Hatch, the river boatman, where we check in and the dunnage is weighed. Packed in an old school bus, we rush down Highway 40 like a runaway stage coach, cross the now placid Green River at Jensen, Utah, and pass the state line into Colorado. A side road takes us north seven miles to Lily Park on the Yampa River. Here, a few miles upstream from the eastern boundary of Dinosaur National Monument, the Yampa breaks out of the narrow Cross Mountain Canyon and runs slowly through an open valley with scattered grassy flats and groves of cottonwood. We walk under the hot sun to the lower end of the Park where the river disappears into the main Yampa Canyon. Here the boats are waiting to be launched.

Without thinking and with recollections of Powell and Dellenbaugh in the back of my head, I had somehow expected wooden boats. Nearly all river running nowadays is done in rubber landing craft or life rafts, essentially giant black inner tubes shaped into blunt-nosed boats and divided into compartments so that a puncture is inconvenient but not fatal. The floor or bottom (deck doesn't seem to be the right word) is a single piece of heavy rubberized canvas, adequate but not very stable. Stepping on it, you learn the sensation of walking on the water. The small boats hold four or five people and their luggage; the larger ones are about twenty feet long, have two sets of oars, and hold ten or twelve people.

After lunch we haul the boats into the water and push off on the short run of five or six miles to Anderson's Hole, our first camping spot. Across the water we hear the boatmen calling to each other that everything will be all right. In other words, there is enough water. During the first two Club trips, the Yampa was higher and swifter. Thus we shall have some rowing to do on the lower stretches of the river before we reach the Green.

Almost immediately we enter the mouth of the canyon and float along quickly between red sandstone walls several hundred feet high. Neal and I are in Bus Hatch's boat, a small one named the *Plesiosaur*. We sit easily on the stern, ten inches above the water, and watch the little fleet move down the river. The large boats flex with the waves. Instead of cutting through the water, they fit themselves to it, undulating, and from a distance they look like big caterpillars. The small boats act in the same way, only less so. There are also two small folbots, or kayaks, in the party. These I watch with a mixture of envy and apprehension as they knife through the waves, the double-bladed paddles dipped quickly for steering and then held high, flashing in the sunshine.

Today we have only a few mild rapids, an easy initiation. In the choppy water our boat slaps the waves, and I learn that even a small wave, timed just right, can throw water into our laps and onto our feet. Bus tells us we shall all be doused many times in the days to come and that it is an excellent way to keep cool.

Bus is of medium height, with round figure, red face, glasses. Probably he doesn't look at all like a riverman during the winter in town, where he has a construction business. But we soon see that he knows what he is doing. Experience and skill are evident as he directs the other boatmen, steers his own boat with a quick dip of the oars, no waste motion, detects a hidden rock by the lines in the water, watches the waves and the shoreline for tell-tale evidence of the river's behavior. And all the time joking, answering questions, offering to hold the boat still for pictures. He is an old hand at the game. Several years ago he was with the first party to get through the Middle Fork of the Salmon River in Idaho. Another time he and Jim Orr, also one of our boatmen, tried to run the still unconquered Cross Mountain rapid in the upper Yampa, had their wooden boat smashed, lost all their equipment, and spent two hungry days getting out of the canyon and across twenty miles of desert. Listening, I reflect that the rubber boats and the skill of the boatmen have made it possible for tourists like me to go down all but the wildest western rivers in comparative safety. Some risk remains and adds to the feeling of being alive, but it is rather smaller than the risk of the open highway—and *that* does nothing for a man's spirit.

In recent years Bus and his sons have developed a flourishing small business taking people down the Yampa and Green and also down Lodore Canyon on the upper Green. Sometimes Bus runs through the Green and Colorado to Lake Mead, but ordinarily the lower river is left to the boatmen who are based farther south. Until this year his largest party has

been thirty-one people, and we ask him how he feels about our three groups of sixty each. The answer is quick and favorable; the Club groups are fairly well organized before coming and they bring their own commissary, leaving him free to handle the work on the river. And Club members, most of whom have been in the mountains on their own, know how to take care of themselves. I gather that some less experienced groups need to be wet-nursed down the river, so to speak. And it is startling to think that this group of nearly 200 people from another state (or rather from several other states) came to Dinosaur because one man, Dr. Harold Bradley, made the trip last year and brought back glowing reports of the canyons' beauty. How many of us knew where Dinosaur was before this summer?

The name Dinosaur is unfortunate. It is not the bone quarry that we have come to see but rather the great river canyons of the Green and Yampa. The Green comes down from the Wind River Mountains in Wyoming and cut its way through the full breadth of the Uinta Mountains, the greatest east-west range in the United States, while the Yampa flows west from the Colorado Rockies and joins the Green in the north-western corner of Colorado.

We reach Anderson's Hole in the late afternoon, with time to find camping spots in the trees beside the river and to sleep or swim before dinner. There is a small rapid here and some of the bolder swimmers come down it on rubber air mattresses, but that is not for me. So I just relax under a tree, safe from telephones, messenger girls, appointments, newspapers, radios, and the other inescapable facts of my ordinary life. To a confirmed city dweller the change is sweet, and I can feel the nerves unbending, one by one.

July 6. We are off early for our longest run, about 22 miles to Harding's Hole. The big rapids come early in the day. I say big because they are much rougher than anything we had yesterday, but when we act impressed the old hands smile and tell us to wait for Split Mountain. Nevertheless, the boatmen are taking no chances. They stand up and peer ahead at each rapid, they row like galley slaves for what seems the best passage, they go down correctly, stern first, and every now and then a sharp rock rushes by so close I can reach out and touch it. The water has a smooth, deceptive way of gliding over the upstream side of a rock and falling away sharply on the downstream side, revealing naked points and sudden drops. They tell a hair-raising story about one of the large boats on an earlier trip; the front end slid smoothly over a big rock and suddenly

dropped several feet, out of sight of those in the rear. Then the stern snapped up, catapulting the rear passengers into the water. This may be only a story but it illustrates the trickiness of the waves and shows how hard it is to see the rocks from above. The incident pops into my mind again when Bus beaches his boat and stands on the shore ahead, shouting directions to the others.

Today we are riding with Dave Allen, the 16-year-old son of one of the regular boatmen. This is Dave's first trip down the river; he is a little nervous at first but his confidence grows measurably as we get through the difficult parts successfully. His father is easily the most imperturbable and confident of the boatmen and already has a loyal following in one of the large boats, unofficially named the *African Queen*.

The method of taking the rapids stern first seems so obvious and right that it is easy to think rivers have always been run thus. The boatman faces his adversary, he is continually watching the water before him and is in the best position to check speed or to pull away from dangerous spots. Nevertheless Ellsworth Kolb says, in his book, that this method was first introduced on the Green and Colorado rivers by Nathan Galloway, a trapper and a member of Julius Stone's expedition down the two rivers in 1909. Presumably Powell and the other early voyagers went head first with a steering oar behind.

Both Powell and Dellenbaugh point out that river waves are the opposite of sea waves. That is, the river wave or the form of it remains in one place while the water rushes through it, but a sea wave moves along the surface of the ocean while the water stays in one place.

Tepee Rapid is long and pretty rough. Big Joe, which we take just after lunch, is short and mean, the closest thing to a waterfall we have seen, and here we almost lose one of the folbots. A large rock lies in the center of the stream and the water rushes through in two passages, one probably impossible to run and the other swirling and twisting close under a steep cliff. The only way is to stay in the middle of the left-hand stream and go with the main current. This we do, and as we slide down the quickening tongue of smooth water, with the waves quartering in from left and right, we notice that the folbot is moving along the edge of the rocks, trying to stay out of the swift water. It is crowded with two men and a girl. Then we plunge into the churning waves at the apex and I am looking at these when someone shouts; turning, I see the folbot upside down and lodged against the upstream side of the rock; the people are not in sight. A girl screams that we should try to get close and help them, but the current carries us away in the other direction. Looking back we see one head come

up beyond the rock and then after a terrible wait, two others. They reach the shore, while our boat slows down and floats to a stop in the slack water below. Then we, the passengers, realize that we have come through the rapid without seeing it; Dave tells us that our boat, unknown to us, swung around in a complete circle. And he has not even seen the accident.

Bus Hatch, who has been waiting below, stays behind to help with the damaged folbot. It is clear enough, even to me, that the three people have taken an unnecessary risk and I am sure that the little boats will not be allowed in the big rapids from now on. All the rubber boats came through beautifully, with thrills and splashed water but in complete safety.

We row on down a long beautiful canyon of quiet water with steep forested banks and smooth red sandstone walls above. The boatman works and we lean back, completely relaxed after the speed and the excitement, trailing our hands in the water and enjoying the sun and shadows of the late afternoon. We go from sunshine to shade and back to sun again as the canyon turns and twists. On one occasion our boat startles a doe and two fawns close above us on the bank. The doe leaps ten feet into the water just ahead of us, swims across the river, and flings herself up the other bank. Meanwhile the fawns have disappeared. Generally I am bored with deer, for they swarm in many parks, but I have never witnessed anything like this. Later our boatman claims to have seen another deer fall off a ledge and roll down the slope high above the river. I do not doubt his word but it seems to me that a deer must fall off a ledge about as often as a cat off a porch.

July 7. Today we have an easy run of ten miles to Mantle's Ranch at Castle Park. All our stopping places on the Yampa and Green are named either *park* or *hole*, and one of them has two names, Echo Park or Pat's Hole, take your choice. The name *parque* or *park* was scattered across the map of the Rocky Mountain region by the French trappers of the 1820's and 1830's. It seems to mean any large open or grassy place among the mountains or along a river bottom. It doesn't appear with the same meaning in any of the Pacific Coast states nor, I think, is it used in the East. If Tuolumne Meadows were in Colorado, it would certainly be a *park*.

Hole must be American in origin and pretty unlettered American at that. I don't know whether there is any other distinction between the two terms although one might well expect a *hole* to be smaller. According to Dellenbaugh: "In the old trapper days when a man found a snug valley and dwelt there for a time it became known as his 'hole' in the nomen-

clature of the mountains." Both appropriate and natural, it would seem, but he goes on to tell us that the rather fussy Major Powell considered Brown's Hole (on the upper Green) an unsatisfactory name and changed it to Brown's Park.

Today the cliffs are higher, more imposing, and I begin to feel that we are getting close to the Green River. Indeed we are not far away as the crow flies, but the Yampa chooses to make its way slowly in great horse-shoe bends, running three miles to gain one. We are riding one of the large boats, aware that the number of places in the small ones is limited and that everyone should be given an opportunity for the greater excitement they afford. We are thinking ahead, hoping for a small boat through Split Mountain on the last day, and it seems wise to do our turns in the big caterpillars before then. Dave Allen, who is alternating with one of the other boatmen, has charge of a large boat today, and we have decided to stay with him. The father has his regular following; we can provide a small *claque* for the son.

We come into Mantle's Ranch in mid-afternoon. Here there is a road of sorts and Bus's truck has come in with supplies, including a cold can of beer for each of us. In the evening Mrs. Mantle visits our campfire and tells us something about life in this remote place. Remote it surely is, for the Mantles have sometimes gone without mail for six months and in one recent year were snowed in from January until April. At first there was no road but they built one a little at a time over a period of several years; only when the children were ready for high school was it put in fairly good shape. To me it is startling to come across such an example of western pioneering in the middle of the twentieth century. Most of us who love the mountains and the desert still prefer to take them as an occasional change from the swarming city. And thanks to the National Park Service, the Sierra Club, and Bus Hatch's boats, here we are on a wilderness river, far from highways and picnic grounds, and reasonably comfortable. If a dam is built at Echo Park, Mrs. Mantle says, their place will be flooded.

July 8. The day is hot and still and we keep cool by alternate dunking and evaporation, swimming alongside the boat in the quiet water and then riding again until dry. Or fearful of sunburn, we dip our shirts in the water and put them on wet. One young fellow, eager for exercise, swims ashore, runs across the sand flats as the river sweeps around in a wide curve, swims again, runs again, and keeps up with us for more than a mile. The rest of us lead a lazy life. Once we follow a swimming beaver for several hundred yards until he gives us the slip.

This is the day for water fights. Yesterday first blood was drawn and vengeance has been sworn in more than one quarter. We are reasonably well prepared: a small boat that is easily maneuvered, a good man at the oars who can splash water as well as row, bailing cans for the passengers, and a spare oar which I learn to use with good effect at a distance of fifteen feet or more. The big boats have more guns, in theory, but they get in each other's way and the boats are awkward. We give some of these sitting ducks a good drenching and, while we get away, another small boat, which scorned an alliance with us, is boarded and almost swamped. Still another big boat, full of comfortable photographers, buys us off with soft words and candy. We sell out too cheaply but our hearts are big today.

The river is slow approaching its marriage with the larger Green, swinging in one wide curve after another, detouring left or right before each minor advance. Above us the red sandstone cliffs are more magnificent than ever, towering vertically for 1500 feet or more, carved by wind and water into outlandish forms, faces, and towers. Here and there great exfoliation shells have peeled off and fallen into the canyon; the exfoliation seems to be on more vertical lines than in the Sierra granite and hence does not leave the same rounded domes—at least we do not see them from the river. Some of the great cliffs overhang the water for many hundreds of feet—this on the outside curves where the river has swept against the rock for millions of years. And there are small, deep overhangs almost like caves; we run the boat under these and stand up to touch the rock over our heads. Life has never been so easy. We swim in the pools under the rock or lean back and try our voices on the echoing cliffs. We load our cameras in the semi-darkness of the caves and head out into the stream for more pictures. We slide close by the plastered bird nests on the stone walls.

In the afternoon the wind blows up the canyon, as Bus predicted, and we row with aching arms for every yard of advance. Our young boatman, although clearly enamoured of his oars, has gladly turned them over to Neal and to me for a long trick each. Outboard motors are often used on this stretch and sometimes even in the rapids, but I am glad that we go under our own power for the roar of motors would destroy the feel of the wilderness. In the quiet of the canyon I think I can capture some of the awe that must at times have overpowered the first voyagers on these rivers.

Straight ahead rises a long cliff of lighter red—Steamboat Rock, the great landmark of Echo Park and the sign that our day's run is nearly over. Here the small dark Yampa and the heavier, lighter Green slide

together easily and move beside each other under the vertical cliff until in the distance they mingle in the same bed and sweep around the prow of the Rock, doubling back. On our side of the river, opposite the Rock, is a wide open park with grass and scattered trees—here we tie up the boats and make our camp.

This remote spot has had its share of Western history. The Uinta Mountains and the canyons of the Green and Yampa were a high and deep barrier (confused as that may sound), to the early trappers and traders, forcing most of them around to the north or south but tempting a few to find a way through. General Ashley, the fur trader, left his name and the date 1825 in one of the canyons of the Green above here and he may have come to Echo Park. The inscription "D. Julien 1836" has been found in several places; probably a group of French Canadian trappers tried to go down the river. The Manly party of gold seekers, widely known from the book *Death Valley in '49*, passed through some of these canyons and may also have camped here. Certainly Major Powell and all subsequent river explorers who embarked at Green River, Wyoming, passed by and most of them must have camped, as we do, opposite Steamboat Rock. Powell named the massive cliff Echo Rock for the echoes that bounce back from its smooth wall, and from that came Echo Park. I do not know how or when Echo Rock was changed to Steamboat Rock. A short walk along the grassy park shows the end of the rock rising out of the water like the prow of a stone ship, six hundred feet high.

Dellenbaugh, the chronicler of the second Powell expedition of 1871-72, tells that the party camped here several days. Major Powell, with four men and one boat, spent three days exploring the Yampa while the others stayed in camp. One evening they rowed up the Yampa in the moonlight, singing *Softly and Sweetly It Comes from Afar* and other songs and listening to their words echo from canyon wall to wall.

Above here for twenty miles the Green River runs through Lodore Canyon, celebrated as one of the roughest stretches of water in the whole Colorado system and, in Major Powell's words, beautiful "beyond the power of pen to tell." The canyon walls rise more than 2,000 feet above the swirling stream; individual peaks stand higher still and waterfalls come off the cliffs in the rainy season. Powell named it for "the waters that go down at Lodore" in the poem by Southey, but he was in a less poetic mood when he won through to the quiet of Echo Park and wrote of "a chapter of disasters and toils." And well he might, for consider the names of the rapids: Upper and Lower Disaster Falls, Triplet Falls, Hell's Half Mile. At Disaster Falls his party lost a boat and managed to salvage

from the cargo only the barometers, a package of thermometers, and a three-gallon keg of whiskey. Powell reported, rather petulantly, that the men had taken the whiskey aboard unknown to him, but added, "Now I am glad they did, for they think it will do them good."

Skill and the rubber boats can do wonders. Nowadays the Hatch boys take parties through Lodore in safety, lining the boats past some of the worst spots. (A boat is lined when it is let down a rapid at the end of a rope held on shore.) Several of us are beginning to think of Lodore as a project for next year's vacation—if it is still there.

This evening we have a rousing campfire, enlivened by songs and short talks. Jess Lombard, superintendent of Dinosaur National Monument, has driven sixty miles to join us and tell us something about the country. Echo Park, where we are gathered, bears the local name of Pat's Hole, after Pat Lynch, a hermit who lived here in the 1890's. He was still around in 1911, when the Kolb brothers came through; a picture of him may be found in Kolb's book. The Monument was established in 1915 to protect the small dinosaur quarry near Split Mountain and was enlarged in 1938 to include the canyons of the Green and Yampa; hence the inappropriate name and much of the popular misunderstanding about the character of the region.

Before finding our sleeping bags some of us stand on the grassy bank under the trees and watch the pale river slide by in the semi-darkness under the looming cliffs. A week ago the claims made for Dinosaur sounded extravagant; now I would not trade it for any of the great southwestern parks.

July 9. We must be rested for we are up early and willing to walk a couple of miles before breakfast to hunt petroglyphs and visit a cave. Our group doesn't see the petroglyphs (although others do) but we find the cave, which is different from any I have seen before. A huge exfoliation shell, several feet thick, has been warped out from the sandstone cliff, leaving a space between shell and rock body, with a small opening at ground level. Within, a cool wind blows from somewhere. We find that we can walk to either side for an indeterminate distance, with the passage narrowing gradually until we can just move sideways, the rock touching us fore and aft.

In the boats again, we swing around Steamboat Rock and enter Whirlpool Canyon. Here the walls are higher, perhaps 2,000 feet, and the rock formation has changed to a rougher kind of sandstone that is eroded into broken, jagged cliffs, set back tier after tier with towers and pinnacles on

several levels. At the water level the cliffs come close together, leaving little or no room to walk in the event of a wreck, and as we go into the first rapid I am aware that this is no longer the little Yampa but a big, muscular river, quite capable of inspiring fear. The water runs deep, with whirlpools, and the waves are high. But we are in one of the large boats again and we go through swiftly, easily.

Powell writes: "All this volume of water, confined, as it is, in a narrow channel, and rushing with great velocity, is set eddying and spinning in whirlpools by projecting rocks and short curves, and the waters waltz their way through the canyon, making their own rippling, rushing, roaring music."

Today's run is fast and we pull up at our last camp spot, Jones Hole, before noon. (Half a mile above here we crossed the state line and are now in Utah.) With the rest of the day to spend we can choose between trout fishing in Jones Creek or a two- or three-mile hike in the same direction to see a fine series of petroglyphs. With no feeling of guilt at all, I choose neither and sit instead under a tree reading and working sporadically on these notes.

Whenever I get too warm I walk down and sit in the river a few minutes. Bus told me this morning that the Green is carrying five or six times as much water as the Yampa. I was inclined to question his estimate but now, sitting neck deep in the water and feeling the heavy pull of the current, even here close to shore, I doubt no longer. As I look across the stream at eye level, the water is bowed up in the middle and I begin to appreciate the strength of its sweep through the canyon. This, after all, is the main stream of the Colorado and was recognized as such by Powell and by all the early explorers.

July 10. This morning we have Jones Creek trout for breakfast and start down the river in a light rain. In the fast water we soon pass out of the high canyon walls, tilted, terraced, and banded with colors, and float slowly into Island Park. Through this open valley the river winds for several miles, dividing itself into channels, making islands, spreading out over sand bars so that we are sometimes hard put to find the deep water. Once or twice we get out and pull the boat through the shallows, with the sand and the pebbles under our feet.

The river cuts through a low ridge to Rainbow Park, really a part of the same valley; here we have lunch and regroup the boats for the Split Mountain run. The rain is no longer falling but the skies are somber and the color of the open cliffs is duller than it would be in bright sunshine.

Split Mountain looms in front of us with its arching, rainbow-colored cliffs—a magnificent geological exhibit. The river, seeming to avoid an easier course, runs straight into the end of the mountain at ground level, splitting the ridge in two for a distance of six miles. An amateur geologist explains that the mountain is an *anticline*, a thick layer of hard rock that has buckled up in a great curve. Once the anticline was underground; the river ran over it on a nearly level course and began cutting into the hard rock. Later the soft surrounding sediments were worn away, leaving the mountain with the river running through it. The stream, still cutting away the rocks, now descends swiftly through the canyon, dropping in a long series of rapids that are the biggest and roughest that we shall see. Throughout the trip we have been hearing sidelong remarks about them, particularly about the one called the S.O.B. or the Dirty Sob.

Before we take off, the excess gear and the folbots are loaded into a truck for the long way around by road, and a few people choose that way too. The small boats are limited to three passengers but fortunately many people (particularly the photographers) prefer the large boats, and we have no trouble staying with young Dave Allen. Naturally he is nervous; we might be worried if he were not. For the first time we put on life jackets, and I get rid of some extra clothes that might be awkward in the water.

We are the fourth or fifth boat away. A few pulls of the oars bring us into the current and soon we pick up speed going into the first waves. Several hundred yards away, the head boat is bucking and twisting where the dark water breaks white, and the muffled sound of the rapid, echoing off the canyon walls, rings in our ears. Stern first we lurch down before a wave and up again with a few gallons of water in our laps; some still bigger waves break too soon or too late and we ride over them dry; we are poised high on the swelling water between two huge rocks and then rush down into a tall curling wave that wets us again and swings us around while the boatman lays on one oar to point the stern downstream again; we bob through the long choppy end of the rapid, and some of the little waves slap the boat and throw their tails in our faces. Up come the buckets at our feet and we bail like good landlubbers. All at once the fear is gone and we go into the next rapid with a whoop.

They come one after the other, no two the same, the best channel to the left, to the right, down the middle, or take your choice when they are all bad. No time to sit still: ride with your whole body when it's rough and bail the water out when it's easy. In one place Bus stands on shore, pointing to the middle of the stream and shouting. Dave stands up to get the directions, sits again and rows like a demon for the single open chan-

nel. Suddenly he stops and we race down past a big rock with thin water spilling over a three-foot drop, then into the rough stuff below, bouncing but untouched. Pulling up near the shore, we watch the others. One of the big boats finds the channel but swings around and comes through sideways, down deep and thrown up again with heads jerking and water over everything. A wooden boat might have capsized but the rubber rides high. A few yards downstream, another boat runs head-on into a rock, bounces back a few feet, and goes around it unhurt.

We are as gay as children, shouting, intoxicated by the motion and by the rushing water so close to us, but young Dave carries the responsibility. Concentration holds his face as he works the oars and watches the rocks ahead. We have known that he approached today's run with a healthy mixture of fear and desire and with a lot of natural pride. And he has done splendidly. Now, in a quiet stretch of water we come close to Bus Hatch's boat and Dave calls over to ask when we reach the S.O.B. rapid. "Passed it two rapids back," says Bus, and there'll be no holding us from here on in. We head for the biggest waves, scorning all others, and the little boat has the roughest ride we can give her. Dave joins the shouting, and I am sure he would pick a fight with the next boat if we could only get close to it.

But time and water go swiftly and the canyon is running out on us. Blue, rounded hills appear in the distance behind the dropping cliff and I see, with regret, that we are coming to the end. Soon Split Mountain slips behind us, we turn the last curve and float out into the wide valley. As we pull the boats up on the sandy beach under the cottonwoods, we wish we could go back and come through again—but it is twenty-five miles around by road.

With many hands to help, the boats are tipped up to drain, carried across the beach to the road and stacked under a tree, where they can be hoisted by rope and pulley onto the trucks. We spend an hour at the park headquarters nearby, looking at dinosaur bones and touring the little museum. Then, relaxed and dusty, we pile into the old school bus again, two to a seat and some on the floor. Thus we return to Vernal and make ready for the thousand-mile drive home.

Class 6 In the Tetons

By RICHARD M. EMERSON

JOY IN MOUNTAINEERING is the sum of many satisfactions. Ranking high among them is the feeling that you have really completed something when you have solved a mountaineering problem. Certain mountains, when they fulfill the aesthetic standards we refer to as alpine, and when they also place real obstacles in the path of a man, attract the mountaineer's attention. Their very presence provides a problem, or a test if you will, for those who think of themselves as climbers. For this reason and others, the Tetons, for example, attract climbers in increasing numbers. Here alpine beauty is intimately combined with mountaineering obstacles in an entrancing way.

Few visiting climbers have failed to notice one of the most entrancing sights of all—the shadowed north face of the Grand Teton and the sunny exposure of Mount Moran's south buttress. After six years of anticipation, I had the pleasure of trying both the face and the buttress, two climbs which for me were the two major obstacles in the range.

The north face of the Grand rises nearly three thousand feet above the bergschrund of the Teton Glacier. It is "interesting"* rock climbing throughout, varying from class 4 to difficult class 5. Yet the north wall is more than a rock climb. The problems of route selection, equipment, and—most of all—timing (both with respect to weather and daylight), place it properly in the realm of mountaineering.

Leigh Ortenburger approached me one evening with the news that he and Bill Unsoeld were to be free from guiding responsibilities the next two days, and at noon on July 23, 1953, we were on our way to the Teton Glacier, where we would set up camp that evening, above the icefall and just short of the bergschrund. It was a simple matter of putting into operation plans which each of us had been formulating over several years.

Our plans were built almost entirely around climbing speed and the effective use of daylight hours. When the face was first climbed, Pannall, Gilkey, and Garner took eighteen hours. They completed the last difficult pitch in almost total darkness. Since the condition of the route on the face could be determined only after we were well up on it, timing seemed essential; a bivouac on the face is not to be taken casually. So as a first step we selected a route across the bergschrund; cut steps up the snow

* *Interesting* is probably used here in the sense of the definitions in "Adjectives for Climbers" (*SCB*, December 1952, page 94): "describes a climb one grade higher than you'd care to lead just now."—ED.

wedge above it, and made sure that this led up onto the rock at the base of the proper route. All this we did before turning in the night before, thus saving a lot of time the next morning.

When we cached crampons and axes above the bergschrund it was just light enough to see, and the morning was still young when we reached the black chimney described by Garner. Bill had just re-read Garner's account and informed us that we were a good two hours ahead of the earlier party. Bill had been leading to this point, and the confidence with which he climbed spread contagiously to Leigh and me. Pitons were used sparingly, but always where warranted. When unsnapping from a piton, as I brought up the rear, I could not help saying to myself, "Yes, quite called for." Efficiency with the rope seemed to occupy our minds collectively, and we soon found ourselves on the snowfield in the center of the face. The sun still shone on the face, which meant the morning was new.

We reversed ropes at this point and I took the lead, Bill the rear. The snow was in excellent condition and we kicked our way up and across, asking when the climbing would really begin. We had climbed continuously for only a short period up "the ledges"—when we had our answer. We were above the older Petzoldt route, and starting the upper portion. I was about ninety feet above Leigh with five or six pitons in behind me, on by far the most exposed pitch of the climb. If I had known then that it was Pawnall's "pendulum pitch" I would have pendulumed. But I didn't know it. Instead, I saw that a small ledge tapered until it disappeared at a corner, with the upper wall and the lower wall slightly overhanging. I dropped down, with my hands on the ledge, and could then continue around the corner and finger-traverse for ten or fifteen feet.

And here I made a mistake. I had placed my pitons in such a position that the rope was directly through the crack where the ledge inverted itself at the corner; after permitting me to make some progress on the traverse, the rope bound in the crack. I was stopped midway in the traverse, with my weight entirely on my fingers, and had to retreat quickly, loosen the rope, and continue again just as quickly. The rope only jammed again, but this time not until I had gained a decent stance beyond the finger traverse. I anchored myself and went off belay while Bill was belayed up to free the rope and place a glove in the crack, allowing me to continue a few feet to a belay stance on the highest of the ledges. Only then did I notice puffy snow flakes being scattered by transparent clouds.

From this point there was just one near-vertical section of the face left, and Leigh took the lead. After climbing up the ledge a short distance he came to the first apparent break in the wall above. It was slightly farther

out on the face than the break found by Pawnall, and appeared questionable, but some friction holds judiciously placed by nature—and some protective pitons similarly placed by Leigh—did the trick. When we glanced at our watches on the summit they read 11:30 A.M., and we shook them in unison with complete disbelief. The climb had taken eight hours from base camp, and from start to finish it had progressed like clockwork—not quite literally, for a clock must rely on hands alone, and needn't back up.

Needless to say, we were overjoyed with the outcome of the problem we had tackled. Mathematicians speak of a "fine solution," and Leigh, being a mathematician, must have been especially pleased with this one. But for all of us, good climbing conditions, a well-balanced party, and extensive knowledge of route had combined with years of anticipation to make the climb not only a fine solution, but also a lot of fun.

* * *

Mount Moran's south ridge presented problems of a different order. There had never been an attempt upon it, largely because of its length and the obvious difficulty of the lower portions. Hence, we had to explore extensively before we were willing to place it in the category of "possible."

South of Moran is Leigh Canyon, from which the south ridge rises 5,000 feet in three gigantic steps. The first step, which we chose to call the south buttress, rises 2,000 feet in one smooth sweep of granite and pegmatite. The buttress was formed when the south ridge was sharply severed by the glacier which sculptured Leigh Canyon. It has an over-all angle of 85 degrees, much of it essentially vertical, with one very imposing overhang about 1,500 feet up.

Our plans for an attempted ascent were formed gradually over the summer, as reconnaissance progressed piecemeal. We examined the upper portion from the summit, the middle section in profile from the valley, and the lower buttress from its base in Leigh Canyon. As we observed we saw two problems emerge: 5,000 feet of roped climbing was one; direct aid—a lot of it—on the lower buttress was the other. I decided upon a reconnaissance climb to estimate just how much direct aid was required.

On August 14, 1953, Don Decker and I transported about seventy pitons to the base of the buttress. We roped up at eleven o'clock one morning, took some thirty pitons, and started exploring our way up the nose of the buttress. The first rope length was fairly rugged class 4, and each lead became steeper and more exposed. It seemed that the general formation of the mountain forced us to the left, but the possible route we intended to investigate was straight up and to the right. At each point the mountain seemed to lean on our right shoulder, forcing us into difficult

class-5 climbing. So it went for 500 feet as we forced our way straight up, feeling less comfortable as the pitch steadily steepened. Then, quite unexpectedly everything changed.

The formation of the rock suddenly became friendly, even though it was nearly vertical. A thoroughly enjoyable chimney went straight up behind a flake, terminating at a narrow ledge on top of the flake. This ledge diagonaled upward across a vertical face. The face was smooth; the ledge afforded balance, but nothing more. We followed it upward, and when it ended we were thrilled to find another one starting back in reverse. So it went for several hundred feet up a vertical armor-plating of granite. It was by far the best rock and the most rewarding climbing I have found.

But an upward glance told us this had to end. As I climbed up to Don, who had just completed a long lead, he informed me that we had apparently reached our highest point. I was still about 15 feet below him. Above me there was a two-inch ledge leading away from the direction of Don's lead. It sloped inward, he said; he could see it from above. With his upper belay I could reach it, and it turned into a 10-foot hand traverse, ending again at a ledge which I could swing myself onto. So the climb continued on ledges as before, each extremely exposed, but always sloping inward. Two long leads above this temporary halt, I came to a corner about 100 feet and three good pitons above Don. Around the corner was a smooth slab about 40 feet across, extending upward 40 feet at 85 degrees. It was an exfoliation slab terminating under a 15-foot ceiling above, and undercut about the same across the bottom. We were about 1,500 feet up; it was 5:30 P.M.; further progress would require direct aid, and there was not a single crack visible on the ceiling. A heavy bank of clouds was tumbling into the head of Leigh Canyon, and we called our reconnaissance to a halt.

While I was climbing back to my belayer a fierce hailstorm swept the buttress, but by the time I had reached Don it had subsided. A long series of exposed rappels with some intermittent climbing brought us back to the canyon floor, where we spent the night. Around the fire it seemed that we took turns expressing amazement that we had managed to get as high as we had. Throughout the previous afternoon we had felt that each lead would bring us to our highest point. Instead, we had reached the overhang without direct aid. We felt there was a slight possibility that most of the overhang could be by-passed on the left with 60 or 70 feet of direct aid (*if* there were piton cracks, and *if* they went in the right direction).

With this reconnaissance behind us, we started laying plans for a

bivouac climb, and we scouted around for a third climber to give the party more strength. In the meantime, Don Decker and I climbed Mount Moran on Park Service business, and left a choice cache on the summit.

When the time came, Leigh Ortenburger joined our party and we spent the night in Leigh Canyon. On August 30 we roped up at about 6:30 A.M. and, with some variations, worked our way up the route we had followed in the reconnaissance. About five hours later I found myself standing in the same footholds at the corner, looking out over the same slab and up at the same ceiling.

There were no piton cracks within my reach, and the next handhold was about eight inches too high, so I spent another fifteen minutes standing in those same footholds trying this and that. I had traversed about twenty feet out from the last piton and felt rather exposed—certainly too exposed to lunge eight inches. I had to kick my left foot about waist high, use a right-hand push hold next to my foot, and raise up, keeping my right toe pressed firmly against the wall as it rose to maintain my balance. In the meantime my left hand was scouting around for that upper hold as though it were directed by a purpose of its own. My hand succeeded, and I could reach a piton crack which sent us on our way again for a few feet.

Leigh was belaying me and I went onto intermittent direct aid up the corner of the flake, hoping to find something leading around the ceiling to the left. Twenty feet up everything ended. There was not a single crack either on the ceiling or around it on the left. The ceiling, however, curved down the right-hand side of the flake, and directly across the flake was an excellent crack leading out and over the overhang. This was 40 feet away, across an 85-degree flake which hung out 1,500 feet above Leigh Canyon. True, my position was 20 feet above that crack, but this would hardly permit a pendulum. I took an anchor where I was and belayed Leigh while he pendulumed far below, exploring for a possible way under and to the right. This revealed nothing but more exposure, so we gave up and I started back down. It appeared as though our "serious attempt" was going to end only 20 feet higher than our reconnaissance had gone!

On the way down I scanned the flake for anything which might take a piton, and lead to a better place to pendulum. I was successful in getting three wafer pitons in which would hold my weight plus. From the highest of these I was able to reach out about four feet to the right and I could feel a crack which might take another. The crack closed within a half inch, but—by placing an army wafer with its *head down, against the flake*, I could pound along the edge of the blade. While the entire length of the

piton was partially exposed, it was nonetheless quite firm, if the pull on it was down, not out.

From here I climbed back to my belayer, made certain that it was a dynamic belay, and got some more wafer pitons. Suspended from the piton described, I pendulumed out onto the slab and found enough irregularity to hold myself as far out as I could get. From here I could reach a thin crack, going upward like the other. Two wafer pitons, each placed twice while I went up this crack, were sufficient to take body weight with foot slings; I did not snap the climbing rope into them as I progressed upward, for I was belayed from a higher piton to the left. From the highest piton in the crack I could reach a spot in the crack still farther to the right which widened as though nature had known in advance the shape of an army wafer. It was just the width, and closed completely right above and below the piton blade. Not only was it the best piton I have driven, but it was high and to the right on the slab, and from it I was quite sure I could pendulum to the crack I was headed for.

As a pendulum it did not work, but as a tension traverse it did. Lying back against the flake, I could brace against irregularities, and gain distance to the right, with the belayer slowly feeding out a taut rope upon signal. Although Leigh could not see me, he seemed to know exactly what I was doing, and I have never seen better belaying where it was needed. About four feet short of my objective I found a loose flake of rock lying against the main flake, which, when removed, left a ledge four inches wide and flat. I had tapped this flake loose with my toe; it fell free for about 400 feet, glanced off the wall, and was not heard until it struck talus 1500 feet down. I don't know what compelled me to watch it!

I could reach the bottom of the important crack, and when I was anchored to a piton in it, I called off belay, with a feeling of satisfaction which I don't expect to equal again. Leigh climbed up and secured his rear rope in the pendulum point, then let himself be lowered to my level. I threw slack rope across to him, and he swung over and joined me. I then went up and around the overhang about 20 feet on direct aid, to a comfortable belay position on the very nose of the south buttress.

Since the rope had to slide under tension through the two pendulum points, we left carabiners in them instead of sling rope, but the sacrifice was worth it. After bringing the pack across on a separate rope, Don followed. He, poor fellow, had been sitting on a ledge a foot wide and a sheer 1500 feet up, for about five and one-half hours during all this. He claimed he amused himself by tossing pebbles at the tree where we had roped up, which was directly below us.

By the time all three of us had assembled at my position, it was approaching 7:00 P.M., and darkness was on its way. There were still at least 500 feet of the buttress left, which rose straight above us at about 85 degrees. To our right, the ledge we were on led under another ceiling, soon disappearing, but up against that ceiling was a deep crack which would provide a strenuously long hand traverse, disappearing around the corner. Leigh was in position to explore the angle straight up, and with my belay he started out. It soon became evident that the going was tough and the angle did not let up to provide a bivouac. We could have spent the night where we were, but it was an exposed spot. Leigh came down, and I took up a belay on Don's rope. He was in position to explore the hand traverse and was the strongest at this point anyway.

Fortunately, there were many projections along this traverse which gave purchase for the rope, and he could rest on tension without placing pitons. After 40 feet, he disappeared around the corner. The rope kept feeding out and he seemed to know where he was going; he rested on tension at intervals since there was nothing for his feet. When there were about ten feet of rope left we heard Don's gleeful call. He had gone completely around the ceiling, and emerged from under it into a broad shelf which nourished a patch of several scrawny trees.

By the time I reached the shelf, coming last now, it was barely light enough to see, but Don had a fire already started and we spent a very satisfactory night beside it.

There remained 3,000 feet of climbing for the next day, but we knew it would go rapidly as class 3 and 4; the south buttress was behind us. When we climbed onto that shelf, we knew our effort had been a success and tension gave way to the purest satisfaction. We could think of our food cache on the summit, where, at two o'clock the next afternoon we were to open a can of plums packed, as the label read, in heavy syrup. And Moran's south ridge bestowed upon it the quality of purest ambrosia.

The Predator in Wildlife Management

By A. STARKER LEOPOLD

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FROM ITS INCEPTION in this country, wildlife management has included predator control as a keystone, along with legal regulation of hunting. For the first three decades in the present century there was little serious challenge of this activity, and millions of dollars were spent subsidizing the killing of everything from crows to cougars. Ecological research on wildlife started about 1930. From that time on, evidence has mounted to cast doubt on the necessity or the wisdom of universal predator control in the production of game.

Because predators kill game it has been assumed that any reduction in predator numbers will create a corresponding increase in game. It is this basic premise that is open to question. A specific example may suffice to illustrate the complexities of predator-prey relations as we now understand them.

In a given watershed we shall say there are 100 quail in the spring. These birds pair and nest, and by autumn they have raised a crop of young. Some of the nests were destroyed by ground predators like skunks, raccoons, and feral house cats, forcing these pairs to re-nest and try again. A good many of the chicks likewise were caught by predators and even some of the adults, especially incubating females. Nevertheless, when breeding is over, the whole population may have increased to perhaps 250 birds. From this point until the following breeding season the population is harassed by hunters and predators, and many of the birds are killed. Especially persistent are some of the birds of prey such as Cooper and sharp-shinned hawks and horned owls. Come spring again, the chances are that the population will be back down to around 100 breeders. The cycle then repeats itself.

The 150 birds that were lost may be looked upon as "biological surplus" and many recent studies suggest that these individuals are predestined to perish in one way or another because the habitat will not support them. Each unit of game range, like our watershed in the example above, has an arrangement of cover, food, and water that will tend to maintain just so much game year in and year out, 100 quail in this example. It is part of the natural scheme of things that the breeding stock will produce a crop of young considerably in excess of what is needed to replace annual losses. The excess feeds the predators. By the same token a forest drops in-

finitely more seed than is needed to replace the dead trees. The extra seed feeds chipmunks and small birds. A pair of bluegills may produce thousands of young that feed the pike and bass, only two having to survive to replace their parents. Biological overproduction is a normal phenomenon, and in fact the hunter who goes afield in the autumn and shoots part of a covey of quail or one or two deer from a herd is merely helping to harvest this surplus.

One frequently noted aspect of predation is that it is most effective when surpluses are large. Predator kills decrease in frequency as the population of the prey shrinks. Thus, 250 quail in our arbitrarily defined habitat may furnish many good meals for hawks, owls, and other flesh eaters, but as the population drops toward 100 the rate of loss falls off until finally it virtually ceases. A point of diminishing returns is reached where it is not worth the predator's time to try to catch any more quail, the alert and experienced survivors being ensconced in the most "secure" parts of the habitat. This point is determined by the nature and distribution of the cover and its proximity to food and water. In the parlance of wildlife managers the area may be said to have a "carrying capacity" of 100 quail.

The relative number of predators is *not* a primary factor in determining the level of the surviving prey. Predator control is based on the premise that it is. Were the hawks, owls, bobcats, and skunks reduced to half their normal populations it is doubtful that more than 100 quail would winter, for the smaller number of predators would continue to catch quail until the same point of diminishing returns was reached. Subsidizing a modest reduction in normal predator numbers, therefore, may have little or no effect upon the level of small game populations.

Admittedly this is a simplified presentation of a complex situation. If *all* predators were removed the quail would certainly increase, for much terrain would be made habitable that normally is lacking in cover and hence is too dangerous to use. But full control is almost never achieved because of the cost. Likewise nest predators such as skunks, raccoons, crows, and snakes may decidedly affect the size of the annual hatch and hence the size of the surplus (the 150 per cent used above is no fixed constant). But most control measures, as they have been carried on in the past, by bounty payments, paid government trappers, or encouraging hunters and ranchers to shoot "vermin," are for the most part ineffective in building up local stocks of game. At the most they give the hunter a slightly larger "cut" of the annual surplus but at an exorbitant cost. On economic grounds alone it may be argued that sportsmen's dollars will

yield more game if invested in improving game habitat (e.g., increasing "carrying capacity") than in controlling predatory birds and mammals.

One of the best recent documents verifying the above conclusion is a little bulletin published by the New York Conservation Department entitled "A study of fox control as a means of increasing pheasant abundance." After a long and expensive set of controlled experiments the conclusion was reached that "reducing the fox population to a very low level did not increase pheasant abundance appreciably and certainly not to a degree commensurate with the cost." This finding merely substantiates what many previous experiments and studies have suggested.

There may be some actual benefits to the game in predation. Ground nesting game birds like quail, ducks, and pheasants tend in a given latitude to begin nesting all together. If all nests were left undisturbed the young would hatch more or less in unison. An untimely spring storm might wipe out all the chicks of a given hatch, leading to severe decimation in the population—this phenomenon has been observed frequently. Nest predators which break up part of the first nests, forcing re-nesting by some pairs, thus serve to stagger the hatch, which insures the population against wholesale loss of young.

It is often stated, but not often proved, that predators cull the sick and the weak from prey populations. They certainly maintain a degree of alertness and wariness in the prey—desirable characteristics in all game species.

Likewise predators reduce the numbers of rodents that compete with game for food and that often damage agricultural crops as well. But this benefit must be interpreted in the same light as predation on the game itself, namely, it is only the surplus rodents and not the breeding stocks that are taken. The defenders of predators often are guilty of faulty logic in ascribing "control" to the actions of mouse eaters while in the next breath they condone the quail eaters for limiting their kill to the biological surplus.

Each range may be said to have a carrying capacity for predators, just as it has for prey species, and broadly interpreted this means that normal predator populations are determined by the amount of surplus prey—a reversal of the original idea that prey populations are determined by the numbers of predators. Predators themselves likewise produce an annual surplus, and much of the subsidized control merely harvests, at a cost to the taxpayer, excess individuals that could not live anyway because of the limited supply of prey.

To sum up, populations of the small game species of which we have

been speaking are regulated by a highly complicated set of interaction between the breeding stock of game, the habitat in which it lives, the many species that prey upon it, and the equally large group of species that compete with it. The key element in the life equation appears to be the habitat. A much less potent force is the relative numbers of natural enemies. It follows that control of the natural enemies is unlikely to pay big dividends in increased game.

Among big game species, such as deer, a somewhat different situation prevails. The enemies of deer are few in number and a high degree of control often is achieved. Excess deer when not taken by wolves, mountain lions, or hunters do not necessarily die immediately from some alternative cause, but they tend to accumulate for a few years until the winter food supply is exhausted and then large numbers perish at once. The depleted herd builds back only to die off again a few years later. As with quail, the condition of the habitat still may be designated as the key to deer abundance, but predators seem to be a necessary "balance wheel" to maintain a level rather than an undulating population. Full removal of the annual surplus by hunting may be substituted for predation, but it is not often accomplished under present rigid hunting regulations. The worst feature of permitting herds of deer, elk, or moose to build up periodically to abnormal levels is the impact of overgrazing on the range. In time, the carrying capacity of each local area may be greatly lowered by the sheer numbers of animals, and that means that the average size of the herd inevitably will decline. Predator control without compensatory shooting pressure may lead then to a *decrease* of big game.

Thus, all in all, control of predators which seemed such a logical part of wildlife management up to 20 years ago, has proved to be of dubious benefit in many ways. There are few clear cut examples of predator control actually resulting in a substantial increase in game. There are many examples of its leading to mere wastage of funds without any change in game populations, and a good many more of its causing indirectly a lowering of ungulate populations by permitting range destruction through overgrazing. As a practical tool of management it has worked out rather badly.

Perhaps much of this devious and complex reasoning is rendered unnecessary by a consideration not yet weighed into the argument, namely, the intrinsic social values of the predators themselves. As indicated above, much of the persecution of predators is intended to produce more game for the hunter's bag. Even if this objective were achieved, which often it is not, what moral right has the hunter to dictate the fate of all wildlife

to serve his specific form of sport? For every man who enjoys shooting quail there is another who enjoys equally the sight of a soaring hawk or the evening hoot of an owl. For every deer hunter there is a mountain hiker for whom the track of a lion would be the high spot of a summer's adventure. Is there any valid reason why society must rob Peter to pay Paul? Should not game management imply the conservation of wildlife collectively to serve the interests of the whole public rather than merely those of the shooting public?

Thus on ethical as well as scientific grounds, uncompromising control of predatory animals is hard to justify. Perhaps in social maturity we will some day overcome the prejudice against our ancestral enemies, the beasts of prey, and find that we can live better with them than without them. Actually there is considerable evidence that such a change of view is occurring in this country, albeit slowly. The old-fashioned jay and crow shoots in the name of game conservation, are rather out of style. Sportsmen's clubs are becoming more interested in preserving game habitat and are less inclined to offer prizes for the largest number of hawk legs or coyote ears. State game departments are expanding staffs of biologists and managers but not of trappers. These shifts of emphasis are dictated by management results more than by ethical considerations but they pave the way for the latter.

Paul Errington, one of the most respected authorities on predation, sums up the matter this way: "Writing as a hunter, I would say that sport purchased at disproportionate cost to other outdoor values is not worth having. Wildlife management will be found very much wanting if it fails to safeguard any but the popular game species."

The Sierra Hermit Thrush

The Lord must have been in mellow mood
 As He created the birds,
 Humming, perhaps, a whimsey tune
 Under His breath as He fashioned them.
 The hermit thrush caught a vagrant impress
 Of that divine motif
 That he can never quite recapture.
 That's why he hides away deep in the woods
 To practice—and practice—his pixie song,
 Seeking with patience to weave Eolian notes
 Once more into that half-remembered,
 Celestial melody.

—LOYE MILLER

The Building of Camp Denali

By GINNY HILL WOOD

IT ALL STARTED in the fall of 1951 when Celia Hunter came down from Fairbanks to visit Woody and me at McKinley Park. Woody was a ranger there then. That week end we flew our Cessna 170 out to the airstrip at Kantishna, a collection of old cabins and caches and one old-timer living there the year around—all that was left of a once bustling gold-mining camp of the early 1900's. Leaving the "Snow Goose" tied down on the field, we shouldered our rucksacks and set out to explore the surrounding country.

McKinley Park cannot be reached by highway—at least not for a few more years—but a 93-mile dirt road starts at the railroad station near park headquarters and runs the length of the park to Kantishna, just outside the north boundary. Eventually a road will cut across mountains and tundra to the Richardson Highway, but now people and automobiles alike arrive by rail.

A mile and a half from Kantishna we left the road and began climbing up a ridge above Moose Creek. As we ascended, we gained a full panorama of the Alaska range, culminating in majestic Mount McKinley—or Denali, as the Indians call it—20,300 feet. Twenty-five miles distant, soaring in icy splendor from the tundra wastes, the mountains spread before us to the south—Brooks, Mather, Silverthrone, and dozens of unnamed peaks, all of which would be famous in their own right were they not dominated by the monarch McKinley.

A half hour's climbing from the road brought us to a plateau where the tundra cradled a small tarn whose waters reflected the glaciers of Denali. Except for a scattering of spruce flanking the pond, one would describe the ridge as barren—until he took another look at the color and variety of the tundra vegetation underfoot. Mosses, lichens, and assorted wildflowers peeked out from clumps of dwarf birch, wild cranberry or lingon, and blueberry bushes. Already the first fall frost had begun to turn the verdant carpet flamboyant. Below the ridge the terrain fell away abruptly to Moose Creek, actually a river. Three miles to the south a tip of Wonder Lake glistened between the gap in the hills. Through binoculars we watched herds of caribou grazing on the flats. A quarter of a mile behind us a spruce forest climbed up the mountain to timberline at 2,500 feet.

While we drank in the beauty of the subarctic scenery stretching before us, The Idea began to take form. Although we all favor keeping the wil-

derness unspoiled, we reflected on the irony of building a road through a wilderness, placing a luxury-type hostelry at its origin, and then providing no facilities or campsites for the rest of the 93 miles. The hotel then operated by the Alaska Railroad offered rooms with baths (a rarity in Alaska), a fine dining room, and a bar, but it was a hundred miles away from Mount McKinley, and twelve from the first point along the road from which the mountain can be seen. In the effort to provide physical comforts, the administrators lost sight of the fact that many people came to McKinley Park to see its glaciers, mountains, and wildlife. On the drawing boards was a similar hotel to be constructed near Wonder Lake which — although in full view of Mount McKinley — would specialize in attractions designed to isolate guests from the genuine delights of nature and its wildlife rather than to bring them closer to them. It seemed easy to raise the interest of officialdom in these hotel plans, but difficult to find enthusiasm for developing less luxurious shelter or building campsites.

We mused on the trend current in Alaska. Awake to the tremendous tourist potential, promoters were keen to develop tourist attractions. But all plans called for making living in Alaska just as comfortable and convenient as in the States. "The public demands it," we were told. We believed, though, that there are those who seek experiences genuinely Alaskan, who want to feel that they become "sourdoughs" and catch the spirit of the bush country — even if it means living without running water and electric lights, and taking the mosquitoes with the scenery. And here was the ideal spot to try out our ideas. We could build our own resort!

Rapidly we developed the concept. We'd provide tent-cabins with wooden floors and sides, and canvas roofs with flies; there would be bunks and down sleeping bags with washable interliners; Yukon stoves for heat and Coleman stoves for cooking. We would place every unit so that it had a full view of the mountains, but we'd scatter them around the ridge so that each had space and privacy. We'd equip them for housekeeping and keep a stock of groceries for sale, so guests could economize on meals and live independently of set schedules.

We would make our tent-cabins clean and comfortable, but the emphasis would be on something other than comfort. These cabins would be merely shelter and a base from which to explore the surroundings. And what resources the area offers! Kantishna with its picturesque cabins and caches to photograph, and Johnny Bucia whose homestead is reached by a cable tram across Moose Creek (Johnny likes to tell tales of the old days and share his homemade beer); Wonder Lake with boating and mackinaw trout fishing; Moose Creek, full of arctic grayling. Caribou

hunting is good outside the park boundary in the fall season — but we wouldn't stress that; we'd rather develop big-game photography trips in this unique wildlife preserve boasting moose, grizzly bear, Dall mountain sheep, caribou in herds of thousands during migration, as well as fox, wolves, wolverine, lynx, marmot and other smaller animals, and nesting places of scores of rare and familiar birds.

Hiking? Well, there weren't many trails — just one down to Moose Creek and McKinley Fork patrol cabins, but people would come to thrill at hiking over the trailless tundra and fording the glacier streams — that is, if they wore shoepacs or other such footwear. And mountain climbers would have enough virgin territory to keep them busy for years — if they were rugged enough to pack across the tundra up to the glaciers which begin at 6,000 feet.

Of course there would be problems. Lumber was very expensive in Alaska. All supplies and materials would have to be hauled out from the railroad, and freight rates were high. We'd have to build some sort of a road up to camp. And our season would be short — three months at most. Getting the land, though, was simple — we could stake up to 80 acres on a business-site permit under the homestead act, as we were just over the park boundary. Celia decided to go ahead and claim the land and make a start. Woody at that time still thought he could best serve the public by staying with the Park Service, but we could help Celia on weekends.

And so our venture was begun. Before the snow closed the road that fall, we were able to cut and haul down timbers for two tent foundations, have a miner bulldoze a road within 400 yards of our campsite before he took his equipment out of the park for the season, and build a cache in which to store our tools and a tent. All winter we stockpiled equipment that Celia bought and sent down to us from Fairbanks: tents, stoves, beds and mattresses, sleeping bags, and a mountainous supply of miscellany, which we cached like pack rats in empty rooms and warehouse corners at park headquarters. The lumber arrived in the spring while Woody was out on a two-week patrol with the dog team, and it was up to me to get it off the flatcar and stacked for drying.

Then Woody was ordered to Katmai National Monument, where he had been a ranger before. We had to make the decision whether to leave the Park Service or leave McKinley Park. Our hearts were in McKinley. Perhaps on his own Woody could do more for the park than as a ranger. Our project was a gamble — but we'd take it. We moved out of our comfortable place at park headquarters in May and set up housekeeping in a tent while we waited for the road to open. Meanwhile, Woody set to work

making rustic furniture for the tent-cabins. On June 1 Celia came down to be with us, then came Ted Lachelt, a wildlife student at the University of Alaska who intended to build a cabin above our camp from which to make a study of the wolverine during the winter. Don Rehbein, fresh from a season as tow operator on Signal Hill at Donner Summit, popped in to offer his help for a short time before taking a job in Anchorage.

The road opened June 12, the latest date on record. Celia and I arrived at Camp Denali, as we now called it, right behind the snow plow with the jeep station wagon jammed with supplies. Don and Woody followed next day with our military-type jeep and the trailer loaded with lumber. Ted had already hiked in ahead of the plows to set up one tent. For a few days we were able to drive the four-wheel-drive jeep up over our bulldozed road and beyond over the tundra, but as the frost came out of the ground even the indomitable jeep bogged down. We resorted to backpacking. The boys devised a way for hauling lumber in teams of two by carrying several lengths with the planks tucked under their rucksack shoulder straps. The groceries arrived and we lugged them up the ridge a case or two at a time. Woody and Don put up the first tent-cabin in one day, despite frequent stops for debates on just how it should be constructed.

Les Viereck, also a wildlife student, arrived to lend a hand until the Fish and Wildlife Service could fly him over to Castle Rocks, 60 miles west, where he would do research on the marten.

Daylight lasts for 24 hours in June, and we were usually hammering and sawing just as hard at midnight as at noon. Trip after trip had to be made back to the railroad with the jeeps for more equipment. On June 19 we had all just tumbled into bed exhausted at 1 a.m. when a plane buzzed low over camp, signaling us to come down to the airfield to pick up customers. We moved the boys into pup tents while we readied their quarters for our first guests. The newcomers were three girls from Juneau who, far from being dismayed at our primitive accommodations, relished the whole setup. Celia fired up a stove to prepare them a meal, and Woody and Les spent the rest of the night making an outhouse to go over the hole we had just dug. We were in business!

A few days later, while we were eating supper, a weary, bearded figure stumbled into the mess tent. It was Phil Bettler. He, Dick and Mary Houston, and Fritz Lippmann (all Sierra Club members), together with several Fairbanks climbers, had started packing in toward Mount McKinley five days before to tackle the mountain from the west side. Over a plate of hot food, which he attacked eagerly, Phil related his sad tale. Sixty miles out from Wonder Lake their party had lost a pack horse in a

rain-swollen stream. Down the river on the drowned beast had gone the climbing equipment and grub necessary for the expedition to continue. Phil and the packer had ridden night and day without food or rest, plagued by mosquitoes and rainstorms, back to Wonder Lake. Would we fly him to Fairbanks so he could replace his supplies? We thought of the work we had to do and what the absence of even one hand would mean.

"I'll gladly pay for the flying time," Phil urged.

"How long will it take?" we asked.

"Three or four days probably."

"Make it twenty-four hours, and I'll take you," Celia countered.

Phil accepted the challenge and they flew off in the "Snow Goose" for Fairbanks. A day later they returned with all the items he needed.

By mid-June we had erected four 10 by 12 housekeeping tent-cabins and a 14 by 16 lodge-tent. I think it was the influx of climbing expeditions—there were six in all, including two Mexican groups, who descended upon us in various stages of starvation—that convinced us of the need for even cheaper and less luxurious accommodations. So we pitched plain white wall tents on the ground, equipped them with Yukon stoves, beds and mattresses, and offered them for a dollar a bed per night. For every paying guest we had another, who hiked or hitchhiked in, offering labor in exchange for shelter from the elements. Sierra Club members Virginia McKay, Ruth Westfield, and Barbara McDonald "did time" on our wood-pile and road. Joan Hessler, who arrived in a hearse with the Harvard Mountaineers (she had bought the tires for the rig in exchange for her transportation) spent a month working for board and room while she waited for the boys to get down off the mountain. Even our paying guests pitched in. Herb and Lois Crisler, filming wildlife for Walt Disney, never came by our lumber pile at the head of our road without toting up a few planks. Dick and Jean Collins, CAA radio operators at Lake Minchumina 50 miles to the north, often came over in their seaplane to help us.

When the snow line started creeping down the mountain we began building an aluminum warehouse in which to store all our equipment for the winter. Hardly was it completed before winter struck with full force. Woody had flown to Fairbanks September 3 and I had gone into headquarters to take possession of Jumbo, a surplus 1935 truck for which we had been high bidders. A cold rain was falling when I started back to Camp Denali with the truck. At Savage River the rain had turned to snow, and by the time I wheeled Jumbo over Stony Pass, drifts were building across the road. I found Celia with Dick and Jean Collins hurriedly dismantling the camp, the last guests having scurried back to park head-

quarters before the passes closed. By afternoon Camp Denali was stored in the warehouse, leaving only a skeleton of tent frames. Celia flew out with the Collinses and I started back with Jeoper toward the railroad station. Thirty miles out I was turned back by snowdrifts. It was four days later when the plows broke through the drifts and I could drive out.

Thus ended the first season for Camp Denali. Almost a hundred persons had signed our guest book. They had arrived by car, plane, foot, and the erratic railroad bus. We even had a visitor on horseback, another on a bulldozer, and two by helicopter. We had demonstrated to our own satisfaction that Camp Denali filled a need, and we could prepare through the winter for several more tent-cabins, and for the start of camping trips by jeep through the park.

We can't tell now what coming seasons will bring, but we can be sure of hard work, fun, friendships, and the knowledge that we are helping appreciative visitors to enjoy the park.

Challenge

He has not seen a mountain, who can dwell
Content within its shadow till he dies.

A man who sees a mountain, though he pause,
Continually scales it with his eyes;
And all his life lives fissured till he joins
His vision where the summit cuts the skies.

But he who seeks a mountain on a map
And plans reconnaissance before the rains
Carries the granite peaks within his heart.
And glaciers course like fire in his veins.

—AILEEN R. JAFFA



Wilderness Lakes

ALPINE LAKES tell where ancient glaciers took their steps down through the High Sierra sky-land—lakes of many moods. Mount Whitney was lost in the smoke of a clearing thunderstorm when sunset light broke through at Timberline Lake. Cedric Wright was ready. The right moment came, too, at seven other High Sierra lakes, from northern Sequoia National Park to the Tuolumne Meadows region of Yosemite. Three photographers make us wish we were there.

Photographs by

PHILIP HYDE, WILLIAM MENKEN, AND CEDRIC WRIGHT



HIGH ON THE KERN SOME SHORES SEEM BARREN

Cedric Wright



NOT SO A MILE OR TWO WEST

Cedric Wright



UNDER HARRISON PASS, ONE OF THE SIERRA'S MOST EXQUISITE LAKES

Philip Hyde



AND NEAR KEARSARGE, A LAKE WITH NO NAME

Philip Hyde



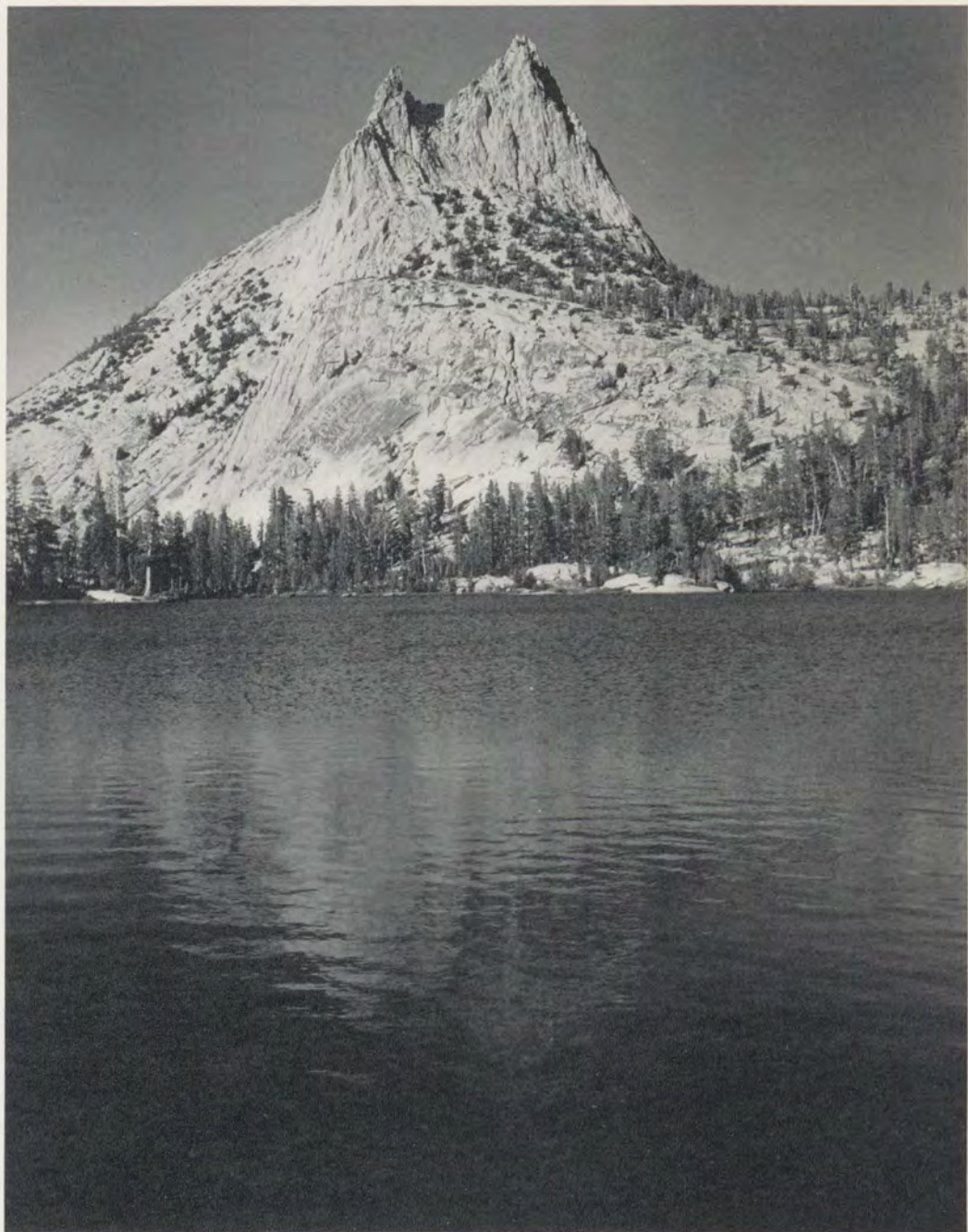
BULLFROG IS ONE OF THE MOST FAMOUS OF ALL

Philip Hyde



BUT FEW EVER SEE LOWER CATHEDRAL LAKE

William Menken



CATHEDRAL LAKE AND PEAK, YOSEMITE

William Menken

The Spiritual Values of the Wilderness

By FATHER JOHN S. DURYEA

IN THE STRUGGLE to protect the remaining areas of American wilderness from destructive exploitation, we are compelled to employ the practical techniques of political and economic argument. But it would certainly be shortsighted as well as dishonest if those of us who treasure the spiritual, esthetic, and moral values of the wilderness did not present them, for all the world to see, as our real motives for conservation. Their force was attested by the length and liveliness of the discussions held on this subject during the Wilderness Conference of 1953.

Among wilderness lovers there seem to be two main points of emphasis: the sacred glory of the untouched wilderness itself, totally isolated from man; and the value of the wilderness as a stimulus to man's higher nature. There is conflict here, for man cannot benefit from the wilds if he does not visit them, and yet as soon as he arrives he begins to change the environment. It is my thesis that these two values—nature and man—are not necessarily contradictory. They appear so only because of man's perversity. It is his habitually destructive behavior that creates the demand for his total exclusion.

I have no quarrel with those who see in nature's power and beauty some absolute value, independent of man's enjoyment. For I see nature as a finite expression of infinite God. Nature is not self-explanatory. It is not a Personality, endowed with its own inalienable rights. It is the mysterious outpouring of God's infinite wisdom and love; and as such it cannot fail to reproduce some of His glory. Our problem arises with man, for he too is a part of this admirable creation. He should not be considered an intruder, a blot upon the universe. Rather, as the most intelligent creature discovered by science, he should be the finest mirror of the Divinity. To admire nature and omit man is to leave the keystone from the arch.

I believe that it is part of man's destiny or vocation to interpret and articulate the unconscious worship of the nonintellectual creation. Man has at his disposal the arts of music, poetry, painting, and sculpture with which to express nature's orientation to its Maker. Our present problem is whether man steps out of his proper role when he extends this activity into the constructive arts which change the face of the world. There seems no logical reason for saying that he does; and indeed any impartial judge must admit that great buildings, bridges, and dams rank at times with the greatest works of art, and do truly "show forth the glory of God."

Where then can we find justification for preserving some areas against human alteration? Not in any peculiar right or privilege bestowed by God on certain regions. But in the fact that man should use the various resources of the world according to their highest value. Man's fault does not lie in his innate tendency to use and to alter the world, but in his failure to do so in the right ways and places and times. Bad motives, which serve only the selfish interests of certain individuals, and a lack of proportion with respect to the highest values of different resources have so often vitiated man's effect upon nature that we are inclined to think that all human intervention is damaging. It is the proper task of human reason, devoid of self-interest, to estimate the uses to which different areas should be put; where multiple use is possible, it is certainly good, but where the highest value of a region lies in its sheer beauty or its scientific interest, these elements should be preserved inviolate.

One of the hotly debated questions among wilderness lovers is whether a true wilderness can be managed at all without destroying its distinctive character. Are fire-protective measures, insect control, and perhaps the artificial maintenance of a scenic meadow desirable or permissible? Here again we must employ the concept of man as a manager of the world, appointed by the Creator to express its various qualities in appropriate ways. If beauty is estimated to be the ultimate resource in this area, then such management as above cited would be acceptable. If on the other hand a scientific study of natural forces is being set as the prime value, any management at all is inappropriate. The present laws which give mining a priority over any other value are clearly not in accord with our basic thesis, since their origin lies in the selfish individualism of the last century.

From this discussion of man's effect on the wilderness, let us proceed to a consideration of its effect on man. Here we cannot be so theoretical. It is a highly personal and subjective matter.

The first such effect is that of esthetic delight. This is not all a matter of beauty; nor does it depend on objective standards of remoteness, hardship, or lack of human presence. It seems to be a composite of past associations and present attitudes. To some a weekend at a public camp is the acme of wildness; to others a pack trip into the High Sierra is too familiar an experience to arouse any awareness of isolation. But regardless of its subjective variations, there is a real thing here which those who have known it prize highly—an enriching experience which never ceases to affect our consciousness.

Perhaps of more significance is the character formation attributable to wilderness life. But we must not drift into the error of thinking that such

experience necessarily reforms or ennobles the human spirit. Unprepared by moral and religious motivation to appreciate his relationship to nature, man seems all too prone to assume a selfish and predatory attitude toward both the material resources around him and his fellow man. This is exceedingly obvious in the history of the "wild west" and its colorful desperadoes. Courage and resourcefulness these men had, but other virtues seemed to be lacking. However, with proper training in basic ethics, man can find in wilderness living a stimulus to the development of a well-rounded character.

Wilderness creates an environment hard to find in this modern world—one of quiet, leisure, and freedom from competition. A poorly adjusted person cannot profit from these conditions; but for others they provide a welcome opportunity for reflection and creative thought, as well as artistic activity. The mountains and deserts also give their visitors the chance for exploration, scientific study, and the development of new living techniques. The specialization and standardization of modern living have robbed us of the self-reliance and resourcefulness which characterized earlier American generations. In the wilderness we may recover some of that independence of spirit. Even in human relations, something new is experienced in the wilderness. Every person becomes an individual, not part of a crowd, and every meeting is an adventure.

There is one more effect upon man which I wish to mention. It is the growth of reverence, created by setting aside as inviolate some part of the world's endowments. Primitive peoples manifest the need of this reverence by the taboos they set up concerning certain places. The offering of sacrifices was fundamental to Judaism. Christian practices of self-denial demonstrate the need of man to discipline his possessiveness. Apparently we are so prone to feel that we own the world, that we must do something to remind ourselves that we do not. I believe that the creation of primitive areas in which man curbs his talent for dominating the earth is good and that the spiritual enrichment resulting from this sacrifice far outweighs whatever material loss there may be.

Return to the Alps

By PETER FABRIZIUS

I HAD NOT seen the Alps for fifteen years.

When I was four years old my father rolled my jacket, my wind-breaker, and my lunch in a bundle and stuffed them into a tiny rucksack which, from then on, I was to carry myself when we hiked in the Vienna Woods. When I was five I got my first Lederhosen to take the place of my short linen pants. When I was six my father took a trip to a mountain in Tirol, which was six times as high as the Kahlenberg of our Vienna Woods. He mailed me postcards which showed the snow-covered peak and the meadows with Alpenrosen, gentians, and Edelweiss that grew on that awe-inspiring mountain.

When I was seventeen I stood on that same Tirolean mountain with a heavy rucksack, a pair of Lederhosen greasy from years of hiking in the Alps, a sprig of Alpenrosen pinned to my jacket. A dirndl-skirted girl sat beside, barefoot, her hands clasped around her knees. The grass of the mountain meadow was short and mossy and had the feel of a bearskin. With sun-flushed faces we looked toward the surrounding peaks, breathing the cold, fresh air.

When I was eighteen I hitchhiked to Switzerland heading for the Matterhorn, which for years I had longed to see. On the way a motorist offered me a ride to the Dolomites, a temptation I could not resist. So I allowed myself to get sidetracked, trusting I would get to the Matterhorn another time. I did—twenty-five years later.

When I had made my home in California and the years passed, the memory of Austria faded—except for the Alps. I made trips in many lands, visiting many peers of the Alps—Canada's proud Rockies, Japan's venerable Fujiyama, California's magnificent Sierra. But although my Lederhosen were locked in a basement trunk, the memory of the Alps lived on.

Occasionally, when I admitted I was thinking of the Alps—the Vienna Woods, Tirol, the Matterhorn—friends would tell me that I was just yearning for bygone youth. Many a Sunday I drove a few hours in search of a small green patch for a family picnic—a patch, that is, with grass grown naturally, not coaxed into existence by a sprinkler system in a public park. I thought about the lush Almen, the pastures of the Alps. They became a never-land of green.

And now, in this summer of 1953, I was looking straight at them. For

three hours the Arlberg Express was speeding along in this blessed land as I stood by the window drinking in the changing scene.

Mine was to be a common enough experience—seeing old places again. I had decided to live, for once and for a short time, a life given completely to the elementary joys that come from natural beauty, sunshine, trees, undisturbed by as much as a newspaper. So often in years past had I heard people say, when they talked about the anxieties and responsibilities of daily life, how wonderful it would be if sometime they could “forget it all.” Really doing just that was the only uncommon thing about my trip.

As I stood by the train window I realized that although I had remembered the grass, I had forgotten the flowers. The train followed a green lane dotted with millions of buttercups and foxgloves and larkspurs and snapdragons and wild pansies and bellflowers and cornflowers and red poppies and daisies and many others whose English names I didn't know. Hour after hour these welcoming flowers would be with us in a never ending stream, and I affectionately watched them as we rode along. Weeks later, when I was up in those mountains that were now visible in the distance, I would come across people who asked my why I had picked weeds along with my flowers. I did not explain that these were not weeds to me, but friends whom I had not seen for a long time.

The mountains narrowly squeezed the flowery lane between them. We rode in a valley between the peaks. They had snowy caps, and from them wild foaming brooks tumbled down. You thought you could almost feel, just by sight, how cold they were.

The green lane was paralleled by a country road. We passed a number of Leiterwagen—horse-drawn wagons with racks. Hay was stacked high, and kerchiefed peasant women sitting on top waved to the train. Gabled wooden houses with begonia-decorated carved balconies appeared and disappeared. No billboard spoiled the scenery.

As we approached Vienna, I greeted every familiar hill of the Vienna Woods. Here was the one where we had our boy-scout headquarters in the quarry; here the one where you could find shell fossils; here the one where we bandaged Lotte's leg when she got caught in rusty barbed wire. I knew I was not going to visit these hills—they were in the Soviet zone, and we were allowed merely to pass through it, not to get off the train.

Eight hours I stood by the open window with wind and sun beating down on my face. When we arrived in Vienna I had as much of a tan as if I had already spent a week in the mountains.

Before I had my suitcase unpacked in the morning, I was on my way to the Kahlenberg. The 760-mile range of the Alps begins in Vienna; here

are the foothills that rise to those heights in Tirol and Switzerland and Italy and France. The Kahlenberg is the first rung of the ladder that makes up the Alps. It is only 1,400 feet high and still within the metropolitan limits of Vienna itself, hence within that internationalized island that is surrounded by the Soviet occupation zone.

Beneath us lay the city of Vienna. To the left, the Danube with the bridges restored except one, still gaping, a reminder of the violent days of 1945; to the right, the soft rolling hills of the Kobenzl; in front of us, slightly below, the vineyards of Sievering and Grinzing, with a sweep, sweetness, and music that made you understand the inspiration of Schubert and Mozart; in the distance, hazy outlines of the Hungarian hills.

As the shadows grew longer I slowly walked up to the Sofienalpe, a neighboring hill. A playground for Vienna's Sunday hikers, it was today quiet and peaceful and infinitely lovely. The beeches were tall and slender, their nodding crowns forming arches through which you could walk. There was nobody around. The parting sun shot horizontal beams of light through the trees, outlining them as dark silhouettes. This place was a symbol of my childhood; it had determined much of my standards of beauty. I had been here so many times—when I was happy and when I thought I was not, when I felt on top of the world and when my boyish heart was broken. I walked among the trees and between little stumps from which new branches had grown. Last year's fallen leaves formed a soft cover on the ground. Never before had I noticed the delicate fragrance of this place; I had always taken it for granted.

I picked a couple of beech leaves to be taken to America. As I walked down several twisting trails in the darkness I did not realize until I reached the bottom of the hills an hour later that not once had I lost my way . . .

From the Vienna Woods I followed the Alps westward into the lake world of the Salzkammergut. I had expected to find it spoiled in St. Wolfgang by tourists of the fashionable White Horse Inn type, and in Bad Ischl by international patients suffering real and imaginary ailments. But I found much of the old pace of life. A bumpety toy train took me from Ischl to Salzburg—a distance about the same as from the Bay area to Sacramento. An old bearded peasant got on at one of the stops and was greeted by a young woman in the car.

"Where d'you come from?" asked the man.

"From Ischl."

"Ah—Ischl! Aren't you enterprising. I won't get there in *my* lifetime any more. I was there once, when the old Kaiser still lived."

The mountains of the Salzkammergut were rich with memories for me—Dachstein, Traunstein, Totes Gebirge. But they still averaged no more than 5,000 feet, and I had already caught the fever for the higher peaks. The glaciers and the Almen of Tirol were beckoning.

I followed the chain of the Alps to Innsbruck, Tirol's capital. At Kitzbühel the bizarre Wilder Kaiser appeared. The train was full of youthful mountaineers. Many had to stand up, and I was among them. But I didn't mind. I wore my old Lederhosen which I had exhumed from their California basement grave and taken along; I felt young, forgetting the years that had passed, as my eyes rested with pleasure upon a young dirndl of eighteen or so who sat next to where I was standing. She returned my glance, got up and offered me her seat. That took me down a peg.

The Stubai Valley and the Oetz Valley are two of several parallel Tirolean mountain valleys that run each at a right angle to the Inn River, the main tributary of the Danube. These Tirolean valleys are not connected with each other; if you want to cross from one to the other you have to follow the first down to the Inn, then follow the Inn until you reach the mouth of the second one, then go up. Otherwise you can cross from one valley to the other only by climbing the intervening mountains up one side and down the other.

I did that. Joining a small group of tourists, I took several days to cross from the Stubai Valley over a 10,000-foot peak into the Oetz Valley. It took us one day to ascend leisurely to a mountain hut which was built at the edge of a glacier. We had decided to stay in that hut overnight, then cross the ice-bound top on the second day. We planned to spend the following night in hut number two, built at the opposite side of the glacier, beyond the top, on the way down to the Oetz Valley.

Perhaps it is absurd to acknowledge that there were few hours I have ever enjoyed as much as the ascent to the first hut while rain was falling. It wasn't a downpour, but a refreshing spray, which bothered none of the company in their watertight boots and Loden cloaks. I had brought a poncho, which had rendered good service many times in the Sierra and was duly admired as something rare in the Alps.

The fine rain added to the feeling of freshness from dozens of cold brooks that came down from the glacier we would be crossing tomorrow. Everything around was green and rich and growing abundantly. It was here that I found the first gentian—that deep blue single bell that has become the symbol of the Alps, sharing the affection of mountain climbers only with Edelweiss and Alpenrosen. There are several varieties of

gentian. The one we found was stemless and had a metallic luster inside. We didn't pick it.

When we arrived in the Alpine Club hut we found Schorsch and Willy, two German students, talking with the hostess. These huts are usually owned by the tourist clubs and leased to hostesses.

The woman was cooking noodles. "How much is a helping of those?" asked Schorsch. The hostess looked him over. "If you're short I'll let you eat your fill for 4 schillings." That's about 17 cents. He reflected a moment, then pointed to a pot in which rice was boiling. "We've still some rice left in our knapsack, uncooked. May we take a plateful of your rice here in trade for some of our own?" The woman nodded, and the two helped themselves.

We sat down, sharing a table with the students. The hostess was busy with the noodles, the rice, and the Kaiserschmarrn—scrambled pancakes—which we had ordered. We heard her husband chopping wood outside. A flock of well-behaved children played in one corner of the room. Its center was taken up by the huge wood stove; it had a rail all around on which the woolen socks of the students were hanging to dry; several pairs of hobnailed boots were close against the stove for the same reason. It was dark outside. A bowl of Alpenrosen stood in the middle of the table which was illuminated by a kerosene lamp.

Our guide, a Stubai Valley native, roused us from our bunks at 4 A.M. the next day. We poured a little cold water from the china pitcher in the basin and dipped our fingertips into it, going through the motions of a morning wash. It was very cold, and we didn't thaw out until we got to the warm kitchen and filled up for the trip.

As we started across the glacier just beyond the hut, the snow was crisp. We took our time, patiently putting one foot in front of the other. After a couple of hours we had left every bit of green and soil behind us. This was the zone of eternal snow. It was an unreal world, with the reflection of light from the snow hitting our eyes despite our dark glasses and despite the fact that the sun was hiding. We walked in single file, the guide ahead carrying rope and ice axe. All around, snow-covered mountains loomed high above us, as we slowly crawled to the top like black beetles.

We reached the summit at noon. It gave us a superb view back into the Stubai Valley whence we had come, and ahead into the Oetz Valley where we were bound. The glacier on which we stood reached quite a way down into the second valley. Where the ice ended we could see hut number two, our goal for the day.

There was a snow-free spot on top, perhaps swept clean by the wind

that was usually blowing over the crest. When we arrived, the sun came out, and we took our shirts and shoes off. Some fine small flowers, like strawberry blossoms, grew here. "Gamskresse," said the guide—plants eaten by chamois.

We spent half the afternoon at the top. We were in no hurry. As we lay there, at peace with a tranquil world, we were flanked by two chains, the Stubai Alps on one side, the Oetz-Valley Alps on the other—summit after summit as far as the eye could see. The row of peaks continued endlessly as they accompanied us into sleep.

A short descent in the late afternoon took us to the second hut, where we stayed for the night. Here, we were about a third of the way down into the Oetz Valley. The next morning we continued our descent under our own power. The guide returned, having taken us safely across the glacier.

We were now in the lovely country of the Almen, the classical pastureland of the Alps. Soon after leaving the second hut we discovered a bright red spot in the near distance. It was the first shrub of Alpenrosen, an exciting, moving sight. As we descended further, more Alpenrosen appeared, at first in little islands, then in large patches, until finally the whole mountainside was covered with them, cascading down for miles.

After two hours the steep trail flattened out, allowing a small unbridled brook—which had issued from the glacier and had followed us all the way down—to overflow its shallow banks, irrigate the surrounding meadow, and turn this mountain valley into a flower garden. Below us lay the valley with millions of colored dots strewn in the pasture; left and right, the mountainsides enclosing the valley were covered with Alpenrosen in full bloom; at the foot of the valley, a white foaming stream wound its way; above us, the tops of the snow-covered Stubai Alps looked over one end of the valley, those of the Oetz-Valley Alps over the other; in the center, cuddled against a small knoll, was hut number three.

We were halfway down the Oetz Valley. Two of us decided to stay in the hut for a few days. The rest went on.

If the Lord is black for Negroes, paradise is green for Austrians. I closed my eyes and tried to remember how I had dreamed about some mountain Shangri-la as I had known it in my childhood. On my way to Europe I had prepared myself for some rough awakening when I should actually see the places I had probably glorified in memory. Reality, I had thought, can never catch up with dreams. Now I remembered how I had anticipated this moment: a velvet-thick meadow, a blue sky, sparkling air, a light cool breeze in the sunshine . . .

When I opened my eyes I saw that I had been all wrong. This place was

much more beautiful than I had dreamed. It was not just a bucolic painting; it lived, breathed, and was overflowing with the moisture of life. The sounds of the grass moving in the wind, of the insects, of the brook, were sweet and familiar. I moved over to the brook that came bounding over the rocks, stooped down, and took a long draft of cold water. I sat down on one of the boulders by the bank, dipped my toes in the spray, felt the soil with my hands. The impact of being a visitor in my native land hit me with full force.

I returned to the meadow. Its grass, as I lay down, half buried me. The flowers were at a level with my eyes, some looking down on me. It grew dark as I still lay there, conscious of the moment—conscious and grateful and happy in this hour of fulfillment and pause and unity with the world. I truly felt that, like Faust, I could “tell time to linger.”

Time did linger, forgotten for three timeless days. Then I returned to the world, descended to Sölden in the Oetz Valley, mostly walking bare-foot across the Almen. A few days later I was on my way to the Matterhorn.

I followed the Alps from Austria, across the incomparable Arlberg Pass, to Zürich and Lucerne. Like sentinels the mountains looked down as I crossed the Four-Canton Lake to Flüelen; they closed in on the cogwheel train to Göschenen; and they opened up in a wide view from the top of Furka Pass. Farther along the road I stopped at the Belvedere Hotel, 7,600 feet, built on a crag directly alongside the incredibly bright blue Rhone Glacier where you can see the melted ice trickling down into the valley to become the Rhone River.

I arrived in Zermatt, the Matterhorn town, at midnight and went directly to the hotel without seeing The Mountain. Zermatt offers a peculiar mixture of a fashionable tourist resort with palatial hotels and the original unsophisticated mountain village with ramshackle barns on the main street from which the goats are driven to pasture (through the center of town) every morning.

I was aroused by their bells the morning after my arrival and went to the balcony to see what this jingling was all about. As I looked out I stared the Matterhorn directly in the face. I hadn't thought of it just this moment and the surprise was overwhelming. There is no mountain on earth like the Matterhorn. Its celebrated pyramid towered over the picturesque town with its picture-book church steeple. The white edges of the snow-covered mountain were set off sharply against the deep blue sky. I could understand instantly the sphinx-like fascination that peak had for the early mountaineers. It has it still for me.

A puffing cogwheel train took me with a party of international tourists from Zermatt up to the Gornergrat from which one has a panoramic view of the Matterhorn and its surrounding giants. I shall not try to describe my feelings as I faced the spectacle from the Gornergrat.

There are people who see the Mona Lisa, listen to Bach, look at Michelangelo's Moses and still feel no more than respect. Up at the Gornergrat I found it hard to imagine that anybody, young or old, man or woman, American or Chinese, would not be stirred. Surely there cannot be many sights in the world that match it. This had been the way I felt when I first came upon the Grand Canyon; and like this, I suppose, one feels at first seeing the Himalayas from the south.

The physical setting is this: You stand on top of a high mountain—10,300 feet (3,130 meters)—on a platform which affords an unobstructed view all round. You are surrounded by a wreath of more than twenty "Viertausender"—mountains higher than 4,000 meters (13,000 feet). Every one of them has, like a symbol of its majesty, an ermine train, a glacier that flows down in a powerful yet graceful sweep. Many of the glaciers come together at the base of two or three of these mountains, forming medial moraines between them. The mountains carry names glittering in the history of mountaineering. Assembled here in a ring around you is Monte Rosa, the highest of all, 15,300 feet, half Swiss and half Italian; the mighty Lyskamm, 15,000 feet, the regal Breithorn, 13,800 feet, and many more. The Matterhorn, 14,870 feet, is not the highest, but it is by all odds the most arresting, and the *primus inter pares* in this illustrious company. It presents to the eye a main pyramid on which a small second pyramid, with a slightly tilted peak, seems superimposed; and it is this little extra twist that seemed to me the most telling characteristic of this peak.

As I hiked down during the afternoon, not taking the cogwheel train on the way back to Zermatt, the Matterhorn variously seemed to me like a sphinx, or like a rearing giant seal balancing an invisible ball on its nose, or like a watchdog. The last impression was especially strong, for the mountain seems to watch you all along the way as you descend; it peeks over the tops of the trees as you enter a forest, and it peers between the clouds when evening overtakes you. Sometimes the watchdog will growl when the storm blows the snow away from its nose in long horizontal streaks.

It was late when I got back to Zermatt. I had seen the Matterhorn—twenty-five years after I had been diverted from it by that hitchhiked ride to the Dolomites.

If Austria has the loveliest part of the Alps, and Switzerland the most

dramatic, France has the highest. It is only a short ride from Zermatt to Chamonix. And what the Gornergrat is to Zermatt, Le Brévent is to Chamonix. A daring two-section suspended cable car lifts you from the town to the dizzy heights of a mountainous viewing platform. The first section goes up from Chamonix along the side of that mountain to one of its peaks. From there, a second section will take you from this peak to a neighboring one, called Le Brévent, from which you get a magnificent view of Mont Blanc. In this peak-to-peak affair the cables are hanging free in the air, like a tightrope, and you sail along 300 feet above the highest crag beneath you.

This, then, was Mont Blanc, Zeus of the Alps, 15,800 feet high (4,800 meters), higher than any other mountain in Europe, more than a thousand feet higher than Mount Whitney. When I saw the gentle pure-white dome I realized why it was called the White Mountain. Unlike the Matterhorn, Mont Blanc does not stand by itself, but is part of a massif which it dominates—if the Matterhorn is a king among princes, Mont Blanc is a chairman in a directors' meeting. Grotesque needlelike crags form the neighboring spires—L'Aiguille du Midi, L'Aiguille du Plan, L'Aiguille Verte. Angry banners of fog and clouds whipped the tops. Like a huge white gnarled index finger squeezed into a narrow vertical furrow between dark green forests, the Mont Blanc glacier reached deep into the valley where were clearly to be seen the tiny dots of Chamonix houses.

With my eyes I followed the glacier back up again from where it came, to the top of venerable Mont Blanc. This was the end of my trail. If the Alps had started with Schubert in the Vienna Woods, here they ended with Beethoven. A dream only a few weeks ago, they had become reality—a real chain of mountains rather than a memory. Together with the countries they graced, these mountains were no longer a second world of the past, but had become a living experience, part of a unified world of the present.

The rest of the trip was long in miles, short in time. A few days in Basel, Geneva, and Paris, a brief stopover in New York. A week after I said good-bye to the Alps I said hello to the Sierra as I flew over it.

I am back again in California with the family, and the Lederhosen are again in that trunk in the basement. I cannot imagine that they will lie there for another fifteen years.

Hills of Home

By MARGARET THAL-LARSEN

A MAN'S own mountains will never cease to spell home. These are the scene of his first awakening to the wonder of mountains, of experience which could have occurred in any range but which, for him, did occur among his native peaks.

The memory of his own mountains does not fade, no matter how distant they may be. Consciously, the traveler will make his hills a standard of reference for all mountains that he ever sees. Unconsciously he will find their shadows and their light upon all the mountain ways he ever walks. If the home mountains are the Sierra, he may find himself, with some amusement, measuring the last climb on a legendary peak as three and a half times the Yosemite wall. The final scramble over a famed pass may, for him, be translated into twice the pull from Pate Valley to Rodgers Lake.

Perhaps, because of some inner perversity, one's absent hills will flash rich contrasts to the immediate scene. I have walked through wastes of snow while the mind conjured up the sparkling and blessedly warm stretches of granite between Tuolumne Meadows and Glen Aulin. In the velvet mossiness of the Olympic Peninsula, my thoughts have turned to the jewel-like rock and water clarity of Evolution Lake at dawn. The holy-city-whiteness of the peaks beyond Asulkan Pass in the Selkirks has been broken momentarily by a glimpse from the mind's eye of the brilliant reds and yellows to the south from Pinchot Pass.

The Sierra will also return to those who wander from them with messages of similarity. The delicate Soldanella rising from the snow in the Oetztaler Alps will remind the traveler that the crimson snow flowers must be clear along the Sunrise Trail. No one who has ever gazed south from Foresters Pass can stand at Testa Grigia looking down upon Breuil and believe that nature does not repeat herself, in part at least—just as there is a little of Lake Ediza in all the fairest of mountain lakes.

Gradually the perception grows upon the traveler that if he is at home in his own mountains, he is at home in all mountains. It is, perhaps, the very echoes from the hills of home which bring at length the feeling of at-homeness in the mountains of any land. Certain physical verities serve to enhance this feeling. The comparable life zones of the higher elevations present much the same guise no matter what the latitude. The Swiss marmot and forget-me-not will give the walker from California a greet-

ing from home, and patches of Alpenrosen will substitute for the arresting fragrance of the azaleas at Laurel Lake. Feet can grow as weary and breath as short on any pass on earth as on the haul over Elizabeth if the pack is too heavily loaded. The good companion of a long mountain evening becomes a friend to be remembered whether an office worker from Zürich, a hotel porter of Innsbruck, or a school teacher from Oakland.

There is one range, however, in which the visitor from afar is apt to feel himself not only "at home" but actually in his own hills. Despite the grip of one's own mountains and the love of native land, the Alps will irresistibly intrude themselves as hills of home upon anyone who comes to know them. Why among all the mountains of "other people" should the Alps grip the foreign traveler in a way akin to his native hills? How can these mountains come to be in a certain sense those other native hills of the traveler whether he come from the Highlands of Scotland, the Rockies of Canada or the Sierra of California?

Frequently I have heard visiting European climbers reply to questions from boosters of local peaks. The questions invariably involved a demand for comparison between the local scene and the Alps. The answer frequently and with polite ambiguity was some variant of the reflection that "there are no mountains like the Alps."

Why should this be so? There may be as many answers as there are foreign climbers in the Alps, but it seems to me that two aspects of this great chain of peaks must be considered in any appraisal of their uniqueness. The Alps may claim to be "the other hills of home" to all who love mountains simply because they are so beautiful and also because they have played so large a part in the story and legend of mountaineering.

Man first climbed for pleasure in the Alps and in that sense they are the home mountains of all for whom climbing is the greatest sport. The boy who begins his association with mountains by scrambling up some local Inspiration Point or Falcon's Roost will, if he continues to climb, become a part of a great company reaching back to the walls of Mont Blanc and the Matterhorn. Whether he realizes it or not, peaks which he will ascend at home will have already been judged and measured against some Alpine prototype; his will be thoughts and feelings, before he is done, first known to some climber at Chamonix or Zermatt.

Probably few mountain lovers, whatever their national origin, have looked upon the Alps without a feeling analogous to that which previously had been experienced only in some moment of pride and wonder for their own and native land.

I once stood upon the Petersgrat. The morning was intensely cold but

how cold I had not realized until a lashing wind at the summit brought the hitherto unconsciously endured discomfort into sharp focus. Suddenly, the magnificence before me began to penetrate and then to dispel the distressing numbness of both body and mind. Behind and to the left of us and now dwarfed into the insignificance which proximity can give even fine peaks were the Tschingelhorn and the Breithorn. Across and to the front rose a striking and until then to us unfamiliar mountain, the Bietschhorn.

Our Swiss companion said, "This is a sight to remember all your lives!" He pointed out that at this unusually clear and wonderful daybreak we were seeing far more than just the local ranges, and so we were. In the great array which stood there before us, the roll included the Weisshorn, Matterhorn, Mont Blanc, and many another famous peak. One writer has exclaimed that when he first saw the Alps he beheld his religion. It seemed to me, when my first great view of them had taken full effect, that I was beholding the apotheosis of my hills of home. Suddenly, the mind could store away, so that the eye of memory might forever recall, a vision of endless ranks of snow-clad giants marching to the very horizon where the insubstantial crystal of distant snow must give way to sky. There is only one other army of peaks which, in my memory, has ever marched in such majesty from the ground where I stood to the curve of earth—the Range of Light which on a summer's day gleams north from Whitney like a golden highway to glory.

The eye of memory can now see both a crystal as well as a golden mountainland when it recalls the hills of home. These hills of home, it seems, have merged and there are now not only the native mountains but also those other mountains which for many can come to be a second range of native peaks, even to one who was not reared among them.

Glacier Studies with a Camera

By A. E. HARRISON

SIERRA CLUB members have been interested in glaciers since the earliest days. John Muir and Joseph LeConte discovered the Lyell Glacier in 1872. Early issues of the *Sierra Club Bulletin* included stories by W. D. Johnson, G. K. Gilbert and J. N. LeConte, followed at a later date by the work of François E. Matthes. My interest in glacier studies was a result of Gilbert's recommendation in the 1904 *Sierra Club Bulletin* that we should record the changes in our glaciers with photographs from the same points in different years.

Comparative photographs are easy for anyone to make and understand. Another advantage of photographic records is that a correct interpretation of the data is possible at a later date, regardless of the fact that the significance of an observation may have been overlooked at the time the picture was taken. The report in the 1950 *Sierra Club Bulletin* entitled "Glaciers Then and Now" mentioned the growth of the Lyell Glacier between 1937 and 1949, but the significance of this observation was not recognized until a year later when "Are Our Glaciers Advancing?" was written.

Stereoscopic photographs offer the greatest advantages because they permit accurate mapping of the entire surface of a glacier as described by Walther Hofmann in the 1953 *Mountaineer* annual. Few people can afford the specialized equipment needed for this work, but they can utilize photography in two other ways which are almost equally important. First, they can take photographs of glaciers from the same points at approximately the same time in different years to show the changes that are taking place. Second, a photographic record of an area, not necessarily a glacier, showing the changes in snow conditions at a number of times during the same season is invaluable in estimating climatic conditions affecting the melting of glaciers. The importance of accurately dating the photographs should not be overlooked.

Both kinds of photographs are included in the collection on the next few pages. Many more pictures are needed to complete the story.



Glaciers — and a Camera

THE SUMMER of 1953 was favorable for the growth of glaciers, as is illustrated in this view on July 9, 1953. A late, cold spring delayed the melting season; in Yakima Park and on Mount Rainier in the distance, it is still winter.

For several years Arthur E. Harrison, an electrical engineer, has let scenes such as this spark his mountaineer's imagination. He has carefully photographed large glaciers, such as this one, and small glaciers, such as the Sierra bodies of test-tube value, and has meticulously compared his with photographs made years and decades ago. Many of those, as well as his, have appeared in the *Bulletin* before. They combine with others to show, in a stop-motion series, progressively more about the coming and going of a primary mountain-sculpturing force.



The Nisqually Glacier front is considered to be at the point where the river emerges at the lower left of the picture, although debris-covered ice extends down both sides of the canyon below this point. The advancing wave of active ice has passed the lava-capped rock to the left of the tree-covered ridge in the center of the picture and is beginning to recover this rock. The debris-covered ice below this rock is virtually motionless.

Mt. Baker and the Coleman Glacier in 1949. Only the tongue of ice in the middle of the glacier appeared to be active in 1949. The top of the cliff at the left of the ice tongue is bare rock. The feather-edged appearance of the ice is typical of stagnant ice and a retreating glacier. U. S. Geological Survey photo by Arthur Johnson.



The steep front and convex shape of the ice tongue of the Coleman Glacier on Mt. Baker are characteristic features of an advancing glacier. This view emphasizes the volume of ice involved in the advance which began about 1949. The tongue of new white ice is a hundred feet thick and several hundred feet long. The small inverted-V ridge across the stream at the left of the picture is a relic of stagnant ice left behind when the glacier was retreating.



Mt. Baker and the Coleman Glacier in 1953. The bare cliff in the 1949 view of the Coleman Glacier has been covered with black ice and large blocks are being pushed over the edge. The ice tongue has advanced several hundred feet into the canyon below. The ice at the front has become so thick that most of the glacier is hidden and only the top of Mt. Baker is visible.









Koip Peak, Kune Peak, and the Kuna Glacier

This glacier is noted for its almost perfect multiple moraine structure. The lower half of the glacier was bare ice, covered with a thin layer of new snow on September 3, 1953. A temporary lake had formed between the moraine and the glacier called "Koip Glacier" in the June 1950, *Sierra Club Bulletin*.

Mount Dana and Glacier Canyon

New snow from the storm on August 30, 1953, still clings to the higher rocks on September 1. The lake in the foreground is dammed by a series of moraines much older than the recent moraines in front of the glacier.

Mount Lyell, Mount Maclure and the Lyell Fork

This first distant view of the Lyell Glacier gave the impression of increased snow depth during the last two years. The low water level and lack of silt in the Lyell Fork implied a cool summer with less than the usual amount of melting.



Mount Dana and the Dana Glacier

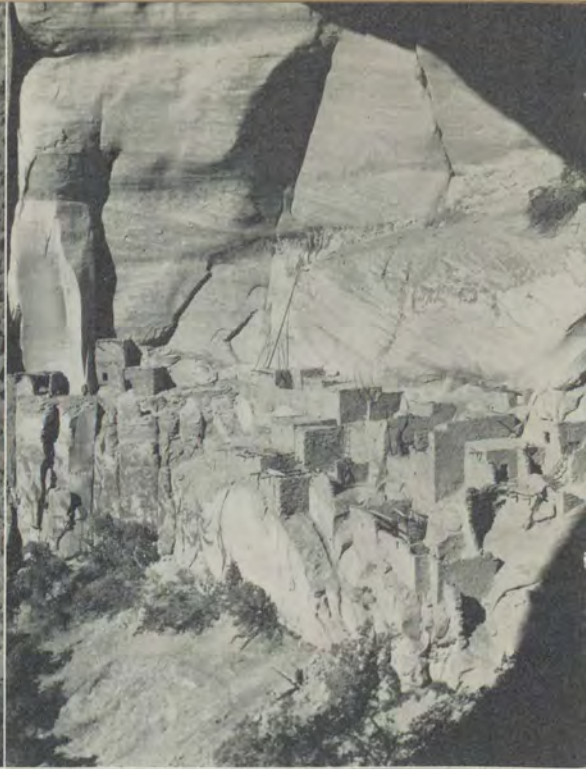
Compare with the 1949 photograph (June 1950, *SCB*). The ice in the chute is shallower, but new snowbanks indicate conditions favoring glacial growth.

Dana Glacier from the Dana Plateau

The snowbank at the low right of the glacier, between the moraine and exposed bedrock, has formed since 1949 and is about 20 feet thick. This and the snow around the pointed end of the moraine suggest that the entire surface of a small cirque glacier is an accumulation area during times of glacial growth.

Mount Lyell and the Lyell Glacier

This view of the Lyell Glacier on August 29, 1953, was taken from G. K. Gilbert's cairn built in 1903. (See June, 1950, *SCB* for views in 1903 and 1949.) The ice thickness has increased both above and below the icefall chute in the past two years, but there is less ice and snow in the chute. The glacier was covered with snow on this date, and new snow began to fall during the night.



Exploring Navajo Canyon Country

PHOTOGRAPHS BY CLIFFORD V. HEIMBUCHER

In remote and forbidding canyons of northern Arizona are many striking remains of the pueblos of an ancient people who vanished long before the discovery of America.

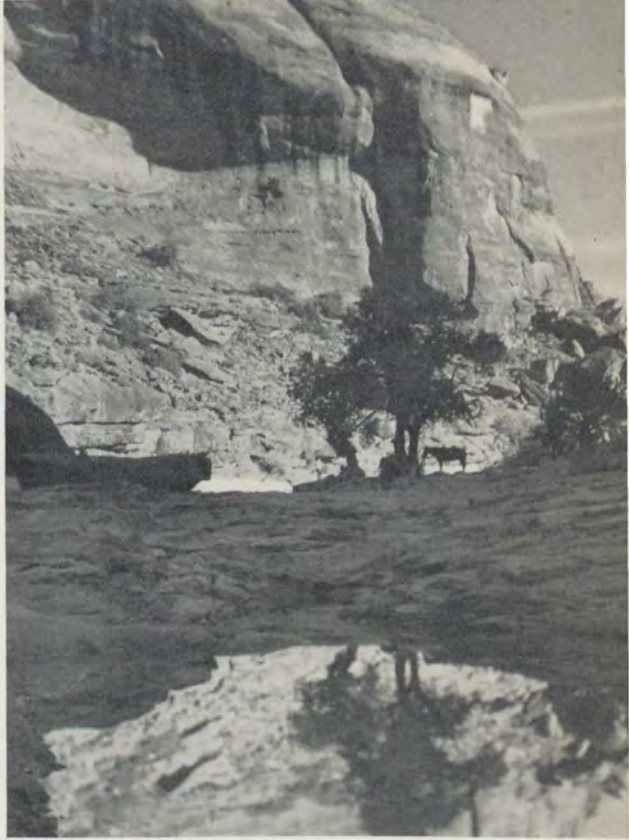
Facing page (clockwise):

A portion of an ancient village built on a high ledge in Navajo Canyon.

Betatakin, in neighboring Tsegi Canyon, is a well-known beautiful example of the Kayenta culture architecture.

Rocks were shaped with stone age tools.

The more easily built mud walls of the wattle type leave only skeletal remains.

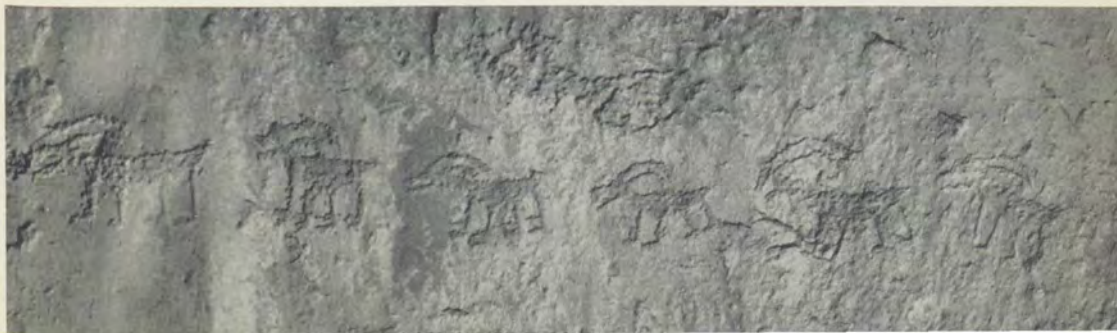


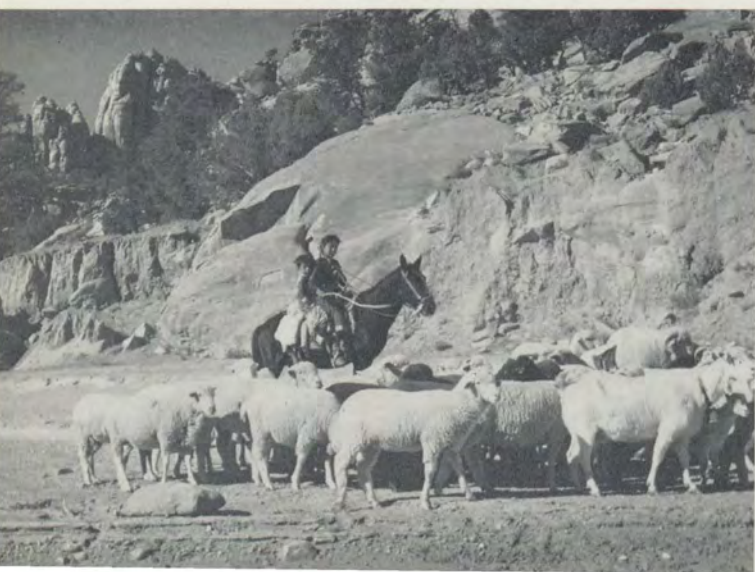
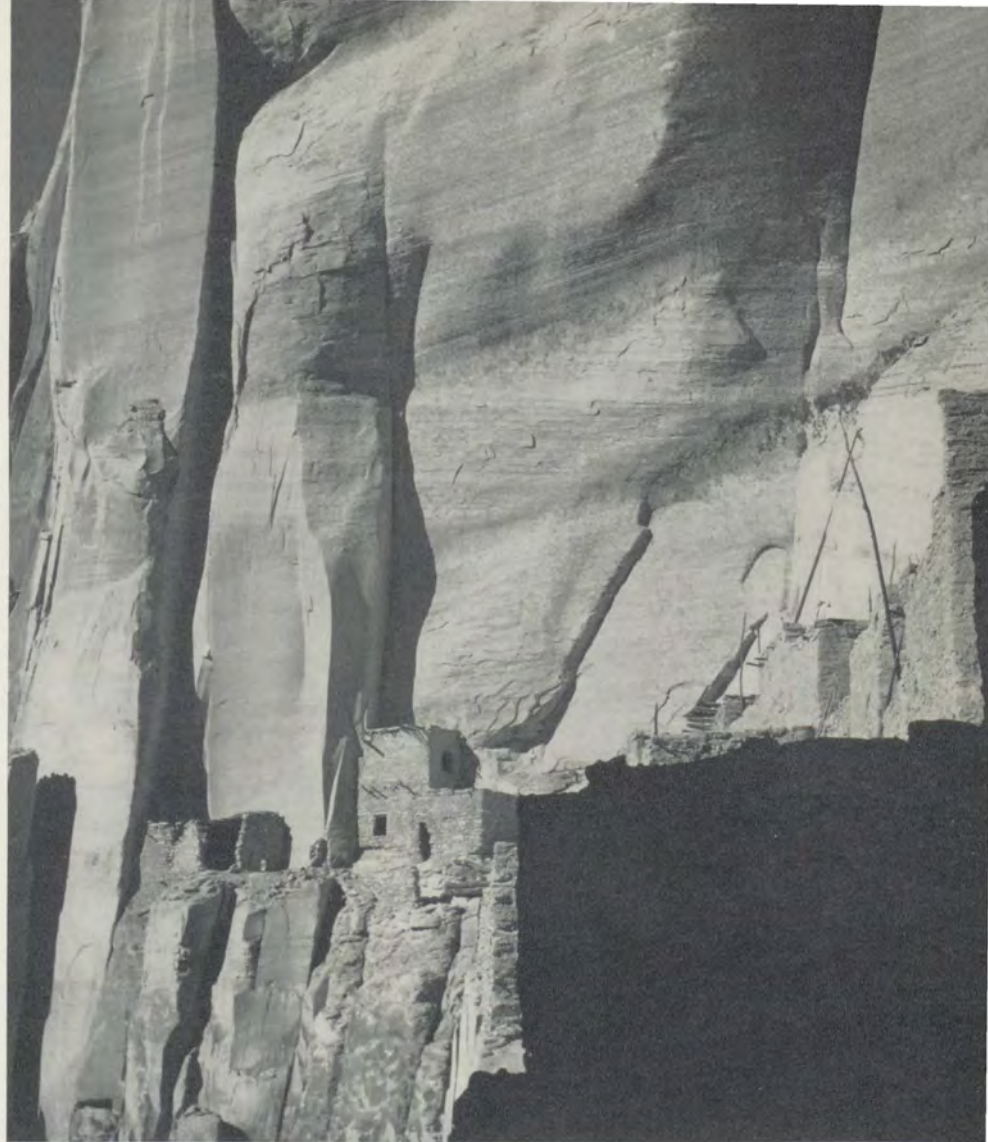
Campsite in the depths of Navajo Canyon.

The earthen paints of the early artists are still bright.



A procession of goats pecked into the rock wall greeted us at the entrance to Big Hole Ruin.





The Betatakin cave even contained a spring for the convenience of the apartment dwellers.

Navajo children take naturally to the saddle.

Exploring Navajo Canyon

By CLIFFORD V. HEIMBUCHER

IN NORTHERN Arizona is a great canyon, magnificently beautiful, yet so remote and so inhospitable that few have experienced the delight of traversing even a part of its gnarled maze. Indeed it appears that even among the Navajos who live near its rim only a surprisingly few are familiar with its depths. This is Navajo Canyon. It is a long rugged gorge with a great number of deeply eroded tributary canyons. The main canyon contains Navajo Creek, a small stream which contributes a heavy load of silt to the Colorado near the Arizona-Utah boundary in Glen Canyon between Lee's Ferry and the Crossing of the Fathers.

In October, 1953, eight of us, including two Navajos, made a limited exploration of a middle section of the main canyon and of some tributaries. The party consisted of Samuel B. Ballen of Dallas; Ephraim Crank (Tseginniyazhi-badaani); Charles de Y. Elkus, Jr. of San Francisco; Charles M. Gooding of Los Angeles; Paul Heyneman of Berkeley; Carl I. Wheat of Menlo Park; Buck Whitehat (Ch'ahlgaii); and myself.

We assembled at Flagstaff and drove to Navajo Mountain Trading Post, camping one night on the way in a beautiful serene piñon grove at the edge of one of the upper gorges of a Navajo Canyon tributary. The trading post is at the southeastern base of the lonely, massive, rounded, 10,416-foot peak for which it is named. Here we spent an afternoon becoming acquainted with our Navajo guides, and getting used to our horses. Later we visited with the children of the little Indian Service School and their devoted teacher, Elizabeth Eubanks.

We quickly developed a liking for our guide, Whitehat, a dignified, capable, sixty-year-old Navajo who had lived in the canyon as a youngster. As he spoke no English we communicated with him partly by signs and partly through the interpretations of Ephraim, a young Navajo who was not familiar with the country we wished to explore, but who handled the horses and mules very ably.

We told Whitehat that we wished to ascend Navajo Mountain the following day and then to descend into Navajo Canyon. He readily agreed to lead us up sacred "Naatsis'aan" (Mountain of the War God), but he was a little reluctant about the canyon trip, implying that the way was hard and there was nothing much there anyway.

The following night we slept on the commanding summit of Navajo Mountain, a large bubble-like mass, a laccolith. It was seen and described

by Father Escalante in 1776. Because of its isolation it is an impressive sight from all directions, with jagged multicolored sandstone cliffs at the base, dark ponderosa and lodgepole pine forests above, topped by a long narrow aspen- and juniper-covered plateau.

From a vantage point at the edge of our camp site we looked down 7,000 feet on that wonder of the world, Rainbow Bridge—"Nonnezoshi" to our Navajo friends—a thrilling sight. Several bends of the Colorado could be seen winding through its Glen Canyon chasm.

The following morning Whitehat led us through the summit forest to a point of rock on the northern side of the mountain where the majestic sweep of the view was overpowering in its scope and depth. Red man and white alike stood in silence for a moment to adjust eyes and senses to the flaming color and to the vast distances to the west, to the north, to the east. This was not like the soft silence of a Sierra Nevada summit inspiring quiet contemplation, but like a crashing thunderbolt commanding awe and realization of the heights to be achieved to be worthy of such joy.

To the northwest, eighty-five miles away, stood the towering cliffs of Bryce Canyon, beyond the long fingerlike Kaiparowits Plateau and the rocky gulch of the Escalante River. Directly to the north, a mere ten miles away and one and a quarter miles down, ran the San Juan to its meeting with the Colorado. In the distant north rose the peaks of the Henry Mountains. To the east, seemingly almost at our feet, lay Piute, Copper, and Nokai canyons, forming a glowing base for the shining face of Hoskinnini Mesa and the fantastic buttes of Monument Valley far beyond.

Leaving this splendor with great reluctance we hurried down through the vibrant aspen forest, past the small water seep half way down, known as the War God Spring, from which we had carried water to the top the day before, and returned to our camp at the trading post.

That night we discussed again our desire to enter Navajo Canyon the following day. Whitehat expressed concern at the speed at which we should have to travel to reach pueblo ruins. He also said that because of the need to carry feed for our horses we needed one more pack animal and none seemed available in the area.

Meanwhile, in conversation with Mrs. Eubanks, we learned that this night was the final one of a three-day squaw dance somewhere on the desert to the northeast, and that our friends, particularly young Ephraim, were a little despondent because their commitments to our party and lack of transportation prevented their attendance.

All of us had heard of squaw dances, but we had never been privileged to attend one. It is a Navajo ceremony combining religious, medical, and social features. When we diffidently but eagerly queried Ephraim as to whether we should be welcome, his reply was unequivocal. "Sure! You drive. I know where to go." He assured us that it was only a short distance and that we could easily make it in a station wagon. In a few minutes most of us had squeezed into the car and we were off across the desert.

Ephraim's "short easy drive" developed into a slow twelve-mile journey along wagon tracks in the soft sand, down into and up out of steep-sided rocky washes, and around rock ledges and outcroppings where even the wagon tracks disappeared completely. When we finally saw the fires of the Navajo encampment ahead, and I knew that with Ephraim at my side we had successfully completed this drive through the dark moonless night, I was convinced that radar is an utterly unnecessary invention as a direction finder or obstruction indicator. All that is required is one Navajo.

We found ourselves in the center of a group of several large open brush shelters in which small fires flickered. At one side of the camp area a large shelter could be dimly seen by the light of the fires and the stars. From that direction came the strains of a high-pitched chant sung by a number of men in a falsetto. Ephraim led us into another large shelter at the other side in which burned two smoldering fires ringed with cooking utensils and food sacks. Around the outer edge of the single circular room lay some eight or ten sleeping Navajos, all of whom seemed to be either old people or young children.

Outside again, Ephraim explained something about the ceremony to us, while we feasted our eyes on the splendor of the stars shining brightly in the absence of a moon, our ears on the unending chant, and enjoyed the pleasantly pungent fragrance of the juniper bough fires. He told us that this dance had been called to cure the illness of a man named Charlie who was not present. This was the final night of the three-day ceremony. The Indians had come out of the surrounding desert for many miles around to participate, bringing with them their babies, food, and cooking equipment.

We had been told that only men and unmarried girls participate in the dance, and that the girls choose their partners by grasping firmly an edge of the man's blanket or his sleeve and leading him into the dance circle. These dances are quite important affairs for the young girls for two reasons. Firstly, they are among the very few opportunities for women to participate in social or ceremonial activities. Secondly, because of the tribal prohibition of marriage within a clan, these dances provide a means

for the marriageable girls and youths of different clans not only to meet, but to meet under circumstances conducive to romance.

All this we knew, but we were totally unprepared for the size of the first girls to appear, and, to our great consternation, for our being the first men to be chosen before having an opportunity to observe and learn what was expected of us. The old women who had been sitting at the entrance to the shelter went inside and reappeared leading a number of very little girls, probably about five to seven years old. After some whispering and pushing by the women the girls, fairly quivering with fright, approached a few of us and, plucking at our jackets, led us into the center of the now brilliantly lighted area. The girls were either too frightened or too young to know what to do either, so for a few moments we waited in the center, when the chief medicine man, who was lying on the ground near the fire, motioned to us to start moving around in a circle. More girls appeared, other men were chosen, including Navajos whom we studiously mimicked, and soon we were all gaily shuffling along in a large circle, one arm around the girl, jogging up and down to the beat of the tom-toms and the rhythmic intonations of the singers. Although all standing together, the singers seemed to consist of two groups who sang alternately, sometimes accompanied by laughter which indicated that improvisations were being made. From time to time the pitch would change suddenly, usually preceded by a loud shout from the lead singer. When this happened all of the dancers would turn about and dance in the opposite direction.

Although it is the girl who initiates the dance, it is the man who terminates it by drawing the girl out of the circle and handing her a coin, the size of which varies in direct proportion to the size of the girl. As soon as one girl was dismissed another, slightly larger, would appear, pulling at a sleeve or jacket edge. Soon we were dancing with young maidens of about sixteen, resplendent in their velvet skirts and bright blouses, and heavily weighted with silver, turquoise, and coral jewelry, necklaces, bracelets, rings and earrings.

Having in mind the precarious drive back to camp and our hopes for an early start the next day, we took our leave at the height of the dance activities, despite the protestations of the medicine man and the singers who urged us to stay. On the return trip Ephraim gave us the happy news that he had successfully negotiated for the hire of a pack horse to be delivered to our camp in the morning.

Leaving the trading post the following day we traversed the plateau just south of Navajo Mountain some eight miles in a southwesterly direction to reach the rim of a subsidiary arm of the Navajo Canyon labyrinth.

From this point a very poor rough trail dropped sharply downward to a beautiful wide flat grassy plain. For four miles we crossed this veritable flower garden, riding among junipers and tall yuccas, while at our feet glowed small sunflowers, purple loco weeds, daisies, lilies, columbines, and primroses.

This pleasant walk was followed by an even steeper and more rugged drop than the first into a narrow high-walled lower gorge which, after a few slow rough miles, brought us into a main side canyon where we found our first water and also our first miring quicksand pitfalls. Here we spent our first canyon night at an eerie, dark, hemmed-in bend in the stream, below a small triangular mesa. Whitehat said his people called this gorge "Canyon of the Sand-covered Water"—a well-chosen name, because the stream ran generally under the sand, cropping up at short intervals to form shallow pools of good clear water.

The following day we continued down stream, passing uprooted old cottonwoods, heavily gullied sand drifts, and other evidences of recent floods, to the junction with the main Navajo Canyon, considerably wider than the tributary and containing a fairly large continuous tawny stream carrying a heavy load of sand.

About a mile below the junction we visited the family of Joe Manygoats (Tl'izi lani), one of the very few living in this remote and forbidding area. Joe himself was not at home, but two women, one with three small children and the other with two, were sitting in the shade of a few large cottonwoods next to a stone building which Joe had constructed. The family clearly lived, slept, and worked entirely out of doors, at this season at least. Nearby hung several rugs and goat, sheep, and fox skins. Flat on the ground lay a very crude loom, constructed solely of four poles tied together in the form of a square, on which was a partly woven rug. Near the entrance to the stone structure were three saddles in different stages of construction, ranging from a wooden block just being shaped, to a nearly completed saddle of good workmanship. Inside the building were further evidences of Joe Manygoats' enterprising character. The women showed us his silversmithing tools and some examples of his work. From the ceiling hung several old interesting guns which appeared to be kept in working order.

Below the living area, on a flat nestled in a graceful sweep of the creek, were a peach orchard, a cornfield, and a melon patch. From this field one of the women brought us several delicious white-meated watermelons, which were a most welcome addition to our lunch.

Now we held a powwow with Whitehat to decide our future course. He

said that we could reach the Colorado, if that was our desire, either by continuing down the main canyon or by starting up a side canyon which he pointed out to us. However, he stated that although he was not personally acquainted with the canyons below this point, he did not believe that they contained any ruins, which he knew were one of our objectives. On the other hand, he did know of ruins about three days' travel away in side canyons which we could reach by going back up the main canyon. We very quickly decided that we should take full advantage of his ability and willingness to lead us to the ruins and leave the exploration of the lower canyons for a future trip.

We returned upstream where, not far above Joe's place, we came upon a herd of goats climbing and leaping nimbly along the steep canyon wall. The herder, who soon appeared, proved to be Joe's eighty-year-old father, Drake Manygoats, a clan father of Whitehat.

That night we camped a few miles farther up the canyon, above our entry point, opposite two clear springs, a welcome sight in this valley of sandy water. The smaller of these springs afforded excellent drinking water, while the larger provided three small delightful grass- and fern-ringed bathing pools in a superb box-canyon setting.

The following morning we awoke to face stinging blasts of fine sand whipped up by a strong wind. Old Drake Manygoats appeared for a visit in time to share our breakfast. For several miles we proceeded up the canyon, the walls becoming continuously steeper on both sides, and the bottom more uniformly covered with quicksand. At some sharp bends the inner bank of the curving stream consisted of a steep-sided dune of sand blown in from the plateau above, while on the outside there was no bank at all, the stream running at the base of the cliff itself. At such places passage was easy when the stream bed consisted entirely or partly of rock, as the water was never more than a few inches deep.

Sometimes, however, where the entire stream was covered with quicksand it was necessary to climb a few feet up the cliff where there was usually a clearly defined bench marking the line where the hard Kayenta sandstone ends and the much softer Navajo sandstone above begins. The Kayenta formation, derived from limy gypsum-filled muds, is much older. The crumbly Navajo sandstone represents merely sand dunes which later drifted on top, and then became solidified. It is so soft that sometimes large pockets of still unsolidified sand occur in the rocks, thus accounting in part for the rapid rate of erosion.

Eventually we left the main canyon by mounting to the top of a small plateau, from which we had splendid views both of the canyon and of

red stone skyscrapers and weirdly shaped cliffs still ahead of us. We realized that it would be foolhardy to attempt to traverse the steep part of the canyon we had just covered, at a time of high water or when a cloudburst could be expected.

From the plateau Whitehat led us down into a colorful cottonwood-studded tributary gorge, called "Animal Track Canyon." We questioned him about the significance of this name. He replied by extending three fingers and pressing them into the sand at his feet, meanwhile pointing up the canyon. Needless to say we urged our horses on, eager to learn if our interpretation of this pantomime would be correct. Soon, rounding a bend, the party came to a small flat area of windblown sand at the base of a cliff, in appearance much like hundreds of other similar spots in the canyon. Unhesitatingly Whitehat rode to this point, dismounted, and began to scrape away the sand. Quickly, about six inches below the surface, he reached a hard stone slab in which was clearly impressed a large well-formed track of a three-toed dinosaur. Further digging brought into view three more, all four lying in a line, about three feet apart, and each somewhat more than a foot long and about as wide.

Just around the bend from the tracks we had lunch at Billy Goat Spring, a very pretty trickle of water dropping from a cleft in the cliff into a small waist-high rock basin of just the right size and shape for dipping a Sierra Club cup. A spring is a necessity in this streamless canyon.

After lunch we continued up beautiful Animal Track Canyon for several miles, until late in the afternoon. We made camp in an oak grove beside a clear refreshing streamlet which emerged from the sandstone, ran far enough to form three delightful small pools, and then disappeared into the sand. In this quiet, green, sheltered recess the name "Windstone Canyon" which the Navajos used, seemed unduly harsh. From the top of a large red rock, however, at the edge of the grove, high enough to provide a view over the tops of the trees, the appropriateness of this name became apparent. A few hundred feet above was a bleak wind-swept pass, while around and below stood sand- and wind-carved pinnacles and delicately chiseled arches.

That night at campfire after dinner Whitehat stated that by traveling light and fast we could reach ruins known to him and return to this campsite in one day. We decided on this trip, but one of us chose to remain in camp. He promised to keep an eye on the pack animals and to greet us with a substantial dinner on our return.

Accordingly the following morning we traveled up a steep rough slope, and reached a pass about five hundred feet above camp, from where we

looked down into a rocky storm-battered canyon, enclosed by majestic opalescent cliffs in which were cut many large arches in different stages of formation. From the pass, we followed a contour around to the east, heading the gorge, and continued on for a considerable distance along the northern wall. Whitehat informed us that this large canyon is called "Pine Tree Canyon," and showed us a large, magnificent, solitary pine standing on a ledge in the cliff face opposite us.

Soon, as we rounded a gentle curve in the gorge, Whitehat pointed to a large cavelike ledge high above us and announced "Enoo' sud!" There on the ledge stood the remains of an ancient village, an impressive sight still after nearly a thousand years of decay. The customary archaeological name for the people who built these cliff dwellings is "Anaasazi," but Whitehat, disclaiming any knowledge of this term, insisted that to his people they are "Enoo' sud." Using the method of tree-ring dating, archaeologists estimate that these pueblos were built during a period of about two centuries extending approximately from 1050 to 1250 A.D.

Leaving our horses with the Indians, who generally will not enter ruins themselves because of the association with death, we climbed up the cliff without difficulty into the broad shallow cave. Here we found a penciled note placed under a rock on one of the walls carrying the following message, "PE 1. Site recorded for Smithsonian Institution Bureau of Ethnology by Bert Tallsalt and Bill Adams. June 26, 1951."

The ruin consisted of some excellent masonry walls, many wattle skeletal remains of mud walls still upright, and about twenty rooms in a good state of preservation. The wattle-type walls consist of upright stakes interwoven with twigs and then plastered with mud. There were relatively few pottery shards on the surface of the fine red sand which lay some two to three feet in depth on the floors of the rooms and which showed some evidence of digging. On the cliff face itself, which formed the back wall of some rooms of the settlement, were a number of interesting pictorial representations, both petroglyphs cut into the sandstone and pictographs drawn with white, red, pink, and orange earthen paints still clearly visible.

Continuing down Pine Tree Canyon, with a brief stop for lunch at a pretty spring and small flower-encircled pool, we rode along a rocky bench for a considerable distance to another ruin of about the same size, which had also been visited by Tallsalt and Adams.

We found this cliff cluster of dwellings even more interesting than the first. The inhabitants of this settlement enjoyed spectacular views of the canyon from their home on a high ledge situated on a scarp which juts out

like a broad buttress from the main wall. Indeed a few who built their rooms directly at the edge of an overhang near the center of the community could even boast of a view straight down to the tops of the trees at the foot of the cliff. That they were proud of their home is evidenced by their hard work in building it. We saw no walls of the rather easily built wattle type. Here all walls appeared to be of masonry, constructed of rock and adobe mortar. These people did not discover the principle of bonding by overlapping rock slabs, particularly at the corners, for greater strength, and they used a very high proportion of mud to rock. Nevertheless, these walls showed great skill and workmanship—the more remarkable because they were built in a stone-age culture without metal tools.

All rooms were square or rectangular, and all were above ground. The circular subterranean ceremonial chambers commonly found in some well-known ruins, notably those at Mesa Verde, were not here. The rooms were also filled to a considerable height with wind-blown sand, but, in contrast to those in the first ruin visited, showed no signs of digging. On the surface of the sand lay numerous pottery shards. The shards covered a wide range of types, including fire-blackened cooking-pot fragments of corrugated ware, plain gray, black designs on white with a good clear slip or coating, and black and red on orange. The patterns, which consisted largely of stripes, spirals, and other interlocking geometric designs, were clear and pleasing to the eye. The back wall bore a number of paintings and incised drawings closely resembling those at the other ruin.

When we descended from the ledge and rejoined the Navajos beneath the cliff Whitehat told us of the existence of an interesting place he called "the big hole," known only to a few of his people. We lost no time in mounting our horses to follow him. The ensuing roundabout ride up and down rocky inclines, over passes, and around russet cliffs afforded some of the most dramatic vistas of our entire stay in Navajo Canyon. No longer were we confined by towering walls on either side. Here we picked our way among the rocks at the head of a group of small canyons, each turn providing new prospects of gleaming columns before us and delicately colored gorges below.

At last, after clearing two passes, we entered a small side canyon where Whitehat led us to the base of a small rocky ridge. Here we dismounted and climbed up a short distance to the "big hole"—a cave dwelling. It was a tall narrow cleft in the sandstone cliff which some enterprising early American had converted into a snug home, completely unlike anything we had ever seen. The high slender opening had been skillfully closed with

masonry, leaving three expertly designed apertures or entrances. The lowest of these served as a doorway into a single large chamber, whose black walls testified to the many fires that had warmed the inhabitants. A smaller entrance above opened into a storage room, and, higher still, the smallest opening clearly had served as a vent to permit the escape of smoke from the lower room.

Directly across a small draw from this unique habitation, and slightly above us, we saw a very beautiful two-level little ruin, half of which was already obscured by the long late afternoon shadows. Whitehat insisted it had never been visited by white men. Two of us clambered over and up to the lower level of this settlement, which we named "Big Hole Ruin." The condition of these dwellings confirmed in our minds Whitehat's statement that we were the first white men to look upon this site. Some of the carefully cut thin slabs of rock which had served as doors to close the room entrances still leaned against the openings, presumably placed there by the last occupants and since then disturbed only by the elements.

The single most striking feature of this ruin was an extraordinary petroglyph which depicted a parade of wild goats cut into the cliff immediately at the foot of a series of very small shallow toe notches leading to the upper level rooms. Even as we tested the first few steps up the steep severely eroded incline, the shadow of a nearby spire enveloped this niche, and the rest of the party called a warning to us from across the draw to make haste lest we fail to reach camp by nightfall.

Two rather strenuous days followed, during which we retraced almost as much ground as had been traversed in three days on entering the canyon. The last evening campfire was a big one, and burned a long time as we tried to stay the close of our last day in Navajo Canyon.

The Knife-Blade Piton

By CHARLES WILTS

"I DON'T CARE how strong those pitons are, I never want to fall on one!" This remark by one of the most able rock climbers in southern California was not at all surprising. The occasion was a test of strength of a piton with blade about the size of a one-cent postage stamp, a piton less than half as thick as an ordinary pencil lead. Yet this piton held over 2,000 pounds in rock and was stronger than the angle piton used as anchor for the test apparatus. Have you ever needed a piton like this?

No cause for retreat from an ascent is quite so frustrating as lack of a single thin piton, but few hardware collections have pitons which will fit in very small cracks. There is a definite need for a piton that will fit in the smallest of hair line cracks—a piton that perhaps will even fit into a crack that isn't quite there yet.

This article is about such a piton. It has appropriately been called a knife-blade piton because of its extreme thinness. Its manufacture is so simple that anyone with a little metal-working experience and some small tools can make it. Its strength has been found adequate not only for direct-aid purposes but also for holding well-belayed falls of average severity. The following sections describe its shape, strength, use and methods of fabrication.

Desirable properties of pitons.—In an excellent article on belaying¹ it was pointed out by Leonard and Wexler that a leader may fall a considerable distance without injury (a recent 80-foot fall at Tahquitz Rock attests the truth of this statement). The two most important factors in minimizing the chances of injury to a falling climber were shown to be the use of a nylon rope and application of a dynamic belay. No positive statement was made regarding the strength required of pitons under such circumstances, but it was implied that a strength of 1,000 pounds is inadequate and 2,000 pounds perhaps too much to hope for. However, in addition to mere strength there are several other important factors. Although strength of the piton itself is necessary, holding power of the piton in rock is equally necessary. Ductility and freedom from brittleness is required if a piton is to be removed and used repeatedly and if it may suffer appreciable bending under the forces of a fall. Ease of driving, retrievability, ease of manufacture, and low cost are other desirable characteristics.

¹ Richard M. Leonard and Arnold Wexler, "Belaying the Leader," *SCB*, XXXI (December, 1946), pp. 68 ff.

Pitons of normal size which are made of the cheapest iron or low carbon steel (SAE 1010) satisfy all these requirements. Most of them will withstand forces between 3,000 and 6,000 pounds before breaking, and it is not difficult to get holding power in rock in excess of 1,500 to 2,000 pounds if suitable cracks can be found. The relative softness of these pitons insures ease of driving even in cracks which are not straight, while their thickness ($\frac{1}{8}$ inch to $\frac{1}{4}$ inch) gives them adequate rigidity so that they do not bend unreasonably while being driven. Being made of soft iron, they are very ductile, particularly if annealed after forging, and they may be used repeatedly if re-annealed occasionally.

The use of alloy steels.—Conventional pitons have also been made of alloy steel with moderately high carbon content.² When properly forged and heat-treated, these pitons permit much higher strength and stiffness without serious loss in ductility. Predictions have been made that such pitons would not be satisfactory in holding power because they would not conform to the shape of the crack. The experience of both John Salathé and the author has been quite contrary to this. We believe that these pitons are *on the average* stronger in rock than similar pitons made of soft iron. On the other hand such pitons are difficult to fabricate and heat-treat and therefore are much more expensive. Since the soft-iron pitons of average size are almost completely satisfactory, the alloy-steel piton is less appealing to most climbers.

However, when a piton is made for thin hair-line cracks, soft iron is useless, since a piton made of such material cannot be driven without bending. It should be emphasized that the problem is to a large extent not one of strength. Even a soft iron piton $\frac{1}{32}$ inch thick and 1 inch wide might withstand a force of 2,000 pounds before breaking, but it would be exceptional if this piton could be driven in a crack in such a way that it could hold a load of 500 pounds before pulling out.

The use of ordinary high-carbon steel permits greater strength and stiffness but only at the cost of a great loss of ductility. For this reason alloy steels have been developed by the steel industry which have high strength yet possess remarkable toughness and ductility. The growth of the aircraft industry has made one of the best of these readily available. This alloy steel is SAE 4130, a chromium-molybdenum-iron alloy with about 0.30 per cent carbon. This steel has excellent strength—as much as four times that of soft iron and two times that of unalloyed steel with the same carbon content and heat treatment. Knife-blade pitons have been

² Anton Nelson, "Five Days and Nights on the Lost Arrow," *SCB*, XXXIII (March, 1948), pp. 104 ff.

made of this steel, patterned after vertical pitons. Thin horizontal pitons have been avoided for three reasons. If of usual shape, the junction between eye and blade is very weak, and forging of horizontal pitons even of conventional size is something of an art which requires considerable metal-working experience. Furthermore, with some qualifications to be noted later, there is no objection to using vertical knife blades in a horizontal crack. Figure 1 is a full-scale drawing of a typical knife-blade piton.

Strength tests.—Knife-blade pitons have been used in southern California for several years but usually only as direct-aid pitons; confidence in their strength was lacking. In an effort to encourage their use in a limited way for fifth-class climbing, tests of their strength in rock were made at the climbing area on Mount Pacifico near Los Angeles. The granite at Mount Pacifico is a moderately decomposed feldspar porphyry which is generally regarded as poor for piton work. Nevertheless it may be regarded as an average rock, though far from the ideal which might be expected at Tahquitz Rock or in Yosemite Valley. The tests were carried out in the manner described in an earlier article.³ The test piton and an anchor (piton or expansion anchor) were driven about 2 feet apart on a vertical rock face. The rock wall was chosen of course for suitability of cracks. Force was applied between piton and anchor by means of a screw and spring balance with a capacity of 2,400 pounds. With this equipment it was only possible to apply the load slowly. Impact tests are a field for future research.

Presentation of test data is nearly as difficult as performance of the tests themselves. Each crack in rock has its own individuality which makes it necessary to qualify not only general results but each individual result with explanatory remarks. Nevertheless a tabular presentation is required if the reader is to get any impression at all from reading the article. The data given below were thought to be the most important for this purpose and are listed in Table 1.

1. Thickness of piton
2. Length of piton
3. Type of crack
4. Direction of pull
5. Ultimate strength
6. A qualitative impression of the soundness of the piton.

The last item in Table 1 is more important than it may seem. The impression of piton soundness was derived from the ease of driving, the

³ Charles Wilts, "Expansion Anchors in Climbing," *SCB*, XXXIV (June, 1949), pp. 123 ff.

TABLE 1
ULTIMATE STRENGTH OF KNIFE-BLADE PITONS IN ROCK

Piton number	Thickness at root (inches)	Length of blade <i>a</i> (inches)	Direction of pull	Ultimate strength (pounds)	Type of crack <i>b</i>	Qualitative impression of soundness
2	.035	1.20	Parallel	360	3	Poor—rock very rotten—thicker piton would be stronger.
2	.035	1.20	Parallel	500	1	Fair.
4	.035	1.40	Parallel	1020	1	Fair—anchor piton came out at 1,020 lbs. also.
5	.037	1.40	Parallel	700	NR ^d	Fair.
5	.037	1.40	Parallel	1000	3	Fair—rock rotten—piton drove too easily.
4	.035	1.40	Parallel	1700	3	Good—rock moderately rotten—maintained good strength until rotated completely out.
3	.050	1.15	Parallel	850	1	Good.
2	.035	1.20	Parallel	1980+ ^c	2	Excellent.
6	.090	1.50	Perpendicular	540	1	Solid—broke on very sharp edge of crack.
1	.030	1.15	Perpendicular	300	1	Solid—broke on very sharp edge of crack.
4	.035	1.40	Perpendicular	550	2	Poor—drove too easily.
3	.050	1.15	Perpendicular	1080	2	Fair.
5	.037	1.40	Perpendicular	900	2	Fair.
2	.035	1.20	Perpendicular	1710	2	Good.

^a See Table 2 for width of blade.

^c All anchors pulled out. Ultimate strength not known.

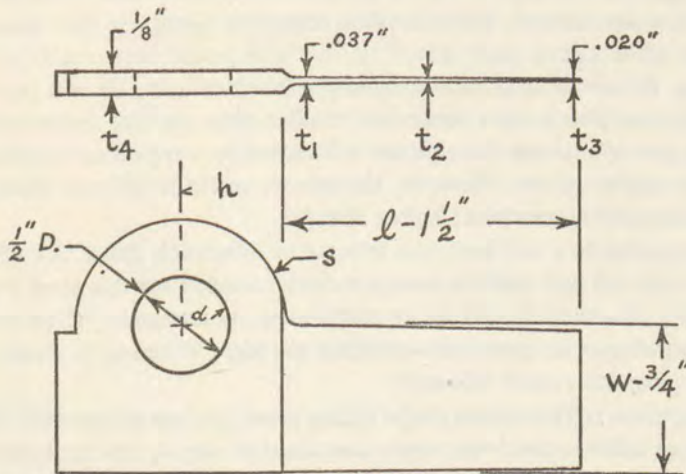
^d Not recorded.

^b Types of crack: 1. Well formed crack in solid rock
2. Well formed crack in decomposed rock
3. Incipient crack in decomposed rock

ringing tone of the piton while being driven, and visual inspection. The impression was recorded before force was applied to the piton. The importance of a correlation between this and the ultimate strength cannot be overemphasized, because this impression is all that a climber can rely on when using a piton on an actual ascent. The other quantities in Table 1 have more obvious definitions. The ultimate strength is defined as the maximum force applied in the process of slowly pulling the piton out. Because of limited piton supply, the force was applied either parallel or perpendicular to the crack. The cracks at Mount Pacifico can be conveniently grouped into three classes: well-formed cracks in very hard rock, well-formed cracks in moderately decomposed rock, and incipient cracks in moderately decomposed rock. It makes a most impressive demonstration to place a piton in an incipient crack of the last type. All strength data obtained are listed in Table 1. More detailed descriptions of the test pitons are given in Table 2.

TABLE 2
 GEOMETRICAL PROPERTIES OF TEST PITONS
 (All dimensions in inches)

Piton number	l	w	t ₁	t ₂	t ₃	h	d	s	t ₄
1	1.15	.60	.030	.020	.015	.46	7/16	.20	.100
2	1.20	.60	.035	.034	.020	.47	7/16		.120
3	1.15	.65	.050	.040	.030	.50	7/16		.125
4	1.4	.61	.035	.030	.015	.57	1/2	.24	.130
5	1.40	.62	.037	.030	.020	.48	1/2	.22	.090
6	1.50	.63	.090	.076	.041	.60	1/2	.25	.140



Average knife-blade piton

Test results.—With very few exceptions there is a satisfactory correlation between strength and “qualitative soundness.” Pitons believed to be poor held four or five hundred pounds. Pitons believed to be fair pulled out at loads between 700 and 1,000 pounds. Pitons judged good withstood loads between 850 and 1,700 pounds. One piton, classed excellent, held more than 1,980 pounds. Cracks of types 2 and 3 (moderately decomposed rock) were slightly better than a well-formed crack in hard solid rock. This is gratifying since the pitons were developed originally for cracks of the former types. There was no significant difference in strength for the two directions of force application.

Two exceptional tests demand further discussion. Two pitons tested with force perpendicular to the crack broke at very low loads. The crack used for this test was well defined and in very hard rock. The edges of the crack were exceptionally sharp and the break occurred, of course, where the piton bent sharply over the edge of the crack. In later tests of this type the piton hammer was used to break off the lower edge of the cracks and no further trouble of this type was encountered. Until a satisfactory knife-blade horizontal piton is developed, the vertical pitons may be used safely as long as this precaution is observed.

Manufacturing procedure.—A person without very much shop experience should be able to manufacture knife-blade pitons with reliable results. A power saw (Do-all preferred), drill press, power grindstone, and small furnace or blowtorch are sufficient equipment. The following steps may be helpful to someone making them for the first time.

1. “Rough out” piton from sheet steel. Chrome molybdenum 4130, $\frac{1}{8}$ inch thick, is recommended. Blade of piton should be about $1\frac{1}{2}$ inch long and $\frac{3}{4}$ inch wide. Leave blade about $\frac{1}{16}$ thick to insure best results in heat treating. Be sure to drill carabiner hole before hardening. It will be noted that the test pitons were somewhat smaller than the size recommended here. A person making these pitons will naturally want an assortment including smaller pitons. However, the greater width is believed desirable. It should provide somewhat higher strength.
2. Bring piton to a red heat in a furnace or blowtorch flame. A color between light red and reddish orange is recommended for this steel (about $1,600^{\circ}\text{F}$). The steel should not be overheated; an orange or yellow-orange color indicates a temperature somewhat too high. When at an even color plunge piton into a can of water.
3. Grind piton to the desired shape taking great care not to overheat. If the iron turns color beyond the purple described in step 4, the hardness may have been removed. The most useful pitons of this type are about .010 inch thick at the tip and about .035 inch to .040 inch thick at the root.

4. Heat piton slowly and uniformly. If heating is continued, it will change colors in the following order: yellow, brown, purple, dark blue, pale blue, grey. Stop heating when piton reaches a dark blue. Do not allow it to pass a pale blue. This should give an ultimate strength of about 220,000 psi (soft iron is about 50,000). A quick test procedure is to hold a piton by the tip in a vise and to strike it lightly with a hammer. It should hum like a tuning fork and show an unusually high resistance to bending.

Pitons made as described above can be used many times before discarding. Their strength is unusually high. One driven in Yosemite cliffs into an incipient decomposition crack could not be removed with a piton hammer. Comparing it with the Pacifico test pitons, it can be said with reasonable certainty that its strength was (and still is) in excess of 3,000 pounds. On the other hand, when driven under a thin flake they may hold only a few pounds. However, it is remarkable that such pitons have held the weight of a climber when the depth of penetration of the piton was only $\frac{1}{8}$ inch.

Memorials and Correspondence

ALICE EASTWOOD, 1859-1953

THE SIERRA CLUB was only a few months old when, in 1892, Alice Eastwood came from Denver to make her home in San Francisco. Almost immediately she must have been aware of the Club, because in those early days the office of the Club was in the "Academy of Sciences Building" at 819 Market Street, and her good friend, Katharine ("Katy") Hittell, was a member. The exact date when Miss Eastwood joined the Sierra Club, however, is not known, because the Club lost most of its possessions and records in the San Francisco fire, but we can guess the approximate date. Her name was not included in the membership list published in June, 1896, but was in that of May, 1897.

Miss Eastwood was probably never very active in the affairs of the Club, but she was always a staunch supporter of its aims and purposes—not only its early aims "to explore, enjoy, and render accessible the mountain regions of the Pacific Coast," but more particularly in its avowed program of conservation, which would keep some small part of our great country as nature made it, wild and unimproved. Only too well did she realize that the urge in man for "power and pelf" must be curbed and that it can be effectually curbed only by the organized action of those who recognize the irreplaceable values inherent in a naturally wild area. At times she would enter directly into the conflict, as she did when the Tamalpais Conservation Club worked for the establishment of Tamalpais State Park; but more often she let her contribution in conservation matters come indirectly through classes, lectures, and writings in which she sought to foster in the public mind a fuller appreciation for the beauties of nature.

Miss Eastwood made several noteworthy trips into the Sierra Nevada, but only one High Trip, the famous Mount Whitney outing of 1903. Her first trip into the high country was made in 1899, when she went with S. L. Berry, Pierson Durbrow, and Benjamin Brooks up Bubbs Creek to East Lake, Harrison Pass, and Bullfrog Lake. Her botanical collection was large and important, and, based on what she had found, she wrote *A Flora of the South Fork of Kings River from Millwood to the Head Waters of Bubbs Creek*. This was printed as a 96-page book in 1902, Publications of the Sierra Club Number 27, the first book ever devoted exclusively to the flora of the Sierra Nevada.

In 1904 she made another trip with a small party into the Kings River country, this time to Tehipite Valley with John Franklin Forbes, Charles Wagner, and Ralston White. They went into the valley from the north, down the great north wall, and left for the South Fork by way of Simpson Meadow. She writes in her manuscript account of the trip: "I made some very interesting collections on that trip but all were destroyed in 1906 before I had been able to write about the plants. Two I particularly remember: *Trautvetteria grandis*, never before found so far south, and *Raillardella Muiri*, not collected since [it had been] found by John Muir at an unknown locality." Further along she writes: "It was delightful in that canyon with the beautiful clear stream and the magnificent dome at the foot of which we camped. I wish that I could again be there. I have never felt the sublimity of the domes of the Yosemite as I did that. Perhaps it was because we were the only ones there."

Alice Eastwood was born in Toronto, Canada, on January 19, 1859. In 1873, at the

age of 14, she went to live in Denver on the frontier of the Rockies. Here Alice attended the public schools, struggling with the family against poverty and working part time in order to complete her high-school education. She was a brilliant student, the valedictorian of her class, and was given a teaching position in her high school the term following her graduation. From early childhood she had loved plants and all through the years this love had been nurtured. Wherever she was, the flowers would attract her, not only aesthetically but also scientifically, and she came to be known as the foremost local botanist of Denver and the Colorado Rockies.

After teaching for about a decade and having handled her small salary to her financial betterment, Miss Eastwood was able to retire from teaching and turn her attention to travel. First she went east, but it was the West she was drawn to, so in the winter and spring of 1890-1891, she turned to California which she visited as a botanical tourist, from San Diego north to San Francisco. In San Francisco, she visited the California Academy of Sciences, the foremost scientific institution in western America, then approaching the venerable age of 40 years, and it was after that visit that she was persuaded, in 1892, to return to make her home in San Francisco, and to share, with Mrs. Katharine Brandegee, the job of running the botanical department. In 1894 she assumed the full responsibility when Mr. and Mrs. Brandegee moved to San Diego, and from that time until her retirement on her ninetieth birthday in 1949, she was the Academy's curator of Botany.

Miss Eastwood, young, energetic, and ambitious, was more adept in botanical field work than Mrs. Brandegee and welcomed the opportunities for those field trips that have associated her name with many parts of California still little explored. In her first year at the Academy, she explored the inner south Coast Ranges south of Bakersfield and above Coalinga, crossed Mount San Carlos from Hernandez to New Idria, traversed the rugged Santa Lucia Range between Jolon and Big Sur, and climbed her first and last 14,000-foot peak in California, Mount Shasta! Surely such a record would place her name along with those of Clarence King and William H. Brewer as a pioneer traveler and explorer! Almost all of her botanical explorations, both before and after the San Francisco fire, were made with small parties or alone. Afoot, on horseback, or by stage (or, much later, by private automobile), she visited and explored many sections of California. Always helpful to botanists and students from far and near, the Academy's Botany Department prospered under her generous and vigorous administration, and its reputation and the reputation of its curator were enhanced at home and abroad.

In 1906 came the earthquake and the San Francisco fire when the Academy Museum, then situated on Market Street between Fourth and Fifth streets, was burned and most of its collections were lost. In the midst of this harrowing catastrophe, disregarding her own possessions and at the risk of her life, Miss Eastwood distinguished herself by saving a number of historic and scientific treasures before the fire swept the doomed building.

During the reconstruction period following the earthquake and fire, Miss Eastwood again traveled, this time going to Europe to work at famous botanical centers. In 1912, she returned to San Francisco and set about to rebuild the Academy's plant collections and botanical library. She entered actively into many phases of the botanical, horticultural, and cultural life of the San Francisco and California scene, and the effect of her generous, practical, common-sense approach to organizational and social problems has been felt and appreciated locally and throughout the state. Recognition

for her achievements came to her in numerous honors from many quarters over the years. Her selection, in 1950, as one of the honorary presidents of the Seventh International Botanical Congress in Stockholm, Sweden, was perhaps the greatest honor she ever received. I believe, however, that the honor she most deeply appreciated was the naming of the beautiful recreation area on Mount Tamalpais, Camp Alice Eastwood, by the California Division of Beaches and Parks and the Tamalpais Conservation Club, of which she had been a founder and was a past president. Even in her last illness she followed with interest the progress of campaigns to establish the Alice Eastwood Grove in Prairie Creek Redwoods State Park and to build the Alice Eastwood Hall of Botany at the California Academy of Sciences in Golden Gate Park; and during this time she received from the American Horticultural Council a Citation of Merit "for the outstanding work done in promoting amateur gardening in all its phases."

Full of years and adorned with honor, Alice Eastwood died, deep in her 95th year, on October 30, 1953.

JOHN THOMAS HOWELL

DEVIL'S POSTPILE

John C. Preston, Superintendent
Yosemite National Park, California

Dear Mr. Preston:

I have been interested in reading the October, 1952, issue of *Yosemite Nature Notes* which has just reached my desk. This number contains interesting material and splendid photographs of the Devil's Post Pile National Monument. I think the story of the formation of the National Monument should be amplified to give proper credit.

I was the District Engineer of the U. S. Forest Service for District 5 (California and Southwestern Nevada) when a filing was received in 1910 for a permit to blast the Post Pile into the San Joaquin River to form a rockfill-type dam from which water would be conducted around Rainbow Falls to develop power to be used in certain mining operations. In those days original filings for permits for power development on National Forest lands were made with the District Offices of the Forest Service. Because of the proposed wanton destruction of scenery I discussed this particular application with my superior, F. E. Olmsted, District Forester in charge of all Forest Service operations in California. He, in turn, asked me to take the matter up with officials of the Sierra Club. I immediately called upon William E. Colby, who was then Secretary of the Club. He, in turn, called Professor Joseph N. LeConte at the University of California to acquaint him with the proposal. Probably at that time no one knew the Post Pile region better than did Joseph N. LeConte. Very soon thereafter Messrs. Colby and LeConte called to confer with District Forester Olmsted and to object to the granting of the application for a power permit. I was privileged to attend this conference. Mr. Olmsted advised that Henry S. Graves, Chief Forester of the U. S., would be in San Francisco shortly and asked Messrs. Colby and LeConte if they would be willing to lay their objections before Mr. Graves. They readily agreed.

When Mr. Graves arrived he heard the evidence presented by Colby and LeConte. When they had left the conference he turned to Olmsted and asked: "Do we want a National Monument on that area?" Olmsted said very firmly "Yes, we do". Graves then asked me to prepare a draft of a proclamation with required map and to time

its arrival in Washington to meet his own return. This was to permit him to personally present it to James Wilson, Secretary of Agriculture, whom he hoped to have present it with favorable recommendation to President Taft. Until that time attention had centered merely upon opposition to granting the power application.

It was a difficult task to draw a required map for an area not included in the Public Land Surveys. That is why the junction of King Creek and the Middle Fork of San Joaquin River was chosen as an initial point on the boundary. There were no section corners within miles.

I have no intimate knowledge of subsequent conferences in Washington, but Mr. Graves' success is indicated by the fact that President Taft signed the proclamation on July 6, 1911.

My very literal interpretation of the Act for the Preservation of American Antiquities caused me to include only a limited area. To be certain that both the Post Pile and Rainbow Falls were included I made a reconnaissance survey and ran a fly line at the site in July, 1911.

From the above recital it is evident that Henry S. Graves and F. E. Olmsted should rank at the top of the list of those deserving credit. The leaders in the Sierra Club's efforts to offer support were William E. Colby and Joseph N. LeConte.

The use of the name Devil Post Pile National Monument is unfortunate when the name of the principal feature has so long been the Devil's Post Pile. As suggested, this is probably due to a clerical error. Such authorities as Gudde (*California Place Names*, University of California Press) give the name as Devil's Postpile. I hope that all use of the corrupted form will be terminated by proper official action.

Very sincerely,

WALTER L. HUBER

KNOW YOUR AVALANCHES

AVALANCHE investigations carried out by the U.S. Forest Service are an outstanding example of research by a public agency serving the public. These investigations are reported in the *Avalanche Handbook*, published by that agency. Responsible for this excellent job are Felix Koziol, supervisor of the Wasatch National Forest at Salt Lake, who has been a supporter of skiing for many years; M. M. Atwater, who pioneered many of the techniques discussed and is the outstanding avalanche expert in this country; and John Herbert, who was the manager of our Olympic ski team in Norway in 1952.

The usefulness of their handbook extends far beyond the modest circle to which it is addressed. It certainly includes all Sierra Club skiers and all resort operators. Herbert deserves credit for bringing the work of the Swiss Avalanche Research Station, Davos, into use by the Forest Service. We owe a debt to competitive skiing which made Herbert's trip to Europe possible and the introduction into this country of the "colored thread profile," penetrometer studies, use of barriers and explosives, and adequate rescue technique.

I believe the Forest Service should, and will, eventually go even further in its appreciation of European developments. The Swiss classification of avalanches into loose and slab is simple, and tells us how, where, and when the two kinds of avalanches start and what different dangers skiers face from each. Relative wetness of the snow then becomes a secondary consideration. The endless variations in terrain which modify avalanches once they have broken loose should not be used to confuse

the issue *a priori*. Forest Service "standard snow terminology" represents a backward step from the proposals currently under consideration for international adoption which are based on the metamorphosis of snow crystals within the snow profile. Throughout the handbook one gets the impression that the snow profile itself—the properties of the different layers of snow from the surface of the ground—is being slighted in favor of study of weather as related to avalanche conditions. It is true that the rate of snowfall, wind action, and so forth, influence the snow profile and thereby avalanche occurrence, but in touring such influences are unknown in detail and only indirectly at best. After all, the snow on the ground slides. For skiers, as distinct from area administrators, this argument has particular force because slab avalanches are the skier's most dangerous enemy, and study of the snow profile is absolutely essential in detecting slab.

As to avalanche rescue, the chapter on avalanches in Dr. Paul Gut's little book *Unfallhilfe und Hygiene im Alpinismus und Wintersport* (Orell Füssli, Zürich, Switzerland; German, French, and Swedish editions) is an excellent supplement to the handbook. We hope some enthusiastic skiers, particularly those living in the snow country, will undertake to train dogs in detection of avalanche victims. Certainly any dog available should be brought along on avalanche rescues. A well-trained doctor who can ski should join the rescue team if at all possible. Finally, the necessary equipment is vital. Without avalanche probes in the hands of his would-be rescuers, a skier buried only a foot deep can and may die. Not all ski resorts and outlying touring huts may have adequate rescue depots containing probes, shovels, electric lights, and toboggans that can be easily carried to an avalanche site; and they may not all have patrols trained in the use of such equipment, doctors to call on when needed, or dogs. But they do have avalanche accidents.

Publicity on accidents is naturally not desirable for the resorts, but perhaps publicity on what they are doing to combat such accidents would be. Skiers can and should coöperate in the fight against avalanche accidents—avalanches are something that skiers must learn to live with, if they look for steep slopes blanketed in deep powder snow. Such slopes offer the best skiing, but they also produce avalanches. Probably most Sierra Club members are interested in how they themselves can say whether or not the off-the-beaten-track slopes they prefer are safe. This handbook will help.

JACK MAJOR

Mountaineering Notes

Edited by HERVEY VOGÉ

FIRST ASCENTS IN THE CANADIAN ROCKIES

UNCLIMBED Aiguille Peak soared on the western skyline, a cluster of limestone fingers above Alberta's dense forests and ice-hung cliffs. John Mendenhall and I were studying from the shore of Lower Waterfowl Lake the possibility of climbing this virgin peak whose spectacular pinnacles rose southeast of Chephren and Howse.

We had thought much about Aiguille since reading of Dr. J. Monroe Thorington's 1944 trip in the same region with guide Edward Feuz and the Measuroolls. Apparently the only party to have penetrated that visible but inaccessible section of the Rockies, they had made two first ascents and photographed Aiguille (9,840 feet) without attempting to climb it.

The formidable east wall that dropped in front of Aiguille, tantalizingly revealing only its upper towers, culminated in Mount Synge and Midway Peak, also unclimbed. We considered, but dismissed as unfeasible, an approach by the icy couloir that split this wall. Apparently the only practical approach to the area was by a long trek up the Howse River valley from near the Saskatchewan crossing. Hence we drove north, and arranged with the nearest packer to take our gear the nineteen miles to Howse Pass next day.

We had always before served as our own pack animals, so it was a delightful novelty to be unladen as we crossed the pole bridge over the Mistaya in the frosty dawn of August 1, 1952. We swung south on Warden Black's well-maintained trail up the wide gentle valley of the Howse River, whose waters were the peculiar dish-water gray of streams laden with glacier silt. Long-legged moose, nosing in muddy ponds, galloped lankily away at our approach; a band of elk swam the Howse and raced into the timber. Mount Sarbach and the Kaufmann Peaks were occasionally glimpsed to the east through the tall spruce. West beyond the Howse, which spread out in wide gravel flats bright with fireweed, peak after glaciated peak marched slowly by.

After sixteen miles we left the Howse Valley and skirted the rocky gorge of turbulent Conway Creek. Howse Pass, 5,200 feet, a flat area unrecognizable as a pass by High Sierra standards, was well marked, as it is also the interprovincial boundary between Alberta and British Columbia, the Banff Park border, and the continental divide. Here, for miles around, the dense spruce forests had long ago burned, and nothing stood but the gaunt pale stalks of dead trees.

At the pass, Alberta's excellent trail dwindled to a faint track through the wild strawberries. A couple of miles beyond, camp was made in a rough meadow on the headwaters of the Blaeberry (British for blueberry) River, here a series of meandering brooks hidden by grass.

Next morning the packer set out for home, and we shouldered our heavy burdens ourselves. The upper Blaeberry Valley was a painful mixture of fallen logs, small cliffs, dense willow thickets, and frost-slippery grass. The river had already gathered its waters into a sizable stream when we crossed it. We struggled over a steep shoulder between the angle of the Blaeberry and Ebon Creek—a mass of downtimber and alder thickets—and worked down into the Ebon Creek canyon near the junction of

the North and South forks. Now the skeletons of the burn were alternated with dense stands of spruce that had escaped the fire and produced even worse going than the jackstraw jumble of windfalls. At the head of Ebon's North Fork, which raced in white falls down its black gorge, stood Aiguille—"the other side of the mountain," looking a little more promising than it had from the Mistaya Valley.

At around 6,500 feet elevation we neared timberline. Small spruce posed in clumps among lovely, sloping meadows of dainty grasses, columbines, asters, buttercups, dog-tooth violets, and Indian paintbrush. Here we camped on the bank of the thundering Ebon. In the east, Aiguille's fingers beckoned. Westward, far and high, rolled the undulating icefields of the Conway and Lambe glaciers.

First light on August 3 saw us plodding up the water-worn, well-consolidated scree and plushy little meadows below the glacier. The cleats of our Bramanis left imprints beside hoof marks of mountain goats. The fine loose grit of an ancient moraine slid under our feet. We skirted the edge of the Aiguille-Stairway glacier to the foot of the southwest ridge of Aiguille. Here the ice axes were cached, as the climb promised to be largely on rock.

A long third-class ascent over broken limestone took us to the southwest summit, from which there was a drop of several hundred feet to a deep notch. Beyond, the breath-taking summit towers rose in grayish yellow limestone. After descending steep but firm fourth-class rocks into the notch, we were faced with a slowly rising, easterly traverse over a series of outsloping ledges, which passed beneath the summit pinnacles and above a band of snow-festooned, water-blackened cliffs that cut this section off from the glacier below. This traverse was the nerve-racking type of climbing, characteristic of the Canadian Rockies, that explains why most ascents there are made on snow. It is a marvel that rock so crumbling, so rotten, so fractured, and so precariously balanced, can hang together to form such perpendicular towers and overhanging cliffs!

With caution we worked our way toward a black chimney which provided the most likely break in the walls. The chimney proved sound, though a tight squeeze for back-and-knee work. Two pitches took us to the top of a square subsidiary tower, from which we made a short delicate descent down a face to a snow-filled col. Another traverse, to the left and upward on fairly sound ledges, led to the foot of the critical pitch directly below the twin summit towers. This key pitch consisted of a rotten, slightly overhanging, open crack splitting a face of glistening limestone. Tied to an anchor piton, I braced myself on the slanting ledge while John, placing two pitons for protection, worked over to the foot of the crack which could be the Open Sesame to the peak or turn us back defeated.

Extensive gardening—the detritus dashing with wide-spaced reverberations to the glacier—failed to uncover reliable holds. Pitons either refused to enter the shallow cracks or, going in, split off the adjacent rock, so different from good California granite. Eventually, John got three pitons in about an inch. He was now beneath a bulge, and judged it safer to apply pressure slowly to these sorry pitons than to risk the jerk of a possible fall. Accordingly he snapped two slings into the highest carabiner and gingerly transferred his weight to the loops. Another wobbly piton was placed, and from his upper sling he reached above the overhang and with considerable relief drove a wide piton into the first sound crack of the pitch. He slithered over the bulge, moved up a slick slope on delicate friction, anchored into a sling fastened around a chockstone, and called to me to climb.

I was quite ready to depart, having spent two hours shuffling cramped feet on the sharp little hold, and being dehydrated by the sun in full view of torrents in distant valleys. The only good thing I could say for John's pitons was that they certainly came out with ease.

Two more fourth-class pitches landed us on the summit, an airy perch that many thousands must have viewed from the highway, but no one before us had ever reached. Immediately to the north, Howse's black, white-streaked face frowned down on us. Beyond, the Black and White pyramids of Chephren dominated the Mistaya Valley, among whose forests spread the lovely aqua shades of Chephren and Waterfowl lakes. The rock towers of Mount Murchison rose in tints of lavender beyond the highway's faint thread. Nearby, virgin Synge and Midway formed the crest above the glacier. South of these were Stairway and Aries, first climbed by Dr. Thorington's party. Across the Blaeberry rose the peaks and glaciers of the Mummery and Conway groups, and to the right of them the Freshfields and the Forbes group beyond the Howse up which we had come.

The waterways themselves formed part of a dramatic pattern that spans two countries and a continent. Ebon Creek, fed by glaciers and snowfields, rushes to the Blaeberry, whose rapidly swelling waters join the Columbia north of Golden and flow to the Pacific. The Howse empties into the North Saskatchewan, which joins the South Saskatchewan to empty into great Lake Winnipeg in Manitoba, and thence by the Nelson north to Hudson Bay.

The splendid views and the warm sun could not eliminate the long descent before us. Tying our climbing and reserve ropes together, we passed the difficult pitches in one long rappel; unfortunately, a falling rock cut twenty feet from our climbing rope. The long traverses seemed even more hazardous going down. It was a relief to reach the sound rock leading from the notch to the southwest summit, and we had retrieved our ice axes by dark. Darkness and weariness slowing our pace, we spied the tent's peak about 11 P.M., after eighteen hours of taking every step with precision and care.

As the next day was to be our last in the region, we set off to try Mount Synge (9,700 feet) and Midway Peak (9,570 feet). The ascents both appeared to be without difficulty, and after crossing the Aiguille-Stairway glacier we attacked Synge by a great ledge that led to a point directly below the summit. The ledge turned out to be treacherous, with loose rocks and slimy melt water. The snow along the base of the cliffs provided sounder footing part way. After a mostly third-class ascent, with a few minimum fourth-class pitches, we reached the top, and peered over the abysmal cliffs that dropped into the Mistaya Valley. A safer route, just north of the ascent, took us back to the glacier. I returned to camp while John soloed Midway without incident.

The following morning we broke camp with the reluctance always felt in leaving a remote area, difficult of access, marvelously beautiful in its wild seclusion and its perfection of tree and flower, sky and water, rock and ice. It was a long 27 miles back to the car, this time with no pack train. The first day we mastered the jumble of the Ebon and Blaeberry, and plodded along the trail through the forest till near dark. We decided to eat "squirrel food" instead of cooking, so consumed an eccentric dinner of crackers, sardines, cheese, and jello straight from the box. The fact that it tasted good doubtless indicates the low level of one's standard of living after a mountain-climbing trip. Next morning we slogged on to the car through just enough rain to dampen us down like bundles of ironing and add the last touch of un-chic to bat-

tered, sooty, G.I. ski pants, slept-in shirts, and drooping hats. Feet sore, and shoulders aching, we finally spied the car, symbolic of all the comforts that are strangely welcome despite the joy of the forests, glaciers, and peaks.

RUTH DYAR MENDENHALL

CLIMBS IN THE CANADIAN ROCKIES

THE ATTRACTION of untrodden summits seems to be irresistible. This force has thrice drawn parties from Southern California to the same sector of the wild and beautiful Canadian Rockies—first in 1948, then in 1951, and again in 1953. This is the story of the latest venture.¹

In 1948 it was first noticed that about twenty miles north of the Columbia Icefield, and between the Sunwapta and Athabaska rivers, there was a cluster of unclimbed and unnamed peaks. Our first party, Charles and Ellen Wilts, Ray Van Aken, and George Harr, forded the Sunwapta River at Mile 53 and ascended an unnamed valley which pointed in the direction of the sought-after area. We did not know until we had headed the valley if it would offer a feasible route, since the upper valley appeared to be hemmed in by a hanging glacier. An unexpected, easy exit to the north developed which gave access to the wide glacier bounded on the south by Mount Diadem and on the north by unnamed peaks. The same route has been used on all three expeditions although an alternate exit from the glacier has been found and used twice.

In 1948 the first ascent of Mount Gec (proposed) was made. From this summit the peaks bounding the Lynx Creek drainage basin were observed and studied. In 1951 Charles and Ellen Wilts, Dale and Frances Ebersbacher, and Gil Roberts crossed the glacier and continued over the col north of Mount Gec to establish a base camp in a Lynx Creek basin. From here Mount Smythe (proposed) and Mount Nelson (proposed) were first ascended. Two or perhaps three peaks remained untouched.

Hence, for a third time we grouped our forces. Our party, John and Ruth Mendenhall, Ray Van Aken, Gil Roberts, and I waded the Sunwapta, battled through the forest, trudged up the interminable scree, and wandered across the glacier over the col and down to base camp. The distance, timing arrangements, and impediments were such that two camps were established en route. Base camp was situated in a lake basin beside a lovely tarn. Dominating the southern aspect was the majestic but fearsome mile-high north face of Mount Alberta—a view worth the entire effort to establish ourselves in this favored location. To our north rose a great towerlike peak, our primary objective. We examined its uniquely guarded upper third with glasses. The band of 300-foot vertical cliffs did not have an obvious weakness on the three sides we could see—we knew the north face plunged several thousand precipitous feet into the Gong Valley.

On the morning of the proposed attempt we struggled out of our sacks at 4 A.M. and prepared a shivery breakfast. Before we could get under way the previously good weather became normal Canadian weather, and it started snowing. We dove back into our tents. By 7 A.M. it appeared to be clearing so a council was held. Our objective was changed to the next peak west, also unclimbed.

The five of us reached the base of the massif and ascended an easterly snow-filled

¹ See *SCB*, XXXV (June, 1950), pp. 122-123; XXXVII (December, 1952), pp. 94-95.

couloir. At its head we were revisited by dense clouds. In spite of this we climbed a steep third-class ridge. With little warning the air became tense and the rocks sang with static. As we huddled on flat projections of the ridge, crash followed crash as lightning tore at the clouds. We were quite unhappy with our situation. But the display stopped temporarily, and we continued upward. Rock ridge became snow ridge—feathery cornice and all. We donned ropes and cautiously felt our way along. Generally, the visibility was restricted to a few yards, but an occasional rift in the clouds revealed the nearing summit. A final steep pitch and we were on top.

Without the mist, we should have had a splendid view. But such was not to be, so we constructed a small cairn and christened the peak Mount Palmer after the co-author of the *Climber's Guide to Canadian Rockies*. As we secured an aluminum note-tube in the cairn the air again became charged, and we started down. The descent was tedious. Three to four inches of new snow dictated that we stay roped over the steep rock and to the head of the couloir. Below, the snow storm of the ridge became a gentle rain. We slogged back to camp happy but wet.

After a day in camp we revised our strategy. We would divide our party: three to attempt a peak to the west, and two to tackle the now snow-clad tower. Consequently, Ray, Ruth, and I set off early the next morning after bidding John and Gil best luck on their venture. Our peak to the west proved to be an incredibly long crud-walk up its southern flank. The summit presented us with a shock. There stood an unmistakable cairn. Search turned up a rusty iron tube containing a wet and faded note: "First ascended in 1927 from the Athabaska Valley by a Harvard Mountaineering Club party." We tentatively named this peak Mount Second Ascent—and trudged down.

Simultaneously John and Gil had come to grips with the Tower. The lower two-thirds proved to be much more difficult than anticipated. They skirted the base of the forbidding cliffs but found vertical walls and overhangs. One rib on the southeast corner seemed to offer the only hope. John led off on this. Inching his way up verglas-covered ledges, John used pitons where possible; some definitely lacked the soundness desired—one fell out with rope jostling. Two long pitches, gained at the expense of several hours and much racking of the nerves, ended in a blank wall. The mountain had won the first round. Gathering clouds, the advancing time, and most of all the extreme technical difficulties made retreat inevitable. The circuit of the base of the cliffs was completed to the west and this confirmed that no weakness existed in this sector of the upper peak.

We decided that for the present the great Tower was out of the question. At least four days of good weather would be required to clear the upper walls of verglas. The dangers were too great to justify the risk, and the weather was ever-ominous. John vouched that the Thorington Tower, as we chose to name this virgin summit, was more difficult than Mount Aiguille and Mount Confederation, or perhaps even Brunsells Peak.

G. B. HARR

MOUNT MCKINLEY, 1953

A REPULSED MOUNTAINEER becomes an aggressive one. Mountaineers will not fail to understand my feelings, then, as I looked back on Mount McKinley following our setback on the West Buttress in 1952, when inclement weather, continuous clouds, and galelike winds which shredded three of four tents induced us to retreat

from 12,000 feet. The retreat only intensified the desire to return. To do so again without air support meant planning for the northeastern, Muldrow Glacier, approach as that is the shortest way to the summit from the road end.

An exchange of letters took place early in 1953, and a party of three materialized to join me in the proposed enterprise. They were Keith Hart of Fairbanks, famed for the first ascent of King Peak, and David Collins and Tom Steinburn of Seattle.

The stateside contingent arrived by plane in Fairbanks on Saturday, June 13, and were met by Keith Hart with a borrowed truck for the gear and bodies. On Sunday the combined party went on a food-buying spree which brought up the total from thirty-five to forty days' supply. The check on this orgy was the fact that we would have to carry every ounce on our backs; a halt was called when gear and food totaled 160 pounds per man.

On arrival at Wonder Lake in a truck belonging to Morton Wood of Camp Denali, we were at a loss as to the exact location of the peak, which was hidden behind a veil of cloud. During the next eight days we had only scant glimpses of the mountain while we and the packs played leapfrog with the miles, twenty of them, to McGonagall Pass at 5,700 feet. We covered this section three times. At the pass a twenty-four-hour deluge kept us in the tent, with activity confined to avoiding the drips from the regrettably not waterproof Logan tent.

The ascent continued via a succession of camps, clouds and snow permitting. To the head of the Muldrow Glacier we had to negotiate two icefalls. We bypassed the first by way of the true left-side gully, on a route menaced by a hanging glacier with debris below showing that not too much faith must be placed in its stability. The second icefall was ascended directly via a central corridor where deep snow justified our labor in bringing snowshoes this far. We placed Camp III (from McGonagall Pass) at the head of the cirque at 10,800 feet, where ice falling from the tongue of the Harper Glacier provided fitting sound effects for the stupendous scene.

Clouds and snowfall harried our move up the next obstacle, the 3,500-foot-high Karstens Ridge. A level spot on the ridge at 12,100 feet was the site of Camp IV. We placed Camp V among the rocks at Parker Pass, 14,500 feet. Cold and driving snow marked our entry into the Harper Basin with our first relay, dropped at 15,800 feet under the steep slopes of the North Peak. The camp was carried no higher the next day because Hart's feet were frozen—an unusual circumstance with vapor-barrier boots, but one easily explained by the fact that at the start of the trip he had cut off the tops of the boots to prevent chafing. With unsealed tops water got into the insulation during a stream crossing, and at this stage the water was solid ice.

Relaying was at an end as we chose to make one haul to the next camp, our last. The weather also chose to mend its ways, and caught Hart unprepared when he toiled bareheaded up the slope. Camp VII at 17,000 feet was pitched early, rather lower than we had hoped, owing to Hart's sunstroke and again numbed feet.

We postponed the summit attempt one day hoping that Hart would recover, but it was not to be, and Hart went no higher. We three set off for the summit on a clear, brilliant day, Sunday, July 12, with Collins leading in the steps Steinburn and I had punched to 18,000 feet the previous day to give us a flying start, for there were 3,300 feet to go. From the vicinity of Denali Pass, we branched off up the ridge to swing behind the rocky sentinel, Archdeacon Tower. The snow on the ascent varied from icy hardness requiring crampons to velvet softness where we sank to the knees, with the former fortunately predominating. Sharing the lead, we mounted the 800-

foot slope leading from the upper plateau to the summit ridge and reached the summit (20,300 feet) at 3:30 P.M. With a weakened companion, Collins, who had exerted himself to the utmost, we did not tarry long on the summit. After perhaps fifteen minutes, which was enough for a round of pictures and appreciation of the vastness of the ice world below, we headed down the slope direct to Harper Glacier. It was a trying descent, first on steep ice relieved finally by a ribbon of rocks, then on powder snow over ice, where we had to traverse amid a jumble of ice cliffs. Camp was a welcome haven.

On the further descent the next day, clouds, high winds, and snow hit us at Parker Pass, forcing us to lay over a day. The storm, especially the wind, continued through the night; we awoke to a badly drifted tent. A slight lull induced us to set off down Karstens Ridge, where we were sinking in waist deep. The steep Coxcumb slope we treated with the caution it deserves, because there is no sharp crest to stick to for avalanche safety. Past this obstacle we stuck to the ridge crest and could view with pleased unconcern the smoking powder snow avalanches which our passage set off.

On the Muldrow, beneath the Lower Icefall, we knew the climb was indeed over as we dispensed with the rope for the first time in many days; we coiled it for good. There remained only the trek to Wonder Lake, surprisingly pleasant because of the absence of mosquitoes. We gathered at Camp Denali for a sumptuous free meal promised by Morton Wood whether we were successful or no; he had specified that we had to reach McGonagall Pass at least.

FRITZ LIPPMANN

SOME CLIMBS NEAR BELLA COOLA, BRITISH COLUMBIA

THREE OF US, Bob Skinner, my brother Dick Long, and I, had come to the British Columbia Coast Range in 1952 not even knowing the names of the peaks we were to climb. A friend told us of the wealth of climbing inland from the town of Bella Coola. The only map of the area we could find was left behind in our car when we boarded the *Catala* in Vancouver, B.C. Some two hundred miles up the heavily channeled coast we disembarked with our 325 pounds of food and supplies. We then asked the residents of this fascinating village if there was a Mount Defiance near the area, and talks with various people made us believe that the sought peaks lay at the head of Noomst Creek to the south. So far our small exploration was progressing smoothly. We had disembarked in the correct valley.

How to get to the mountains was the problem. Perhaps the most prominent peak from the Bella Coola Valley is Mount Nootsatsum, so we decided to make this peak our first objective. From its summit we hoped to see the cluster of peaks rumored to be at the head of Noomst Creek. We cached all but five days' food and began to struggle to the summit of Mount Nootsatsum, which proved to be a first ascent.

Our route lay up a small creek that flows between Mount Nootsatsum and the north shoulder of Mount Defiance. About two miles up the creek we climbed the canyon wall to reach timber line and make our highest camp. Here, about 500 feet below the snout of a glacier, we constructed a platform for our four-man mountain tent and brewed a batch of pemmican stew. The tales we had heard of the horrors of the Canadian bush seemed somewhat exaggerated as it had only taken us two days to come this far and the going had been hard but no more so than one would expect in any untouched mountain area. Ahead of us now lay the true mountaineering work of negotiating rock and ice. We were well prepared with all necessary equipment and ambition, but the weather had other ideas. Next morning it was snowing. With the

snow and mist isolating our tent from the remainder of the world we were forced to lie and wait and hope that the next day would bring relief—and it did. With blue sky and a nippy northern breeze we started up the glacier that reaches up the north-east side of Mount Nootsatsum to head in the northeast face. The best route seemed to be across this face, so leaving the glacier we gained the northern ridge. Here we chose to rope up and move, one at a time, diagonally up and across the face to reach the eastern arête just below the summit. Snow from the previous day had plastered a cold, white, slippery layer on the ledges so that going was quite hard on the hands, and we spent much time warming them under our arms. We reached the ridge and were ready to do the most difficult pitch of the climb. The ridge here became very steep, forming a sharp corner which was vertical for about 40 feet. On climbing to the corner we found holds that were not visible from below and within half an hour we were on the summit of Mount Nootsatsum. One mountain was under our feet, and we looked to the south to see the area at the head of Noomst Creek. The peaks were there, and beautiful they were. Greatly inspired, we were anxious to start the trek that would bring us to the other peaks. And what a trek it was to be!

With packs weighing 90 pounds, we moved slowly up the southern bank of the Bella Coola. The brush became thicker and thicker as night fell. The maze into which we floundered the next day was the worst that any of us had ever seen. So deep and dark was the foliage that we were quite unable to take pictures. There was one moment when, after stumbling over logs, being whipped in the face, and having devils club thorns sticking all over my hands, I became possessed with the urge to see sunshine. I headed for the river letting nothing stand in the way. The next thing I remembered was Bob sitting beside me on the sunny bank laughing—a man with a huge pack on his back, muttering and whining to himself as he barged through wall after wall of undergrowth, was as humorous a sight as Bob had seen in many a day. After enjoying the air and light for awhile we crashed into the brush again and that night made the junction of Noomst Creek and the Bella Coola River. In two days of marching as hard as we could we had covered six miles.

We were elated, however, for we had been told that up Noomst Creek there was a trapper's trail, and after the ordeal of the last two days a trail would be a welcome sight. We did, in fact, find a trail for two miles, but then began the worst going we have ever experienced. The earlier days looked easy compared to the slide alder, devils club, ferns, saplings, and other nondescript types of vegetation that grew on canyon walls more than forty-five degrees steep. From the time we started in the mornings until we stopped at night our shirts were wet with perspiration. Our minds were occupied by the single thought that the next day would bring an end to the bush. This was not to be. Finally the combination of steep slopes, thick brush, and heavy packs made us realize that unless we did something decisive our time would be gone.

So we decided to leave the creek and toiled up to make a camp at timberline just below Mount Defiance. We were ready to tackle another mountain. It would be a long climb but our party was strong and ready.

Weather smiled on us again and we came face to face with the glacier that arcs down the eastern face of Mount Defiance. After 200 feet of step-cutting we had negotiated the snout of the glacier and only had an icefall to deal with. Time was passing quickly so that by mid-afternoon, when we stopped for a quick lunch, we had several hundred feet of rock tower above us. Deciding to risk a night out on the mountain, we continued and at 4:30 P.M. were standing on the summit of the "second first

ascent" of our stay. We hurriedly went through the formalities of building a cairn and leaving a small can with the record of the ascent, for already the sun was low in the west and the trip to camp was very long. We knew that unless we could climb around the glacier we would spend a long cold night. By following an intricate route that had been hidden from below, we made camp by nightfall.

We had climbed two mountains and still we had not reached the group of peaks that pierce the Noomst Glacier. From Mount Defiance as well as from Mount Nootsatsum there had been one peak that was set apart from the others and dominated the view. Our name for this crag was The Horn. Time allowed us four days to move our camp across Noomst Creek and ascend the wall on the other side, thence to work along the ridge at timber line until we were in striking distance of The Horn.

Wasting no time, we crossed the creek and were at timberline ready to move camp next day. Again the weather had other ideas, surprising us with four to six inches of snow, leaving us only two days in which to make the bid for The Horn. But we could complain little about the weather, for it was now the middle of September and our ration of sunny days is rare at that time of the year. Deciding to go light and try a one-day climb from our camp we left on the next clear day early in the morning, only to find that we had camped a long way from our objective. By noon we had reached the glacier at the foot of the mountain itself. The rest of the day was spent in ascending the glacier to the col at the northeast corner of the peak. Here we stared up at the icy, vertical, thousand feet of rock that towered above and realized that our time had run out. We had to leave this beautiful peak unclimbed. By nightfall camp was in sight and clouds were forming for another downpour.

Next morning we shouldered our loads and sadly faced the trek to the Bella Cooola Valley. We hated to leave the world of bleak rock and ice that a climber learns to love, and start days of bushwhacking. But it had to be done. One of the adventures of the return trip was the fording of the Bella Cooola River, which took half a day. It gave Bob and me a thrill when we were testing a crossing using the hand-holding method and were nearly washed away. Dick was unable to assist us, so lay on his back in hysterics at our antics.

Our expedition to the Bella Cooola mountains was over. We had come in search of new mountains, had found them, but had been able to climb only two. In our memories lie visions of The Horn and the majestic towers of the Noomst, and some day we may return to harass these grand peaks. But when we do, we will bear full in mind that they are "mountains in the bush."

WILLIAM E. LONG

BACK TO THE MONARCH DIVIDE

IN JUNE, 1952, rock climbers from the Loma Prieta Chapter set out for the finest area in California for rock climbs outside of Yosemite Valley. Some of this group had stood on the summit of Tehipite Dome a year earlier and had gazed in amazement at the profusion of fang-like rock towers across the canyon in the Gorge of Despair. Later in 1951 the first assault was launched. Dave Hammack and Ax Nelson packed in over the Monarch Divide, a 6,500-foot rise, and down 3,000 feet into the Gorge of Despair. In five days they climbed the upper towers in the Gorge as well as all but the fourth of the towers of the Grand Dike.*

* See *Sierra Club Bulletin*, Vol. 38, No. 8 (October, 1953), p. 67, where the date is erroneously given as July, 1952.

On June 15, 1952, our party of eleven camped at an unnamed creek below the Grand Dike. Here the group split into smaller units for attempts on the first, second, third, and fourth towers. Dave Hammack, George Larimore, Bob Purington, and I were to try the unclimbed fourth tower. I must admit that we had some doubts of finding a feasible route. As we approached the tower on the steep talus, we saw that the northeast face was broken by a large chimney. If there was a route, it had to be there. We were roped up and on our way up the chimney at 10:00 A.M. About thirty feet up it was possible to work out to the northeast face on small holds. From here the route followed straight up the face. Piton protection was necessary on the lower pitches, but the holds improved farther up, and in spite of the high angle we were enjoying fourth-class climbing at its best. Two hours from our starting point, Hammack and I came out on the great north shoulder just below the summit. A short third-class pitch was easily surmounted, and we stood on the summit. It was 12:10 P.M. Purington and Larimore joined us a few minutes later.

Thirty hours later, after struggling upward and over the Monarch Divide on badly sun-pocked snow, we were camped beside the stream at 8,000 feet elevation in the Gorge of Despair. In the waning daylight we looked down this tremendous chute to see the great bulk of Tehipite Dome. Above us, outlined against the sky, were Crystal Turret, Cobra Turret, and El Comandante.

For the next three days the members of our party climbed various rock towers in the Gorge. The second ascent of Cobra Tower was made by Clinton Kelley and Alice Ann Dayton. Nine climbers scaled the great pyramid of El Comandante. On June 18, 1952, Dave Hammack, Jules Eichorn, Clinton Kelley, and I set out down the Gorge of Despair for a try at Frustration Turret. The day before, two climbers had succeeded in fixing a rope on a ledge about 100 feet up on the east face. From there we thought it possible to reach the less-discouraging north face.

Frustration Turret rests in a wild and fantastic setting. The south side drops off into the abyss of the George of Despair. The north and west faces terminate 3,000 feet below in Tehipite Valley. The only means of access to the tower is the notch below the east face. We set ourselves to the task at hand. Above the ledge where the rope was anchored, a series of small ledges led out to the north face, passing under a huge overhanging slab. Above the slab we crossed a very large friction ledge. The route continued up the northwest side of the tower, with several highly exposed, polished friction troughs to ascend. Above the friction pitches the difficulties lessened, and we had several choices of route. About 100 feet below the summit several sixth-class pitons were required to surmount a holdless wall. We finally came out on the northeast shoulder. From here an easy traverse to the south led to the chisel-shaped summit. The 400 feet of climbing had taken three hours.

ROBERT L. SMITH

SUGARLOAF ROCK ON HIGHWAY 50

LESS THAN thirty minutes of walking from the town of Kyburz, on Highway 50 east of Placerville, takes one to the prominent formation called Sugarloaf Rock. The summit can be reached by a scramble up the back side. Less easily reached is a prominent point detached from the south face, which can be seen from the town of Kyburz. This point attracted the attention of Warren Harding and me, but in an early attempt to reach it from the east by way of the notch between it and the highest

summit, we were stopped. On the week end of June 27-28, 1953, we made an attempt on this detached point via the west face. As it turned out, we were off route from the start and unwittingly climbed to the highest summit by a new route.

We walked along beside the base of the west face until we came to a huge oak tree with low-hanging branches. We entered the first chimney to the south of this tree, and after about 240 feet of climbing with two pitons for protection, we came upon a spacious ledge. As we had intended to climb the lower point of Sugarloaf, we had begun the climb in the early evening of Saturday with plans to bivouac for the night at a point somewhere near the notch of the lower point. At this ledge we stopped for the night, and we continued the climb Sunday morning. The next pitch proved to be the crux of the climb. After seven tries, we decided to resort to the unorthodox method of Prusiking in order to surmount this obstacle. Upon getting our ropes arranged in an intricate manner, we found it a simple matter to get to the top of this pitch using three pitons for anchors. A short fourth-class pitch and moderate scrambling took us to the shallow notch below the summit, a walk from here.

The climb is short (450-500 feet), and it can be considered as mild fifth-class with the exception of one pitch. With three men, the leader can be given a shoulder stand in perfect safety; this will put him in a good position to use hardware on the chief obstacle of the climb.

JOHN OHRENSCHALL

HIGH TRIP, 1953

ALTHOUGH this year's High Trip was only four weeks long, the amount of climbing accomplished was equal to that done on previous six-week High Trips. Mount Whitney had far more attention than any other peak; well over one hundred persons made the ascent by trail. Polemonium-club practice climbing was enjoyed by as many if not more High Trippers than peak climbing was. The art of belaying was taught to some thirty persons, two-thirds of whom became quite proficient. First ascents are getting scarce; there were only two. Safety was well stressed in all the climbing activities. In all twenty-seven peaks were climbed, the more important climbs being listed below.

Mount LeConte (13,960) was ascended July 15 by Ken Green and Phil Berry from Iridescent Lake via a point north of the peak. Mount Mallory (13,870) was traversed July 15 by Green and Berry on the way north from LeConte. Mount McAdie (13,800) was ascended from Arc pass July 15 by Green and Berry, and was also climbed August 5 by John Carpenter, John Baker, Douglas Moore, Donald McCrea, Elizabeth Henderson, and Phil Berry en route from Timberline Lake to Rock Creek.

Mount Whitney (14,495) was climbed by over one hundred persons during a six-day period. One notable time was made by Alan Carpenter, who reached the summit in two hours and one minute by trail from Timberline Lake without running. The average time was about four and one-half hours. Mount Muir (14,025) was climbed from Trail Crest by David R. Brower, Phil Berry, and Marjory, Roger, and Suzanne Farquhar on July 18.

Mount Russell (14,190) was climbed July 20, July 21, and August 3 by various parties led by Eleonore Ginno and Phil Berry. Climbers included Madi Bacon, Jim Kahn, Frances Chisholm, Dean Meyer, Harold Kirker, Peter Farquhar, Frank Owen, Al Childs, Howard Parker, Alan Carpenter, Don Scanlon, Jim Harkins, John Carpenter, and Jim Lipman. All ascents were by the southwestern face from Timberline

Lake. Mount Tyndall (14,025) was climbed July 24 by several parties from camp at Wright Creek, as was Mount Barnard (14,002) on July 24 and 25. Junction Peak and Diamond Mesa were climbed July 23 via Muir Trail to Foresters Pass by David R. Brower and Phil Berry and again July 29 by Hank Tendall and Nancy Slusser from Foresters Pass. Mount Stanford (13,983) was climbed on July 24 and 29 by two parties including Alan Carpenter, Al Childs, Ken Green, Phil Berry, John Carpenter, Mary Alvarez, and Madi Bacon.

Center Basin Crags, numbers three, four, and five (see *A Climber's Guide to the High Sierra*) were climbed July 24 by David R. Brower and Phil Berry. Three pitons and one shoulder stand were used. A first ascent of crag number one was made by Richard Miller, John Carpenter, Phil Berry, and Bruce Owen. The climb was by the southern arête, and three pitons were used. An ascent of Center Peak (12,767) was made July 25 by Peter Farquhar and Roger Hackley by the southeast face (class 4). Mount Keith (13,990) was ascended by a party of five led by Eleonore Ginno. Kearsarge Pinnacles 1-4 were traversed by Don Scanlon and Phil Berry on July 24. Cairns were found on some summits, but only one contained any record. University Peak (13,588) was climbed by the western scree chute on July 28 by Jim Lipman, Ken Green, and Emily Hatfield. East Vidette (12,742) was climbed by Don Scanlon and Nancy Slusser on July 29.

Table Mountain (13,646) was ascended on July 31 by a party from Milestone Bench including Don Scanlon, Bob Breckenfeld, Gurney Breckenfeld, Tom Jukes, Emily Hatfield, Gus Benner, Becky McSheehy, Holbrook Working, Madi Bacon, Anne Reed, and Phil Berry. Milestone Mountain (13,643) was ascended by two parties. One on July 31 was led by Pat Goldsworthy and Eleonore Ginno. The other, led by Phil Berry, climbed on August 1. Altogether thirty persons reached the summit from the camp in Milestone Basin. Mount Langley (14,042) was climbed by a party of eleven led by Eleonore Ginno on July 14. Several small groups made the ascent via Army Pass to Cottonwood Creek on the final day of the trip, August 7.

PHILIP S. BERRY

BASE CAMP, 1953

FROM CAMP at about 9,000 feet in Second Recess various one-day and overnight trips were made to explore the surrounding terrain. In all 554 ascents were made, during which thirteen peaks of more than 13,000 feet were climbed and fourteen peaks of more than 12,000. First ascents included Peak 12,800+ (12,866 on the new map) south of Seven Gables by Jim Koontz and Rosemarie Lenel; Peak 12,736 above Granite Park by Norv LaVene and Hervey Voge; Peak 12,751 northwest of Mount Hilgard by Jim Koontz, Ralph Perry, Al Schmitz, George Wallerstein, and Fred Peters; and Peak 12,100+ (12,241 on the new map) on the west wall of Second Recess. New routes of class-3 to class-5 difficulty were made on Mounts Abbot, Mills, Julius Caesar, Gabb, Recess Peak, and several unnamed summits. Details are to be found in the mimeographed book, *Base Camp 1953*.

JAMES W. KOONTZ, II

A SKI-SLED

BECAUSE ski travel gives all-around convenience in snowy country, and added safety on snow-bridged crevasses, a light and compact collapsible ski-sled could be useful for the mountaineer. Even when the party is not ski-equipped the convenience of the ski-sled may be worth its weight solely as a sled. The sled described below was

constructed as an experimental model and used with varying degrees of success on hard glacial ice in the British Columbia Coast Range and on the soft winter crusty spring snows of California.

On a pair of skis used for touring two metal plates were screwed fore and aft and a hole was drilled through the ski near the binding. (If you are the owner of a pair of fine imported skis you may not see eye to eye with this practice.) On these three points of support on each ski an aluminum framework was mounted. It was built of $\frac{3}{4}$ -inch extruded aluminum angle and fastened together with $\frac{3}{8}$ -inch bolts. The design gives strength and lightness combined with the desired flexibility. The twenty-two pieces that make it up can be completely disassembled. All but three of these are less than 23 inches long and can be easily packed in a knapsack. The other pieces, two 60 inches long and one 42 inches long, are difficult to pack unless strapped to the skis while the disassembled sled is being transported. The width, 22 inches, is enough to give good stability at a height of 7 inches. This height is about right to keep the bed from scraping the surface on rough ice or from offering too much resistance in soft snow. The width is ample for a load of equipment or for a person and yet not too wide for a relatively narrow path. The length, 60 inches, is a minimum for accommodating a good-sized person and about the maximum which can be supported by the skis at points heavy enough for secure fastening and sufficient strength.

One reason for mounting the framework on points as close to the center as possible is to give the skis the desired flexibility that makes this type of sled glide easily.

The $\frac{3}{4}$ -inch aluminum angle permits easy fastening and gives good flexibility. In contrast, tubular construction, though lighter for its strength, would be difficult to bolt together and would be too rigid. Any lighter construction would be too weak under the strains of rough travel while a heavier framework would be unnecessarily strong compared to the strength of the skis. The sled weighs 10 pounds without its ski runners. A magnesium material would make it lighter but aluminum is less expensive—the framework costs about \$11.

It is a disadvantage, of course, that a pair of skis must be made to fit the sled. This alteration weakens the skis; besides the center supporting bolt offers some slight resistance to the running surface. These disadvantages might be overcome by fastening the sled to any skis by clamps. Such modification should also have a less complex arrangement of bolting the framework together; it now requires about half an hour to assemble it. Wing nuts might cut the assembly time to a few minutes.

The sled is designed to be loaded with greater weight toward the rear for best running. Similarly, a person is carried feet first. The load limit depends primarily on the smoothness of the surface. We carried 250 pounds over an undulating hard crust for several miles at a high speed. If the surface is smooth enough, specially at a slow uphill pace, greater loads might be carried. On rough glacier ice, however, a load of 150 pounds may be maximum for the strength of the skis.

This sled and its application to mountaineering is still an object for further experimentation. On a closely timed climbing expedition it might prove valuable, while in a region of unreliable or poor snow conditions I would not recommend it. I would welcome suggestions that anyone might offer as to the sled's use or construction.

LARRY WILLIAMS

[A drawing of this sled may be obtained from the Sierra Club—Ed.]

Reviews

Edited by HARRIET T. PARSONS

WILDLIFE IN ALASKA. By A. Starker Leopold and F. Fraser Darling. Foreword by Fairfield Osborn. Ronald Press, New York, 1953. 138 pages, 22 photographs, 6 maps. \$2.75.

This is, to my knowledge, the most concise and significant summary so far published on the history, present status, and probable future of Alaska's wildlife, and its vital importance to the economy of the Territory. Background facts and figures, though encyclopedic in scope, are introduced so skillfully and tellingly as to heighten the reader's interest. More than half the population of Alaska depends almost entirely on the fish and wildlife resources, which constitute the Territory's greatest source of income. The drawing power of wildlife on tourists is immense and growing; no other area in North America contains such a variety of hooved game. Income derived from Alaska's wildlife is many times greater than that derived from forest and mineral wealth, and official predictions are that this dominance will continue even with the accelerated development of various other resources that now is being actively planned. Therefore, the authors feel that wildlife management should be developed in Alaska as a *primary industry* rather than an "orphan sister" as in the United States.

Much of the book shows how the game-management problems of Alaska are like those in other parts of the world in that restoration and control of the habitat required by the various species is fundamentally more important than the passage of regulations. It is true that protective regulations have been effective for seals, salmon, and other marine life, but this is because man has never been able to change drastically the habitat in the ocean. On the other hand, regulations have not solved land wildlife problems because man-caused habitat changes have been unchecked. The foremost of these changes has resulted from man-caused fires, which burn an average of one million acres annually, and in some years as much as five million acres. Fire has destroyed 80 per cent of the virgin forest of interior Alaska; with it went most of the winter food supply of the caribou, which consists primarily of lichens that require 50 to 100 years, sometimes longer, for regeneration. Concentration on a more effective and better-coördinated fire-control plan by all agencies is at present more important than additional control of hunting and predators.

There was no forest to burn on the west coast of Alaska, but the destruction of the caribou range was accomplished equally completely through overgrazing by introduced reindeer, paralleling the overgrazing of the western range lands of the United States in the early days. As a result of such habitat changes in Alaska, and in spite of an intensive wolf-control program, the only caribou to maintain their primeval numbers are those north of the Arctic Circle, beyond reach of man, where the range does not burn, reindeer have been absent, and wolf-control has been restricted to the fringes of the region.

By contrast, the changes that destroyed the lichens required by the caribou produced browse plants needed by the moose. Therefore, the latter have multiplied and extended their range during the period of caribou decline. However, the authors warn of the danger of a growing moose population, which, if not kept within bounds, may destroy its own food supply, paralleling the deer irruptions of the United States. So great has been the increase of moose in recent years that a liberalization of hunt-

ing regulations that were formulated for an earlier situation of scarcity now appears necessary in some areas to protect the animals' food supply. In view of these conditions the authors question a rigid system of wolf control for the protection of moose on currently overstocked ranges, or predator control when applied as an end in itself in any area. Rather, they consider that instead of extermination, "regulating wolf numbers can be a delicate tool in regulating caribou numbers," as well as those of moose, and of deer in southeast Alaska.

The chapter on the status of the reindeer, summarizing a much misunderstood phase of Alaska's history, is a classic example of ecological insight and scientific objectivity. Previous attempts to explain the great reindeer die-off had emphasized straying and wolf predation, which actually were secondary factors, and had almost ignored the destruction of the lichen ranges by overgrazing, which was the basic factor. Apparently the fact had been ignored that when the lichens were destroyed on Nunivak, St. Lawrence, and St. Paul islands where there were no wolves, and no caribou for the reindeer to stray away with, the same die-off occurred as on the mainland. In the Old World, reindeer pastures are either given long rest periods on a rotation system, or the tenders are nomads who allow the herds to wander in a natural manner like the caribou of the New World. Since the reindeer of western Alaska have destroyed their winter range, because they were confined on it too closely, and since the Arctic offers poor winter range, the authors conclude that in Alaska the outlook for a major commercial reindeer industry for export is dim. However, they believe that under mobile herding enough animals might be raised to feed the Eskimos themselves.

The chapter on native people in relation to wildlife is an illuminating recapitulation of the disruption and degradation of native ways of life by the white man, as seen by the human ecologist. A generous consideration of native needs in future wildlife conservation programs is urged as a means of rescuing native culture.

Continually the reader is reminded of the pressing need for more research on the management and restoration of wildlife habitat in Alaska before serious mistakes are made. In addition to short-term studies of specific local problems, the need for long-term ecological investigations is stressed, particularly of caribou range problems in an unmodified wilderness. The importance of preserving a wilderness for this purpose in a part of the Brooks Range in extreme northeast Alaska is specially emphasized. Elsewhere in the book the value of this unique wilderness area is mentioned in connection with restoration of the musk ox to its original habitat.

The authors point out the need for designating large blocks of suitable country as permanent wilderness, for the visitor industry, and for wildlife and research because preservation of the quality "which makes Alaska attractive to visitors—the remoteness, the wilderness flavor—is by no means assured." It is shown that wilderness must be designated now, before further drastic changes take place, and that even "the seemingly remote Arctic has been so changed by fire, reindeer grazing, wolf control, hunting, and fishing that there is shockingly little of it left unaltered." Wilderness areas in the Kilbuck and Wrangell ranges are proposed, and particularly in the Brooks Range. Fairfield Osborn in his foreword to the book also adds his plea for the establishment of an Arctic wilderness in the Brooks Range.

The concluding chapter emphasizes that despite past mistakes the condition of Alaska's land resources is far from hopeless. Since they are still in government rather than private hands, responsibility for their proper management is squarely up to the

government. If government planning can be better coördinated, and the ecologic principles of land management applied, the authors visualize "an unusual opportunity for application of . . . conservation to a fascinating and magnificent stretch of country."

LOWELL SUMNER

ALASKA'S FISH AND WILDLIFE. By Clarence J. Rhode and Will Barker. Fish and Wildlife Service Circular No. 17. U.S. Government Printing Office, Washington, D.C., 1953. 63 pages, illustrations by Bob Hines, 16 maps. 25 cents.

Everyone interested in Alaska's wildlife should own a copy of this attractive, authoritative—and inexpensive—booklet, particularly if he is a visitor or hopes to be one. The introduction corrects various common misconceptions about Alaska's climate and shows that the economic importance of the fish and wildlife outranks that of mining. In a section entitled "The Country," the Alaska mainland is shown to comprise four very diverse natural regions, each with its characteristic climate, vegetation, and wildlife: the southern Alaska panhandle, the gulf region, the vast interior, and the Arctic. The Aleutian and Pribilof Islands, each with their unique features and fauna, are treated separately; so is Nunivak Island, now famed as the only U.S.-owned refuge for the musk ox, which was exterminated in arctic Alaska in the early whaling days.

Excellent, well-illustrated sections summarize the habits of Alaska's great variety of fishes, land and sea mammals, and birds. The authors warn that in general big game is not as plentiful as some people have been led to believe, and that the salmon have been depleted by the increasingly intensive commercial operations.

A few mammals are singled out for direct or implied condemnation, particularly the wolverine which is branded "a gluttonous killer," and the wolf, whose predation on caribou is described without qualification as "severe." Biologists question such inflexible attitudes, which are becoming outmoded by modern scientific field research. For an impartial evaluation of the wolf in Alaska the reader is referred to *Wildlife in Alaska* by Leopold and Darling, reviewed elsewhere in these pages.

Terminal sections of the handbook contain a summary of Alaska's current wildlife-protection program, check lists of the fishes, mammals, birds, trees, and shrubs, twelve useful if somewhat generalized maps of species distribution, and a bibliography.

LOWELL SUMNER

ICEBOUND SUMMER. By Sally Carrighar. Alfred A. Knopf, New York, 1953. 262 pages, illustrations. \$3.95.

Sally Carrighar, whose *One Day on Beetle Rock* and *One Day at Teton Marsh* made such a distinctive contribution to the field of nature writing, has written another beautiful book on wildlife, similar in style to the earlier books but covering a longer period of time and ranging over a wider area.

Icebound Summer is a series of short stories about some of the vast multitude of wild creatures that find their way from the ends of the earth to the upper coast of Alaska for the brief period each summer when the ice partially withdraws, the sun shines, and flowers and plants spring into being. For the wildlife it is an intense, dramatic period of courtship, mating, nesting, and raising of young.

The stories, dealing with seals, walrus, polar bears, foxes, lemmings, whales, loons, terns, as well as occasional Eskimos, are as exciting as fiction. At the same time they are highly informative and revealing, and include such accounts as that of the amaz-

ing migration of the restless, overcrowded lemmings which ends in the sea, and of the lonely, pathetic life of a rogue walrus.

Before writing her latest book, Miss Carrighar, for three "icebound summers" divided by three nine-months-long winters, lived with the Eskimos in the village of Unalakleet, went seal- and whale-hunting, traveled extensively by dog sled, and flew thousands of miles by bush plane.

B. S.

THE STORY OF EVEREST. By W. H. Murray. E. P. Dutton & Company, New York, 1953. 193 pages, illustrated. \$3.75.

For one who wishes to refresh his memory of the successive attempts to climb Mount Everest, Mr. Murray's admirably written book provides all that is needed. The whole half century of conjecture, exploration, and assault is lucidly summarized. Yet, here is no mere condensation from the published record; on the contrary, one finds a fresh approach to the subject based on first-hand knowledge of mountaineering techniques, of many of the men concerned, and, finally, of Everest itself. Murray was a member of the reconnaissance party of 1951, which included Bourdillon and Hillary who two years later were on Hunt's great team. Murray, therefore, speaks with authority.

But there is more to it than that. Murray writes with an individuality and charm of style that has earned him a foremost place in current mountaineering literature with such books as *Mountaineering in Scotland*, *Undiscovered Scotland*, and *The Scottish Himalayan Expedition*. So, irrespective of its value as an introduction to Hunt's classic account of the 1953 triumph, *The Story of Everest* is worth reading for its own sake, especially for its comments on the character and purpose of mountaineering, summed up in the author's concluding sentence: "The true value of these expeditions will not be found at any moment of victory, or of defeat, but in the striving and the discovering for which all men are made."

FRANCIS P. FARQUHAR

THE CONQUEST OF EVEREST. By Sir John Hunt, with a chapter on the final assault by Sir Edmund Hillary. E. P. Dutton & Company, New York, 1954. 300 pages, illustrated. \$6.00. (English edition, entitled *The Ascent of Everest*, published by Hodder and Stoughton.)

The Conquest of Everest! For a third of a century we have been waiting for a book with that title. The whole shelf of Everest books, from *The Reconnaissance, 1921* to the Swiss *Everest—1952* required it. Last spring when the news trickled out of Nepal that the climbers were nearing the goal there were great hopes throughout the world; then came the word, *failure*. It was the same old story. But before the word could be spelled out, there followed another flash, so marvelously timed on Coronation Day—Everest conquered! In a trice mountaineers became knights and Tenzing became a famous name. Newspapers all over the world ran the story, and *The Times* issued its "Supplement." But a book was expected and must be written. In Hunt's words, "The demand to tell the story quickly has been urgent and it was written within a month." Under such circumstances one might expect some signs of hasty work. But with Sir John Hunt in charge there could be no such thing. The book proceeds as competently and as thoroughly as did the expedition. It is well planned, it is replete with well-organized information, and it is polished off with a masterful finish.

At first glance one may be inclined to underestimate the book. There is nothing heroic about its appearance, no shout of triumph or display of medals. Nor will the contents immediately entrance the reader or hold him excitedly in suspense. Yet, there

is no lack of dramatic quality in the story, even if the outcome is known in advance. There were obdurate problems to solve, there were frustrations and disappointments, and there were moments when the subjugation of the earth's highest peak seemed beyond the powers of even these stalwart and determined men. As the story progresses, more and more emphasis is placed on the build-up and the self-effacing team work of the members of the party. The Sherpas, at first aloof, become amalgamated in the team. Higher and higher go the men and the stores of equipment until they are established on the South Col, and the stage is set for the final act. The moment is tense. It is now or never. The first assault party, Evans and Bourdillon, supported by Hunt and Da Namgyal, take off on their assignment. It is their task to reach the South Peak, to examine the further route to the ultimate summit, and to attempt the latter only if time permits. They did not fail. The South Peak was reached, over 28,700 feet, not only the highest peak but the highest point on the earth's surface ever reached by man. If the expedition had ended then and there it would have been a notable success. But not for Hunt and his men; they were out to reach their one and only objective, the highest summit of Mount Everest.

At this point Edmund Hillary takes over, both on the mountain and in the book. His chapter will always stand as one of the great passages in mountaineering literature. With the utmost simplicity he tells us what happened. It is a temptation to quote here a few sentences, but they are better read in sequence in the book. Suffice it to say that Hillary's account sets at rest for all time the sensational claims manufactured by opportunists upon the party's return to a world of nationalistic hysteria. One need only examine the record to see that these claims were none of Tenzing's. He appears throughout the book as a man of the finest character, a full partner in the enterprise. All that memorable day of final assault Tenzing and Hillary were tied on the rope together, a pair operating as a unit. As a unit they reached the top, and as a unit they did the things necessary and appropriate to the occasion. One might as well argue whether the left or the right foot took the final step as to assert that one got there before the other. It is to the glory of the human race that two men of such diverse origins and experience could become so completely welded in harmony of movement and singleness of purpose that they could be the instrument of success for the entire party.

In his final chapter, "Reflections," John Hunt brings his part in the expedition to a fitting climax. Here are set forth the reasons for success. First, the work of the earlier expeditions—the building of the "pyramid of experience." Next, the detailed planning in "the proportions of a military campaign." There were other factors, but "above all else," he says, "I should like to stress our unity as a party." And finally the question: "Was it worth while?" And the answer: "For us who took part in the venture, it was so beyond doubt. We have shared a high endeavor; we have witnessed scenes of beauty and grandeur; we have built up a lasting comradeship among ourselves and we have seen the fruits of that comradeship ripen into achievement. We shall not forget those moments of great living upon that mountain." For others, too, there are lasting benefits: the stirring of the spirit of adventure latent in every human breast and the realization that "there is no height, no depth, that the spirit of man, guided by a higher Spirit, cannot attain."

There are many aspects of this book to attract the attention of many kinds of people: there are the descriptions of the journey through the still hardly known valleys of Nepal; the bleak life in the Cwm and the struggles upon the ice fall and the

terrific slope of Lhotse; the experiments with oxygen—open circuit *vs.* closed circuit. There are appendices which will be avidly studied by present and future generations of mountaineer planners, or merely wistful thinkers about expeditions to high peaks. And there are the illustrations from photographs, several in color, superb in their artistry and their appeal to the imagination. It is altogether a book worthy of this great historic event.

FRANCIS P. FARQUHAR

ECONOMIC ASPECTS OF RECREATION IN ALASKA. By William J. Stanton.

Part 1, Volume 1, of the Alaska Recreation Survey being conducted by the National Park Service. Department of the Interior, Washington, D.C., 1953. 199 pages, photographs, maps, charts.

This report summarizes two studies made by the University of Washington Bureau of Business Research, under contract with the federal government: one, a preliminary study of Alaskan trade, industry, economics, and their recreational implications; the other a study of tourist facilities together with an economic evaluation of the tourist industry in Alaska. The survey, of which these studies are parts, was initiated by the National Park Service in 1950. Of particular interest are the suggestions for expanding facilities at McKinley National Park—with the possibility of a lodge at Wonder Lake, camp grounds, and other conveniences for visitors coming to the park by the new Denali Highway, scheduled for completion in 1955. Also stressed are the need for overnight accommodations for tourists at Glacier Bay National Monument, museums, and informative signs.

DOROTHY VARIAN

THE MOUNTAIN WORLD 1953. Edited by the Swiss Foundation for Alpine Research. Harper and Brothers, New York, 1953. 220 pages, illustrated. \$6.00.

This book is the first of a new series on mountaineering, with further volumes to be added annually. The purpose is to provide an annual review of the preceding year's major mountaineering expeditions of all nations. British, American, French, and German editions will be published simultaneously.

The story of the Swiss 1952 Everest expedition which reached 28,200 feet and helped to find the way for the successful British expedition, forms the greater part of this volume. Although each member of the Swiss group contributed at least one chapter, the account reads quite smoothly. It is introduced by a survey of the previous attempts on Everest, written by Marcel Kurz.

Other chapters describe the geology near Everest, a journey through Nepal, the life of the noted Swiss climber Gustav Hasler, a geological exploration of northeast Greenland, and two Andean expeditions. The latter are of special interest to climbers. In one, Hans Ertl describes the 1952-1953 German expedition to Bolivia and gives spirited accounts of heroic solo and two-man ascents of Illimani (21,260), Kondoriri (19,420), Hancouma (NW peak, 20,970), Illampu (20,830), and Sajama (21,425); some of these were first ascents. In the other Andean chapter, Piero Ghiglione tells of first ascents of Solimana (20,746), a peak of Aussangate (21,326), a summit of Coropuna (21,425), and some additional lesser south Peruvian peaks. His group included an Italian, an Austrian, and a Swede, and, like the German group, demonstrated the opportunities for exploration and achievement in the many incompletely known regions of the Andes.

The printing, binding, and photographs of *The Mountain World* are excellent. There are several illustrations of real dramatic content, including Ertl's "Ladder to Heaven," and a 3½-foot panorama of Everest and neighbors. It is hoped that the

publishers will continue this series, which can bring to readers of English much that would otherwise be published only in French or German. The international representation is not well balanced in this first volume, and some criticism against the British in the survey of Everest history is harsh. But these defects detract little from the value of a generally outstanding volume.

HERVEY VOGÉ

TIRICH MIR. The Norwegian Himalaya Expedition. Translated by Sölvi and Richard Bateson. Hodder and Stoughton, London, 1952. 192 pages, photographs, maps. 21 shillings.

The various members of the Norwegian Himalaya Expedition give here an account of the first ascent of the highest peak in the Hindukush mountains. Northeast of Nanga Parbat, Tirich Mir (25,264 feet) has always been considered one of the most difficult of the high Asian peaks, and many attempts had been made by others before this successful one. The narrative probably loses in the translation, because the style is not inspired. But it is always interesting to see how each one of these expeditions from different countries, lured by the same dreams, plans its trip, gets under way, and carries on the venture.

EVOLUTION OF THE CALIFORNIA LANDSCAPE. By Norman E. A. Hinds. Bulletin 158, State of California, Department of Natural Resources, Division of Mines, 1952. 240 pages, illustrated. \$2.50.

Professor Hinds, of the Department of Geological Sciences, University of California, has brought together information about the evolution of the landscape of various parts of the state, using the language of the layman rather than the technical vocabulary of the geologist.

Those who know Hinds's *Geomorphology* will find familiar pictures and material. However, the arrangement is different. The state is divided into regions or geomorphic provinces. The origin and development of each is then discussed in general and in detail. Naturally, the Sierra Nevada has an important place in the book, occupying about one-fourth of the pages. The other ranges, the deserts, the Great Valley, the Modoc Plateau, and the sea floor are described in the other eleven sections. The sections on those parts of the state for which less material is available are not as informative as others, though still interesting.

The abundant illustrations include drawings, maps, and photographs. A 20-inch shaded relief map and a geomorphic map of California are in the map pocket of the book.

Because each section is inclusive enough to be read alone, one who reads the book from beginning to end will find a certain amount of repetition. Nevertheless, the book is interesting and useful for trips in the state.

MARY ACELIA CHAMBERLAIN

THE OPENING OF THE CALIFORNIA TRAIL. By George R. Stewart. University of California Press, Berkeley and Los Angeles, 1953. 115 pages, illustrated. \$3.75.

This is the story of the first wagon train to reach California by a direct crossing of the Sierra Nevada. Leaving the established Oregon Trail at Humboldt Sink in October, 1844, the Stevens party pioneered a trail across the Forty Mile Desert, up the Truckee River canyon to Donner Lake and finally over the true summit where

now the railroad runs, and down the Yuba River to Sacramento. The central narrative is taken from the reminiscences of Moses Schallenberger, then a boy of seventeen. It is a lively, graphic story of the journey and of his own lonely winter at Donner Lake when he was too weak to travel with the others and was snow-bound in a tiny cabin with an occasional trapped fox as his only food. George Stewart has supplemented this account with an extensive introduction, notes, and photographs, which show his careful research into the records and his familiarity with the ground over which the wagons came. Comparison with the Donner party is natural. Both parties were trapped by snows that were measured in feet rather than inches; but the Stevens party was well led, efficient, and congenial. They came through a terrible experience with morale so high they offered to pay with their labor for the stray cattle they had shot for food on their way into the Sacramento Valley. Of particular interest are the aerial photographs of the ancient wheel tracks of the wagon trail meandering beside U.S. 40 through the desert, and of the long granite slope at Donner summit up which the wagons were dragged. This is an excellent reference book as well as delightful reading.

CICELY M. CHRISTY

INDIAN LEGENDS OF THE PACIFIC NORTHWEST. By Ella E. Clark, with illustrations by Robert Bruce Inverarity. University of California Press, Berkeley and Los Angeles, 1953. 225 pages. \$4.50.

The Indians had their own explanations of the origin of the Pacific Northwest's natural beauties—the peaks of the Cascades and the Olympics, the mountain lakes, the rivers and waterfalls. It was a land of gods and demons, and fabulous animal people. These brief tales are enjoyable reading, and there are the usual interesting parallels (such as the Deluge, and the origin of fire) with other folklore of the world, of whatever place or time.

V. S.

THE CONSERVATION YEARBOOK: 1953. A directory and guide to facts, figures and people in American conservation. Edited by Erle Kauffman. The Conservation Yearbook, Washington, D.C., 1953. 320 pages. \$5.50.

This is the second annual edition of a reference book valuable for writers, editors, lawmakers, public administrators, and others concerned with the conservation of natural resources. Adding a chapter on conservation education, the compilation again offers essential facts and figures on soil and water, forests and forest products, wildlife and fisheries, rangelands, parks and wilderness. Officers and vital statistics are listed for the Sierra Club and more than 500 other organizations. There is a roster of the national parks, monuments and forests, wildlife refuges and wilderness areas, state parks and state forests. Publications in the field are listed, and there are economic and political data on income, government, population, etc. The editor sums up his purpose: “. . . to report annually on the extent and condition of the conservation estate—key areas under organized protection and management.”

F. G.

YALE CONSERVATION STUDIES. Volume 1, Number 1, 1952. Yale Conservation Club (New Haven). 84 pages.

The novel degree of Master of Science in Conservation led Yale graduate students to conservation studies which are now collected in this small volume. Most of these theses indicate a theoretical approach rather than practical experience in the wide range of subjects, but this in no way discredits the thorough grounding in funda-

mentals this fine study offers. Fairfield Osborn, in the foreword, says this book could appropriately be called "The Study of Man in Relation to His Environment," and the variety of subjects indicates a serious effort to live up to such a title.

The papers are of special interest to conservationists because of the promise implied in the establishment of the new degree. It is to be hoped that we can follow the careers of the authors; they should be able to contribute greatly, in their various fields, to the cause of conservation. From the first article by Edmund W. Sinnott, dean of the Yale Graduate School, "Conserving the Intangibles," through such familiar subjects as "The Promotion of Good Forestry on Private Woodlots" to the different but equally important "Sewage Sludge as Potential Fertilizer in the United States," and a wide range of other subjects, we realize the value of such studies. It is worth-while reading for those of us who are sometimes accused of being one-sided conservationists, because we deal principally with the current and rather overwhelming subject of preserving the wilderness areas in our national parks and forests. The comprehensive study and coordination of the many elements in the conservation field must become standard procedure if this nation is not to outgrow its basic national resources.

ARTHUR H. BLAKE

RESOURCES AND THE AMERICAN DREAM: Including a Theory of the Limit of Growth. By Samuel H. Ordway, Jr. The Ronald Press, New York, 1953. 55 pages, diagrams. \$2.00.

This unpretentious little book should be read by everyone concerned with the overconsumption of our natural resources, and even more so by those who are unconcerned. It is an engrossing essay which discusses the American dream of an ever-higher level of living, what that dream can do to our resources, and how it can produce scarcities which destroy the dream and with it our present culture. Mr. Ordway does not believe that the pressure of population is so much responsible for the drain on our natural resources, as the expanding industrial economy. He gives us his theory of the limit of growth. He feels we must eventually reach that limit, because the levels of human living are constantly rising with the mounting use of our resources, and because each year we are spending more resource capital than is created. "If we are prepared for it [the limit of growth], if we accept in advance the fact that higher values in life are not material; that the Good Life is dependent on spiritual freedom and self-sufficiency as much as on new motor cars . . . on luxury and leisure (truths forgotten in our great prosperity), we can ease the transition. Therefore it is important to prepare now." He believes that if this limit is reached unexpectedly, irreparable injury will have been done to the social order. He does not suggest stagnation, but a more balanced civilization—a voluntary checking of the furious expansion so prevalent in the industrial world we live in. "Free enterprise has developed in the United States the most expansive industrial civilization the world has known. It is essential to our culture that free enterprise balance its resource budget and thus preserve its own freedom We can hope and work for continuing growth as our technologists deliver on their promises, but growth itself is less vital than stability with freedom."

THE CALIFORNIA CONDOR. By Carl B. Koford. Research Report No. 4, National Audubon Society, New York, 1953. 154 pages, illustrated. Paper, \$3.00.

This study was made in cooperation with the University of California at Berkeley

in an endeavor to learn the causes of the decline of the condor and to find means by which this can be checked. Unusual photographs and detailed accounts of the condor's behavior, all of which were obtained after long and careful work, make this book interesting not only to ornithologists, but to all conservationists who are concerned with the preservation of this great bird.

A GUIDE TO BIRD FINDING WEST OF THE MISSISSIPPI. By Olin Sewall Pettingill, Jr. Oxford University Press, New York, 1953. 709 pages. Illustrated with line drawings by George Miksch Sutton. \$6.00.

No book is likely to be of more use to bird students in the western United States than this publication, which continues a series of familiar identification guides in various fields. A companion to the same author's guide to the eastern states which appeared in 1951, this volume covers the 22 states west of the Mississippi River. Each state is treated in a separate chapter in which the general topography, biotic communities, and such ornithological items as peak migration dates and winter populations are discussed. Following this general account, specific areas are taken up and detailed directions given for reaching the spots where birds can be expected. The kinds of birds to be found are listed. Special mention is given to the major national wildlife refuges, national parks and monuments, and to the many state and private sanctuaries. Of interest too, is the suggested reference material which includes general works, regional publications, maps, and travel guides. In preparing this book, the author has been aided by hundreds of students all over the west who have contributed their intimate knowledge of particular areas to the enrichment of the whole. Certain chapters have been written entirely by specialists—for instance, Drs. Charles G. Sibley and Howard L. Cogswell for California, and Mr. Gale Monson for Arizona. A minor fault is the listing in the index of certain place names only under the general terms of Canyons, Rivers, Points, Sloughs, or Parks. This, however, does not detract from the worth of the book, which is a valuable addition to the library of bird watchers.

ALEXANDER SPRUNT, IV

INSECTS CLOSE UP. A Pictorial Guide for the Photographer and Collector. By Edward S. Ross. University of California Press, Berkeley and Los Angeles, 1953. 80 pages. 125 photographs and drawings, 8 in color. Paper, \$1.50, boards, \$2.25.

If a superb photographer and a top entomologist join hands to produce an illustrated book on insects, it's bound to be good. The photographer is Edward S. Ross, a nosy little boy who used to look under rocks and grew up still doing the same; and the entomologist is the Curator of Entomology at the California Academy of Sciences—Edward S. Ross. This situation makes for harmony between the "two" makers of the book.

It is not a "learned" book, yet a book from which anyone from seven to seventy will learn a lot while looking at the pictures and enjoying the brief sketches that go with each. He is a rare scientist who can, without talking down, pick the most dramatic episode of some insects's life, photograph it, and tell it in straight language.

Such hair-raising episodes as that of a wasp which has just paralyzed a grasshopper by its sting (and you'd better read yourself what happens *then*) are followed by charming ones about butterflies and all manner of interesting tales about the bug world from the earwig to the rhinoceros beetle. Most facts should be new to those who realize the existence of insects only when they crawl into sleeping bags. For

example, I was fascinated by the mosquito that emerges from its pupa in the water by puffing itself full of air (from an air bubble conveniently located inside the pupa, but outside the insect), until its abdomen will split the narrow pupa shell.

The closing section of the book, called "Insects for Pleasure," tells all about how to collect and photograph the insects—photograph, incidentally, by patiently waiting for your chance, not by what the author calls "nature faking," that is, catching and killing the bug and then photographing it posed.

I have a hunch you will no longer mind being bloodsucked by a mosquito after looking at these pictures and reading this delightful little book. MAX KNIGHT

SPORTSMAN'S COUNTRY. By Donald Culross Peattie. Houghton Mifflin Company, Boston, 1952. 180 pages, illustrated. \$3.00.

This is a little book of a dozen chapters, each with a game animal, bird, or fish as "hero." It makes delightful reading for relaxation, yet it carries a powerful argument for wildlife preservation. The subject of each chapter—mule deer, hawk, trout—is presented against a background of local ecology as an essential cog in the delicately balanced wheel of life.

Mr. Peattie is a poet at heart and there are a few exaggerations for poetic effect. Nevertheless, more power to the poets! They have probably created more friends for the wilderness than all the scientists can claim. The charm of all outdoors is here, and both sportsman and armchair traveler will enjoy this book.

CICELY M. CHRISTY

THE DESERT YEAR. By Joseph Wood Krutch. William Sloane Associates, Inc., New York, 1951 and 1952. 270 pages. \$3.75.

A man who had been in the habit of quietly observing living things moved from New England to the Southwestern desert for a 15-month interlude in a land that had fascinated him from first sight. Now he enjoyed an entire cycle of seasons, with time to watch and to absorb. But what an unfamiliar cycle! This imperceptible swing of scarcely differentiated seasons was in amazing contrast to the extremes of New England's year.

There is a leisurely pace to Joseph Wood Krutch's writing, a digressive thoughtfulness, that suggests a reflective stroller watching, listening, pondering, and unhurriedly arranging his impressions. "Desert" is not necessarily barren. "My Lower Sonoran Desert . . . supports life, less crowded than in wetter regions, but pleasantly flourishing. Nature does not frown here, she smiles invitingly." Light and leisure pervade everything.

Krutch has a strong feeling for undisturbed terrain. Contrasting his desert world with the more crowded one he was accustomed to, he remarked, "Here man [is] able to live in nature without being compelled, as in cities he is compelled, to destroy her." He values the opportunity to observe rather than interfere with the processes of nature.

The reader cannot go through *The Desert Year* without sharing some of Joseph Wood Krutch's feeling for the cycle of life—on the desert or elsewhere. He must sense Krutch's conviction that—if we but leave them a few stretches of undisputed land—these natural processes will still go on as surely and as interestingly as they have since a shadowy beginning, enriching and perpetuating our natural world.

C. E. M.

THUNDERBIRD PASS. By Adrienne Jones. J. B. Lippincott Company, Philadelphia, 1953. 222 pages. \$2.50.

A story for young readers, of a thirteen-year-old city boy who learned to know and love the mountains at his uncle's pack station in the Sierra. Written by a Sierra Club member who also knows and loves the mountains, this pleasurable and often exciting tale pictures very graphically life in the high country and on the east side of the Sierra.

THE MOUNTAIN. By Henri Troyat. Translated from the French by Constantine Fitz Gibbon. Simon and Schuster, New York, 1953. 122 pages. \$2.50.

The French title *La Neige en Deuil* suggests the psychological aspect of this book better than the American one. It is a short, dramatic novel about an airplane crashed near the summit of a Swiss mountain, and the climb of two brothers from the village to the plane. Their motives are distinctly different. The climb is absorbingly described, and the story with its background of the village and the surrounding mountains is beautifully done.

FOOD PACKING FOR BACK PACKING. By Ann and Gerry Cunningham. Gerry Mountaineering Equipment Company, Ward, Colorado. 1953. 27 pages. \$1.00.

This booklet makes worth-while suggestions in meal planning and food packaging for minimum weight and maximum nourishment. Menus affording variety and ease of preparation; foods chosen for keeping quality, nutritive value, and tastiness; and methods of packing for shipment, airdrops, and caching are included. The plan permits adjustment of food intake per day according to activity, even though meals are prepackaged individually, and there is flexibility by having "supplementary" items to fill out the "basic" meal plan.

The scheme presented appears especially valuable for long trips, trips by large numbers of people, or parties consisting mostly of men. The 3700 calories of the two pounds of food per man-day would permit a great deal of activity for a man and about maximum activity for a woman.

Drawing from my own experience I would like to make a few suggestions. Instead of using canned potted meat for lunches, as recommended by the authors, use dry Italian salami, which keeps well and has no can weight; instead of using eggnog mix exclusively, try instant puddings for variety and greater nutritive value; instead of dry and crumbly crackers, use Russian rye bread and pumpernickel, which keep well for several weeks; instead of cocoa and sugar for the morning drink, use Hemo, a mineral- and vitamin-fortified chocolate beverage which provides more nourishment, is easier to prepare, and weighs less (1.3 ounces per day). Dried fruits were not used in the sample menus although they are nutritious and could easily be incorporated into breakfast and lunch. Also, I do not see much advantage in the recommended instant tea, considering the weight of the breakable jar, when 32 individual tea bags weigh only $2\frac{1}{2}$ ounces.

A final comment on nutritional adequacy: The foods themselves probably supply enough vitamins and minerals, with the exception of vitamin C. It is definitely desirable to take this in the form of 50-milligram pills twice a day. To take vitamin-B tablets would be a waste in this diet—they will only be excreted. The caloric intake is perhaps overemphasized for a trip of a week or two for average-weight persons.

MILDRED JENTSCH

KNOTS FOR MOUNTAINEERING. By Phil D. Smith. The Desert Trail, Twentynine Palms, California, 1953. 10 pages, 55 drawings by Rodney H. Smith.

An interesting little pamphlet nicely prepared and printed, discussing commonly used knots and methods of tying. Unfortunately, the treatment is far too technical; and there is no glossary, no index, no bibliography. Twelve pages of this kind of information could have been provided simply by a reference to *The Book of Knots* (3,854 of them) by Clifford W. Ashley, published in 1945. On page 62 Ashley has a section "Occupational Knots for the Mountain Climber" but, unfortunately, although Ashley knows knots he does not know the problems involved in climbing. Thus there is still a need for Smith, Ashley, and an expert climber to take some of the strength data on knots from the Sierra Club article "Belaying the Leader" in 1946 and from various issues of *Appalachia* and *The Alpine Journal* and thus prepare a good pamphlet on knots for mountaineering.

RICHARD M. LEONARD

ALPINE GLACIERS. By A. E. Lockington Vial. The Batchworth Press, London, 1952. 126 pages, illustrations, plates, diagrams.

Alpine Glaciers is both a textbook on glaciology and a guide book to the glaciers of the Swiss Alps. The author, a member of the British Glaciological Society and a Fellow of the Royal Photographic Society, explains the inner working of glaciers by taking the reader to the ice fields of Switzerland. There, after properly equipping him, he discusses the different types of glaciers, the dynamics of ice movement and moraine formations, and some questions still being argued among glaciologists.

As he threads his way down from the upper névés through the intricacies of crevasses and ice falls to the rock-strewn termini, he weaves into his presentation the early bickerings of glacial scientists and thrilling tales of narrow escapes—just as any seasoned guide is accustomed to do. Occasionally he cautions of some hazard and tells how to avoid it.

As he develops his points, he illustrates them with reproductions of exceptionally artistic photographs, gathered over many years from forty Swiss glaciers—reproductions which, I suspect, have not done justice to his excellent photographic work. He even tells us some secrets of how to take good pictures on these glaring fields of ice and snow. Here is one book on Switzerland that favors the spectacular in the valleys over the sensational on the summits.

By the time our tour is finished, we feel we have acquired a good working knowledge of glaciology and familiarity with the glaciers in the Alps.

OLIVER KEHRLEIN

FIELD GUIDE TO THE MAMMALS. By W. H. Burt and R. P. Grossenheider. Houghton Mifflin Company, Boston, 1952. 200 pages, illustrated. \$3.75.

Another invaluable book in the Peterson Field Guide series, which gives the field marks of all species found north of the Mexican border. As the preface reminds us, mammals are more nocturnal and secretive in their habits than birds and therefore more difficult to see and identify in the field. This book, as far as possible, attempts to indicate which kinds might be confused. The endpapers and illustrations in the text give the tracks of the animals, showing size and shape. The many distribution maps are important and useful, and the colored drawings have the double virtue of accuracy and artistic appeal. The book is small and light as a field guide should be.

More Books from the Sierra Club

For the convenience of members, the Sierra Club office carries a few books by other publishers which were written by members or which pertain particularly to the club's fields.

A Sand County Almanac, by Aldo Leopold (Oxford, \$4). As the author writes in his foreword, "There are two kinds of people; those who can live without wild things and those who cannot. These essays are the experiences and dilemmas of one who cannot."

Round River, by Aldo Leopold (Oxford, \$3), is more of journal than of essays and reveals more of the experience out of which Leopold wrote; of how he came to notice "that a deer's taste in scenery and solitudes is very much like my own."

Every conservationist (who cannot be one?) might well own two copies of *Sand County* and *Round River*—one copy for constant reference, the other for constant loan.

The National Parks: What They Mean to You and Me, by Freeman Tilden (Knopf, paper edition, \$1), by example, anecdote, and pervasive good humor makes the reader understand why the parks are what they are and why they should remain so.

Birds and Mammals of the Sierra Nevada, by Lowell Sumner and Joseph Dixon (\$7.50); *The Incomparable Valley: A Geologic Interpretation of the Yosemite* (\$3.75), and *Sequoia National Park: A Geological Album* (\$3.75), both by François E. Matthes; and *The Sierra Nevada: The Range of Light* (various authors; \$5.00)—these are books that will add greatly to an understanding of the Sierra scene.

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