

SIERRA CLUB BULLETIN

November
1958



San Francisco, California

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Sierra Club Bulletin



Tenaya Tragedy

By ANSEL ADAMS

MANY YEARS AGO—I believe it was 1922—I trudged along the shores of Tenaya Lake in the company of two friends of the human variety and two others of the burro variety. We had come up the steep trail from Yosemite Valley, camping the first night in Snow Creek Canyon. We had selected our next camp by a little stream near what is now the Tenaya Lake Ranger Station. I recall the late evening light glinting on the white granite along the lakeshore. A cool wind was blowing and wisps of smoke drifted through the trees from a fisherman's camp at the far end of Tenaya beach. It was very quiet, except for the wind-breath in the lodgepoles and the hollow chant of falling water in the cliffs above.

The meaning of nature is resonant and clear in such experiences; the solidity and purity of the stone, the expanse of time, the nearness of water, earth and growing things—these are the symbols of a reality beyond the material works of man and beyond the ability of his art to express fully. Such symbols, in actuality and in remembrance, vastly enlarge the spiritual horizons. No one is denied them; everyone who can make the pilgrimages to the wild places may claim them as his own. They are not gained by the swift whirr of wheels on pavement, but more by the contact of dusty boots on the earth. Some of these wild areas are so beautiful and worthy of appreciation that we must make appropriate efforts to render them accessible to the less adventurous people. Appropriate roads can bring us to the thresholds of the cathedrals and even penetrate them if a sensitive attitude controls our planning. This attitude has been lacking in National Park Service developments and must be regained.

Not too many years ago some enlightened men realized the need for the

preservation of the natural scene, and action was taken in the formation of the national parks, and later, in the establishment of the National Park Service. Apart from Muir (and very few others) there was not much eloquence attending this great experiment in civilization; leaders of the movement did what needed to be done with courage and devotion. Sometimes they thought of spiritual experience, sometimes of recreation, but in the main the *protection* of these magnificent moments of the natural world was the dominant theme.

Populations grow, administrative bureaus grow, pressures—complex and often questionable—are to be contended with. It is understandable how the original concepts could become diluted with “developments,” “services,” and the demands of political and public relations. Examples of this condition are many, but we can find a most distressing demonstration at Tenaya Lake. This is not the time to discuss the years of argument, planning, protests, and frustrations attendant on the completion of the fateful twenty-one miles of the Tioga Road. Conservation organizations, acting in an advisory capacity, were inadequate to stop the trend toward engineering domination; protests could be carried just so far—feelings must never be hurt! Road standards were discussed, agreements and “understandings” were expressed. Finally money became available and the bulldozers moved in. The road as built in this region betrays the description of its proposed character to be found in various statements by the National Park Service itself.

So, in July 1958 I came to a Tenaya very different from the one of 1922. I observed progress in the guise of a wide road of maximum 6 percent grade, blasted through forest and canyon, blasted through beautiful swells and ridges of granite, blasted through the mood and heart of a priceless treasure of our natural scene.

True, the tonnage of rocks blasted away is very small in comparison to the tonnage of rock remaining. True that succeeding generations will find some of the scars softened by time and growing things; having never seen some of the blasted rocks they will not especially note their absence. But it is true that they will never know the experience of near-primal nature that a young man of twenty received from his first trip to Tenaya. Magic is an intangible commodity and not understood widely enough. Magic cannot be weighed, priced, or betrayed—and remain magic. For what purpose was this desecration perpetrated?

I am sure that many concerned with this road will have a few sleepless nights when they contemplate the scale of the final damage. Buildings can be taken down or removed and the grass returns; trees can be felled

or burned and the forest will usually return to the skylines; but only another glacier age can heal the scars of Tenaya.

I am an artist who also appreciates science and engineering, and I know we can't keep everything in a glass case—with the keys given only to a privileged few. Nevertheless, I want people to experience the magic of wildness; there is no use fooling ourselves that nature with a slick highway running through it is any longer wild. We need balance; our "progress" has ruined much of it, and unless we all stand and be counted to speak in solemn protest, no one can foresee the end.

The Tioga Road runs for about 50 miles from Yosemite Valley to Tuolumne Meadows. All but 21 miles of this road was completed years ago in the form of a beautifully constructed high-speed road (with posted speed limits of 35 and 45 miles per hour)—the result of which is to get people somewhere fast. Although I feel most of this road is too elaborate for the area, I am not too distressed at its design (except in principle) through the forested areas and in parts of Tuolumne Meadows itself. But there are about five miles of road alongside Tenaya Lake and in the little canyons to the east and west which flagrantly desecrate the principles of national park preservation. Here the road should have been very humble, graded and curved to conform to the greatest possible extent with the configurations of the land, and to effect minimum damage.

I am sure the public would understand a reduction of speed limit to 20 or 25 miles per hour in the most critical three-mile scenic area. We demand reduced speeds in settlements, at certain important road junctions, and in the vicinity of some great natural and cultural features. Such a limit will undoubtedly have to be imposed to make the Tenaya Lake vicinity safe for campers. Respect of the natural scene in the road design here would have reduced speed automatically!

What possessed the minds and hearts of the road people (in the Park Service and the Bureau of Public Roads) to maintain ruinous standards in this priceless area? From what swivel chair and drawing board came this dreadful concept? What pressures destroyed the ideal of minimum damage in maximum wild areas? The road *was* located, hence it must have been walked and surveyed. *Who* walked every inch of the route? What objectives did these people bear in mind when they sought out the optimum route? Did they approach the problem with a deep sense of responsibility to the natural scene, with the desire to seek and plan, to weigh and evaluate the qualities of the terrain, so that minimum harm would come to this fragile place? Or were they concerned with exhibiting the prowess of bureaucratic accomplishment in terms of a

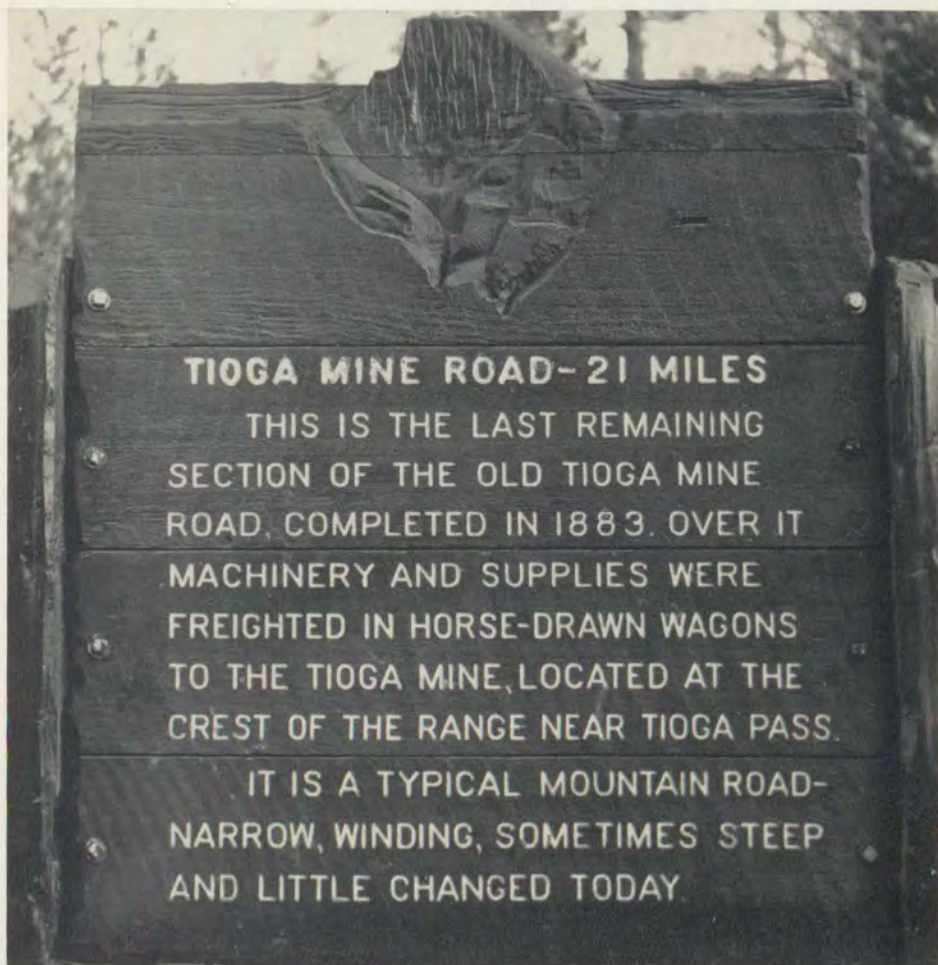
costly example of well-engineered highways? There is a grand illusion in aggressive highways; accomplishment by mathematics and money seems to impress the extroverts, and the manipulation of nature is condoned. As is seen here, all too often a "vista" is something gained by destroying something else. Why not plan a road in such country so that the speeds are automatically restrained to the point that a natural vista can be appreciated? What can one see at 45 miles per hour and at the same time drive safely? From a road of this character the passing scene is just something decorative to hurry by on the way through. Good engineering is *appropriate* engineering, not just construction show-off!

A typical and dangerous attitude toward wildness is revealed in the borrow pit established at the base of the little granite dome (Pyweack Dome) just to the east of the lake. The damage here is aesthetically shocking and probably ecologically severe. Material was needed for the fills of the road in the canyon area. Acres of sloping land near the base of the dome were scraped away. One of the most charming and subtle areas of the region is violated and the excuse is simply: "What are you worrying about? This borrow pit can't be seen from the road" (It *can* be). This would suggest that all areas of the national parks which cannot be "seen from the road" should be returned to public domain—or to the Indians!

We must be fair; while the National Park Service is open to most severe criticism in this Tenaya Lake road matter, so are the conservationists, who should have been alert to possible damage. I, personally, must assume my share of the blame because I failed to do my part before most of the damage was accomplished.

The Tenaya tragedy stands as an example of what must never happen again in national park or other wild areas. The only way we can prevent further depredations is to join firmly in a demand for an immediate moratorium on all construction developments in the national parks until a new and freshly oriented study can be made by competent individuals and groups. A sensitive definition of parks and wild areas must be affirmed, and a vital restatement of the basic National Park Service Act of 1916 must be set up as the fundamental guide for their protection and administration. The guide must be heeded.

The bulldozers of bureaucracy have bypassed the gentle persuasions and advice of our conservation spokesmen. The fruits of compromise are tragically revealed at Tenaya Lake. We need to rededicate ourselves. We have nothing to lose but our wilderness, and nothing to gain but the satisfaction of seeing as much of it as possible preserved for the time to come.



Harold Bradley

IN SEPTEMBER 1958 a sign like this stood at each end of the twenty-one miles of old mining road; but the tense was wrong, for only part of the twenty-one miles still remained and this part had lost its meaning. Progress had come through this part of Yosemite with no thought of changing pace.

One man suggested half-humorously that if the Park Service had kept the old road and charged five dollars for the privilege of driving it, people would have loved it. No one had argued seriously, however, that the road should remain exactly as it was. Modest improvement was necessary if the tail fins were to clear.

The Tioga Road and Tenaya Lake

TWENTY-TWO PHOTOGRAPHS

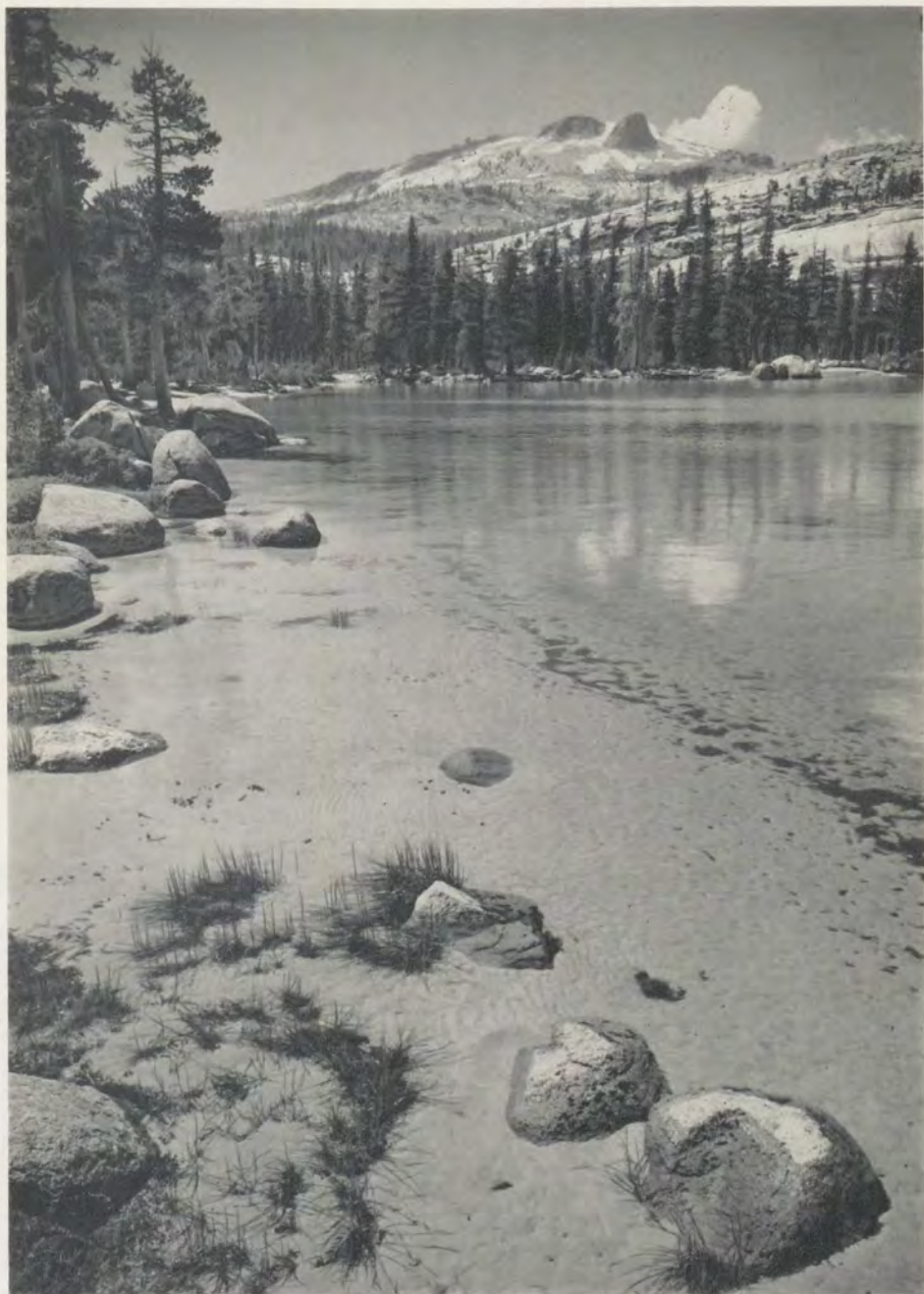


Harold Bradley

The old road relaxed, feeling no compulsion to compete with a turnpike. Great trees towered close, their branches arching. Meadows were right out the window; curves and grades slowed you down enough to see. The road didn't hurry elsewhere; it was *there*, restrained, quite a little like a trail, delightful adventure for some people, too much for others. But that doesn't matter. It's gone now.

Philip Hyde





Ansel Adams

There was solitude in Tuolumne Meadows and at Tenaya Lake, a pleasing, quiet remoteness along the old road. When two hundred thousand people passed by each year, it still looked wild, felt wild. No one knows what two million people a year will bring; nevertheless that is the goal here for Mission 66.

“. . . and wilderness reaches out from the roadside,” says a National Park Service brochure.

But from what kind of roadside? We're not looking at the Tioga Road now, but at two different treatments of meadows in Yosemite Valley, treatments sixty years apart. One carried little traffic and the dust wouldn't stay down. The other carries a million people a year and the dust can't get up. Skipping the figures—something happens in one scene that doesn't happen in the other. What happens isn't obvious, isn't to be weighed, measured, and sold—and is nevertheless important to hold hard to in a park.

They couldn't have done much less to Bridalveil Meadow and still call it a stagecoach road. But much less could have been done to the meadow below the Old Village without hampering access to Yosemite. All that was lacking was sensitivity.

* * * *

Ninety-three years ago, at a time when you'd hardly expect it, one of the most perceptive statements was made about what the philosophy of national park planning should be. In 1865 Frederick Law Olmsted, Sr., one of the greatest landscape architects this country ever produced, had a brief tour of duty in Yosemite that led him to report: "The first point to be kept in mind is to preserve and maintain the natural scenery as exactly as possible." He warned that to sacrifice this value to the "convenience, bad taste, playfulness, carelessness, or wanton destructiveness of present visitors" would probably "yield the interest of uncounted millions to the selfishness of a few."

Half a century later his son wrote the part of the basic National Park Act of 1916 which requires that use of the parks shall be so regulated as to preserve them unimpaired for future generations.

Stephen Mather believed that the parks should be opened to the millions in order to build a strong protective force of public opinion. John Muir had felt the same way. There would have to be some impairment in order to bring the public appreciation that would prevent excessive impairment.

Roads were built and improved. Accommodations were made more varied. Other attractions were introduced. The use figures were built up and the word "visitation" came into the park vocabulary. The protective force had arrived and the park idea was safe even in places that had been little visited. For the great parks, Phase 1 was complete.

The momentum for development of more visitation and appurtenances, however, continued unabated and the concept of "the fatal beauty of Yosemite" could emerge. To borrow a figure, the house had been furnished, properly enough. But now more and more furniture was being piled in, and the foundations were in danger. It was coming in on the ever widening roads.



J. N. LeConte, 1897

*1897–1957 — sixty years, and wilderness retreated from the roadside.
The first phase was complete. How much more pavement for the second?*

Harold Bradley, 1957





"When the line is put through and the grading done, [natural conditions] are changed very radically. The drainage pattern under which the forest grew is no longer in existence. A resulting wind tunnel exposes the remaining trees to strains the root systems were never developed to withstand. Sunlight penetrates where it would never reach under normal circumstances. . . . the result of substantial disturbance of the balance of nature . . ."

CONRAD WIRTH, 1958



The Tioga gap began to close twenty-five years ago, first westward from the pass, then eastward from Crane Flat, the old road making way for the beginnings of another trans-Sierra highway. Carved in the land, not laid on it, the road required wide swaths through the forest, pushed the wilderness back, upset the ecology, inviting and getting speeds of 55 to 75 miles per hour, initiating the road-load spiral of the Second Phase of Visitation—bringing more traffic that demanded more roads the Service would not deny and that would bring still more traffic to create still more demands. Again and again, safety was used as the excuse for the high standards; but it is the new road that kills motorists; the old one never did.

To combat overengineering and undersensitivity the Sierra Club proposed lower standards for national park roads; conservationists concurred and the Park Service Director expressed general agreement, as did a statement the Service published about what it intended to do with national park roads. The remaining 21 miles would be realigned on lower standards, conservationists were assured. They relaxed.

We'll do well to remember Tenaya as it used to be and as Ansel Adams saw it ➤









Ansel Adams

. . . For this is what they did to Tenaya—the most controversial part of the most controversial road—with the approval of all Park Service echelons. Here if anywhere the plans should have been drawn with sensitive fingers. That was what had been expected when the Director wrote in 1955:

“We can put this relatively narrow road—which will be 18 to 20 feet with 2-foot shoulders—through that country with relatively little damage.” That was what had been expected when Dudley Bayliss wrote for the Service:

“They [park roads] are essentially low speed roads, and thereby are more readily adapted to being fitted into the landscape with consequent reduction of construction scars.”

“It will be a narrower and slower road than that section already built,” the Director promised. *“I want to keep it as narrow as we possibly can.”*

Narrow? It is 36 feet wide from stake to stake. This will include a sidewalk, and beyond that is the spoil of blast and dozer, dumped over the sandy, grassy shoreline, torn from the dramatic, lichen-textured talus slope. Yet a road 15 feet wide in all, now carries *all* the traffic between El Portal and Yosemite and could have done as much here.

Slow? “We wiggled it a little,” one Park Service landscape man said. This kept the first 1600 feet of causeway from being absolutely straight.

Sensitivity could have spared Tenaya. *The Park Service which puts up 20-mph signs at ranger stations could have done so here to preserve what only another ice age can now restore.*



David Brower

The new: "Open up!" The old: "May I come in?"

Philip Hyde





Philip Hyde

Where the old road curved up the canyon above Tenaya Lake you could look out—or step out—on glacier polish; erratics rested just where the melting ice left them nine thousand years ago, and grass filled the chinks the sun had split into the Cathedral granite. Now the speed-prompting turnpike has rearranged the park landscape to accommodate—sameness. You drive by erratics that dynamite and dozer have left and pass a dam and blasted stream canal that substitutes for a series of meadows and pools now spoil-filled. But it no longer matters, for speed blurs the close-ups that gave this place meaning, and when the scars begin to heal and the dust settles under black-top, you won't miss what you never knew.

Much of this healing won't happen while we watch. Above Lembert Dome a 25-year-old cut is just as raw as it was in 1933. Below White Wolf the sharp fragments of blasted granite which fell as litter two decades ago look as if they had fallen yesterday. West of Wawona Tunnel the marks are more subdued; there they sprayed the scars with paint.

But the point not to overlook is the basic point. National parks are not places where primary scenic resources are to be desecrated, and the crime against nature rationalized, "They won't be missed." Parks are places where use is to be so regulated that coming generations will find the parks unimpaired. *That is the law.*



Robin Welch



Ansel Adams

Above Tenaya—sacrificed to a six per cent straightaway.

David Brower





Ansel Adams

David Brower



Massive destruction.

The 5.9997% grade gets under way—the old road winding but a few feet below.



Ansel Adams

“[Park roads] are located and designed to best fit the topography. . . .
If possible, the road is ‘laid on the ground’ rather than cut through it.”

—DUDLEY BAYLISS, *National Park Service*, 1957

For the last 21 miles the Director instructed that the standards be made lower than the too-high specifications of the new road west of White Wolf; they were made higher instead. Thus this quantitative damage:

Bulldoze, blast, and fill—750,000 cubic yards of national park sacrificed on a Procrustean roadbed.

Grubbing, clearing, and burning—170 acres stripped and bared to the sun—an average width of 70 feet impaired for “convenience.”

Stream obliteration—17,000 feet of culverts and drains to rearrange water courses and the flora and fauna dependent upon them.

Overload—2,000,000 people a year beckoned to places a tenth of that number is already damaging because of too little protection and interpretation. But more visitation can always be flushed through faster.

Borrow pits—by-product of excessive standards, this one (*upper left*) destroying a fragile juniper-pine association under Pyweack Dome where a trail should have gone, and excused with: “It can’t be seen from the road.”

**“The laws of the Nation require preservation of
wilderness in National Parks and Monuments.”**

—Park Service wilderness brochure, 1957



David Brower

"I have given out definite instructions that I do not want a fast road; I want a narrow road, because it is the width of the road that controls the speed."—CONRAD WIRTH, *Director*, National Park Service, 1955

Remembering Tenaya, let the planners resolve:

1. To rescue the national park for those of all generations who are willing to accept it for what it is, not for what has been added.
2. To restrain road standards—and *adhere to them*—to preserve the change of pace inseparable from deep park experience, encouraging the visitor to slow down, stop, get out, and take enough time to see what the ages have done.
3. Acquire new parks for the increasing load of park seekers, and new recreation areas for the recreation and resort seekers.
4. Leave the park wilderness alone. It contains the finest of the few remaining samples of primeval America and there is no more where it came from. Its wildness must serve all the generations yet to come.

Text: David Brower

Six years after Yosemite was set aside as a park—and two years before Yellowstone was established—a San Francisco man took a memorable walk

“Pedestrian Notes”

By JOHN MAXSON STILLMAN

WE HAD been pent up in school for nearly six months, we six, Dwight Huntley, Robert Hayne, Wendall Jackson, Sam (?) Hall, Bill Robinson, and myself, and as the summer vacation approached, someone broached the idea of a pedestrian trip to Yosemite. After an immense amount of calculating, we decided that we could make the trip with a load of about twenty pounds apiece and with ten dollars each in cash.

Thus it happened that at 8 o'clock in the morning of May 31, 1870, we started on the Central Pacific, furnished with canvas bags with provisions, and all the necessities that a month's deliberation had suggested to us. Our arms were a rifle, shotgun, revolver, hatchet and hunting knife. We were provided with a half-fare ticket to Stockton by the liberality of Governor Stanford, the president of the road, and with a note to the conductor to stop at French Camp, a place five miles this side of Stockton and not one of the regular stations. About noon we arrived at our destination, where we apportioned the baggage and commenced our march in high spirits, amidst the comments of the natives. Some predicted our safe return, others that we would be obliged to give up without accomplishing our purpose, and all agreed that we would be heartily sick of it before we came back.

Our first sixty miles, we knew, would be over the San Joaquin plain, where we had been led to expect little comfort. True enough: as far as the eye could reach, extended a broad, level, and dry expanse of plain. Still, we were determined to make the best of our condition and not grumble. We walked steadily on for the rest of the afternoon until we

The author, born in 1852, was a student at the University of California, later an instructor there. He was head of the Chemistry Department at Stanford University from 1891 to 1917, and vice-president of Stanford from 1913 to 1917. He died in 1923.

Professor Stillman was an early club member—one of his articles appeared in the *Sierra Club Bulletin* of January, 1897. The present journal, written when the author was 18 years old, was recently discovered by his daughters, Miss Minna Stillman of Stanford and Mrs. Dorothy S. Duryea of Palo Alto. Mrs. Duryea's two sons, the Reverends John S. and Robert F. Duryea, are life members of the club.

came to Atlanta, ten miles from French Camp, a place where we expected to find a town, as was indicated on our map. However, we found only two or three houses, to one of which a bar room was attached. About a quarter of a mile beyond here, we decided to stop for the night. We left the road and went into a field under the shade of a large oak, where we kindled a fire and prepared a meal. This consisted of half a dozen doves which we had shot during the day, besides the provisions which we had brought from home. While seated around the fire, roasting our doves on sharpened sticks, we were surprised by the farmer who owned the field and had been attracted by the fire. We expected to be obliged to leave on the instant, but he greeted us in a very friendly manner, only cautioning us against allowing the fire to spread. We told him we had already provided against this. He, like almost everyone else, was astonished at the labor of our undertaking, but encouraged us, and we parted with mutual good feelings. After dining, the next consideration was sleeping. We had but three blankets, and we found that, with these accommodations, five could sleep quite comfortably, but no more. We decided, moreover, that a fire would greatly promote our comfort. Hence we made the following arrangement: We divided the night into six watches of an hour and a half each, drawing lots for the succession. Each one was to wake up his successor, taking his place under the blankets. The one who had the watch was supposed to keep the fire bright, and was armed with the revolver and hatchet in his belt, rifle on his shoulder, bowie knife in his teeth, and shot-gun loaded and within convenient reach. He was also to have a watch, the property of Dwight Huntley, who, on account of superior age and general usefulness, had been chosen leader of the expedition.

On this night I had the second watch. I thus had the privilege of sleeping an hour and a half before my turn came, but the situation was so novel that I did not get to sleep before my watch. During my watch I wrote my diary, which I kept up during the trip, and, at length, having awakened my successor, I turned in and slept soundly until the whole party were aroused at the expiration of the last watch.

June 1.—Having eaten our breakfast, we packed up, reappportioning the baggage, and at ten minutes to six were on the road. All forenoon we walked over the hard, hot ground, and by noon the feet of some began to be blistered and inflamed, and we were glad to stop in the partial shade of a straw stack to rest our feet and eat our lunch. In an hour and a half we resumed our journey, stopping, wherever opportunity offered, to bathe our feet and wet our handkerchiefs, which we placed in our hats to guard against the effects of the overpowering heat of the sun. By three o'clock

we reached the Stanislaus River at Leech's Ferry, where two or three took a bath in the river and the others rested in the shade of a tree. After a while we were ready to cross and exerted our lungs in a vain effort to call the ferryman who lived in a house on the opposite bank. Then Hayne, the swimmer of the party, stripped, swam the river, and went after him. The boatman having appeared, we held a discussion across the river as to terms, which ended in the reduction of the ferriage from \$1.50 to \$1.00 and finally to fifty cents. This being satisfactory, we crossed over, taking the baggage and Haynes' clothes with us. Arrived on the other side we selected a spot to camp, and then two or three tried fishing while those who had not bathed before, did so now. Those who were fishing, having caught two or three fish and lost two or three hooks, desisted and all set to work preparing dinner. This being dispatched, we decided the one who had first watch the night before should have second watch this night and so on. We then went to sleep.

June 2.—We arose early this morning, fresh and ready to start. For three miles we traveled through country which, though level and warm, was tolerably well wooded with oaks, and then we emerged on another plain hotter and drier, if possible, than the previous ones. We toiled on until about eleven o'clock when we stopped in the shade of a deserted shepherd's hut and ate our lunch, then traveling on until we came to the Tuolumne River. This river is wider and deeper than the Stanislaus at the place where we crossed it (and also muddier). All the rivers on the plain are muddy, owing to the mining operations carried on above. At the ferry, after a little coaxing, the man promised to let us cross for fifty cents if Hayne would swim. No sooner said than done, and we were soon all safe on the other bank and on the road to Morley's Ranch four miles ahead, where we were informed we could get milk. Arrived here, we obtained three quarts of milk, which, though not sour, yet hardly could be called fresh. Still it came to us, tired and hungry as we were, quite acceptably. Mrs. Morley also gave us a piece of beef for which we heartily thanked her, and, making a fire, we roasted pieces of it on sharp sticks. Our dinner disposed of, we were consulting as to the best location for our camp when our host volunteered to let us sleep on the floor of his haybarn, which was covered with fine straw mixed with dust and wild oats. We accepted the offer gratefully and slept without keeping a watch. This day we had walked twenty miles over a dry, hot expanse of plain.

June 3.—Before proceeding on our journey we decided to offer to pay Mr. Morley for his kindness, although it had been entirely voluntary, and our leader was chosen to make the offer. He did so, and was informed that

"seeing it's you, I reckon a dollar will be about the thing." We paid without a murmur, secretly resolving to make our terms beforehand in the future.

After leaving this place we traveled on for nine miles to a place where we got some good water, and here we finished our stock of provisions. From there we went on to Snelling's, the county seat of Merced County, situated on the Merced River. This was the neatest and pleasantest town we saw on our entire trip. After purchasing some provisions and mailing some letters for home, we went up the river about a quarter of a mile.

After some difficulty, we succeeded in fording it, having spent two or three hours finding the ford and carrying the baggage across. We then camped on the opposite bank which was smooth and sandy. At last we were off the great plain and out of the region of the locusts, which were thicker than the flies of Egypt. These insects look like small brown grasshoppers and are so called in that region, but are in reality tree locusts. We were now on the border of the hilly country, the edge of the foothills of the Sierra Nevada mountains, whose snowy caps inspired us with new vigor as we saw them glistening in the sunshine during our last day's walk.

In anticipation of the hot weather and up-hill work hereafter, we arranged that he whose watch came last should cook the breakfast for the party so that we could walk as much as possible in the cool of the day. This day we had only gone fifteen miles, as our crossing of the Merced River had occupied some time, and we camped early.

June 4.—The rising sun saw us on our way, following up the bank of the Merced toward the Merced Falls where we were to strike the road for Hornitos, the next place of any importance. The way along the bank was shady, cool and pleasant, passing through fields of grain as fine as any I have seen in counties nearer home, though they were not of great extent. Before we came to the fall, which was not more than four or five feet high, we took a bath in the river. It was refreshing, but so cool that we did not stay in it long. A little further on, and about six miles from our last night's camp, we struck the road and commenced our ascent. The sun now felt even hotter, but the scenery was more varied and we enjoyed ourselves much more in consequence.

We stopped awhile at the toll house, and found that we were not unexpected, as our trip had been mentioned in the *Stockton Independent*. This rather surprised us and somewhat flattered our vanity.

In the afternoon we passed through Hornitos, a lazy, shiftless-looking little place where we made a few purchases. This afternoon my feet, which had so far been in comparatively good condition (though blistered like

the others), became very sore and inflamed. It was only with great difficulty that I could walk over the hot ground, which burned through the thin soles of my canvas shoes.

About five miles beyond Hornitos we came to Morrison's Ranch, near which we halted and pitched our camp in the shade of some trees. Here we obtained some sweet milk, and the next day being Sunday, we determined to stay over one day to rest or make necessary repairs on our clothing. This led to a discussion of religious observances, the result being, as usual, to confirm each in his own particular opinions.

June 5.—We slept rather late this morning, but at length arose, got our breakfast, and while some of the best-conditioned went off in quest of pinenuts, the rest of us stretched the blankets on the ground and employed ourselves writing letters, mending clothes, and discussing poets, authors, and the leading topics of the day. Our explorers returned after an absence of two or three hours, and brought back no pinenuts. They did bring twenty-five or thirty quails' eggs, which we considered our circumstances justified us in taking. Mrs. Morrison, near whose house we were camped, kindly gave us an apple pie, and we bought from her some potatoes and milk. We could not refrain from contrasting her generosity with that of the previous host, Mr. Morley. Early in the evening two boys stopped near us, cooked a hearty meal, and went on their way. They also were bound for Yosemite.

June 6.—We arose this morning much refreshed and walked on at a good pace over a pleasant though rather warm, road. Before noon we had made fifteen miles, arriving at the town of Mariposa. Here we were to obtain all provisions necessary for our walk to Yosemite and as much as we could carry, to assist in provisioning us during our stay there. We found Mariposa to be quite a large town, but with a thriftless appearance that was confirmed by the dilapidated specimens of humanity that crowded around us.

Here we procured stores enough to increase our loads to about twenty-five pounds each, and again went on. A short distance beyond the town we came to a quartz mill which we took a short time to inspect. The road now ascended very rapidly, the temperature climbed to above 100 degrees with not a breath of air stirring. We had emptied most of the water from our canteens in order to lighten our load, and we soon suffered from thirst. The distance to Big Spring was about four miles, and here we planned to camp, but in that four miles we suffered more from heat and thirst than at any other time during the trip.

At last we arrived at our destination, where as the name denotes, a copi-

ous spring breaks out of the mountain. Here we drank our fill and then bathed. There was a deserted cabin near this spring containing two rooms, one having a fireplace, and here we prepared to spend the night. We gathered a pile of dry pinecones from the hillside, together with what wood we could pick up, and placed them in the house. As the night was cold we determined to keep up a good fire. While at this place, several Indians, both men and women, passed by on horseback. They were decently dressed and not as ugly as most of those we saw afterward. Here, too, we met Mr. Hutchings, who keeps a hotel in the valley, and Mr. Lamon, also a resident in Yosemite, to whom we are indebted for many kindnesses during our stay there. We were informed by them that we could obtain plenty of provisions in the valley, which greatly encouraged us.

During the night we kept a watch, as usual, to keep up the fire and because we were suspicious of the Mexicans and Indians, of whom there were a considerable number in the neighborhood. Hence occurred a little incident that served as a standing joke on the party concerned. There were, as I have said, two rooms in the cabin, in one of which we slept. The one who had the watch had gone, about midnight, into the other room to vary the monotony of his hour and a half. Another of the party, awaking and missing him, got up to look for him. He went noiselessly to the doorway between the two rooms and looked in. The watch, startled at seeing someone in the door and not being able to identify him in the dim light, sprang up, and placing the revolver within six inches of his face, called out "who's that?" This was answered by a precipitate retreat to the blankets.

June 7.—By five o'clock we had packed up and started on our journey. We were now almost above the region of the oaks, and the trees were mostly pines which became denser as we advanced. At about ten o'clock we arrived at Thompson's Ranch where we bought some milk and spent about four hours resting and practicing with the rifle and revolver. Here we first saw that beautiful little flower, the Mariposa, which in form resembles the yellow flower commonly called the California poppy but is much more beautifully colored. At last we left this place and traveled on for four miles to a pretty little valley thickly wooded with pines and oaks. Here we camped. During this day's journey, springs were plentiful and the water generally clear and cold. We had come but fourteen miles today.

June 8.—At a quarter past four we were up and on the road for the Big Tree grove which we expected to make before night. Our path led through a dense forest of huge pines, which sheltered us almost entirely from the sun's rays. The road for a good part of the way was freshly dug and the

earth was cool and soft so that even those whose feet were in the worst condition did not suffer at all. The scenery was fine—I was about to say magnificent, but if I use such strong expressions here I will have no terms in which to convey an idea of Yosemite or the Big Trees. In the course of the morning we met several Indians and a pack train of twenty-four mules.

At about noon we arrived at Clark's¹ where the trail branches off to the Big Trees, five miles distant. From here the trail was very steep, in fact it rises about 2,500 feet in a distance of five miles. About half way up we stopped and rested for an hour and while two or three indulged in a discussion on wine-drinking, the others went to sleep. The view from this trail is very fine. On one side are deep valleys, dark and shadowy from the dense pine forest, and enclosed by equally dark and sombre mountains. On the other side, far below us, lay a bright green plain walled in on every side, as it appeared, by almost perpendicular cliffs almost a thousand feet high.

We traveled quite leisurely this afternoon as we intended to camp near the grove and take the next forenoon to inspect it. At four o'clock we pitched camp on the outskirts of the grove, 6,500 feet above the level of the sea, and retired early.

June 9.—We awoke this morning full of ardor, and expecting to be amazed and astonished at the sight of the Big Trees. The trees were scattered around through a forest of large pines and there was a rather indistinct trail winding around to all the larger trees. We lost much time hunting this trail during which time we chanced on some of the smaller of the Big Trees. At length we found it, after we had once or twice nearly given up in despair and denounced the Big Trees, as a stupendous fraud upon a credulous public. After following the trail a short distance we came upon one of the largest of these trees, but were obliged to confess that we were not as astonished as we expected to be. Surrounded as they were by huge pines, six or eight feet in diameter, their immense size did not stand out in such bold relief as we had pictured. But as we advanced further and saw more of them, the consciousness of their height gradually dawned upon us. Lying on the ground and gazing up into their rugged branches, gnarled and broken by the snows and storms of three thousand winters, it seemed almost like a glimpse into eternity. The tops of most of the larger

¹ Galen Clark, an early pioneer, received visitors at his enlarged ranch on the South Fork of the Merced River, after he settled there in 1857 on the site of the camp occupied by the Mariposa Battalion in 1851. (This information and the notes that follow are taken from Carl Parcher Russell, *One Hundred Years in Yosemite*, University of California Press, Berkeley, 1947.)

trees were broken off at about two hundred or two hundred and fifty feet from the base. They were all more or less burnt and blackened by the fires that have swept over the mountains perhaps centuries ago. Into one of these trees was burnt a cavity at the base into which we all went, carrying our baggage with us, and there was room for as many more.

After viewing all the principal trees, and picking up some of the cones from under the "grizzly giant," the largest one, we took our leave of these gigantic forest sentinels. We now returned to Clark's, well satisfied with our view of the Mariposa Big Trees. In some shady spot we had seen, some of us for the first time, the beautiful snow plant, with whose delicate waxlike stem and leaves, and brilliant red color, I was much pleased.

Leaving Clark's we crossed the South Fork of the Merced and traveled on about four miles before stopping to cook our dinner. After that we walked on, in the cool of the evening, until about half-past seven when we stopped, built a fire, and rolled into our blankets, leaving a watch, as usual, to keep up the fire, as the night was very cold.

June 10.—This morning we passed several patches of snow which the sun had not yet melted, and were obliged to walk around several marshy flats, called "The Meadows." By nine o'clock we had reached Inspiration Point, whence we had our first view of Yosemite Valley. We saw it far below us, the Merced River winding along like a slender thread; and on the opposite side frowned the lofty cliffs that with their perpendicular sides, wall in the valley below. After about three miles of steep, rough, and rocky descent, we reached the level of the valley, entering it at the lower end. Well might the Indians who once occupied this valley boast that their stronghold was impenetrable, for it is only by two or three difficult and almost dangerous paths that entrance is attainable, even after so many years of travel by tourists.

Following up the course of the Merced by a wet and rocky trail, we ascended the valley toward Hutching's Hotel, five miles distant. On our right the first object of special interest in a scene where everything is of interest was the Bridal Veil Fall, descending in a snow-white column with a thunderous roar. It plunged from the summit of a cliff 930 feet high, wreathed by a cloud of spray that wrapped the column of falling water like the veil of a bride, serving only to soften and beautify the lovely form.

Nearly opposite stands El Capitan, rising perpendicularly 3,300 feet above the level of the valley. At first glance a person would believe as quickly, if he were told, that it was 1,000 feet instead of 3,300 feet. It is the same with all these cliffs and falls which have made Yosemite one of the wonders of the earth. It is only by comparing them with some familiar

object that one can have any idea of the vast scale on which they are formed. Following up the path toward the head of the valley, we passed on our right the Cathedral Rocks and the Sentinel, so called from the manner in which they stand above the surrounding cliffs. On the left were the Three Brothers, three points that stand on the summit of the valley wall and lean on and support one another in a supposedly fraternal way. Snow was visible on the summit of some of the cliffs, yet all was green in the valley below. We came across some beds of wild strawberries and indulged in fruit for the first time since leaving San Francisco.

We arrived at Hutchings Hotel² early in the afternoon and bought some stores that we were in need of, establishing our camp a short distance up the valley beyond the hotel and close to the bank of the river. Near here we saw the camp of about a dozen Digger Indians. Before dark, however, Mr. Lamon³ came and invited us to come and camp near his place about a mile and a half up the valley. We gladly accepted and, repacking, arrived at Mr. Lamon's cabin at about dusk. Our host showed us where the potatoes were kept and invited us to help ourselves, doing everything to make us comfortable.

June 11.—This morning our friend told us that he was going on an errand above Vernal Fall, and if we wished, he would be our guide and show us the Vernal and Nevada falls. We gladly accepted, and, leaving our baggage at the camp, with the exception of a canteen or two, we started off. Crossing the Merced by a foot log, we followed its course up along a rugged rocky trail which wound among boulders as large as good-sized cottages. Finally we came to a bend in the river where we came into full view of the falls. Here the river, after leaving the fall, dashed on over a steep and rocky bed of granite white with foam, so that for half a mile, not a clear spot of water was visible.

² J. M. Hutchings, "lover of nature and journalist," bought the so-called Upper Hotel in 1864, just a few months before the Yosemite Valley was removed from the public domain and granted to the state to be "inalienable for all time." The mirth and discomfiture engendered among Hutchings's guests by the cheesecloth partitions between bedrooms prompted him to build a sawmill near the foot of Yosemite Falls in order to produce sufficient lumber to "hard finish" his hostelry. It was in this mill that John Muir found employment for a time. The hotel was embellished with lean-tos and porches, and an addition was constructed at the rear in which was completely enclosed the trunk of a large growing cedar tree—the Big Tree room. The hotel has since been dismantled by the National Park Service. There is still a trace of the roof line on the incense cedar.

³ James C. Lamon was a mountaineer who came to Yosemite in 1859, established himself in the upper Yosemite Valley, and there developed the first bona fide homestead by settlement. For many years his log cabin was a picturesque landmark in the Valley, and orchards near Camp Curry serve as reminders of his pioneering.

There are two ways of reaching the top of the fall called "The Ladders," and "The Trail." The latter is the easiest and the longest, while the former is more picturesque. We chose "The Ladders." Following along a narrow, wet, and slippery trail cut by nature in the face of the granite cliff, we at length arrived at the "Ladders," drenched by the spray that is always blowing against it. From here we could look above and see the top of the fall, and looking down into the cloud of spray that continually rises from it, we could see a beautiful rainbow, almost a complete circle. After ascending the Ladders, which rise about 70 feet up the perpendicular side of the cliff, we found ourselves on a level with the top of Vernal Fall.

Along the edge of the cliff over which the river takes its mighty leap, there extends a natural rampart, or wall of granite, over which we could lean and look down with perfect security into the roaring depths 350 feet below. We were within six feet of the fall itself, and we dipped up water to drink just where the river leaped from the cliff. The bed of the river above this fall is solid granite, worn and rounded by the waters which for thousands of years have swept over it. Not a rock or pebble obstructs the course of the river, as all have been swept away by the swift current. Having viewed the fall and its surroundings, we followed the bank of the river to a place called the "Apron." Here the river shoots over a smooth and slightly convex surface with almost incredible velocity. We were informed that it is not more than six or eight inches deep at any point. A little above this was the "Silver Shoot," where the stream, striking some impediment in its swift course, is thrown up in a shower of drops that glitter like diamonds in the sunlight. We unanimously voted this a sight alone worth the trouble of the ascent.

At a bridge a short distance above this place, Mr. Lamon left us on his errand and we traveled up the stream as near as we could to the Nevada Fall, which falls 700 feet in one perpendicular leap. We could not approach very near on account of the driving spray which floats down the river for a great distance, and the traveling got more difficult as we went on. Even at that distance the roar of the water was so tremendous that we could not hear one another speak. While we were at the bridge, the man who tended the Ladders came up and collected the fare, 75 cents each. We were soon joined by our guide and again descended the Ladders, were again drenched with spray, and finally arrived at our camp well satisfied. We next paid a visit to Mr. Lamon's strawberry patch where we found as fine berries, both in size and flavor, as I have seen in the markets of the metropolis.

June 12.—Sunday morning dawned cloudy, and by the time we had fin-

ished breakfast, it commenced to rain. Mr. Lamon directed us to another cabin of his, half a mile distant, and we considered ourselves well off, especially as he had lent us some books to read. On arriving at the cabin, the first one to enter executed a rapid movement to the rear calling out: "A rattle snake!" but he recovered, we pressed valiantly on to the attack. Meanwhile his snakeship attempted a retreat between the chinks of the logs, but was intercepted by me and my stick. He was soon induced to give up the ghost, and someone else on the inside deprived him of his rattles. A cautious survey of the cabin was made, poking into obscure corners with our sticks. We then made a fire in the fireplace and employed ourselves as best we could during the forenoon. In the afternoon we went out, the rain having ceased, and hunted wild strawberries, or rambled off where we saw anything of interest. In the evening we reassembled at our old camp at Mr. Lamon's. After dinner the rain commenced again and Mr. Lamon invited us to take our blankets and sleep in his hay barn. We started on a run and arrived at the barn safe but a little wet, as it was now raining quite hard, accompanied by thunder and lightning.

June 13.—For this day's excursion we had planned a visit to Mirror Lake that we might see its wonderful reflections. We also planned to ascend Glacier Point, one of those lofty cliffs composing the wall of the valley, and from which, we understood, one of the finest views could be had. Consequently we were early on the road to Mirror Lake, lying in a fork of the valley just between those gigantic cliffs, the North and South domes, and about a mile and a half distant from our camp. We found that a slight breeze had ruffled the surface of the lake, at one part, just enough to prevent a good reflection, but in the smooth part we witnessed a fine reflection of the South Dome that fully repaid us for our visit. We then took a row around the lake and returned to camp, stopping at the strawberry patch and indulging ourselves again in the luscious fruit.

We then took up our line of march for Glacier Point on the opposite side of the valley. Our path lay along a bench or ledge, which ran diagonally upwards along the face of the cliff for about half the way up and then a steep and difficult ravine turned sharply to the left. Through this the remainder of our way led. There was no traveled path in this place, but some men had ascended in that way and informed Mr. Lamon about it. We had no difficulty in finding, but much in following it. I have no hesitation in saying that it was the worst path I ever traveled or ever expect to travel and return alive.

At last, by dint of climbing over huge boulders, pulling ourselves up by means of shrubs, and scaling smooth surfaces of granite by taking hold

of hands and assisting each other in every available way, we completed the ascent, although once or twice we had almost concluded to give up in despair and return to camp. We had been four hours making the ascent but the view fully repaid us. Yosemite Fall appeared in its full grandeur, and, illuminated by the rays of the sun, its falling masses of spray were white as snow. To the right were the Vernal and Nevada falls, and beyond them extended, as far as we could see, a barren waste of snow-covered peaks impassable to man.

"The guards with which young Freedom lines,
The pathway to her mountain shrines."

Directly opposite us stood the North and South domes, immense masses of bare granite, the latter towering 6,000 feet above the level of the valley and 10,000 feet above the level of the sea. In the valley below, the Merced dwindled to a slender thread, the tall pines to mere stunted shrubs, and the feeding cattle to almost indistinguishable specks.

After half an hour spent pleasantly and, I hope, profitably on this eminence, we commenced our descent. After another process of climbing, jumping, sliding and crawling, frequently calling out to those below to beware of some loosened rock which bounded down the steep declivity with almost the speed of a cannon ball, and as often scrambling aside to avoid one from above, we at length completed our descent. At about dark we arrived at our camp tired out and with boots torn, wet, and muddy, especially mine, the sole and upper of which had nearly parted company. On the way down I had stopped from time to time and selected some specimens of granite to bring away, on account of the different degrees of intermixture of its constituents. In some places the crystals of mica were an inch square, and the remainder of the mass pure feldspar. In others the constituents were so mixed as to resemble hardened mixture of black and white sand. Between these extremes were all degrees of intermixture. In this connection I may mention that during my stay in the valley, I saw no rock or stone other than granite, not excepting the pebbles in the river beds.

June 14.—The state of our boots and purses now admonished us that we must terminate our stay in this scene of wonders and, as we had seen the principal sights of the valley we reluctantly determined to depart this morning. We therefore took our leave of Mr. Lamon whose generosity had promoted the pleasure of our stay. We offered, and wished, to pay him for the many comforts we had received from him, but he would not accept anything, and we shall remember his kindness among the most pleasant reminiscences of our journey.

I bound my shoes on with rope and twine as well as possible, and at about eight o'clock we left our camp and took the road for Hutching's Hotel, where we bought a few necessaries. As we had come to the valley by the Mariposa trail, 150 miles, we decided to take one of the shorter roads for our return and chose the Big Oak Flat route, 109 miles long. I say 109 because it is so stated in the company's circular, but my conscience will not permit me to write it without entering a protest, not against the number of miles but against their great length. Never have I seen elsewhere such long miles, and never do I wish to travel such again. We were told at Big Oak Flat that each was equal to two ordinary ones.

After leaving the valley, we ascended by a steep, but cool and pleasant trail, leading through a dense forest of pines. Before night we had traveled twenty miles, which, considering the steepness of the trail and our late start, was not bad. We camped in this forest and slept well notwithstanding the cold which was severe.

June 15.—At five o'clock we were up and on our way. Early in the afternoon we arrived at Spragnes's Ranch, having traveled fifteen of those interminable miles since morning. Here we got a good meal of biscuits and fresh milk, and took a rest, writing letters to our homes to be mailed at Big Oak Flat, nine miles further on. Having sufficiently recuperated, we traveled on and, passing through Big Oak Flat, camped three miles beyond. We made no fire, but lay down to sleep in the spreading shade of a rail fence, thoroughly tired out with our 27-mile march. As an old miner at Big Oak Flat told us, they are "mighty long miles at that."

June 16.—As we slept without a fire and in the open air, without shade, we awoke in the morning, cold, damp, and stiff in the limbs, so it was some time before we were in good walking order. Three miles from our camp we arrived at the ferry over the Tuolumne, and, on payment of a dollar, were taken across. Passing through the little town of Jacksonville by eleven o'clock, we arrived at Chinese Camp, the largest town so far and with perhaps the exception of Snelling's, the neatest.

Stopping to rest at a house a little beyond this town, the landlord gave us some specimens of moss agate and petrified wood from Table Mountain, Calaveras County, which was in sight of the house. We were now fairly on the plain and the walking became hot and disagreeable. Two or three became so footsore that they had to be relieved of part of their load. At about half past eight in the evening we reached Knight's Ferry and camped on the farther edge of town. This day also we had walked 27 miles and were quite exhausted.

June 17.—This morning we all felt tired and footsore and traveled but

slowly, stopping at every opportunity to bathe our feet and rest. The road now lay over the level Stockton plain, and the weather was very warm. The heat from the dry, parched ground struck through the thin soles of our shoes and made our feet, already raw and blistered, very painful. During the forenoon we stopped at a farmhouse and got some bread and buttermilk for fifty cents, and then toiled on until five o'clock. We stopped at another farmhouse, got some potatoes, bread, and milk, and immediately spread our blankets. We went to sleep intending to rise as soon as the moon appeared, and travel in the night.

June 18.—At about midnight the watch awoke the party, the moon having risen. Eating the breakfast prepared for us, and leaving all unnecessary articles behind, we started on. The ground was now cool and the night air refreshing, and we walked along, quite cheerfully, singing, whistling, and conversing on different topics. We stopped only once to make a raid on an adjacent well for water to fill our canteens, and by daylight were ten miles from our camp and eleven from Stockton. After the sun had risen, the ground rapidly heated up and as a consequence our feet became sore and tender again. However, we pushed on as rapidly as possible, as we had determined to return by the river boat. We did not wish to be late and be thus delayed over Sunday, so ten o'clock found us on the boat with a couple of hours to spare. We were too worn out to make use of this time in inspecting the city of Stockton as we would have enjoyed doing under other circumstances. After sending a delegate to purchase tickets and some cakes, we lay down on the deck with our baggage, collecting a crowd of passengers who gazed on us in astonishment. In truth we were a strange sight to behold, with our broad-brimmed hats of all kinds, our clothes ragged and dirty, boots worn out, and equipped with blankets, greasy provision bags, guns, pistols, hatchets, bowie knives, and so forth.

After as pleasant a trip down the river, as the condition of each one would allow, we arrived in San Francisco at about eight o'clock. We were tired, stiff and footsore, but well satisfied, having made a trip of 300 miles in nineteen days at a cost of only eight dollars each. On our arrival at the wharf we separated, taking our different ways for home.

*The log of one of the world's most
incredible rock climbs—up the sheer
face of Yosemite's Half Dome*

The Northwest Face of Half Dome

By MICHAEL P. SHERRICK

IN THE eastern end of Yosemite Valley rises Half Dome, one of the scenic wonders of the United States. The summit of this huge granite monolith has been the goal of mountaineers, rock climbers, and hikers since 1850; the first ascent of the dome itself was done in 1875. The northwest side of Half Dome is a vertical face of smooth granite 2,000 feet high. On June 28, 1957, after five days of continuous climbing, Jerry Gallwas, Royal Robbins, and I made the first ascent of this wall.

As early as 1945 thoughts turned to this wall with the idea that a feasible route might be found. Climbers studied it with binoculars from the bottom and from the sides but it was discouraging, as anyone who has looked down from the top knows. In 1954 a Sierra Club party of Dick Long, Jim Wilson and George Mandatory climbed about 150 to 200 feet up from the base. In this same year other persons became interested in this climb; Jerry Gallwas, Warren Harding, and Don Wilson began some reconnoitering on their own. They discovered that the broken bottom half could be climbed, and that there was a massive flake system ascending the top half of the face. The two problems were: (1) connecting the broken bottom half of the face and the flake system, thus making necessary a 300-foot diagonal traverse across a blank section of the wall (Robbins Traverse), and (2) going from the top of the flake system to the top.

In 1955 Jerry Gallwas, Warren Harding, Don Wilson, and Royal Robbins made the first major attempt. In three days they pioneered a route up 450 feet of the cliff using six expansion bolts, including one for a belay anchor, and one for a rappel anchor. With more knowledge of the problems and better equipment, this foursome hoped to return in 1956, but these plans failed to materialize.

On Saturday, June 22, 1957, Jerry, Royal, and I met in Yosemite Valley with plans for a second major attempt. We had assembled the best equipment available. We used nylon flight suit coveralls as outer clothing for Yosemite's comparatively warm bivouacs; underneath, a warm sweater over our regular climbing clothing. Polyethelene containers held our 13½

quarts of water (a little less than one quart per man per day). Food was kept to a minimum—a few cans of tuna, raisins, nuts, lemon juice, chocolate, and some particularly desirable packages of dates. We carried 45 pitons, including 18 horizontal pitons, 16 angles plus knife blades and wafers, and about 25 expansion bolts. We had more than 1,200 feet of nylon rope—two 120-foot $\frac{7}{16}$ -inch climbing, one 150-foot $\frac{7}{16}$ climbing, two 300-foot $\frac{5}{16}$ rappel, one 150-foot $\frac{5}{16}$ hauling, and one 90-foot $\frac{5}{16}$ hauling. Jerry Gallwas had forged about half of our horizontal pitons out of ChromeMoly steel alloy. These tough pitons survived a beating on almost every lead; some must have been used 15 to 20 times each. Jerry also made most angle pitons, which would fit cracks up to $2\frac{1}{2}$ inches or wider; they too held up, despite being used perhaps a dozen times each.

Our gear was hauled up in a so-called torpedo bag which was girdled lengthways by 6 to 8 separate ropes for stability. The bag was covered with a duffle bag to minimize wear on the main parts. To prevent falling rocks as much as possible (usually thrown by someone from the top), Wayne Merry placed a sign halfway up the cables warning people against throwing stones because there were climbers below. We carried a first-aid kit and a flashlight. The latter was used to flash to the ground an elaborate system of prearranged signals at the time of the firefall. The time was chosen when people would be watching the firefall and we would attract less attention. Thus we make known our plans, progress and condition.

That Saturday evening we made the final arrangements with the park rangers, to whom we are indebted for their helpfulness. We packed our equipment into rucksacks in preparation for the next morning's pack in to the base of the climb. Wayne Merry volunteered to help us carry part of our equipment to the spot where we left the trail, after which he would climb halfway up the cables to place the warning sign.

On Sunday, June 23, after an uneasy night in our sleeping bags, the four of us shouldered our packs at Happy Isles and hiked up the Vernal and Nevada Falls trail where we took the branch which leads to the back side of Half Dome. Just before we came to the rock massif itself, we parted company with Wayne and proceeded down to the right along the base of the towering cliffs carrying the extra load. Late in the afternoon, desiring to get a good start, Royal and Jerry climbed about 150 feet up the cliff and left a fixed rope. Only the first 30 to 40 feet were 4th- and 5th-class; from there on it was mostly 6th-class climbing. We ate our supper cold, having brought no stove, and we bivouacked at the base of the cliff—our last contact with the ground for five days.

Monday morning, June 24, we packed the gear which was unneces-

sary for climbing, into the torpedo bag and filled our canteens from a small streamlet issuing from the rock. When all was ready, one of us started to prusik up the 150-foot rope and when he reached the top the second man would start. When the first two would be at the top of a pitch, they would haul up the torpedo bag, which at the beginning of the climb weighed 55 to 60 pounds. If the bag became stuck part way up the pitch the third man would free it on his way up the pitch.

From the top of this rope we followed the complicated route pioneered by the first attempt in 1954. It was all difficult, strenuous, 6th-class climbing; when we came to the first blank, slightly overhanging stretch, the bolts were already in place. Above the overhang we reached a small ledge with an expansion bolt for an anchor. In 1954 Warren Harding had climbed 50 feet from this ledge and had left another bolt from which to rappel at their high point, about 450 feet from the ground. We managed to climb another pitch before dark and reached a small sloping ledge about 500 feet above the ground where we spent our first uncomfortable night tied to the rock. The ledge was large enough, but it sloped down at an angle of about 20 degrees; any movement caused a tendency to slide off.

On Tuesday morning, June 25, the climbing became somewhat easier. By one o'clock we had ascended 400 feet of mixed, moderate 5th- and 6th-class pitches, generally less steep in angle, and arrived at the base of the "Robbins Traverse" about 900 feet above the base of the rock. From all past reconnoitering, this part looked to be the crux of the climb. We had to traverse an exceptionally blank wall for a diagonal distance of about 300 feet, with a vertical rise of about 125 feet, to reach a prominent series of chimneys and flakes ascending the center section of the cliffs. Our problem was to cross this traverse with a minimum of time.

Royal started at about one o'clock and found the first pitch not too difficult. A zigzag series of cracks led diagonally to a small ledge about 80 to 90 feet away, from which a belay was made. From this ledge a small crack led up the blank wall for about 30 to 40 feet where it ended in smooth granite. After eight pitons, a series of seven expansion bolts was placed with arduous hammer and drill work by Royal and Jerry. These brought Royal, late in the afternoon, to a meager network of cracks which led nowhere. After placing 3 pitons he descended about 50 feet on the 150-foot climbing rope and proceeded to attempt a long and difficult, not to mention "airy," pendulum traverse in order to reach a series of cracks about 40 feet to the right. After four attempts he finally reached a hold and placed several pitons in time to return, leaving a fixed rope, just before dark. We spent our second night out on the ledges at the foot of

the Robbins Traverse, our most comfortable bivouac because we had ample space to sit.

On the third day, June 26, we retraced the previous afternoon's climbing on fixed ropes and proceeded up the crack to a small ledge where we placed an expansion bolt for an anchor. One more long 6th-class lead brought us to the large ledge of the great chimney system which was so apparent from the side of the rock. From the ledge a "fixed" rope was left tied securely to the highest expansion bolts to facilitate a retreat back across the traverse if one proved necessary. Let this serve as a warning to future parties: *it is not fixed on the top.*

At 10 o'clock we started up the beginning of a great chimney and flake system which was about 1,000 feet above the base of the climb. Some of these flakes were huge in size and either leaned against the rock leaving a crack, or were separated from the wall forming a chimney. The first large chimney ended in an extremely difficult chockstone about 80 feet above the base. Instead of climbing the chimney we took a straightforward 6th-class crack about $\frac{3}{4}$ to 1 inch wide which ran several feet to the left of the chimney. The flake was rejoined about 20 feet above the chockstone. From this point, strenuous 5th-class and some 6th-class stretches led to the top of the chimney system about 400 feet above us, 1,500 feet above the base of the climb. Of the pitches following the chockstone, one in particular deserves mention. Above the chockstone the chimney is filled with very large blocks of rock. One of them sticks out of the chimney about 8 to 10 feet at a distance of 6 inches from the wall. Royal led up about 40 feet, placing 4 or 5 pitons. At the bottom of this block with a secure piton in place, he grasped up underneath the inside edge of the bottom of the block with his hands and "walked" out the vertical face of the cliff, working his way up around the lip of the block to a belay stance some 20 feet higher. Several pitches higher, with darkness rapidly approaching, we bivouaced behind the last large flake of the chimney system, about 1,500 feet above the base and 500 feet below the summit.

The fourth day, Thursday, June 27, was the worst day. By this time lack of sufficient water, food, and sleep, plus the enervating hot sun rays had fatigued us. With Jerry doing most of the leading, we climbed only 300 feet, but we had to bivouac 50 feet below our high point in a small indentation sloping downward behind a flake. Although straightforward, this 300 feet was composed of extremely strenuous and tedious 6th-class climbing. In the morning we had left behind the part of the flake system where the flake was out away from the wall, giving a chimney effect. The flakes were now 3 to 7 feet thick and were flat against the wall leaving

a crack $\frac{1}{16}$ to $2\frac{1}{2}$ inches wide. As the cliff was absolutely vertical, the climbing of the flakes followed a peculiar pattern; they would zigzag from left to right and back again across the face giving the effect of climbing one overhang of about 30 degrees for about 20 to 40 feet with angle pitons driven straight up, then up a 60 degree sloping ledge with pitons driven down for about 20 to 40 feet, and so on. This 250 feet of tedious work took almost a whole day. Before dark Jerry led an additional 50 feet, leaving his pitons for the next morning. That night was extremely uncomfortable, but we were exhausted enough to doze a good part of the time.

On Friday morning, June 28, we packed into the torpedo bag all our gear that was not necessary for climbing or safety and threw it out about 30 feet. It fell the full 1,800 feet to the base of the cliff without touching the rock! Although we were only 300 feet from the top, some of the most difficult 6th-class climbing was still ahead. Jerry retraced his steps and climbed to the end of the flake system about 100 feet above. There, to our luck, was a 50-foot "Thank God" ledge leading off to our left, saving us from the prospect of a blank wall leading up to a tremendous 150-foot overhang. This ledge was traversed by walking and hand traversing to a series of 6th-class cracks, which led up to the left-hand side of the base of the overhang, ending in a small ledge barely enough for us to stand on.

From this point, the obvious thing to do was to traverse to the left out from under the overhang. This led to one of the most crucial pitches of the entire climb. With a bolt for a belay anchor, Royal led outward on several very poor 6th-class pitons, and then placed 4 expansion bolts which led to a small ledge where the angle lessened considerably. Jerry then made a curving traverse along a shallow crack which led to some easy blocks just under the summit. We landed on top at 6:30 P.M.

Warren Harding was on hand to greet us at the top, whence we all proceeded down the cables. Warren went down to the valley while the three of us returned to the base of the climb to recover our equipment. Since it was too late to return to the valley before dark, we spent our sixth night out in our bivouac suits. Saturday, June 29, we returned to the valley and checked in with the park rangers, fortunate to avoid publicity about an accomplishment which would only have been made into a sensation.

Some have said that we did the "impossible," and it is unfortunate that for decades the word *impossible* has been such a common term in the mountaineers' vocabulary, being applied to that part of a mountain which presents an extreme in difficulty usually too demanding for the equipment and technique of the day. But improvements in technique and equipment just keep on happening.

The Olmsteds: One Fire of Genius

By CARL P. RUSSELL

ON THE last day of August, 1864, Frederick Law Olmsted, Sr. (1822-1903) climbed "the peak next south of Mount Dana." From this summit, which he named Mount Gibbs, he saw and understood for the first time the relationship of the Yosemite Sierra to the fascinatingly beautiful Mono Basin and to the rest of the east-side terrain. Within the year, he wrote to his father, "Yosemite is to be by far the noblest park or pleasuring ground in the world." During that fall and in 1865, as he worked with his fellow Yosemite commissioners on the epoch-making prescription for management and use of the Yosemite wilderness, the term "national park" found its genesis. The words appeared in print for the first time when Josiah D. Whitney published *The Yosemite Book* in 1868.

It is not surprising, perhaps, that the designation "national park" should have originated here, but I think that it is truly amazing that the first Olmsted guidelines for wilderness preservation (1865) should have emerged full-blown and in fadeless words at the very inauguration of national park practices. He wrote:

The first point to be kept in mind then is the preservation and maintenance as exactly as is possible of the natural scenery; the restriction, that is to say, within the narrowest limits consistent with the necessary accommodation of visitors, of all artificial constructions and the prevention of all constructions markedly inharmonious with the scenery or which would unnecessarily obscure, distort, or detract from the dignity of the scene. . . . It is important that it be remembered that in permitting the sacrifice of anything that would be of the slightest value to future visitors to the convenience, bad taste, playfulness, carelessness, or wanton destructiveness of present visitors, we probably yield in each case the interest of uncounted millions to the selfishness of a few.

This perspicacious philosophy of nature appreciation, expressed so early in Frederick Law Olmsted's career, persisted throughout his remaining thirty years of professional leadership in the field of landscape architecture. It became the fulcrum of the controversies and criticism directed against the Yosemite commissioners during the 1890's, criticism which resulted finally in the receding of the Yosemite grant to the federal government. The Olmsted principle continues to be the heart of present-day pronouncements regarding national-park protection.

One wonders what the effect upon national parks might have been had Olmsted continued in his inspired guidance of Yosemite's destiny. While

he was in California, he designed the university campus and its environs at Berkeley and there, late in 1865, accepted what undoubtedly was at that time the biggest job in landscape architecture, the direction of the development of Central Park in New York City. Seven years earlier his plans for this development, prepared in partnership with Calvert Vaux, had been selected by the park commissioners from the submissions of 34 competing planners. While assuming his responsibilities in New York, Olmsted "learned to engage in the bitterly fought, but generally victorious battles between art and politics which were to tax his energies throughout the rest of his professional life." It was in New York, also, that he married Mary Cleveland Olmsted, widow of his brother John. Together, during the following thirty years, the Olmsteds and their offspring gave form to and helped to discipline the budding profession, landscape architecture, "setting new ideals for municipal amenities and leaving in scores of American cities enduring memorials to their foresight and genius."

FREDERICK LAW OLMSTED, JR. (1870-1957)

THAT THE SON of so brilliant an artist should also become an artist was evident very early in the boy's life. He grew up in the atmosphere of parks and park planning in or near New York City. His first trip to California was made when he was 16 years old, while his father was engaged in designing the Stanford University campus. His preparatory schooling took place at the Roxbury Latin School, West Roxbury, Mass., and his college training at Harvard, from which he graduated in 1894.

He served an apprenticeship in his father's office and became a full partner in 1898. His half brother, John C. Olmsted, had associated with the elder Frederick Law Olmsted some years earlier. After 1898, when the father had retired, the firm name "Olmsted Brothers," was adopted. It was at this time that Frederick Law Olmsted, Jr., was appointed landscape architect for the Metropolitan Park System of Boston. His private offices established in Brookline, Mass., which was his base for fifty-two years.

In 1900, Olmsted found occasion to follow his father's lead in work done for the national Capitol. An act of Congress established the McMillan Commission which was concerned not only with the Capitol, but embraced the entire city plan for Washington, including the park system. Frederick Law Olmsted was retained as the designer in the Parks Department Section. For more than half a century he exerted a profound influence on the national capital parks. As recently as February, 1956, his protest of a highway through Rock Creek Park was expressed to the Senate Committee on Interior and Insular Affairs: "I am strongly opposed to

an expressway through the park. . . . Prevent such a lamentable diversion of the park from its proper purposes." Rightly it is said that his is the "longest continuing designing influence . . . upon the Federal City." Olmsted played an important part in the establishment of the National Capital Planning Commission and was a member of the National Commission of Fine Arts. He served as chairman of the National Conference on City Planning, 1910-1919, was a charter member of the Executive Board of the American Civic Association, and taught landscape architecture at Harvard, 1901-1914.

It is a remarkable fact that Frederick Law Olmsted, Jr., authored a basic document of as much consequence to national parks as was his father's "Yosemite Report" of 1865. The policy statement in the Act of 1916 creating the National Park Service is his. From its inception, the National Park Service benefited by Olmsted's clear thinking and good council. On occasion he was formally employed as consultant, and held regular Civil Service appointment as a Yosemite Advisory Board member. He collaborated in shaping plans for Acadia, Dinosaur, Everglades, Grand Canyon, Great Smokies, Kings Canyon, and Olympic.

In 1928 Olmsted conducted the California State Park Survey and laid the foundations on which the magnificent program of scenic-historic conservational and recreational development has been built. He recommended for consideration 125 projects (areas) out of 328 proposals. In 1945, he was employed to do additional work in reviewing special problems of the California State Parks brought about by increasing population. By far the greater number of his proposals have been completed or are now in progress. The "Olmsted Report" of 1928-1929 and his Point Lobos plan of 1936 are still pointed to as masterpieces in state-parks literature.

My personal contacts with Frederick Law Olmsted were made, usually, in Yosemite and at meetings of the American Planning and Civic Association in Washington, D.C. In my recollections I associate him with such stalwarts as Stephen Mather, J. Horace McFarland, Richard Lieber, Tom Wallace, Peter Norbeck, H. C. Bumpus, Flavel Shurtleff, Clark Wissler, Chauncey J. Jamlin, John C. Merriam, William Colby, Duncan McDuffie, and other stout hearts of that generation who gave so generously of themselves in establishing our legacy of parks and monuments. As was true of his father, Olmsted was slightly built and left one with the impression that he was tender-hearted and not physically strong. Also like his father's, his qualities of leadership were quickly manifested in his sincerity of address and mature expression of thought; he was possessed of tenacity and a rare gift of persuasion in dealing with his fellows.

In 1949 he was awarded the gold medal of the National Institute of Arts and Letters for achievement in landscape architecture, the first in his profession to receive this honor. Landscape architecture meant to him all of the amenities. He allied himself with municipal leagues and planning institutes throughout the nation; he was active in the Sierra Club and other leading conservation organizations, in the American Federation of Arts, the National Conference on State Parks, Save-the-Redwood League, and the American Council of Learned Societies. He took the lead in such movements as housing betterment, planned land subdivision, smoke abatement, billboard regulation, and the promotion of the esthetic aspects in the professional training of highway engineers. The "scenic easement idea" for the beautification of approaches to parks is one of his inventions which currently is put into practice by numerous state highway departments and other agencies engaged in building the nation's highways. These accomplishments and scores of others characterized his half-century of professional work, all of it as unostentatious as it was constructive.

At the age of 80 he vacated his office in Brookline and took up residence in Palo Alto, the California community where in the 1880's his father had introduced him to the Golden State. However, retirement did not end his constructive work. His advice was sought by a number of firms and agencies. It was my privilege to renew my acquaintance with his warm personality during this final period. Not until 1956 did Olmsted resign as National Park Service consultant and as a member of the Yosemite Advisory Board. With this resignation the Congress-authorized Advisory Board and an era in national park planning came to an end.

Like John Muir, Frederick Law Olmsted, Jr., passed from this earth at the Christmas season. While on a visit he died at Malibu, Los Angeles County, on December 25, 1957. His wife Sarah (Sharples), their daughter Mrs. Robert L. Gill, Jr., and four grandchildren of Palo Alto survive him.

Most certainly we, with our memory of Frederick Law Olmsted, Jr., can stand reverently before the monumental record of practical accomplishment made by him individually, yet his contribution to the philosophy of conservation in America is inextricably linked with the legacy of thought left to us by his illustrious father. It is entirely fitting that the continuity of the Olmsted farsightedness be celebrated as one fire of genius. Indeed, their combined thought and action through the past century will inspire many who will work in centuries yet to come.

THE NORTHERN CASCADES are the most magnificent, diversified, and livable area in the United States that is still essentially undeveloped and unspoiled. In my judgment its greatest contribution to human welfare will lie in its being preserved in its present primitive grandeur—really preserved, not used up for some less lasting and less essential function. The Forest Service points out that our great timber resources for the future lie in the South and in the nation's idle or half-used woodlots. If that is so, should anyone rush to lumber the Cascade valleys? Why not keep their forests for their great aesthetic value as a beautiful foreground for the magnificent mountain picture, as a superlative, everlasting recreational resource? Timber will still be there if a national emergency should ever require it, and so with minerals, forage, dams, and highway routes.

Two great federal bureaus—Forest Service and Park Service—can offer protection. We like them both—when they do preserve. Of the two, the National Park Service seems more preservation-minded. For one thing, the Park Service is in support of the Wilderness Bill. The Forest Service—reflecting fears of the potent commodity groups, the lumbermen, grazing interests, and miners—is still unwilling to support an effective bill, and not able fully to preserve wilderness without it. In the law of the land the Park Service is required to protect wilderness. There is no such requirement in the Forest Service law—very few requirements at all. These are the reasons why so many prefer to place preservation of this finest of all our scenic areas under the Park Service, a body created by Congress specifically to preserve unimpaired the areas placed in its care—even if that care now and then falters.

Respect for preservation comes to a culture somewhat as it comes to a man. In his infancy, beauty or other intangible values do not register—he will smear an old newspaper or a rare painting with equal gusto. Some years later he at least respects his parents' evaluation of the painting and lets it survive. In maturity he will delight in a painting, know that it is worth far more than a yard of canvas, a pound of paint, and wages. Perhaps it would be the last thing he would sacrifice.

An octogenarian stands where he can discern a culture's growth. I think we have matured enough to seek commodities elsewhere and let the Northern Cascades masterpiece survive unspoiled for those who we should assume will surely mature enough to cherish it. We can save for them, in this wilderness, our greatest national park.

HAROLD BRADLEY

The Northern Cascades:

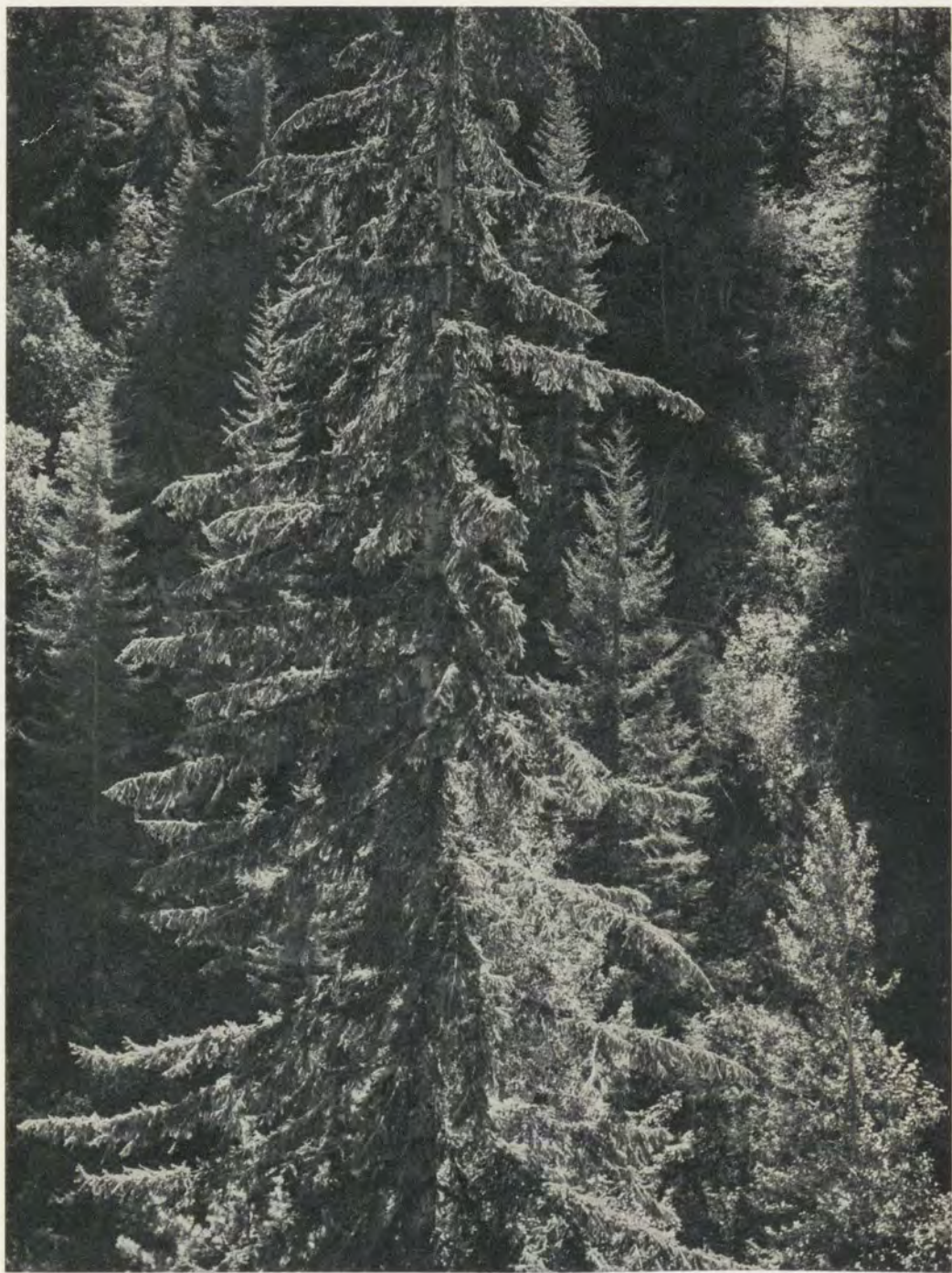


On Bridge Creek

☞ Magnificent moments come to the natural world
and to the man who seeks them out—
who leaves there, for another, the makings of them . . .

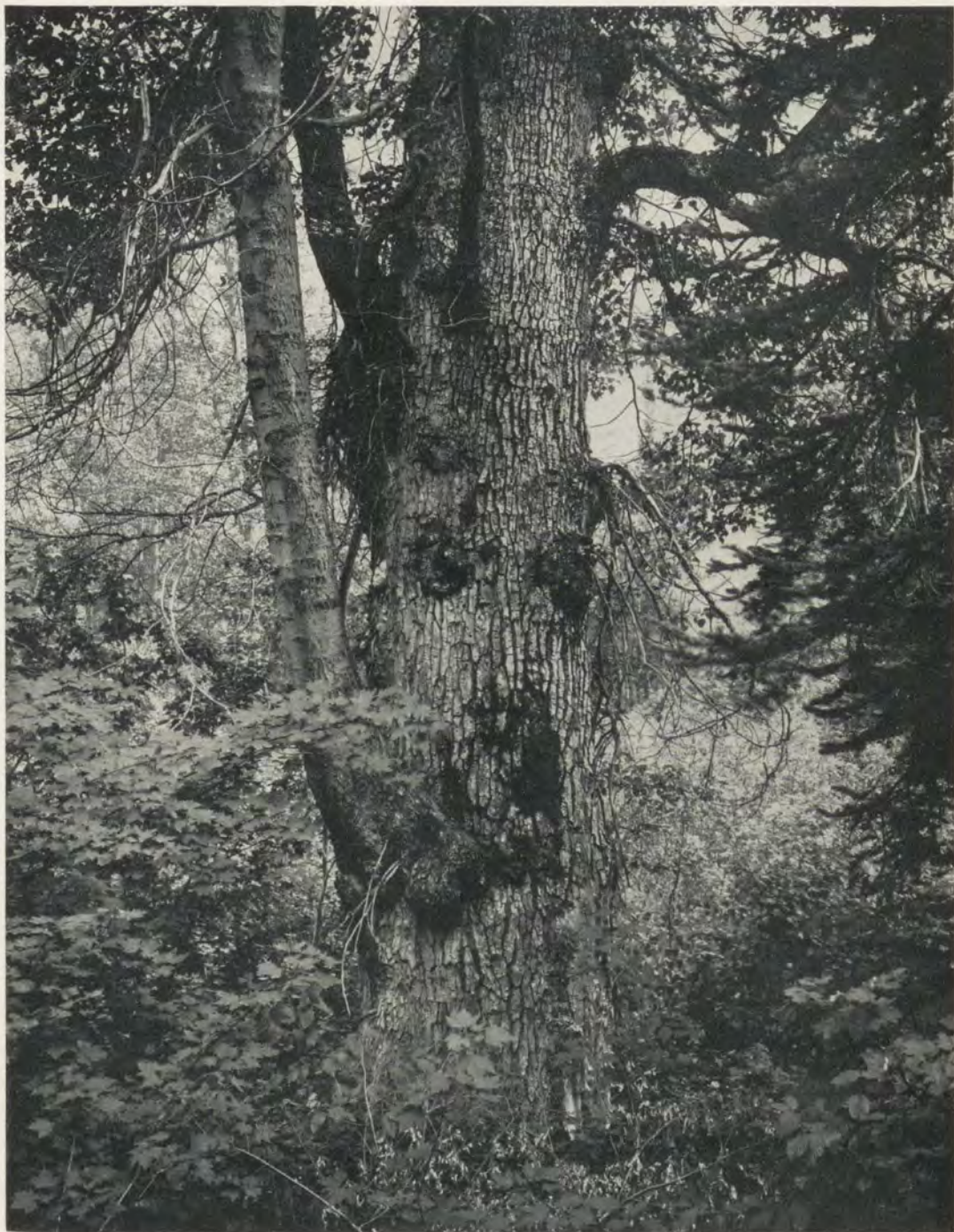
A Masterpiece to Preserve

PHOTOGRAPHS BY **Ansel Adams**



. . . the straight shafts of morning

that illumine the curves,



the vine maple that floats

where the old cottonwood stands solid;

the latent force
of a mile upended—
frozen violence,
spending through
the aeons,



Mount Goode from north fork of Bridge Creek

calming where
the icy river
meets the lake.



Head of Lake Chelan



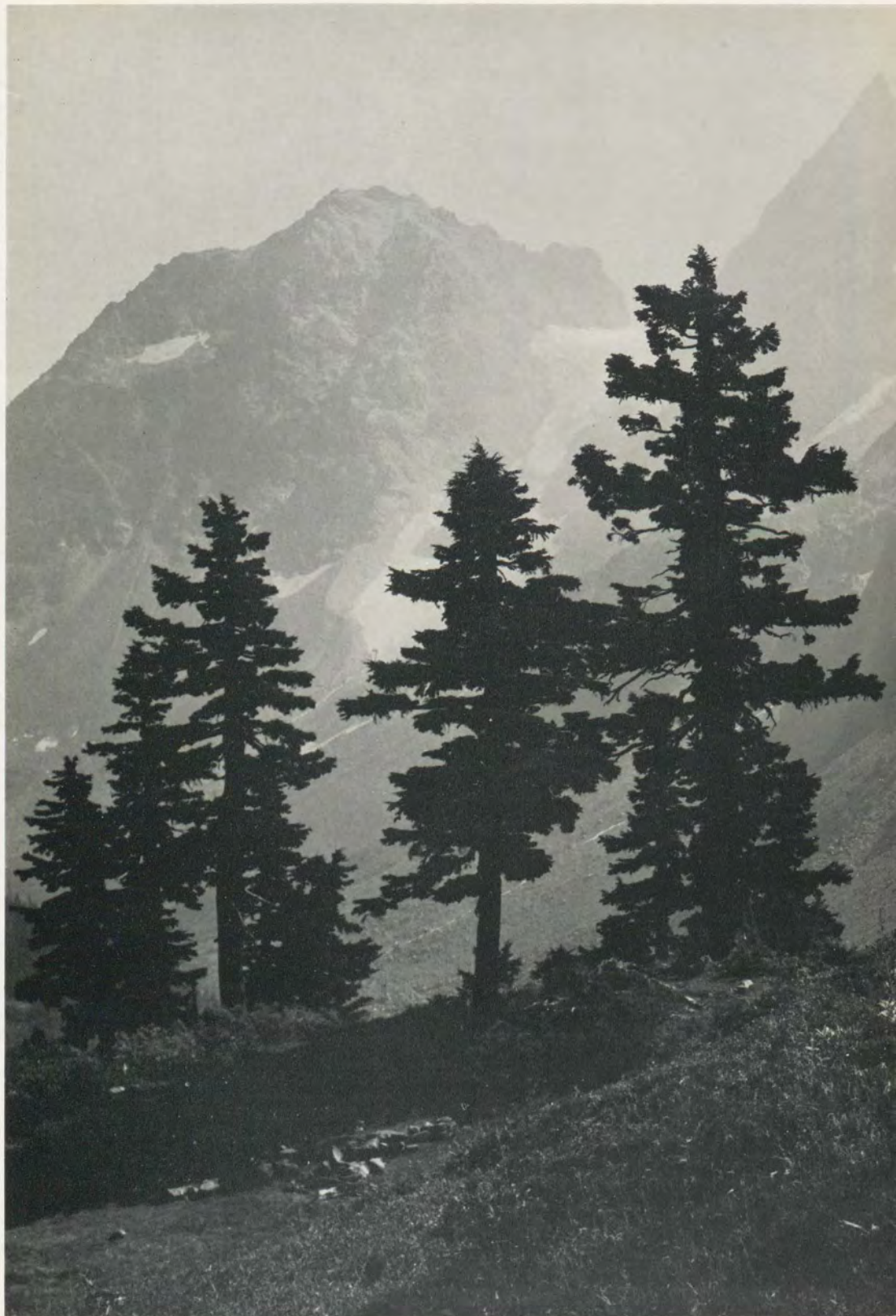
Mount Booker from Park Creek Pass

He walks
in the sun
over the high lawns,

rests in shade
by the
canopied bank.

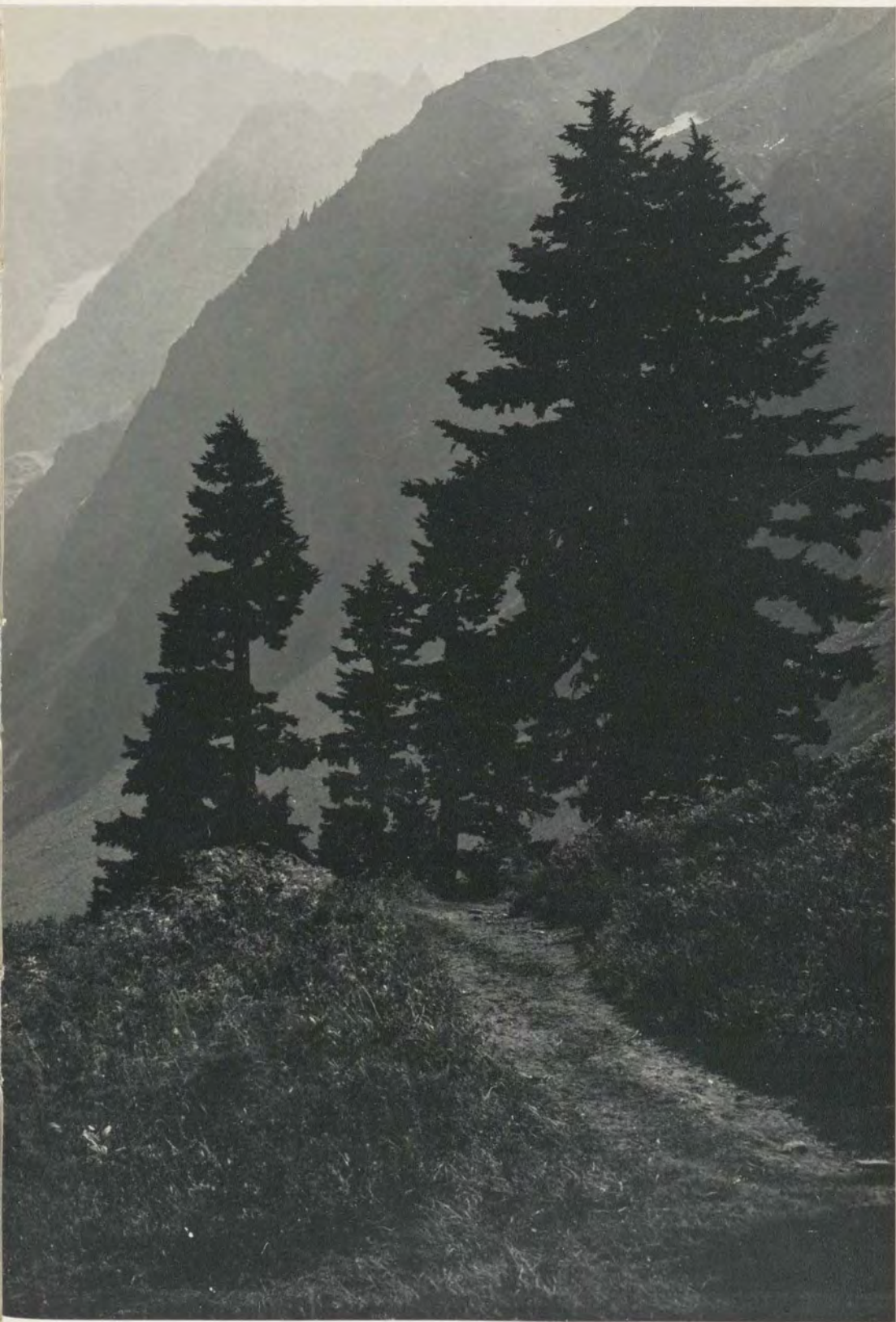


Stehekin River cedars

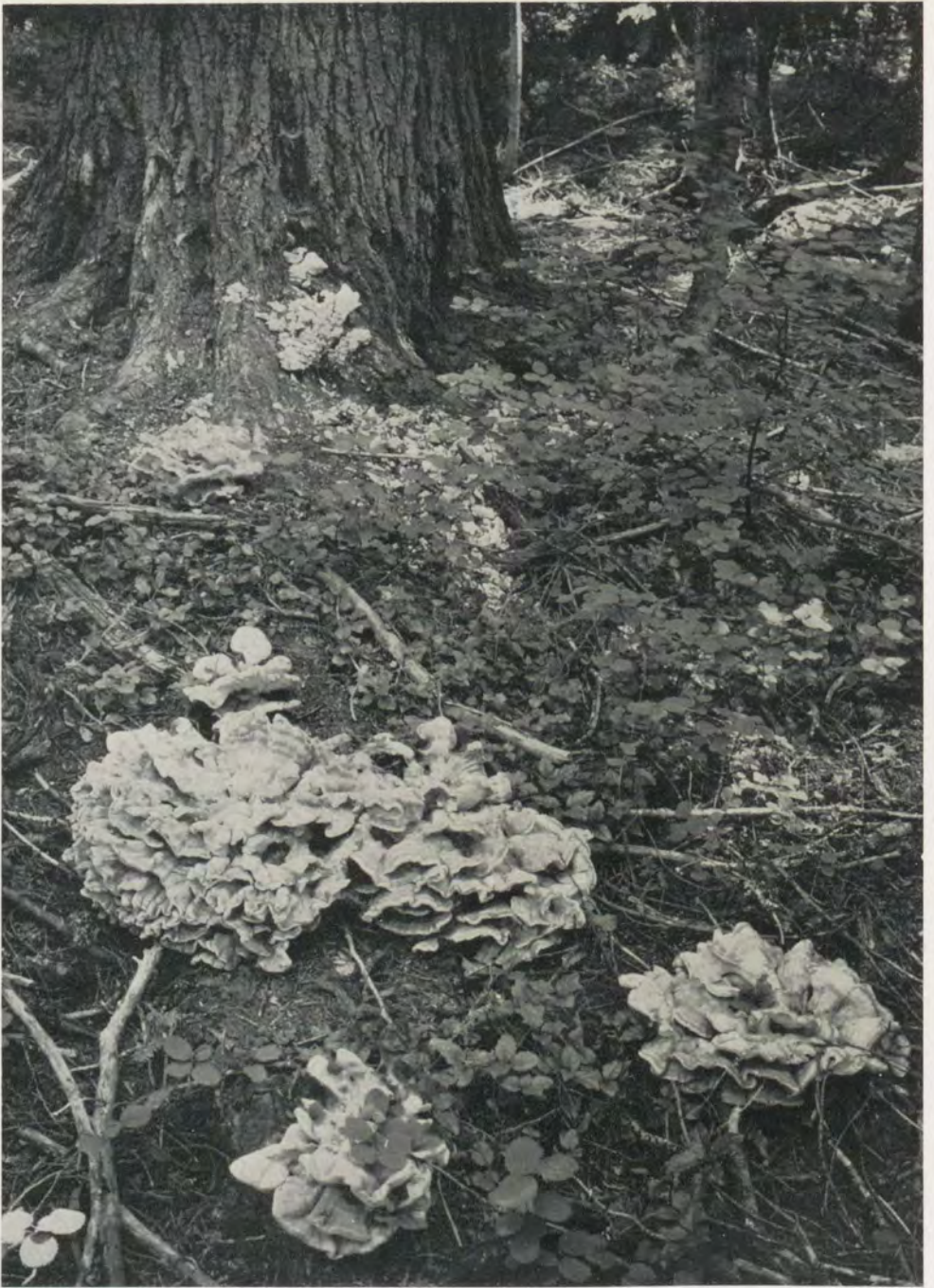


Magic Mountain, Cascade Pass

He begins to add it all up,



there on the pass, then goes down—

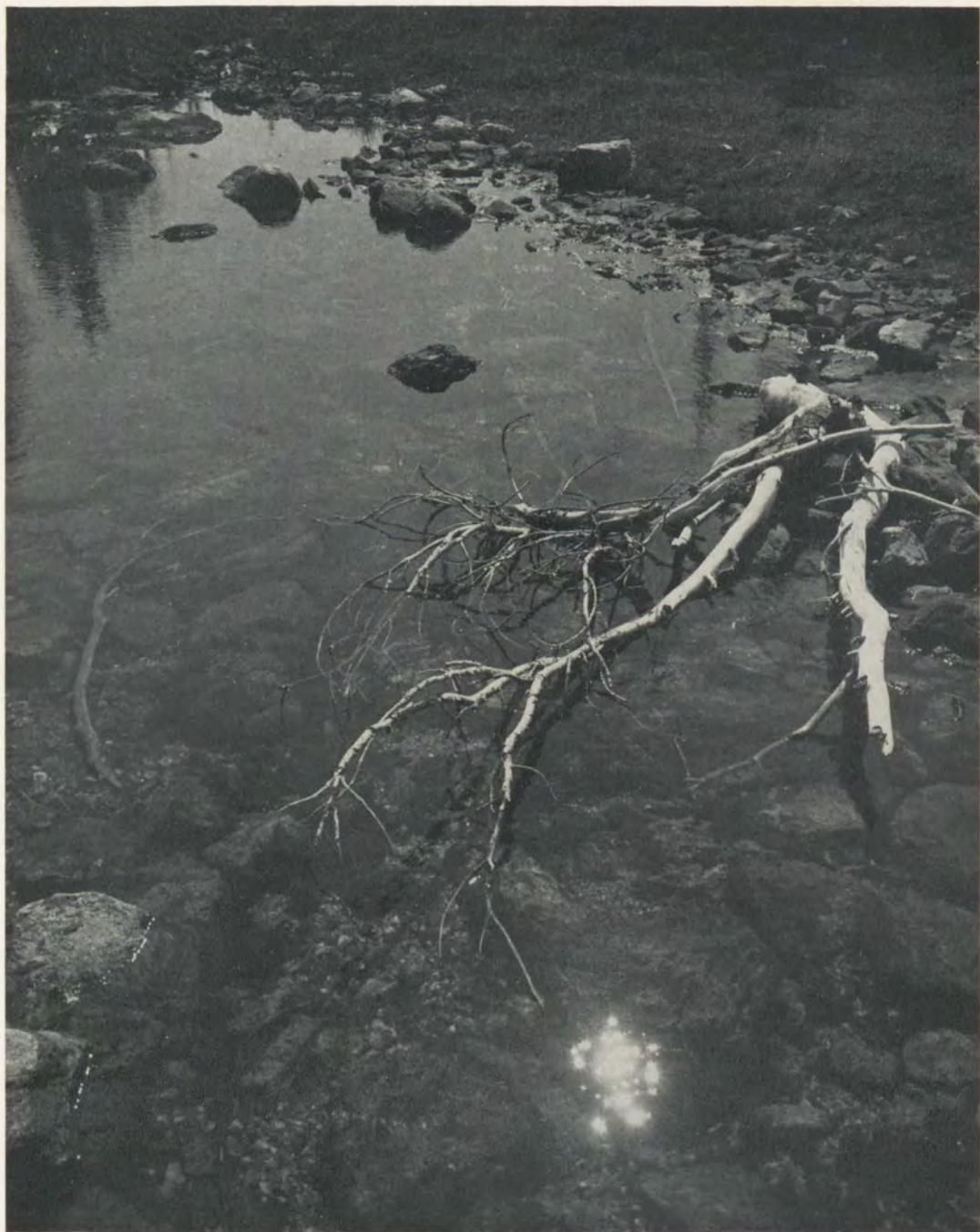


down to mark how life begins, again and again,
in the slow cold fires of decay,



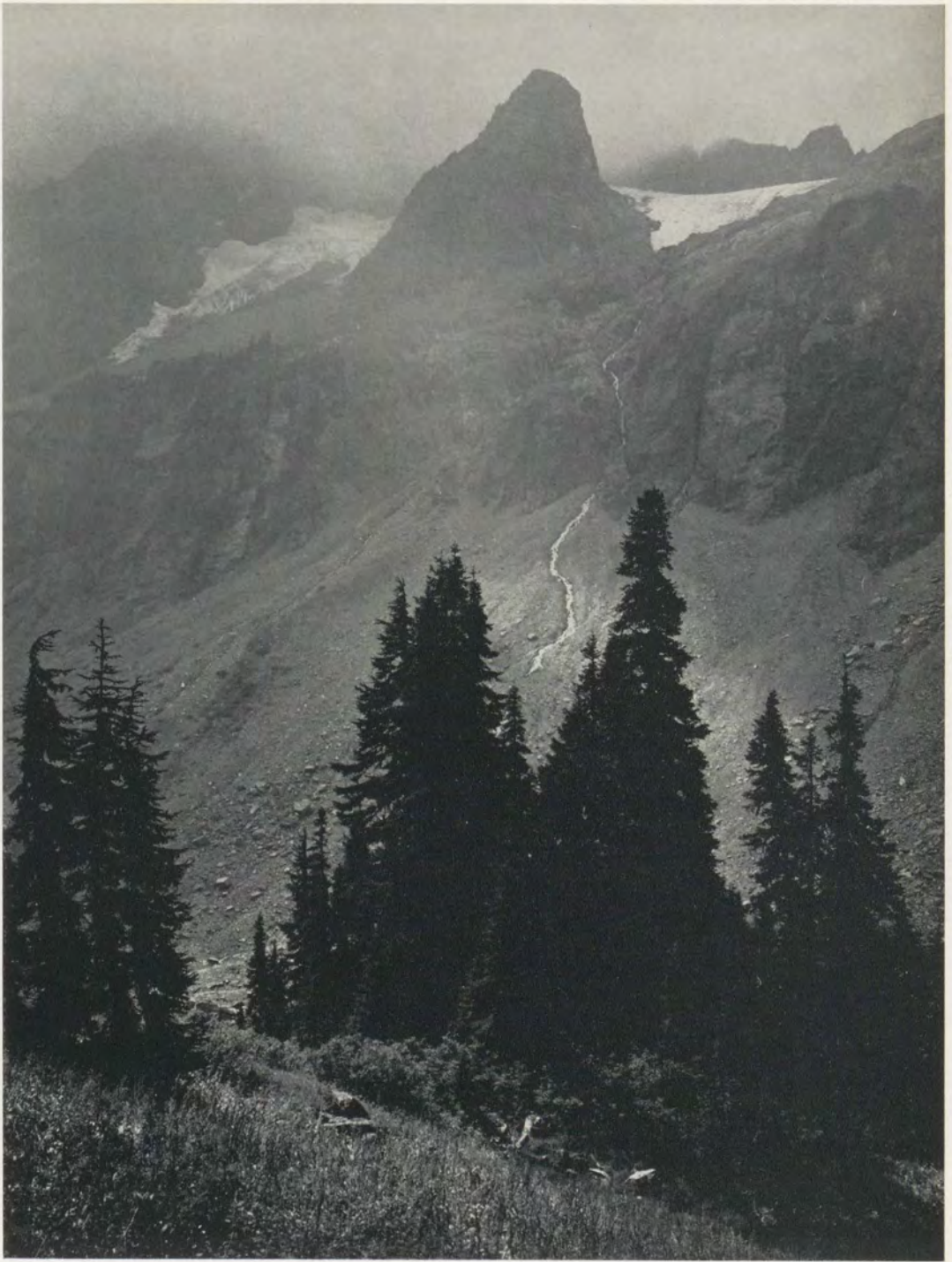
and how life is yet to begin,
after the shards of old peaks

have lain still longer where they fell;



to ponder how the sun lit the tarn ten thousand times

before the tree dropped that had stood firm



in the thousand storms it knew on the pass.

He will see that the forest survives —

and the
great land endures,
untrammelled,
brought from
eternity to here,



to this
moment of wildness
the ages have
made perfect.





Whitechuck forest, clear-cut in 1942, and Glacier Peak

Richard Brooks, 1957

(The photographs by Ansel Adams were made in the Summer of the Drouth, 1958. They are all of Northern Cascades country for which the Forest Service does not now propose, even tentatively, any scenic-resource preservation. The Service has proposed clear-cutting to the base of Glacier Peak—in what could be a great national park.)

Penguin Mountaineers

THERE WAS ONE colony at the very summit of the Cape, whose inhabitants could only reach their nests by a long and trying climb to the top and then by a walk of some hundred yards across a steep snow slope hanging over the very brink of a sheer drop of seven hundred feet on to the sea-ice. During the whole time when they were rearing their young, these mountaineers had to make several journeys during each twenty-four hours to carry their enormous bellyfuls of *euphausia* all the way from the sea to their young on the nests—a weary climb for their little legs and bulky bodies. The greater number who had undertaken this did so at a time when there were ample spaces unoccupied in the most eligible parts of the rookery.

Large masses of ice were stranded by the sea along the shores of the rookery. These fragments of bergs, some of them fifteen to twenty feet in height, formed a miniature mountain range along the shore. All day parties of penguins were assiduously climbing the steep sides of this little range. Time after time, when halfway up, they would descend to try another route, and often when with much pains one had scaled a slippery incline, he would come sliding to the bottom, only to pick himself up and have another try.

Generally, this climbing was done by small parties who had clubbed together, as they generally do, from social inclination. It was not unusual for a little band of climbers to take as much as an hour or more over climbing to the summit. Arrived at the top they would spend a variable period there, sometimes descending at once, sometimes spending a considerable time there, gazing contentedly about them, or peering over the edge to chatter with other parties below. . . .

From the time when they first went to the sea to feed until the end of the season, there was a continual stream of penguins ascending and descending [one] berg. As I watched them through glasses I saw that they had worn deep paths in the snow from base to summit. They had absolutely nothing to gain by going to all this trouble but the pleasure they seemed to derive from the climb, and when at the top, merely had a good look round and came down again.

—G. Murray Levick in *Antarctic Penguins* (McBride, New York).

The Uses of Nature

By PHILIP HYDE

A WILDLIFE management man speaks of "nonuse" of game; a forest officer speaks of the waste, or "locking up" of forest resources. Their remarks indicate that they do not understand or recognize the kind of land use that those who love wilderness advocate for natural areas. To the game manager, the only use of a game animal may be hunting it down and putting it in the freezer for meat; to the forester the only use of a tree may be its timber.

Wilderness conservationists believe that the uses of nature go beyond consumption. Last summer while traveling in Yellowstone National Park, I was stopped by a large traffic jam on the loop road that traverses Yellowstone. Getting out to investigate the cause, I walked up to what appeared to be the center of confusion. Numbers of cars were pulled up, some of them left standing in the middle of the road by their owners, while the cars' occupants were streaming out into the nearby meadow, stalking a large elk who carried a photogenically full rack of antlers. Men, women, and children were following the slow, unconcerned movement of the grazing elk, watching him with a mixture of awe and delight. Many of these people were seeing their first elk, and it was an experience they undoubtedly took back with them to their homes, to think of often, as a highlight of their trip to Yellowstone. A study of their faces certainly revealed the effects of a kind of "use" of that animal quite different, and perhaps more important than if one member of that group had arrived there first with a gun and taken home the meat. To some of those youngsters that saw their first wild animal there, this was an occasion in their lives that would make its influence felt, subtly perhaps, in many ways in the following years. The excitement and wonder was written on their faces, but what measurement is there for it? What "tangible value" does it have? How had it enriched their lives?

In seeking to interpret and explain the uses of nature we must emphasize *qualitative* experience. We must seek means of educating more people to deeper experiencing of nature. The usage figures of the National Park Service on first impression seem encouraging—more millions are visiting the parks—but a study of the habits of these visitors indicates a rather shallow experiencing—an inefficient use of them.

There is something to be harvested from the wild lands. We do not need to worry about the wild lands going to waste if commercial values to be

gained from them are not harvested. It is not the land that suffers from not being used, it is the people. Wilderness conservation means, primarily, conservation of the spiritual values of the wild lands, for human beings. In this kind of conservation, any waste is sociological. If the spiritual values of the wild lands are inadequately communicated and insufficiently taught and instilled, the waste will be far greater, and the effect will be more far-reaching than a local overpopulation of deer, or the loss to loggers of a few so-called "over-ripe" trees. Something far more important to human life will be lost—the experience that transforms existence into living.

CONSERVATION—AND TINKERING

CONSERVATION is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. . . .

The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism. Only those who know the most about it can appreciate how little we know about it. The last word in ignorance is the man who says of an animal or plant: 'What good is it?' If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.

—ALDO LEOPOLD, in *Round River* (Oxford, 1953)

Water economics and conservation need to be thought about separately. An eminent hydrologist, bearer of one of conservation's most eminent names, draws the line of distinction.

Water in the Conservation Movement

By LUNA B. LEOPOLD

WE ARE going to conserve forests, soil, birds, fish, metals, oil, water, coal, wilderness, and several other things. In the name of conservation our generation is going to build dams and prevent the building of dams; we are going to protect the wilderness and develop the wild places for mass recreation; we are going to protect wildlife, and poison wolves, coyotes and prairie dogs. For everything we Americans favor in the name of conservation we also favor the antithesis; it all depends on whom you ask.

When discussing conservation we tend to confuse two different aspects of the use of natural resources. The concept of conservation when applied to renewable resources, soil, water, and forests for example, might mean the use of the resource on a sustained-yield basis, that is, use at a rate and under such conditions that the resource is replaced as fast as it is used.

When applied to nonrenewable resources, the metals, oil, and coal, for example, conservation might be described as orderly development without undue waste.

These simple definitions do not cover all cases but for the present discussion I wish to emphasize basic issues and ideas relatively unconfused by distracting complications.

A second idea which I believe must be understood is that conservation means different things to different people. Conservation has been defined as the greatest good for the greatest number. I strongly protest this definition. So diverse are the interests of different groups that it is nearly impossible to decide what is the greatest good, or to identify that intangible greatest good with any specific group who would constitute the majority.

Let us, for instance, examine the field of water-resources development. All of us recognize that we are part of a growing nation, burgeoning with new industries and new babies, and we are using water at an unprece-

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mented rate. Therefore all of us think that the conservation of water is necessary and desirable. But what would we mean by water conservation? As a prelude to an attempt to answer that question, let me review some hydrologic facts.

Water is a resource which we call renewable. Though water is constantly flowing to the oceans it is being replaced by rainfall. The amount of water which falls each year as precipitation averages about 30 inches for the continental United States. That is, the water falling annually as precipitation would cover the whole area of the country to a depth of about $2\frac{1}{2}$ feet.

Part of this water sinks into the ground and part runs off the surface, collects in stream channels, and flows to the sea. Much of that which sinks into the ground is taken up by plants and returned to the atmosphere by transpiration through the leaves. Part of the water sinks deep enough into the ground to add to the free water of the saturated zone. The top of the saturated zone is called the water table.

This ground water is seldom stationary, but flows slowly under the influence of gravity. Ground water tends to reappear sooner or later at the surface, either in stream channels or along the margins of the continent in the ocean. To clarify this: Did you ever wonder how rivers and streams may continue to flow during long periods of no rainfall? The flow in rivers during fair weather is water draining slowly out of the ground into surface streams. Ground water and surface water are not separate, but closely interrelated, as if they were two reservoirs piped together.

Most of the water which flows in surface streams has, in fact, already been infiltrated into the ground, and is reappearing in the form of surface flow in the river channel. Only during intense storms does over-the-ground flow occur which contributes runoff directly to streams without passing through the ground.

The amount of water that is returned to the atmosphere by direct evaporation and by the transpiration of plants is a large percentage of the total rainfall. Only about one-fourth of the precipitation that falls over the country reaches the sea in the form of runoff. If three-quarters of the rain which falls does not reach the rivers and then the sea, is it wasted? Certainly not entirely, for from that three-quarters comes the water used to grow forests and agricultural crops—all the living green plants which are necessary to maintain life and to provide the organic materials we wear, the food we eat, the lumber we build with, and other organic things which we need and which moderate our climate.

A quarter of the precipitated water is not transpired or evaporated to

the atmosphere, but used by man. What do we mean in the present discussion by "water use"? When passing through the turbines by a hydroelectric power plant, water is not altered, diminished, or in any way consumed. Therefore we define one type of water use as nonconsumptive—a use which does not diminish the supply.

In contrast, consider water used for irrigation—put in the soil where plant roots can absorb it. Most of the water taken up by a plant passes out of the stomata of the leaves into the atmosphere as vapor. A small part of the water taken up by the plant is used in the photosynthetic process, that is, in the manufacture of sugars or, let us say, plant tissue. Thus if irrigation is completely efficient, all of the water is lost to further use because it is returned to the atmosphere. Such water is "consumed."

The principal uses of water withdrawn from surface streams or from the ground include irrigation and municipal and industrial supplies. Irrigation is the primary consumptive use of water. By no means all of the diverted water—taken from a stream or pumped from the ground—is lost to the atmosphere. There is considerable inefficiency in the irrigation process. Water seeps into the bed and banks of unlined canals, a considerable part sinks down into the ground out of the reach of the roots of the irrigated crop, and some is evaporated directly to the atmosphere. We will consider the quantities in a moment.

As for the use of water for public water supplies, only a part is consumed in the household. Just as you sprinkle your lawn with water from the tap, that is, you sprinkle with clean or potable water, so also industrial plants use a large amount of water from public supplies in their manufacturing processes. These industrial uses include washing, dilution, cooling, steam generation, and waste disposal. Some water is used up in the product manufactured. Thus industrial plants use up or consume some water, but a relatively small percentage compared to irrigation.

Though many industries buy water from public supply systems, an even larger number develops individual supplies either by drilling their own wells or by developing surface supplies from lakes or rivers. We can, therefore, speak of self-supplied and public-supplied industrial use.

Household uses include cooking, washing, sanitation, waste disposal in the kitchen sink. The home owner also uses some water for irrigation or sprinkling. Household uses are like industrial uses—mostly nonconsumptive. The largest part of water used from public supplies is returned to sewers and thence to surface streams.

Rural uses of water are mostly for domestic purposes and stock watering, and thus are partly consumptive.

Water use for the generation of power is nonconsumptive,* does not necessitate withdrawal of water from the river or the ground, and will therefore not be considered here.

In the United States as a whole, the present water use, excluding that for water-generated power, is about 240,000 million gallons per day (mgd). Remembering that three-quarters of the total precipitated water normally returns to the atmosphere, the total available one-quarter consists on the average of about 1,200,000 mgd. Thus we now *use* about one gallon out of every five available, but *consume* only a part of each gallon we use.

Let us now consider which of the various uses are the largest.

Annual Use of Water in the United States

	Total Withdrawn	
	(million gallons per day)	(per cent)
Public Supplies	17,000	7
Rural Use	3,000	1
Irrigation		
Delivered to farms	81,000	34
Conveyance losses	29,000	12
Self-supplied Industrial	110,000	46
Approximate total	240,000	100

SOURCE: Adapted from K. A. MacKichan, *Estimated Use of Water in the United States, 1955* in U.S. Geological Survey Circular 398 (Washington, D.C.: 1957).

This table shows that 92 per cent of all water withdrawn is used for irrigation and self-supplied industries. These two uses are about equal in amount. One of these, irrigation, is by far the largest of all consumptive uses. It is not an efficient use, because only about 3 gallons out of every 4 diverted are actually delivered to the farm; the other fourth is lost in conveyance. That which is delivered to the farm is, to a great extent, returned to the atmosphere. Part of the water delivered to the farm, as well as some lost in conveyance, sinks into the ground. Portions may recharge ground-water supplies and some reach surface drains and thence stream channels again. It must be recognized that water which wets the soil particles will eventually be evaporated or transpired and only after the soil is moistened can water percolate downward through the pores or interstices to the ground water table. Now transpiration, like any evaporative process,

*[Except for evaporation losses from reservoirs storing water for power generation.—Ed.]

leaves the salts or dissolved minerals behind. Thus return flow from irrigation, that is, the part not transpired to the atmosphere, is higher in salts than originally and sometimes cannot be used again for irrigation because of the concentration of dissolved material.

Let us now consider what happens to water withdrawn for other uses. Public water supplies are to a large extent treated to purify the water. Usually treatment consists of settling or filtration to get rid of the particles of foreign material and to oxidize organic matter; afterward nearly all public water is chlorinated to kill the remaining germs. Water delivered to your house has been treated for your protection, and this costs money. Yet the amount supplied is so large in comparison with the cost, that we are used to paying but a preposterously small charge for what we are getting. We pay on the average about 5 cents per ton of water delivered at our kitchen sink. Imagine what we pay for a ton of anything else, coal, gasoline, food, or structural steel. The low cost of water is undoubtedly one of the things which made our present standard of living possible, for it means that water for cleanliness, health, and convenience is available to everybody.

After we have used the water, it goes down the drain into the sewer. Here is where one trouble lies. Public water-treatment plants serve 115,-000,000 people in the United States, but not all communities treat the water before discharging it back into the rivers. Of 12,000 municipalities having sewers, that is, disposing of waste into streams, only 6,600 have sewage-treatment plants. Municipalities with sewers serve a population of 92,000,000, but sewage-treatment plants serve only 56,000,000. Thus less than two-thirds of the cities have sewage treatment, and many existing plants are inadequate to treat all the sewage coming to them.

Of a sample consisting of 2,600 industrial plants, only 1,100 or about half are known to have adequate plants for treating their waste water. If the untreated waste of industry and of municipalities is considered together, the amount equals the sewage waste of a population of 150,000,-000. (See *Water Pollution in the United States*, U.S. Public Health Service, 1951.)

Summarizing, then, we can say that this country is endowed with large amounts of water of which about a quarter is available for our use. On the average we are using only one gallon out of every five available and one might suppose, therefore, that there is enough water. Shortages occur, however, because of nonuniformity of distribution in time and place—to be expected on a large and geographically varied continent.

Superimposed on geographic and seasonal variations in precipitation is

a year-to-year variation. The areas blessed with the largest total tend also to be subject to less year-to-year variation. On the other hand, as if semi-aridity were not already a sufficient lack of fortune, such areas bear the additional burden of the greatest variability. It can be said that a basic element of our water problems is that some areas and some periods are water-deficient.

Geographic characteristics combined with historical and economic events in our country's development were factors controlling the present pattern of water occurrence and water use. In the western half of the United States three-quarters or more of the total water use is for irrigation. In the eastern United States three-quarters or more of water is for industry. From these facts emerge the water problems of the present day. As matters stand now, water immediately available and inexpensive is already being put to use. Further expansion of any individual use must be balanced by a decrease in some other use or some attendant cost. For example, the growth of the large metropolitan centers in the West depends on increasing supplies of water. In order to get these increased quantities either some other use must be curtailed, or water must be transported from areas of excess to the areas of deficiency, and at much higher costs than the costs of similar amounts of water developed in the past.

If expanding industry in the East is to have additional water, it will usually be necessary to treat that water to improve its quality. Thus the expense will be greater than in the past when the water was of requisite quality.

We can distinguish three water problems: One, a problem of cost. Water may be immediately available but treatment may be necessary. Two, there may be a shortage. This also reduces to a matter of cost because to increase the supply requires either that the money be spent to bring water in from elsewhere, or the use itself must be moved to the place where water is available.

Third is the legal problem of water rights. If a particular use can bear the cost of developing a new source, or transporting water from a distance, it may be prevented from doing so because others have the legal right to that water. They must be paid to relinquish their right, hence this problem also reduces to a question of economics.

We can see that poor quality, physical shortage, and legal rights all have a common economic base. To the man who can pay enough, these problems can be solved. Whether the price can be justified by the benefit received is the issue. The economic justification, however, is partly influenced by what we have been accustomed to consider the value of water.

Only now are people beginning to realize that we have always obtained water for bargain prices. We must steel ourselves for a new concept of what water really is worth. The economy will gradually reflect this realization.

None of the problems cited so far seem to have any specific bearing on the idea of conservation of water. Let us, therefore, refer back to the definitions of conservation in an attempt to identify problems of water conservation. By one set of definitions, conservation, we said, has two aspects; use on a sustained-yield basis for renewable resources, and orderly development without undue waste for nonrenewable resources.

Are we using water on a sustained-yield basis? In the broadest sense the total water budget can be affected but little by man. Water is continuously regenerated and purified in the natural process called the hydrologic cycle. From ocean to atmosphere, to the land and back to the air by evaporation or to the ocean in rivers, water moves in a never-ending cycle. As it passes within our reach, we use water as we need it. After its temporary service, it continues its natural course.

But at any given place or in any short period of time we can indeed use it faster than it is supplied. In water we can draw on storage, gradually depleting it, just as we can draw money from our capital rather than live on the interest. What is the nature of this storage? The principal example is in ground water. An immense amount of water is stored in the principal aquifers or water-bearing formations in the United States. As water is drawn from these aquifers it tends to be replaced by infiltration of precipitation, but it is quite possible to pump water out faster than recharge is replenishing the storage. Water moves slowly underground and the stored supply in some places accumulated over a very long time. Water tables will fall as a result of pumping faster than the rate of natural replenishment. We call this "mining" of ground water. There are many places where pumping has caused a serious lowering of the water table, but this is by no means universal over the country. The trouble spots are mostly concentrated in California, southern Nevada, southwestern Utah, southern Arizona and New Mexico, west Texas, and southwestern Louisiana.

Ground water is being mined in these areas because it is currently financially profitable. Continued overdraft will sooner or later—and I might add quite soon in some places—mean either exhaustion of the stored supply, or such an increase in pumping cost as the depth to ground water increases that pumping becomes financially unprofitable. In certain areas the exhausted aquifer will not become replenished in the lifetime of our grandchildren or their grandchildren.

Mining of ground water is a problem in conservation in the truest sense of the word, because it constitutes exhaustion rather than sustained yield of a renewable resource.

As to waste, we sometimes hear about the need for conservation of water which flows to the ocean. One of the principal uses of surface streams in a civilized economy is the transportation and dilution of waste products. Water that reaches the ocean in a surface stream is not "wasted." If there were no water in such streams we would have to pump it into the stream channels to carry industrial and municipal wastes to a disposal area.

In this light, therefore, it is logical that we should dump wastes into rivers, but the problem arises of how much wastes and in what condition. Many waste products, industrial as well as sanitary, are decomposed easily in the presence of oxygen and become inoffensive. Some bacteria are also destroyed in the oxidation process. Most normal surface waters contain dissolved oxygen and when waste is dumped into such water the oxidation process begins naturally. If there is not an overload, the oxidation goes on to completion. When, however, more waste material is put into the stream than can be decomposed by the available oxygen, our olfactory and visual senses are outraged and hygiene is endangered.

Stream pollution has been called a problem of conservation. Most people know that pollution exists, but the problem is somewhat abstract and the ordinary citizen is usually not acquainted with the practices even of his own city. We abhor the idea of insufficient sewage-treatment plant capacity to treat the wastes from American cities, but passively condone the existence of inadequate treatment of sewage from the city in which we live. Water treatment costs money and, as in most other water problems, the root of our difficulties is what we are willing to pay for, and how much.

The technology is readily available to eliminate the pollution problem. When we consider the intangible niceties of having clean streams, we are placing an esthetic or ethical value on the resource. The American public has been willing only to foot the bill for some control of pollution but not a complete job. Yet progress has been made and the outlook is heartening. Treatment of wastes, after all, is justified as both a public health measure and as an esthetic measure. Public health is a field in which we are willing to spend money though the benefits cannot be measured in dollars and cents.

I have attempted to analyze a few broad problems in the field of water resources as they bear on the conservation movement. Conservation as a concept is based essentially on the desire to provide for our grandchildren

some values which we enjoy but which can be destroyed. Many different causes or actions are presented to us as conservation which are actually antithetical to conservation. These tend to ride the coattail of a popular movement. I suggest that we examine more critically issues and practices called "conservation" and reserve our special consideration for those ethical and esthetic values which cannot compete in a strictly economic world where everything must have dollar value. We must be willing to stand up and assert that there are some things which we as a nation want, but which in purely economic terms would be valueless or luxury. To preserve such values it may be necessary to decide beforehand that we want them and assign to them high priority without attempting to put a price tag on the benefit received. If we want a particular canyon, a rare species of bird, or a particular valley preserved because of its scenic beauty when threatened by some other use, strictly economic comparisons will seldom result in its preservation. The reason for this is that we have not found, and in my opinion we should stop looking for, ways of placing dollar values on scenery, on recreation, and on that intangible mental well-being which we associate with beauty. In this sense I think there is a real need for conservation of water. Clear streams which are natural in their settings, nice to look at, and pretty to fish in, have a certain esthetic value which defies the dollar. Some of these at least must be conserved if we are to leave to our sons and daughters what this country naturally provided to us and to our forefathers.

With this very important exception, I believe that the word conservation is being misused as applied to water today. All our *other* water problems, important as they are, can be reduced to problems of economics.

Let us, therefore, cease to confuse the basic meaning of conservation with problems which are strictly economic. Those of us who are interested in conservation values as I have defined them see a real need for conservation of water, but if we continue along our present course, trying to place dollar values on sunsets and canyons, there will soon enough be little of the best left to conserve.

*An account of a night ascent of the
fifteenth highest peak in the United States*

Climb Into the Moonlight

By RAYMUND F. WOOD

THERE ARE many ways of climbing to the top of the highest mountain in the contiguous United States, but in my opinion the easiest way to ascend Mount Whitney on foot is to go up at night. For this I recommend taking advantage of the nights when a brilliant moon shines on the trail during the six or seven hours of the stiffest part of the climb, leaving the traveler cool and refreshed to greet the dawn with the world at his feet.

To make the climb from Whitney Portal by moonlight, and to avoid the burning heat of the afternoon sun, it is only necessary to plan your trip for one of the several nights each month when the nearly full moon rises from the eastern horizon in the early evening. It will then shine with astonishing brilliance on the eastern slope of the Sierra for about eight hours, long enough to enable the hiker to negotiate the steep part of the climb up from Whitney Portal, past Mirror Lake and Consultation Lake, up the new series of switchbacks to the high elevation of Whitney Pass, over 13,000 feet. The moon is so bright in the later months of the summer, August and September, that a flashlight is unnecessary, though you might carry a small one along for emergency use.

The phases of the moon are marked in most almanacs. The ideal night for the ascent in August or September comes when the waning moon is about seven-eighths full, because then it will be rising about 10 P.M. daylight saving time (9 P.M. standard time), and will remain fairly high in the sky until about dawn. Plan to leave Whitney Portal shortly before midnight, if you are an average hiker, or an hour later if you are fast. The moon will be riding high by then and will light your way through the trees that line the first four or five miles of trail. You will follow the well-marked trail across the bare granite rocks between Mirror Lake and Consultation Lake, at about 10,000 feet, with a brilliant moon almost over your head, the air delightfully cool and refreshing, and with the great mass of the eastern rise of Mount Whitney itself staring you in the face like some ghostly monster from an unreal world. It is an unbelievable and an unforgettable sight to see the moonlight on that stupendous mass of rock.

Climbing swiftly and easily in the cool air you will come to Whitney

Pass, highest pass over the Sierra Nevada, in time to see the moon hanging like a resplendent jewel in the western sky, before it drops out of sight into the maze of peaks and canyons that make up the long ridges of the western slopes of the Sierra. It is a little chilly now on the top of the pass. You might be glad you put a pair of gloves in your pocket when you started. The cool air blows up from the canyons on the western side. It is best to rest on the eastern slope for a few minutes to admire the blaze of glory that now fills the entire eastern sky. The "false dawn," the phenomenon mentioned by the Persian astronomer Omar Khayyam, has already come and gone. This faint light, the reflection of the sun rising perhaps as far away as Colorado or Utah, has run along the summit of the peaks across the Owens Valley, illuminating them with the promise of what is to come, and has died away almost an hour before the real dawn comes. There is no better place to observe this false dawn than from the summits of the Sierra. It is followed, just about moonset, by the real dawn. First there is a soft, greyish glow along the horizon; then it becomes a deepening, golden red; then every mountain peak in Nevada turns to fire; then the fire turns to an indescribable luminescence; and at last the sun, the glorious sun, bursts forth from the jagged edge of those mountain ranges and fills the whole valley below you with warmth and color.

The last part of your ascent, in which you rise only 1,500 more feet, is now easy going. The sun lights your way and warms your body, but he does not burn you as he might if you were 10,000 feet lower down. Take it easy and by mid-morning you will arrive at the stone shelter hut on the summit of Mount Whitney, 14,500 feet in the sky with little more effort than you would exert climbing up the California Street hill to the Mark Hopkins Hotel.

The descent is easy too. Take your pictures on the way down. The sun is just right now for fine color shots, and you have plenty of time to admire and photograph the scenery. Allow about six to eight hours for the return trip; relax a bit at the lakes; take a swim in the mid-afternoon sun. You will get back to your car at Whitney Portal in good time for a rest before supper, and you will have carried nothing with you but your lunch, your camera, and maybe a small flashlight in your emergency kit.

It is easy to follow the trail by moonlight, but there is one tricky place, difficult to find even by daylight. Shortly before coming to Consultation Lake, the trail passes over a long field of tumbled rocks. On your right is the stream flowing out of Consultation Lake. When your trail approaches close to this stream, look out for a sharp bend to the right which crosses this stream on stepping stones and takes you out onto the high ground on

the right. If you miss it, and find yourself approaching very close to Consultation Lake, with the outlet of the lake still on your right, you will know that you have passed the sharp turn and that the trail is to your right. Either backtrack a few hundred yards until you pick up the turn, or turn right where you are and pick up the trail a few hundred feet to the north of the northern edge of Consultation Lake and at a slightly higher elevation. You are above timberline at this point, and visibility is good, so you are in no danger of not seeing the trail to the north and northwest of you.

So go to Mount Whitney by moonlight without fear; it is a less tiring, less thirsty trip; you will not need to carry blankets, sleeping gear, or cooking utensils; you will see the stern beauty of the eastern face of the great mountain softened by the pale luminescence of the moon; the brisk chilliness of the air will spur you on to discover new beauty in the granite crags; you will see one of the most thrilling sunrises of your life, with a valley nearly two miles deep stretched out before you; and you will return to your home with the memory of a unique adventure.



Here for the record, a vignette about the most beautiful stretch of the Colorado River, by a man who fell in love with the Plateau Province ninety years after John Wesley Powell did.

Forbidden Passage

By CHARLES EGGERT

TEN MILES below Hite a butte rises from the Colorado River's edge—a great sentinel marking the entrance to Glen Canyon. Here some ancient Indian god must have stood, pointing the way to Paradise. If anywhere, that place was below—through the 147 miles of Glen Canyon. What exquisite and wondrous beauty was there!

If there is weeping to be done, cry over the destruction of this place! As I write, blasts of dynamite are shaking its quiet solitude. Mighty earth-movers are roaring over the desert above, and pneumatic drills are tearing at the walls seeking firm anchorage for the Glen Canyon dam. The reservoir behind it will flood under hundreds of feet of water priceless gems of scenic wonder unequalled on the face of the earth. "The reservoir will make the beauty of Glen Canyon accessible to all," they tell us. We would ask: Is it not accessible now? There is no canyon on the river more accessible to all than this one. What of the beauty will remain? It is all in the bottom of the canyon! Everything will be flooded; there will be no more to see except the desert country—the same kind of country one can now see from a car window on roads already built.

We have protected most of our other priceless scenic areas as national parks, unimpaired, for the benefit and enjoyment of *all* the people. To these places you and I and our children's children can come to look in wonder at our land, uncluttered by hot-dog stands, road signs, jive joints, or even the more handsome aspects of progress. There, spread before us is the awesome wonder of natural things—the things God alone made. Stand on the rim on the canyon of the Yellowstone at dawn sometime and listen to the breeze singing in the pines around you. Smell their fragrance, and the bright crisp air, fresh of the earth God created out of time and

Adapted from chapters 24–27 of a manuscript tentatively titled "Forbidden Passage," to be published in revised form by Alfred A. Knopf. Mr. Eggert, of Barrytown, New York, is former chairman of the Sierra Club's Atlantic Chapter, an Honorary Life Member widely known for his films, "This Is Dinosaur," "Wilderness River Trail," "Canyon Voyage," and "Danger River."

space. Feel on your face the spray sent up from the great Lower Falls. Look out across that chasm and up into the sky, still peppered with the brighter stars which outshine the dawn.

* * *

Or some night lie at the mouth of a rock-carved amphitheater two or three times the size of anything you've ever been in. Look up the two-thousand-foot wall to the billion stars and listen to the murmuring of the river still carving deeper the slot of canyon you're in. Think of nothing but what you see and feel and hear and smell.

What a campsite we had picked! We were on a high place above the river, on a rock-ledged terrace. The riverbank was a series of mammoth rock steps rising from the water. Each level was flat and large enough to accommodate all of us. We had made our campfire in one of the numerous pot holes eroded in the rock. The one we chose made a perfect shelter for our fire. Beyond us, the river made a lazy curve to the left and there the canyon wall rose straight up a thousand feet. For a mile and a half this cliff followed the river before the wall fell back again. The face of the cliff was stained with long, black streamers from the water which cascaded over the rim in wet weather. It was an imposing sight, a gigantic backdrop—a motionless hanging tapestry—behind us, soft in the light of early evening.

Tony, Don, and I stayed behind when the *Brontosaur* set off on the morning run. With the cameras and tripods, we climbed to the highest ledge—over a hundred feet above the river—where we could get an uninterrupted view of the full sweep of the river as it made its path through the red rock and under Tapestry Cliff. How amazingly ephemeral this solid mass of a million tons of sandstone looked.

The river below, almost the color of the surrounding rock, would have been lost in the scene had it not been for the thin line of green tamarisk bushes lining the banks to mark the course. In the boats we knew the river *was* a big stream, but high up where we stood, it was a thin, golden, serpentine thread. We could barely make out the *Brontosaur* as she traveled downstream. Knowing how big she really was, we could understand the scale of things. This country was big.

Another twilight and we were at another good campsite. Nearby was an old deserted cabin; the home, one time, of a gold prospector. All along the way there had been ruins of old mines where men had come and dug with hope. But their sights were aimed too short. The gold was here all right, but it wasn't the kind one can take to the assayer's office and get a price on. If they left in poverty it was because they were unable to see.

The gold I speak of surrounded them wherever they chose to look, and those who could see it left this place abundantly rich.

Then we stopped at Navajo Creek, just above the Escalante River. On our map was written, "Waterfalls—lovely pool." We hadn't had a clear-water bath in weeks. "Want to come along for a clean shower?" I asked Cid Sumner.

"No—I'll stay at the boats. You boys just go on. I'll remain here to enjoy my figs in peace!" she laughed. The six of us hiked up the narrow canyon cut by the creek and presently we came to an enchanting emerald pool, crystal clear, surrounded by mammoth boulders. At the far end of the pool Navajo Creek cascaded in graceful leaps of sparkling white water. Around the pool, like a wreath, ferns grew. The place was so inviting, we could hardly get our clothes off fast enough. Clean, clear water! What a relief to get the silt washed off. I stood for a long while under the waterfall, letting the forceful spray pound down upon my head. Then for awhile we all lay on a large rock, sunbathing. The sun felt particularly soothing now that I was clean. I noticed how tanned we all were. The color of our skins nearly matched the brown rocks we were lying on. We had used sun-tan lotion the first week or two, and we were careful not to get burned too quickly. But now we didn't have to worry any longer—except for that conspicuously white patch our shorts had left.

After the sun bath, we jumped into the water again, had a vigorous waterfight which riled up the bottom of the emerald pool, took another shower. Refreshed, we returned to the boats.

"Now wouldn't you like to shower?" Fred asked Cid. "It's really not far to the pool."

Cid was sitting under the shade of a tamarisk bush, her wet nylon veil draped over her head. "No—there's been a nice breeze here in the shade. I'm too lazy to make the effort," she answered. Nevertheless, we sensed, she strongly approved the improvement the pool had made in us.

* * *

Our camp, the night of July 7, was again on a series of red-rock ledges rising from the water's edge. Close by was the narrow slit of an entrance to a side canyon. After supper Fred and I hiked below to explore it. To get to the mouth of the canyon we had to climb high above the river, along the top of a steep talus slope. Upon reaching the mouth, we came upon a scene of tremendous violence. A huge section of the canyon wall had fallen and the big boulders that obliterated our path were so newly broken and cracked that the fall must have occurred within the past few days; the leaves of the trees it had taken with it were still fresh, and sap was still

running from the twisted, broken branches. Tons of rock had come crashing down and there was a mammoth scar on the face of the canyon wall to mark its source. Across the narrow canyon, the walls were scraped where rocks had ricocheted.

Fred and I painstakingly crawled across the rockfall. When we came to the end of the debris we found ourselves buried deep in a narrow passage into the rock beyond. The sides of the canyon were no more than eight feet apart where we stood. They were nearly two thousand feet deep in the sandstone crust of the earth. No sunlight had ever entered the depth of this place. Down the center of the canyon floor ran a trickle of a stream.

The hidden passage twisted and turned as we followed it through the rock, and presently we came to a sharp turn. Here the stream had cut diagonally through the rock. The sky was shut off from our view completely; only the rock hung overhead. The canyon wall on the opposite side of the turn followed upward, parallel to its companion wall, and the two sides were like giant pieces of a jigsaw puzzle jarred slightly apart. Fred and I stood at the middle of the turn where we could look up and down the canyon as it wound its way deep in the earth. As we looked up through the slit the rock wall opposite seemed like the prow of a supernatural ship turned upside down. Behind us, the stream had gouged out a deep cave, and in front of it a soft dune of powdery sand lay piled high. The air was heavy with the green of ferns.

Fred and I wandered on, unable to believe what we saw. In places the bottom of the canyon narrowed, leaving only room enough for the stream to run between the walls. In other places the stream had eroded deep pot holes and we had to work our way along the slanting wall to get around them. At one place there seemed to be a mild enough pitch to the wall to allow us to climb to a ledge above, but we could not. The rock was too slippery, for here small springs gushed from the wall, making the wall wet. Wherever there was a seep in the canyon wall, ferns grew.

It was getting dark by the time we turned back, not yet having come to the end of the narrow passage, even though we had walked a good two miles. We had been so entranced with the place that we forgot the hour. Now we thought of that rock slide with the jagged-edged boulders we'd have to climb over to get back to camp. We hurried out as fast as we could. It was dark when we reached camp. Cid was sitting on her cot by the water's edge. We came upon her first. "You must see this place," Fred said, "no matter what, you must come with us tomorrow up that canyon!"

"We'll spend all day there exploring," I explained. "It's incredible!"

"Like the inside of a conch shell," Fred told her, and I could see the excitement of the place in his eyes. Cid must have too, for she caught the magic of it next day [and later published a poem about it in her book].

* * *

A short distance downstream from Hidden Passage we came upon a great alcove in the rock. If we searched the world high and wide and deep, we could find no grander temple. Here was a domed chamber in the yellow-brown sandstone, more than two-hundred feet high, five-hundred feet long and at least two-hundred feet wide. In the center was a high mound of rock and sand on which grew a grove of box elders, cottonwood trees, and ferns. It was like a Japanese garden, and Fred remarked that it could not have been more perfect had it been landscaped deliberately. At the far end of the vast chamber was a clear, still pool in which, we were certain, lived a water sprite, for every few moments a tiny spout of water would break the surface, leaving behind a perfect ring which would slowly enlarge and spread out until it was stopped by the edge of the pool. The pool was deep—so deep we could not see bottom, and around it, on the rock wall, grew a thick bank of maidenhair fern. Above the pool, through the ceiling and up through the rock for a thousand feet there was a narrow, winding skylight which had been carved out by a little stream which runs only when it rains. What a sight it must be to see it cascading in a two-hundred-foot free fall to the center of the pool below! And, what a lovely sound it must make here, for the acoustics are perfect.

"We are pleased to find that this hollow in the rock is filled with sweet sounds," Major Powell wrote in his diary on August 1, 1869. "It was doubtless made for an academy of music by its storm-born architect; so we name it Music Temple."

It was here that Powell and his men camped and sang. And here it was, too, that Seneca and Oramel Howland and Bill Dunn, along with the others, carved their names on the rock wall where they remain, almost as distinct as on the day they were made. Powell, on his second journey down the river in 1871, revisited Music Temple. Seeing the names of those three men of his first expedition, Powell thought this place would be a fitting memorial to Dunn and the Howland brothers. They had deserted him in the Grand Canyon, convinced that the party was doomed to disaster. They climbed out, only to be killed by Indians when they reached the plateau above. As we stood looking at those names carved in the rock, we wondered what Powell would think, were he to know that this place, too, would be destroyed by reservoir waters, and later by silt which would cover it forever from men's eyes. Powell was aware of the potential water

resources of the Great American Desert, and he believed in utilizing nature in man's behalf. But he was also keenly aware of the resources which feed men's souls. Meeting this need, too, was in man's behalf. How would he have felt about Glen Canyon reservoir?

Five miles below Music Temple we found hundreds of petroglyphs—one of the many sites to be found in Glen Canyon where the prehistoric red men had left their marks in passing.

"An almost universal human wish," Cid remarked, "to leave some sign that will last when we are gone—to hack away at the hard stone with the urgency of our mortality upon us."

Near the petroglyphs another narrow side canyon cut its way back through the rock. We decided to explore it. Perhaps we'd find another hidden passage. Instead we found a hidden amphitheater, unexpectedly. The narrow canyon took a sharp twist and there it was—so big Madison Square Garden could have fit into it without a squeeze. Again, as in Hidden Passage where the creek curved in an almost complete circle, the rock was cut down at a diagonal and the far wall had been deeply gouged out.

The great domed roof above us must have been ten stories high and five-hundred feet across, and coming down the center of the chamber was a gigantic rock peninsula. Near its base at the dry creek bed was a flat area, large enough to hold a symphony orchestra and a full chorus. As we sat on the talus which rose high against the wall opposite, Tony and I speculated on what a glorious concert could be held here. "If Stokowski could only see this, I'll bet he would arrange it!" I said. "He has the imagination for such a thing—just the conductor to do it."

"Yes, and we'd haul everyone down in boats. It would be the most magnificent concert ever given," Tony added enthusiastically. We sat back and speculated. A fantastic idea? Perhaps, but a possible one, I thought. It would certainly be the music experience to end all music experiences, what with the build-up the audience would have just getting to the place. I closed my eyes and could imagine the sound of a great orchestra here.

I kept my eyes shut for a long time but opened them when I heard Al call for our attention. His voice seemed to come from everywhere, close to me, yet far, far away. "Where is he?" I asked.

"Over there—on the rock, climbing down. You can just make him out." Don pointed straight across the chamber to the rock peninsula. In the twilight of the place—for here, too, the sun had never entered—I spotted Al—a small spot no bigger than the period at the end of this sentence.

"Come across," Al shouted, "you can see the sky from here." We walked over and looked up to the crescent-shaped slit of blue winding around

over us. Above the dome, where the chamber ended, rose a sheer wall of solid sandstone another thousand feet. Up there were millions of tons of rock and we were in the very heart of it. All that weight above, the bigness of the place; it was too much for me—too superhuman, too vast. I had to get out of there, get back to where I was my right size again. I felt as I had a few nights before, when I lay on a rock ledge staring into the sky, where every star that was there was brilliantly lit. The longer I looked up, the more three-dimensional the sky became, and I sensed the spatial distances in it. Seeing the universe spread out above and around me that night made me feel as infinitesimally small as the sky was infinitely big. Now I found myself almost running to get out of Twilight Amphitheater. I was glad to be in the open again where I towered above something, even though it might be only a sagebush.

“What a place!” Tony said when he caught up with me. “It was like being in the belly of a whale!”

While we were gone, a strong wind had come up. It kicked up high waves on the river, and we had a hard time fighting our way as we continued downstream. The waves tossed the *No Name* about and the motor's propeller alternately dug into the water and whirled futilely in the air. The sun beat down on us relentlessly. When we could hardly endure it much longer, we saw Navajo Mountain hovering in the distance. We knew we were nearing the mouth of Aztec Creek, the entrance from the river to Rainbow Bridge.

“Almost there!” Don shouted from the small boat, “think you can stand it a little farther?”

“Yes, yes—go on!” Cid shouted back to him from behind the piled-up duffle in the middle of the *Brontosaur* where she sheltered herself against the wind.

It must have been another half hour before we pulled into a quiet bay which was sheltered momentarily from the wind by a sheer, high wall on the opposite side of the river. We dragged the food boxes across the sandy beach to a wide, flat shelf of rock. Here the campfire was built in the shelter of a small crevice and the table set up as the sun went behind the cliff on the other side of the river. “At least we'll be in the shade,” Don remarked caustically. That hot night we huddled in our sleeping bags like pupae in cocoons. The blowing sand was more uncomfortable than the heat.

A climax was ahead. Well hidden up the side canyon was one of the wonders of the world—Rainbow Bridge; Nonnezoshie, it was called by the Indians. A rock arch like a rainbow in the sky, a place held sacred

and secret by the ancient Indians; I dare not be so close and miss it. As I lay huddled in my sleeping bag thinking of that place, the wind suddenly stopped and all was at once quiet; so quiet I could again hear the murmur of the river beyond. I popped my head out of my bag to listen to that soothing sound and breathe the clear air again. When I looked up I saw the stars. To the northeast was the Big Dipper that had followed us all those 650 river miles we had come. Only one night had it deserted us—back in Cataract, where we had slept on the rocks below the Big Drop. The 3,500-foot cliff above us had hidden it from our view. It hadn't occurred to me until now that every night except that one I had looked into the night sky and had seen that one familiar thing in this unfamiliar world, and I had felt at peace, at home in the universe—secure. This night, seeing the Big Dipper there, I felt in place again after the day of incredulities.

* * *

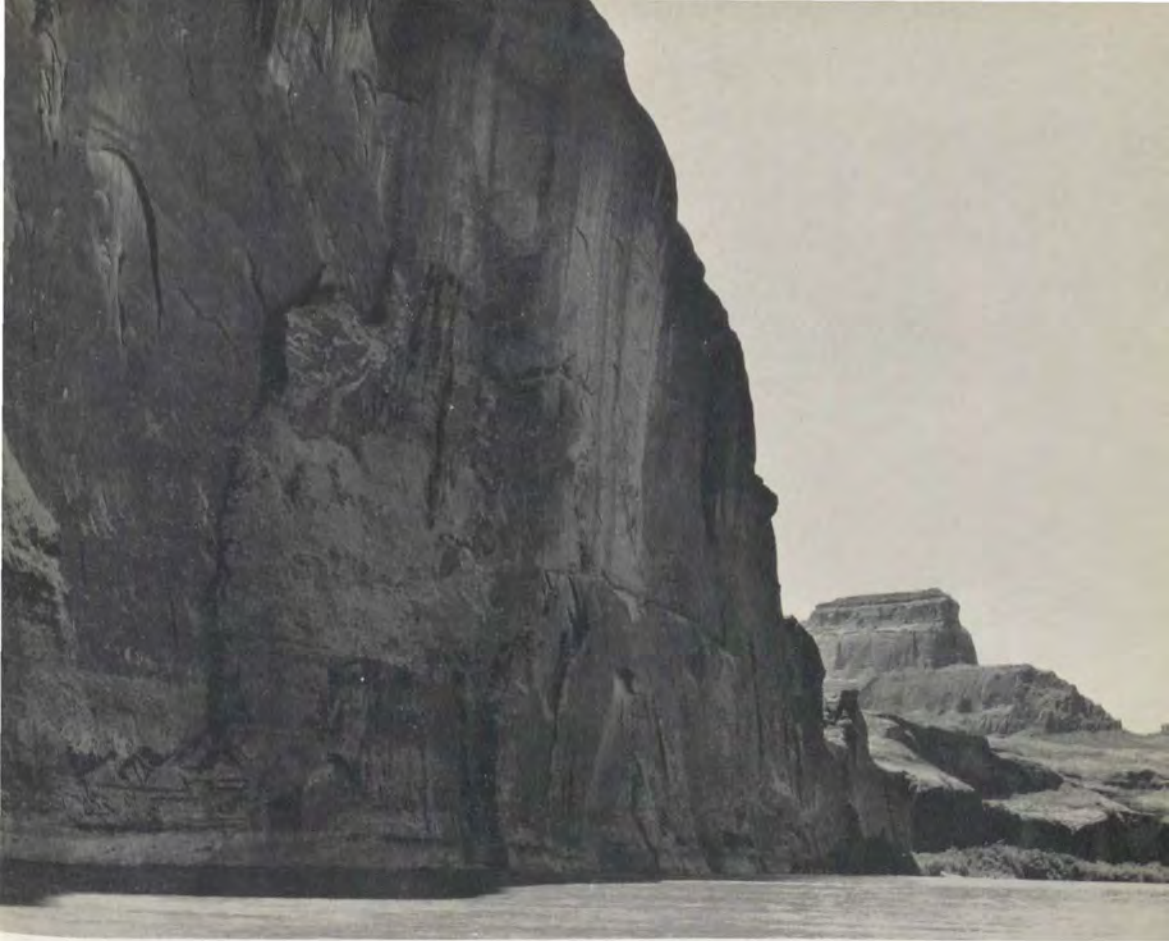
Strange that one should walk so far and suffer so much to see a mass of stone arched across the sky. Perhaps this was why it was such a thrill. It was something one had to exert oneself to see. I wonder whether we aren't making a big mistake in making it so easy for people to see things. Nearly every week I receive press releases informing me that this road or that one in our national parks is being "improved," widened, paved, made into a highway. It is getting so that almost everything can be seen from the car window. People boast about how many parks they have "covered" during their vacation. Only recently I spoke to a couple who, in the course of their auto trip across the country, had seen Yosemite, Sequoia, Death Valley, the Grand Canyon, Bryce and Zion canyons, the Tetons, Yellowstone! *Seen* them? I wondered. *Felt* them? *Understood* them? Hardly. Their pictures showed a two-dimensional experience, all seen either from their car window or from an overlook beside the road. They could almost as well have stayed home and looked at pictures in a travel magazine. Their appreciation of what they had seen was in exact proportion to the time they had spent. One has to get out of the car and walk—feel the ground beneath, the earth around, smell the air, hear the sounds. What is a waterfall without the spray in your face? What is a forest without the spongy feel of the thick layer of needles cushioning your feet? What is a desert without the sand burning through the soles of your shoes or the cactus spine pricking your leg? All these are a part of the whole. And if there is effort involved, the more the appreciation.

Most of what we walked through, and that set the stage for the deep appreciation we would feel, is soon to be erased by the fluctuating reser-

voir behind Glen Canyon dam. Power boats will zoom the most casual traveler into the canyon—indeed right under Rainbow Bridge itself if some of the proponents of ease should have their way and forestall the steps proposed to keep the last half mile from a silty grave. We were among the last to know this approach as God made it. Our sons would not know it, and we tried to forget how rich an experience was being taken from them. They would be deprived of it here, and also up along the main Colorado, in such sweetly quiet and peaceful places as Twilight Amphitheater, Hidden Passage, and Music Temple.

We walked toward the Bridge, stopping at every new vista to sit and look. The closer we got, the more beautiful and graceful it became. There was a simple explanation of how the arch had been formed but that didn't matter; the arch was *there*, spread across the canyon, framing all of Navajo Mountain in its span, and the beauty of it transcended its geology. We spent a long time at its foot, resting there, feeling its presence. Then we climbed to the abutment where the National Park Service had placed a register. We signed in and read a few of the two thousand-odd names of those who had come before, most of them on horseback by a fourteen-mile trail from the one-time lodge. One man had written "Not worth it" after his name. Had he become so bogged down with the contrivances of civilization that he could no longer focus on beauty and wonder?

I think of him often. Perhaps now, his blisters healed and muscle soreness gone, he sits on his foam rubber and looks past the air conditioner upon the crush of humanity, fighting its way across streets, bucking traffic, hating to have to rush back to jobs. Trapped in the maze of the world whose face man has changed, perhaps this man will think back to Rainbow Bridge and the soon-to-be-forbidden passage—and wish he could erase what he wrote there.

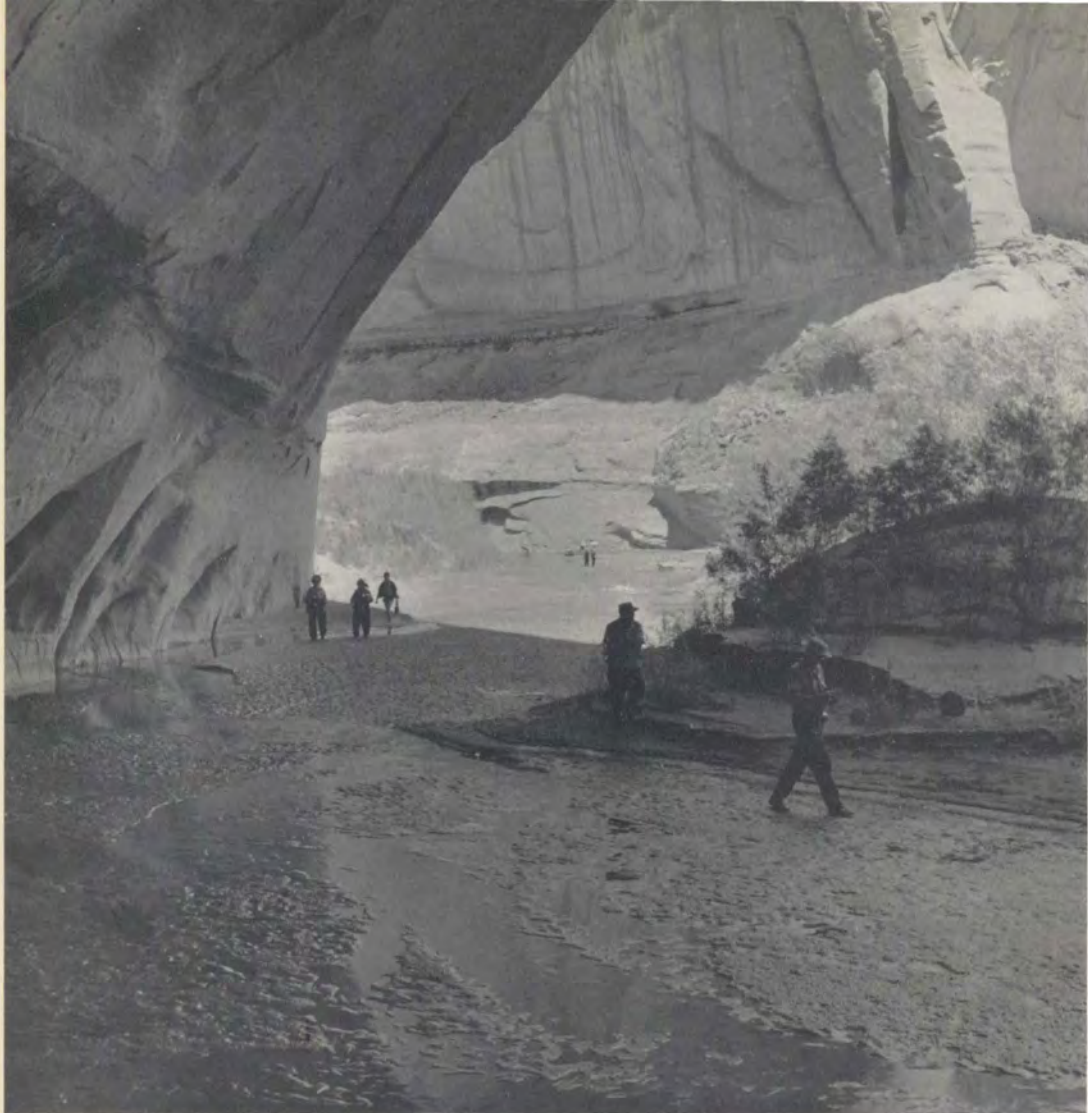


The last days of Glen Canyon . . .

Drifting here, you learned to perceive, not to preconceive, what makes a land beautiful. Beauty is where you see it and you saw it often where the big river, thin-edged with green, slid along under the pastel tapestries. An old river had built the stone grain by grain, and the new river was shaping it—imperceptibly aided by artists who left long ago. You didn't quite catch the river in the act of sculpturing, but the color of the Colorado assured you that creation was still going on.

FOURTEEN PHOTOGRAPHS
BY PHILIP HYDE





... the last of surprises
in the side canyons ...

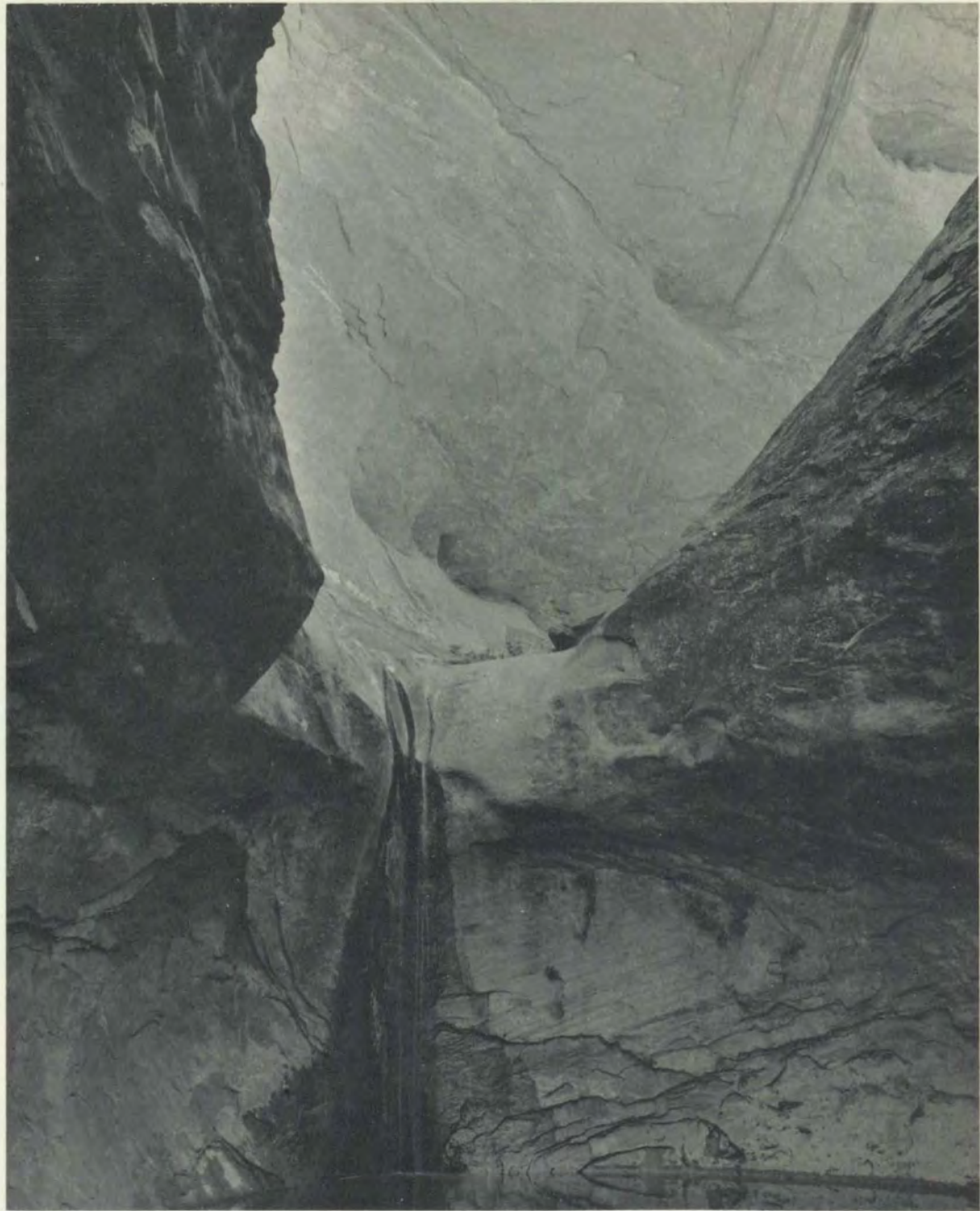




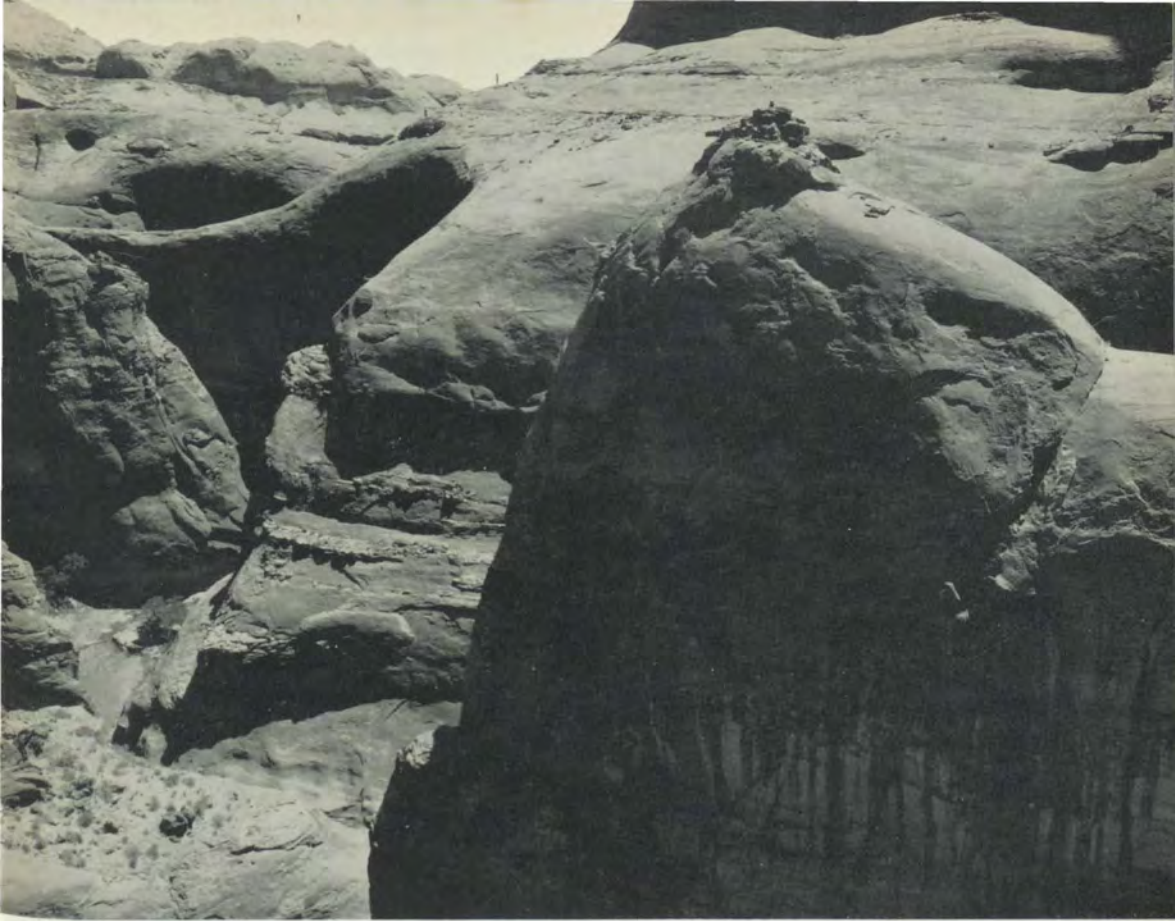
Down in the main gorge the vista was fine enough, but what really counted was what you could seek out in a hundred tributary clefts. Georgie White knew when the big boats should be tied up and people should start walking, and you learned to know Warm Springs, the silence of Moki Canyon, and the strangeness of Hole-in-the-Rock.

There were the antiquities that you discovered, and some that would never be.

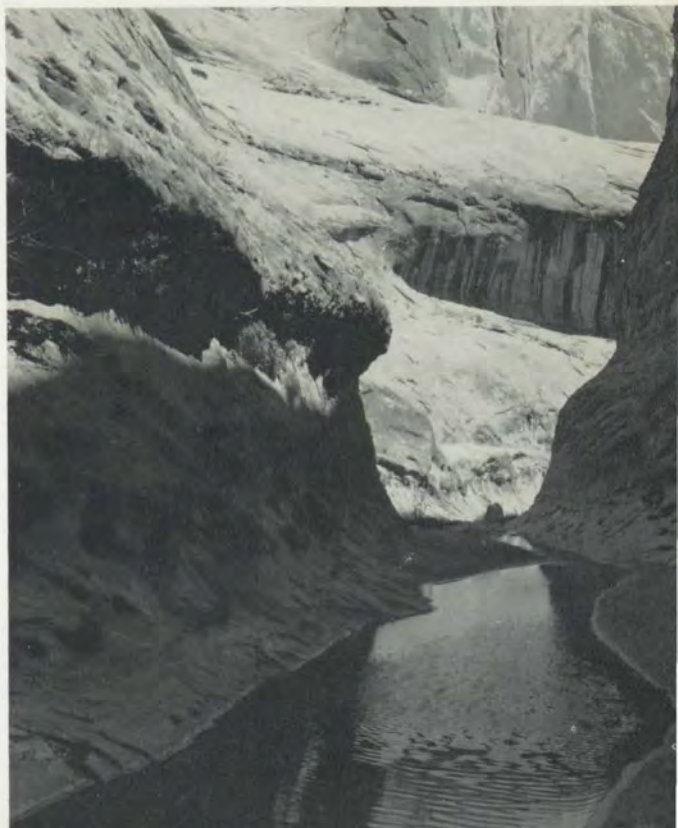


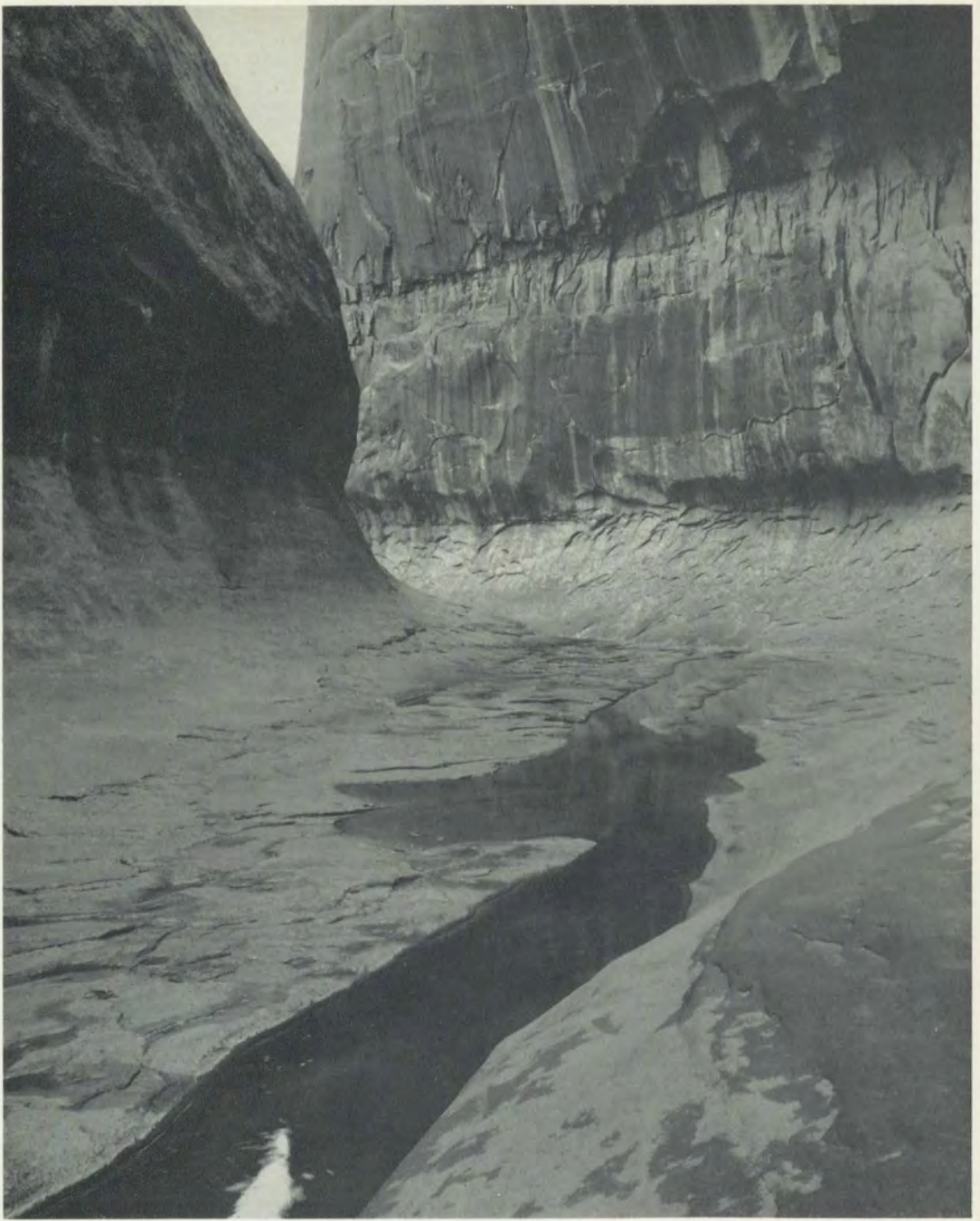


... of somber color
in places the desert sun never knew ...



High above the noontday twilight of Hidden Passage you might have looked small but you felt big. For all the massiveness and height, your own good feet could put you there and had. There was time to rest in shady silence, to wonder how, to begin to understand why, once again, to know yourself.





. . . and of the flood-scoured avenue to the Rainbow—

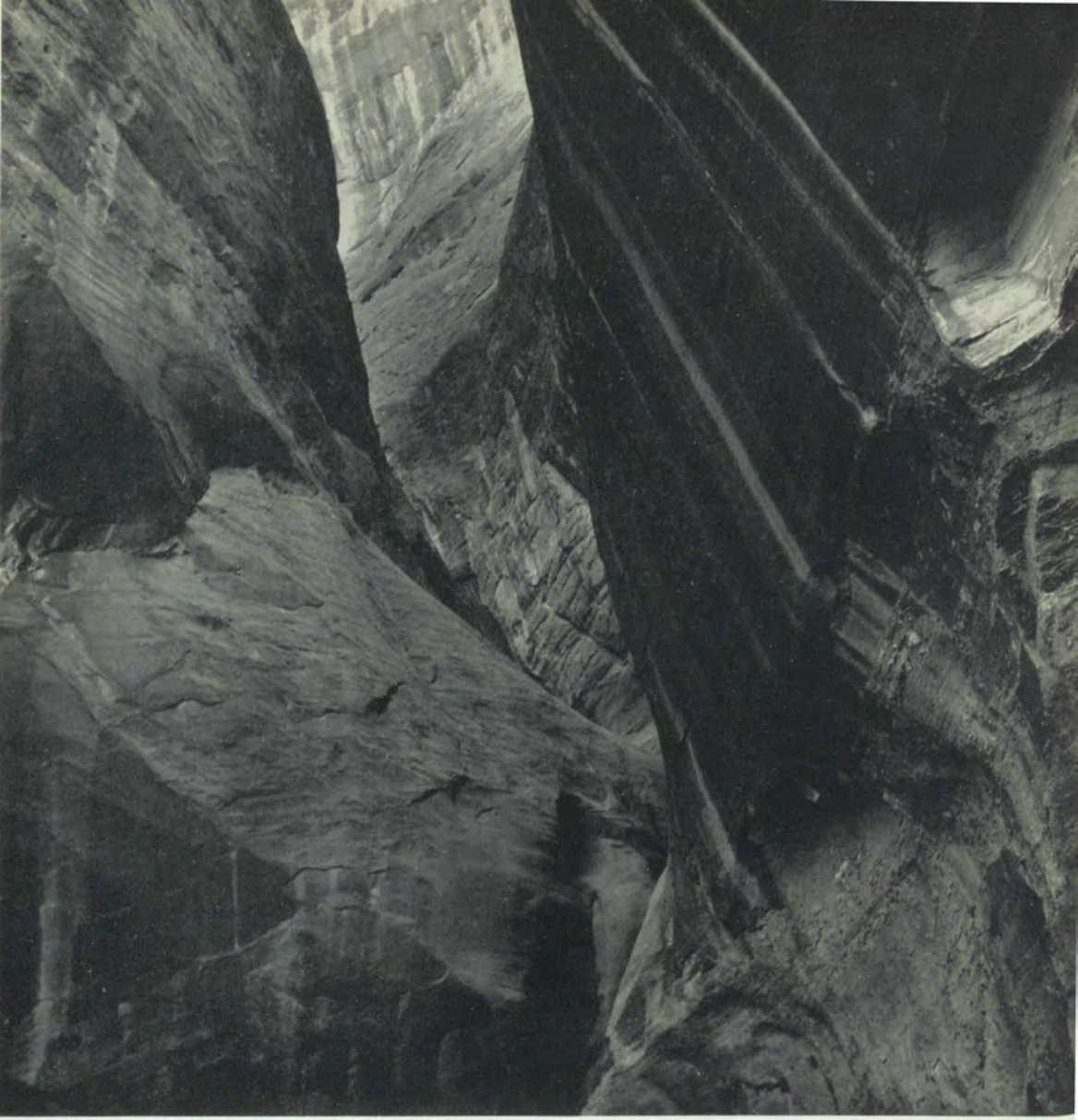
You forgot how far away from the river the great bridge was, once that last turn revealed it to you; and as you walked back down what the flash floods had carved, you were amazed that they had spared so delicate an arch.

Bridge Creek joined Aztec Creek, and Aztec the Colorado, where a bank beaver had a home but his progeny will not. For the flood will come that does not recede and the natural world will miss what the ages built here, and here alone. Just a few miles below the junction the great dam is building. Not to put water on land. Not to control the river. Not to save water in an arid land. But to divert the force that created beauty, to generate kilowatt hours of electricity instead, while other sources of energy lie idle. For a replaceable commodity we spent this irreplaceable grandeur. Your son may pass close to it. But neither he nor any man yet to be born will ever again know it, nor will the intimate things that gave this place its magic ever again know the sun.



—remember these things lost;





and under the vaulting roof of Music Temple
burn a candle to the memory

A California Family in the Alps

By ANGUS E. TAYLOR

IN THE course of sabbatical years spent in Europe the Taylor family has managed to spend parts of three summers in the mountains of Switzerland. During these periods, however, combinations of time, weather, and money were not favorable for very much climbing activity. Also, the boys were not old enough for serious climbing until the third of these summers; then we did just enough to whet their enthusiasm—immensely. So, when fortune smiled with the big opportunity to stay in the high Alps for seven weeks in the summer of 1957, we reveled in the long awaited fulfillment of hopes and dreams. We spent all this time in the region close around the climax of the Swiss Alps: the many-summitted Monte Rosa, whose highest point, the Dufourspitze (elevation 15,217 feet), is Swiss territory, but just a stone's throw from the Italian border. Almost all our climbing was done in five weeks with Zermatt as a base. We also spent some time at Saas Fee and Arolla.

Our aim was to go high and get to know the big mountains, but to do it moderately and safely, within the limits of our training and natural capacities for enjoyment of vigorous activity. Hence we worked up gradually, and followed the classic routes. The boys and I (Gordon, 18 and Kenneth, 16) made most of our expeditions with two guides. My wife, with our 7-year-old daughter Kathleen, had perforce to do less high climbing, but we managed to free her on many occasions, and she ascended the Matterhorn while Kathleen and I strolled and lolled by the Schwarzsee. The boys and I had made the Matterhorn ascent a week earlier. Thus it remains for another year for Kathleen to complete the family record by reaching the summit of Cervin, as the French call the Matterhorn.

When I first went to Zermatt, in 1948, I got acquainted with a guide, Felix Biner, and made an expedition with him. His dignity, skill, and quiet wisdom made a great impression on me, and I went with him again in 1955. By 1957, because of his age, Felix had foresworn further expeditions on the great peaks, so we carried on with two of his nephews, Andreas and Norbert Biner, with whom we had climbed the Rimpfischhorn in 1955. Felix did, however, accompany my wife on her training expeditions to the Riffelhorn, Untergabelhorn, and elsewhere. It is not easy for him to forego the big mountains which he knows so well. He ponders on the idea of going off alone to climb the Matterhorn one last time. I don't know if Felix can be compared on even terms with the great guides of earlier days, but he is

a marvelous person to know and to be with. Andreas and Norbert are young guides, in their twenties. They are excellent company. We enjoyed their singing and yodeling on the mountain tops, and learned to anticipate their pleased cries as they sighted marmots or chamois (they love to hunt in the autumn). In winter they are ski guides. Their brother Edmund guided my wife up the Matterhorn. He has the interesting distinction of being the man who aided the cat that climbed the Matterhorn a few years ago. (That cat, an inhabitant of the Hotel Belvedere where climbers often sleep before ascending the mountain by the northeast ridge, was one day moved to follow the climbing parties. He attained the top after being helped over some of the steeper pitches. Some Italians then took him down to their side of the mountain. This first feline conqueror of the Matterhorn did not have a long life in which to cherish the memories of his feat, and he is now a stuffed specimen in a Milan museum.)

Guideless mountaineering in the Alps is widespread, of course, and the view that such mountaineering is necessarily folly is long since discarded. There is, however, much folly being practiced, both guideless and with guides. Inexperienced climbers often poach on the skill and knowledge of the guides by following closely after guided parties. We chose to go with guides because we felt that to be the safest and most instructive way to come to grips with the formidable problems of Alpine climbing. We like to think that we have learned a good deal, and that we were not mere baggage hauled up by the guides, or tame bears following a keeper around at the end of a rope. Also, we enjoyed immensely the comradeship with the guides on the way and in the huts, and the better insight we got from them into the thoughts and lives of the mountain people.

The elevation of Zermatt is 5,300 feet; for all the major expeditions it is best, and nearly imperative, to go up to a higher point to sleep before a climb. The Swiss Alpine Club has many huts in the district; there are also some high inns and hotels. One could arrange to live exclusively in these establishments above the Zermatt level (at elevations ranging from 8,000-11,000 feet, and in a few places much higher), but we returned to the valley in between expeditions. Normally we bought our food in Zermatt and took it up to the huts with us. Fees at the club huts are moderate.

Life in the huts is interesting, but not always restful. Large groups of Swiss schoolboys are sometimes shepherded from one hut to another on outings. One of our nights at the Rothorn hut was in the midst of such a noisy throng. Sometimes a hut will be fantastically crowded, and people will be sleeping on the floor and on the tables in the eating room. My wife and I once found ourselves in a hut with 67 alpinists and 53 bunks. Our

guide, as it happened, was the brother of the hut guardian, and he saw to it that we got a double bunk and enough blankets.

The heroic moment in the climber's day is when he rises from his bunk in the dead of night and stumbles down to the table for "breakfast" of tea, bread, and jam. Roping up often takes place in the hut corridor, and one steps out into the freezing darkness, numbly following the flickering candle-lantern swinging in the guide's hand. If there is a crowd, it is amazing that rope tangles don't occur. When I started up the Matterhorn there were fifteen or sixteen ropes assembling in the same corridor. But we were soon distributed suitably apart as we found our proper speeds on the mountain. The half-alive feeling that accompanies early morning starts does not last long. Soon comes the dawn, the most wondrously beautiful part of the day in the high Alps. Those who have seen the east-facing peaks turn pink as they first catch the sun will know what I mean. Others must try to imagine, but imagination can never give them a realization of the magical quality of the world as it then appears.

In the Alps a mountain gains a certain extra stature in the minds of men if it surpasses 4000 meters in elevation (13,120 feet). We climbed twelve such "great" mountains during our stay at Zermatt, and eight smaller summits during the summer. Sometimes we reached more than one summit in one day. Notable in this respect was the boys' traverse of the Wellenkuppe and Obergabelhorn—a fine expedition starting from the Rothorn hut, going over the Wellenkuppe and the great gendarme of the Gabelhorn, with descent via the interesting rocks of the Arbengrat and return to Zermatt through Zmutt. Our most ambitious expedition (made by the boys and me) was the round in which we traversed three of the summits of Monte Rosa, and then the Lyskamm, Castor, and Pollux in two successive days. Starting by lantern light from the Monte Rosa (Bétemps) hut at 3:30 A.M., we reached the Dufourspitze at about 8:30 A.M. This is the loftiest summit in the Alps apart from Mont Blanc. From there we traversed over the Zumsteinspitze to the Signalkuppe, or Punta Gnifetti, on the summit of which, at 14,965 feet, we spent the night in the Capanna Regina Margherita (Italian Alpine Club). The next day we descended to the Lysjoch and then traversed the long and interesting double-summitted ridge of the Lyskamm (14,877 feet, higher than the Matterhorn), which is notorious for its treacherous cornices. Thence via the Felikjoch over Castor, down to the Zwillingjoch, a short rock climb back to the icy crown of Pollux, and a long, exhilarating descent with glissades to the Gorner glacier. This was a magnificent pair of days, in ideal weather, with views of an extent and grandeur unrivaled in my experience.

An ascent of the Matterhorn is a memorable event in any one's life. This excursion, unlike other climbs from Zermatt, is made by hundreds of people as an isolated *tour de force* in a life in which, otherwise, mountain climbing plays little or no part. As a result of this, and also as a result of the crowds which swarm up and down the Hörnli ridge, many discriminating mountaineers eschew the ordinary route up the Matterhorn from Zermatt. But one should not avoid the experience altogether. As with the overpopularized Yosemite valley, so with the overpopularized Matterhorn, each is nevertheless a unique and wonderful feature of the earth's surface, and one which is worth devoted attention and repeated approaches from all directions.

An ascent of the Matterhorn is not a trivial excursion, in spite of the fact that novices make it in droves. For a variety of reasons the mountain has become a great killer (five deaths on it while we were in Zermatt). Over most of the ordinary route the climbing difficulties are moderate, but the way is steep, and an unchecked slip is usually fatal. In bad weather or with unfavorable snow and icing conditions, the mountain is highly dangerous. The formerly most difficult climbing, above the shoulder, is now rendered innocuous by fixed ropes. The mountain is steep all the way, and climbing down requires nearly as much time and perhaps even greater care than climbing up, especially since one is apt to be tired on the descent.

We were defeated by the weather on our attempt to climb the Dent Blanche. Likewise, time, weather, and snow conditions kept us from the Weisshorn. But, in addition to those already mentioned, our 4000-meter list contains the Breithorn (easy, but fine for views and for training), the Alphubel, the Dom (at 14,942 feet the highest mountain which is entirely in Switzerland), and the Zinal Rothorn. This last peak is a fine combination ice-and-rock climb, with one sensational but secure rock passage.

Our direct climbing expenses (for the whole family) in 35 days amounted to \$1,176. This includes guide fees, provisions, hut charges, and a certain amount for cog railways and aerial lifts (used in getting quickly from Zermatt to the start of an excursion). It does not include hotel charges and other expenses in between the climbs. We do not expect ever to be able to duplicate this wonderful family excursion, but we shall remember it forever.

*One of the first men to climb the Lost Arrow
chooses a summit with a broader base*

Sierra Club Registers in Equatorial Africa

By ANTON NELSON

AS A Sierra Club member now living among the antipodes in Tanganyika I have received from the club four aluminum box-type mountain registers as found on many Sierra peaks as a donation for the Mountain Club of East Africa. This was a joyous occasion, and it seemed to me and some friends that the placing of these registers called for some real climb. The immediate objects were Kilimanjaro, that is to say, one of its two main summits, Mawenzi (17,386); and Mount Meru (14,979). Just behind our house, somewhat like Whitney from Lone Pine.

Thus, three of us, Dave Goodall, a Kenya agricultural officer, John Cooke, a Tanganyika district officer, and myself—I am with a farmers' co-op—decided on our trip. We would use a much-neglected route which included traversing the Heim glacier for the first time. Kilimanjaro is almost always climbed up a mile-long scree slope at the easiest and least scenic point after a three-day, thirty-five-mile approach which gets some people acclimatized and leaves most sick. On the western side, however, Kibo is much more attractive for climbing. What the Germans (in this formerly German colony) dubbed Bretschwundspitze beetles out like Half Dome except that it is in the tens of thousands and crowned with a beret of ice which tumbles down through tottering rock towers to the floor of the western breach where erosion is beginning to eat into the crater itself.

Kilimanjaro in Swahili means "shining mountain," a lovely name, unspoiled by the memory of some surveyor, statesman, or general. The sheer bulk of this mountain is difficult to appreciate. Kilimanjaro is bigger than the entire Teton range. It is as if you plumped a 4-mile-high mountain down between Tamalpais and Mount Hamilton in the middle of San Francisco Bay. To drive around it is about as long a trip as from the Bay to Sequoia Park. At 13,000 feet it is still 20 airline miles across and rises in one unbroken sweep nearly 17,000 feet above the town of Moshi at its southern base to the crystal ice dome under which my former Cal classmate, Gregory Peck, emoted so effectively on the screen. At our home, 40 airline miles to the west, sunset is frequently a family occasion to look out through the trees of our little coffee ranch and silently watch the

alpenglow on Kilimanjaro as daylight fades. That is enough to excite the dreams of climbers old and young.

Our plan was to traverse from the half-dozen summits of Shira, the oldest crater on the west, to Mawenzi, whose rotten towers and couloirs rise to a cockscomb crest on the east. In the middle we would take the "back side" of Kilimanjaro, following the Heim glacier and icefalls up to the summit. The remnants of Kilimanjaro's ice cap which now rim the summit, some two miles across, frown down in hundred-foot cliffs. On the northwest and southwest, moving glaciers reach down as far as the 1,500-foot contour. Below are extensive works of moraines and scoured valleys, the largest of which, the "Barranco," catches the shattered debris of the left side of the Heim falling from 1,000 or 2,000 feet above.

The first ascent of the Heim glacier was introduced by two avalanches which greeted our arrival at the tongue, made of re-formed ice fallen from walls that cross the entire glacier hundreds of feet above. As we pushed on, a rocky ridge, alternately interrupted by ice cascades into the Barranco far below, offered the most likely and least exposed route. We followed it till nightfall.

A big icicle speared clean through our tent announcing the second morning on the glacier. Apparently the first rays of the sun had set up expansion stresses in the icicles. The ice itself was mostly glassy. There on the west the noon sun would cause a little surface melting followed by refreezing. The upper lips of crevasses, like the build-up of streams in limestone regions, would tend, because of this surface melt-water, to overhang the lower, often by many feet, toothed with icicles. The dryness of the air apparently caused evaporation from the ice, turning into thick mist before noon and coming down as snow about 3 P.M. when the temperature started to fall. A layer of one to three inches of new snow thus covered glaze ice, so we went cautiously, using the axes.

This slow work was not helped when one man slipped on steep ice on the third day on the Heim, losing one of our three axes down a crevasse. The mist problem interfered with our route finding, so we headed for a bivouac quite early rather than stray under hanging ice with its objective dangers. The brightness of the mist was worse than glaring daylight, pushing my exposure meter way over to the pin. The temperature as we rose higher was out enough to make my shutter sluggish, overexposing most film.

We had not trusted store-bought "dark glasses" available in the tropics and had imported some old models from Britain. Glasses are an absolute necessity. One of my comrades, bothered by them when step-cutting, dis-

pensed with them for a couple of hours and paid for it with a painfully blind day while we waited for his vision to return. Medical preparations for special ascents are almost impossible to get in such isolated places even in Moshi's, whose city lights were visible below.

Only in one place did we have to trim overhanging ice, and ice pitons were most welcome protection at a number of points. A fourth night on the ice we were overtaken by darkness and compelled to pitch our tent over a crevasse on a four-foot snowbridge which we enlarged by chopping out the lips. Our exposure to space, wind, and cold made resting and eating impossible but we were able the next, fifth, day to crampon fairly rapidly up the last half mile and get off the ice.

Dehydration was a problem with three men for one small primus and it aggravated the lymphatic swelling of hands and faces apparently caused by flying ice chips, etc. The temperature dropped to not much above zero. We wore all our clothes in our down bags so as to dry out the perspiration of daytime exertions, and put inside the frozen boots at dawn to soften them so we could get them on. One would have wished that the 12-hour days would be longer as in the higher latitudes to give us more time on the march.

The most startling danger of the Heim climb awaited us on the summit rocks. After five days at lonely supra-Alpine heights we happened to walk out on the Kaiser-Wilhelmsspitze just in time for John to yell, "Hit the dirt," as he flung himself flat on his face. I heard nothing and then a flitting shadow on the crater floor several hundred yards below lifted my eye to the swiftly swelling head-on view of an R.A.F. Canberra jet preceding his own sound as he buzzed the summit. With a sudden clap of thunder he breezed by at about 20 feet. Lucky for us there was no downdraft over the wall where we stood or lay.

As we reached the summit of Mawenzi we mounted our precious and long-traveled box and fastened it to the top. Inside we placed a register whose first page reads: "This summit box is an expression of the worldwide solidarity and mutual helpfulness of that fraternity of people who love to climb mountains, a gift from the Sierra Club of California in the United States to the Mountain Club of East Africa, Kilimanjaro Section."

The second box was placed on Mount Meru, 25 miles due west of Kilimanjaro. Meru has felt the Nelson foot many times, indeed, son Chris, now turning 14, has become a guide on his own for scouts and young climbers. As we placed the box we were overtaken, near the top, by a snow storm which made route finding among the rotting towers of breccia a bit of a guess as we skirted the edge of Africa's highest precipice—a

sheer 4,000 feet of loose rock which pitched down to the floor of the collapsed crater.

Perhaps I should state that, in general, the main problems by which the climber in equatorial Africa is faced are not those on the summits, but during the approaches. The rain forest, with its frail flowers and moss-laden trees, 20-foot tree ferns and 40-foot giant heather toward timber line is entirely miserable if it should happen to rain. (Once climbing Mount Meru with two young African friends I had three days of rain.) The bamboo belt is even worse, and with charging through it up sheer slopes and down like a football tackle one alternates by following slippery game trails trampled out by our big game. The imminent expectation of meeting four-legged, armored dreadnaughts causes one to forget one's sodden condition, and perhaps even spurs one on, but the nervous wear and tear makes one devoutly wish for more predictable problems such as California poison oak.

Last year alone our small club had close to 600 applications from nearly all continents to use our three huts on Kilimanjaro, Africa's highest peak. We will place our last two donated boxes also in this general area, and they will undoubtedly add to attract climbers all over the world.

"Give me a mountain I can get my teeth into"—the story of a climb to success as seen through the eye of a crampon

Life Story of a Crampon

By CRAMPONS UNIVERSAL

I WAS conceived on top of old Europe's finest mountain, the Matterhorn—a most noble place for a creature that is to serve mountaineers throughout its life. Unlike most living beings, I am motherless. My only genitor, my spiritual father, is a Slovene. Slovenia, that tiny but hardy westernmost part of Yugoslavia, has survived many perils and hardships; so has my inventor. And so here I am now, shiny, nimble, strong, ready to accompany climbers all over the world and to secure their steps on dangerous slopes.

To come back to the Matterhorn, that *mons montium*: In 1949 my father—the only Yugoslav member of the venerable Swiss Alpine Club, Berne Section—had to bring to the top a friend of his, a physician from Trieste. The doctor, usually very strong, had a bad day and they were the last to reach the top. The peak was gloomy, the traditional storm suspended in the air. Then icy rain came, followed by drifting snow; the rock glazed. "Let us put on crampons," my father decided. It turned out, however, that his friend's borrowed crampons were much too small. The situation became critical, and my father feelingly consigned to hell all crampons in the world because they were not adaptable to every shoe size and shape. That was the moment I was conceived.

They crept down, then, with infinite precaution, father belaying every step of his cramponless, rubber-shod friend. When they got back to the Hoernli shelter the doctor collapsed from exhaustion, and father forgot about me.

Later, at home in Ljubljana, father fell ill of bronchitis and had to go to bed. Now, as an occupation incidental to mountaineering (just to make a living), my father is a university professor in electrotechnics. These scientists! They never can stop thinking, it seems—even when asleep. Bored with his enforced inactivity, father ruminated over his most recent Matterhorn tour, and the idea conceived then was now born. Relying on his experience, he postulated ten qualities of perfect crampons. He wrote them down:

1. They should be continuously adjustable in length and width.
2. They should be separable into two halves, each adequate for easier terrain.
3. Their halves should also be usable in conjunction with sealskins on skis for steep ascents on crusted icy slopes.
4. Their horizontal front spikes, so useful for the steepest ice climbs, should be retractable for climbs on rock, where they are a nuisance.
5. They should be foldable in such a way as to keep the protruding spikes concealed.
6. They should be no more than half as heavy as the normal crampons, even less if possible.
7. They should be stronger than any known make.
8. Their binding should be quick, simple, and feasible in darkness and with thick mittens. (Classical fastenings on rings should be provided as an alternative.)
9. Their fastening material should be supple and simple, and unable to take up moisture, so that it cannot freeze, stretch, or shrink.
10. They should be manufactured by machine, not hand-forged, to keep prices low and quality uniform in large production.

Then for three long days father kept on designing construction after construction. Nothing would entirely satisfy his ten commandments. He had finally to adopt the best compromise. He drew me on a cardboard and then cut along the lines (with the household's best scissors, forbidden to the children and to him by the family's highest authority). So out I came in my first incarnation, in paper. His wife smiled indulgently—knowing that men enjoy toys such as cars, electric trains, guns, and the like—and she approved his funny spiked cardboard creation, fastened to his mountain boots by Scotch tape. So there I was, hanging from the strong shoe, weak as a newborn baby. But, much like babies, I displayed most of the characteristics of the future full-grown being, too.

Father showed his toy at a meeting of the Slovene Mountain Rescue Service. The boys there liked me and one of them took me to the eyes and ears of a big organization that needed thousands of crampons just at that time. That organization wanted me to be patented and produced in strong metal. And I was given a grown-up name before I could even walk:

Crampons UNIVERSAL—Avcin system.

Father then shaped me from sheet steel with file and hammer in the university workshop. The dean was dismayed by this breach of academic dignity, but it was too late. There I stood, still somewhat clumsy, but eager to plunge into true life, a typical adolescent.

When the first tests were made I behaved according to my age: Well enough, but short-comings showed left and right. They had to be rectified. I was still heavy, difficult to adjust, and even then adjustable lengthwise only in coarse steps. The screws were too weak, straps and rings awkward to handle.

Father took me to a friend of his, a great hand at tool-making. Mr. Carman of the "Utensilia" textile-utensils works, where I am being fabricated now. Details of design, tools, and dyes were perfected there. When I appeared in my third incarnation I was incredibly light, fragile-looking. But my smoothly profiled, shell-shaped, tough hardened-steel body was springy and sharp-toothed, ready to bite into ice or rock.

Then father was invited to spend a month as guest at the famous French National School of Skiing and Alpinism at Chamonix (ENSA). We arrived in the kingdom of Mont Blanc full of high-flown plans. I attracted the attention of Gilbert Robino, the instructor of the school (and himself an inventor of excellent mountaineering equipment), and Armond Charlet, the famous guide and now chief instructor of ENSA. Mr. Charlet, whose daring ascents on steepest ice are unequaled, is justly regarded as the greatest authority on crampons. He simply commandeered the two pairs of me, as well as my father, and set out for the Mer de Glace. Father warned him as he put on the first pair because from my singing voice father suspected that I was too highly annealed, too brittle, too likely to break. But Mr. Charlet did such stunts with me in the hard bare ice that I became mountain sick. On one magnificent jump over a crevasse I finally collapsed, and my wearer landed in a pool of icy water at the bottom, cursing me in finest French. When Mr. Charlet emerged, sufficiently cooled off, he inspected me. I was maimed, having lost most of my teeth. But it turned out that this was only a child's exchanging of milk teeth for better, stronger ones.

Mr. Charlet, understanding my juvenile misfortune, simply put on the second pair—the less brittle ones. Now I worked like a charm; even on the most demanding tests I showed my stamina.

Then father started to take me on long trips, finally to the monarch himself. We traversed Mont Blanc with heavy burdens to the Requin cabin, and I enjoyed the steep slopes more and more. On the following day, though, on the way down from a climb of the famous Requin needle, it happened. Requin, "The Shark," showed his teeth. Quite near the shelter, we were traversing a slope of softened deep snow in well-worn old steps trodden by a number of persons immediately ahead of us. There was a sinister swishing sound and the whole slope came avalanching down.

Our efforts to brake were useless and we were mercilessly dragged toward a giant crevasse. I had a heart-twisting feeling when we slipped over the upper lip of the dark gap. But then father did the only possible thing to escape death. In a desperate subconscious effort he thrust his right foot (with me on it) into the opposite greenish wall; this deflected us onto a tiny snow arch wedged some 20 feet below and about 10 feet to one side between the sinister glassy walls of the apparently bottomless coffin. Red darkness engulfed us and everything ceased.

But "la montagne n'a pas voulu." Father awoke under the icy trickle in the crevasse, his face covered with blood and his head spinning—the handle of the ice ax had been broken over his hard Slavic skull when we landed on the bridge. He rose, only to collapse immediately with great pain in his right ankle. It was broken. I had well resisted the shock (I had to do so to save us both), but the leg had given way when I gave it the decisive sideways impetus to reach the fragile snow arch, our only chance for survival.

We had not been on ropes—father had yielded to the insistence of his less-experienced companion who had argued that the hut was near, the trail well trodden, the weather fine . . . Fortunately, the companion, who was carrying the rope, had walked second. Finally it came down to us, the beautiful green smooth snake of the fine American nylon climbing rope, our treasure. At first it was far away; the friend up there could not believe we were so much to the side of where we had disappeared. But eventually, by combined desperate struggle from above and below (my two horizontal spikes on the undamaged foot helped materially), we managed to escape death's claws—this time. The ensuing tiresome journey to the refuge was the ignominious end of my first visit to Mont Blanc.

Father suffered severely, but the ENSA promptly sent a jolly rescue team, and after an opulent dinner at Refuge de Requin we went down to Chamonix, everybody in good spirits, French style.

At the hospital, Louis Lachenal, the hero from Annapurna, himself still suffering from amputations, inspected me—and ordered a pair of my future make. Tragically enough, he was never able to use me. A strangely similar doom, due to a comparable imprudence, put its shroud over the great master not far from where we had our accident. For him "la montagne avait voulu."

"Vous tombez juste bien," the experienced Chamonix surgeons told father, and with screw and wire they fastened his badly shattered ankle, heel, and fibula together again. They advised him, for therapy, to go bicycle riding and to dance as much as possible (but not with his own wife

—this would not be intense enough), and to have the screw eventually removed from the bones by his “garagiste.”

Despite all this, our Chamonix school was successful for me. Father and Mr. Carman worked together at refining me, and soon I entered my fourth incarnation. I was better and stronger now, but still not continuously adjustable in length and still fastened by old-fashioned straps and rings. I was given some hooklike gadgets that permitted lacing and unlacing very rapidly, but they were complicated at first and mentally lazy Alpinists did not like them. It became clear that to the original ten requirements should be added foolproofness.

Now a new series of me was made, to be mercilessly tested by outstanding mountaineers. In Slovenia the results were fifty-fifty. At home mountaineering is not a sport but a spontaneous national movement: the population is only 1,500,000, but the Alpine Association has more than 40,000 members and 130 well-equipped shelters and bivouacs. But there are two main centers of Alpinism, and the rivalry between them, plus the fact that my creator belonged to only one of them, seemed to affect people's attitude toward me. Some liked me despite shortcomings, others blamed the inventor and the invention, not the factory, for every flaw. But from abroad I was hailed. At the 1952 Grenoble exhibit of Alpine equipment I received the Award of Honor from the *Fédération Française de la Montagne*. The greatest modern Alpinists tested me. My strongest friends were the German climbers, who subjected me to the minutest inspections and hardest ordeals. But, although they praised me, I had to become better.

Father's friend, Mr. Riccardo Cassin, boldest of the bold Italian climbers, is even more of a hunter than a mountaineer. He likes to hunt wild boar with father in the bewilderingly savage Slovenian subalpine regions. When they tracked their game in hard winter Riccardo came to know me, and decided to take me immediately to the Karakorum-Himalayas in 1953. I went again the same happy year with Dr. Jonas's Austrian expedition. I had to learn a lot of languages. But my most serious test was under Mr. Rebitch, fine Austrian leader of the 1954 combined Austrian and German expedition to the wild Karakorum, when halves of me were used by native Hunza porters with 100-pound loads to climb the steep moraine slopes of concrete-hard ice-and-rock conglomerate. I did not give in—not one of the 25 samples of me there. From then on Mr. Rebitch has sworn by me.

Father still subjected me to rough tests. Some of the younger Slovene climbers put me to the craziest, most daring winter climbs, which I always survived although frequently the conventional crampons were ruined. At

the same time the great Swiss guide, Raymond Lambert, much the toughest guy ever to walk the mountains, was testing me in the Central Alps. He climbed on his maimed frostbitten feet, using only halves of me on a long series of climbs across the Alps. This was hard on me, because he is strong and weighty like a bear, but Lambert acquired confidence in me and took me to Gaurisankar and Cho-Oyu in the Himalayas in the company of the apparently fragile but iron-willed French lady climber, Madame Cogan. I fitted her small boots as well as the bearpaw-like snow boots of the Sherpa porters. Delighted by my performance, Mr. Lambert offered his renowned name to my French make, to be called UNIVERSAL-LAMBERT, système Avcin. This was gladly accepted, but unfortunately my French incarnation was not up to my standards and brought me some disrepute. It is not easy to manufacture me correctly.

But the superb French mountaineer, Maurice Herzog, found (as did Lambert) that my halves fitted his mutilated legs marvelously, too, and he trusted me. So it came that on the French Himalaya expedition to Makalu in 1955 I regained my reputation, although I was the only stranger among the expedition's equipment.

Meanwhile I have penetrated the circles of the high-mountain hunters. Many a chamois have my wearers carried over steep grassy slopes, down gaping gullies. Hunters have become so accustomed to me that they always keep me in readiness in their rucksacks—my weight (less than 12 ounces in halves, less than 25 ounces complete, lacing included) is negligible for the security offered. For high-Alpine skiers it is the same—especially in springtime I give excellent service on their boots or under their skis. I am no longer a stranger anywhere in the mountains—Greenland, New Zealand, Japan, the Caucasus, and the Himalayas.

From all these expeditions and from his own tests, my inventor learned two things: first, that I must somehow achieve a continuous longitudinal adjustment, and second, that despite his quick hooks the lacing still needed to be improved. These problems he has now worked out. My new, continuously adjustable element is stronger than ever; the fastening quick and durable.

Carefully designed hooks have been substituted for the awkward rings, and the new lacings are spaghetti-like rubber-coated braided cord cables. These tentacles keep me tight to the shoe tenaciously but supplely, never freeze, never shrink; and they yield instead of being cut in contact with rough rock. They fasten and unfasten without any metal parts, by a simple square knot, that can be tied even with mittens and in the dark. Father feels that now he has satisfied all eleven requirements.

I may even join the Swiss mountain troops. They are experimenting with me—I am so much lighter than the present ordnance crampon that I let a man carry two more pounds of food or equipment or ammunition.

Many others have been trying to ruin me—more recently some of the outstanding mountaineers of America, headed by Mr. Arnold Wexler of the National Bureau of Standards. But even the hard rocks of the climbing school along the Potomac River have scarcely made an impression on me. Even if I lose a tooth or so when carelessly pressed into and bent over a crack, only two screws have to be removed and only one-eighth of me has to be replaced—not the whole crampton, as before.

I am no longer an adolescent. My fifth incarnation is to remain definitive. I feel of age, now, and ready to confront any task anywhere in the world. (It would not surprise me if one day we even set off for the moon. There are fine mountains up there, higher than Everest, and with much less gravitation. And no wars, yet!)

It is a wonderful satisfaction to me that I can help courageous people attain the greatest enchantment and the profoundest happiness that nature can offer man—the beautiful mountains.

Mountaineering Notes

Edited by JOHN I. SHONLE

MOUNT LOGAN EAST RIDGE

ON JULY 19, 1957, a five-man party reached the east summit of Canada's 19,870-foot Mount Logan for the first ascent via the east ridge. Mount Logan, the second-highest mountain in North America, had previously been climbed three times from the west. This mountain, the highest of the St. Elias Range, lies in an area which is said to be the third most heavily glaciated in the world. Situated about 80 air miles from the town of Yakutat (Alaska) and the ocean, its approach from the east requires the traverse of three large glaciers; the Malaspina, Seward, and Hubbard. The members of the party were Dave Collins, Cecil Ouellette, Gil Roberts, Don Monk, and myself. Frank Tarver, who helped plan the climb and aided materially in the initial preparations, was prevented from making the climb because of an injury.

The party with equipment and supplies assembled in Yakutat, on June 25. After waiting two days for the weather to clear the party was landed in a ski-equipped Super-Cub 10 miles east of the base of the east ridge. Supplies were air-dropped by Cessna the same day at the base of the ridge. After assembling an aluminum-frame ski sled, an essential item for any expedition in this territory, the party sledged packs and equipment the 10 miles to the base camp, one mile from the base of the ridge.

Following a day's rest and the arrival of the last load of supplies by ski plane, the party gathered up the practically undamaged air-dropped supplies and moved camp on the sled to Camp 1 at a point about 300 yards north of the ridge, the only point for a camp site near the ridge safe from avalanches and free of crevasses. The move over about a mile of heavily crevassed area required almost a full day.

The east ridge begins with a rather level section about a mile long sloping gradually upward from an elevation of about 8,000 feet at its eastern extremity to the beginning of the steep section of the ridge at about 9,500 feet. From this point the ridge rises to about 15,500 feet to the Logan Dome where a high plateau extends gradually upward about 4 miles westward to the base of the summit. The East Peak is very steep on its east face but has gradually sloping sides to the north and south. The mile-long initial section of the ridge rarely attains a width of more than 10 or 15 feet and terminates on the east end in a steep face which rises about 800 feet above the glacier. First we must get our supplies on top of this narrow eastern section.

Monk and Ouellette climbed the east face of the ridge, some of it reaching fourth-class in difficulty, and mounted a pulley on the ridge with about 1,000 feet of manila rope for hauling supplies up the 60 degree ice slope. The cache left by the 1953 party a short distance from the end of the ridge was found in good condition, but we used only a few items from it. After two days of hauling supplies to the top of the ridge from a huge bergschrund about 500 feet below the top of the ridge the party, with supplies and equipment, was assembled at Camp 2 (8,200 feet) on June 28 with 38 days of food—we would stay until it was gone or the ascent made.

From this point we established seven more camps, the final high camp at about 17,000 feet. This required at least two trips per man between each camp with fifty-pound loads. We spent 20 days on the mountain, 13 climbing and 7 stormbound.

Up to about 12,000 feet the climbing was largely over rocks with some long snow-

ridge traverses. Under ordinary conditions the climbing here probably would seldom rise to fourth-class difficulty, but with the accumulation of snow and ice on the rocks and the heavy packs it would probably be considered at least that. The difficulty of the climb varied noticeably from day to day depending on snow and ice conditions. We climbed roped at all times in two parties of two and three and frequently wore crampons even on the rocks because of the snow and ice. Almost 2,000 feet of fixed ropes were used. From the 12,000-foot point the tortuous ridge presents a complicated series of steep snow slopes, narrow snow arêtes and deeply crevassed areas all of which provide opportunity for almost every type of snow and ice technique. The chief hazards of the climb were from snow and rock avalanches, crevasses, knife-edge ice ridges, and the isolation from any help in case of injury. Large snow avalanches frequently roared off both sides of the ridge, requiring us to stick to the top of the ridge at all times. Temperatures occasionally dropped below zero—once to -15° .

On July 1, Collins and Ouellette left Camp 3 at 9,000 feet and established Camp 4 at about 11,000 feet, encountering a long, narrow snow ridge shortly above Camp 3 and loose rock on the ridge. Because of severe storms this camp was not finally established until July 7, the party being divided in the two camps during the storm. Although Collins and myself had pushed the route up to 12,000 feet during the storm, we were unable to set up camp and were forced to cache our loads below a formidable knife-edge ice ridge. Because of another storm it was not until July 10 that Camp 5 at 12,500 feet was established above this narrow section. We came on another long snow-ridge traverse on this route, and it was necessary for Ouellette and me to cut steps on a 150-yard-long knife-edge ice ridge on it. On July 11 Collins, Ouellette, and I left Camp 5 for a Camp 6 site. We found this section of the climb to be the most difficult. Collins led and cut steps on another of the long knife-edge ice ridges with sheer drops on both sides extending to the glacier below. Above this ridge we encountered steep ice slopes where it was necessary to cut steps even though we wore crampons. We were stopped late in the day at about 13,800 feet by a large crevasse which extended transversely all the way across the route. We established Camp 6 at about 13,000 feet and returned to Camp 5. We were kept in Camp 5 by a snow storm until July 15 when we occupied Camp 6 with food for eleven days. From here on we had relatively good weather to the summit. Leading out of Camp 6 on July 16, Roberts went up a steep ice slope and crossed the giant crevasse at a point below where it had proved impassable the day before. We established Camp 7 at about 14,000 feet, and were able to move everything up from Camp 6 that day. On the return trip to Camp 6 we had our closest shave with an avalanche as Collins, Monk, and Ouellette on one rope were almost swept off when the three-foot deep snow parted along the trail they were in, the lower section taking off for the glacier 8,000 feet below. With all members alternating leads, we established Camp 8 on July 17 immediately above the Logan Dome on the plateau leading to the summit. The route was altered frequently to avoid what looked like potential avalanche slopes. On July 18 with Roberts and me using two pairs of bear-paw snow shoes to break trail for three miles, Camp 9, the high camp, was set up at about 17,000 feet in a blizzard. Because of the soft snow the bear paws were not too effective for trail breaking. The party left Camp 9 for the summit in threatening weather at about 9 A.M. on July 19 with the thermometer at 8° below. Climbing up the south ridge of the east peak the entire party reached its goal, the previously unclimbed east summit, at 4 P.M. that day. We spent thirty minutes on the summit. We arrived back in Camp 9 at

7 P.M. It took us only two days to get off the ridge, the wands we had used between Camps 6 and 8 serving to guide us through a moderate snow storm.

The 100-mile walk out over the Hubbard, Seward and Malaspina glaciers proved almost as formidable as the climb. We left base camp on July 24 for Water Pass and traveled the entire day by compass because of snow and fog. We traversed Water Pass from Hubbard to Seward Glacier and traveled nearly all of the way from Water Pass to Cook Nunatak and the Seward Trough by compass, again because of bad weather. We were able to use the sled from base camp to the moraine on the Malaspina, about 90 miles, except for areas in which the crevasses extended entirely across the glacier. We traveled via Pt. Glorious and Seward Rock onto the Malaspina Glacier. Our final obstacle was a string of interconnected moraine lakes about five miles from the ocean which we reached on July 31, finally crossing them by using air mattresses to swim on in the ice-cold water. We reached the beach on August 2 and were flown to Yakutat.

K. F. Ross

ST. ELIAS RANGE

In 1956 the Craig-Wood area of the St. Elias Range, which straddles the Canada-Alaska border south of the Alaska highway, was the site of a Sierra Club-sponsored expedition. Plagued by bad weather, this expedition failed to climb any major summits, but its members were intrigued by the vast possibilities of the area. After the party had hastily retreated just ahead of a threatening blizzard, George Wallerstein of the Angeles Chapter and Bill Davis of the Colorado Mountain Club began making plans for a return trip. In 1957 these plans culminated in the Southern California St. Elias Expedition, which spent most of August exploring and climbing from base camps situated on the Brabazon and Mount Wood glaciers.

Besides George and Bill, the party consisted of Barbara Lilley, Bud Bingham, Don Clarke, and myself, all of the Angeles Chapter. We flew to Whitehorse and drove a rented car to Burwash Landing, arriving at 2 A.M. on August 4, just as the early northern dawn was breaking.

Later the next morning the bush pilot whom we had contracted arrived, and we dispatched him with our air drop. Most of our supplies were dropped on the Brabazon Glacier near our proposed base camp, but a Navy surplus 10-man life raft and some extra food were dropped near the source of the Klutlan River, and one barrel of food was dropped high on Mount Wood. After this our pilot flew the members of the party in to a small lake near the Klutlan Glacier, and we began our 3½-day walk to base camp. On the fourth day we arrived at our air drop on the Brabazon Glacier.

We warmed up by climbing Peak 12,000, one of a pair of prominent peaks north of Mount Craig, which we christened North and South Gemini. Our ascent of South Gemini was a 15-hour snow slog, marked by beautiful sunny weather.

The primary objective of our expedition was Mount Craig (13,250). We established a high camp on the northeast flank of the peak, and pushed within 200 vertical feet of the summit on the east ridge, where we were stopped by overhanging rime ice. Bill attempted to traverse a narrow ramp overhanging the Anderson Glacier on the south, but it led into an impassable ice chimney dropping 3,000 feet to the glacier.

The following day, as a consolation prize, George, Barbara, and Bill climbed Peak 13,400, on the east ridge of Mount Craig, which we named Snowfield Peak.

Upon retreating from Mount Craig, we moved our camp to the base of Peak 13,800, just southwest of Mount Wood. Our plan had been to traverse the broad pass connecting Peak 13,800 and Mount Wood, but the deep, soft snow which we encountered

convinced us that this plan was unreasonable. So, with many grieving thoughts of the barrel of food on Mount Wood which we would never eat, we settled for Peak 13,800 and Peak 11,500, to the north, which presented a beautiful knife-edged ridge with the best technical climbing we encountered. We named Peak 11,500 Angeles Peak.

Still thinking in terms of climbing Mount Wood, we retraced our steps down the Brabazon Glacier, passed the 1956 base camp, and made our way up the Mount Wood Glacier to Wolf Creek divide in the shadow of the northern slopes of Mount Wood. But our time was running out. After much debate, we regretfully gave up the idea of climbing Mount Wood, climbed a couple of minor 10,000-foot peaks to the north of Wolf Creek divide, and started our long back-pack out. We retraced our incoming route as far as the junction of the Mount Wood and Klutlan glaciers, crossed the Klutlan Glacier, and paralleled the glacier until we reached the source of the Klutlan River, where we rounded up our air drop and prepared the life raft for our river trip. We were four days from Wolf Creek divide.

The river trip, down the Klutlan River to its junction with the White, and then down the White River to the White River bridge on the Alaska highway, consumed three short, river-drenched, and frequently exciting days. We went at once to the White River Inn, about a mile from the bridge, where we discovered that the bus which was to take us back to Whitehorse had gone out of business two weeks earlier. So we wound up hitchhiking back to Whitehorse.

Although we failed on Mount Craig and Mount Wood, we had beautiful climbing weather and accomplished six first ascents. And there are many more unclimbed peaks in this virtually unexplored area, including Mount Craig, which may some day be quite a feather in the cap of the first party to reach its summit.

JIM SUTHERLAND

CORDILLERA BLANCA

Four of us—Fred Martin, John Dixon, and I—spent the month of August, 1957, in Peru, with climbing in the Cordillera Blanca as our primary objective. At Huaraz we engaged two natives as porters, Macario Angeles and Augusto Jamanca. The six of us established and occupied a base camp at an altitude of 14,000 feet at the head of the Quebrada Rurec, about three miles south of Nevado Huantsan.

The Quebrada Rurec is ringed by four peaks with altitudes of 18,700 to 18,800 feet. To the west lies Huantsan Chico; to the northwest the east peak of Cashan; to the northeast Nevado Rurec, like a projection extending from the south ridge of Nevado Huantsan (21,000 feet); and to the southeast Uruashraju. Cashan was climbed in 1948 by a Swiss party, but none of the other three peaks had been ascended.

Our party made two attempts on Nevado Rurec. Both were unsuccessful: we were turned back by crevasses at about 16,500 feet on one attempt and at about 17,200 feet on the other. We made a strong attempt on Uruashraju and reached the summit ridge, a point about 100 feet below the summit. We had to turn back because of very soft snow, dangerous cornices, and an imminent storm. We made ascents of the following unnamed peaks: a snow peak (17,500) on the main divide about one mile north of Uruashraju; a rockspur (16,800) on the ridge running southeast from Cashan; a rock peak (16,700) 1½ miles east of Cashan; and a peak with an ice summit (17,400) on the Cashan-Rurec ridge, about one mile east of Cashan.

The members of this climbing group were enthusiastic about the scenery and the

climbing in the Cordillera Blanca. We owe much to our porters, to Presidente Jose Patiño Camones and Cesar Morales Arnao of the Club Andinista de la Cordillera Blanca at Huaraz, and to our interpreter, Juan Ramirez, who all helped with the necessary arrangements.

BILL DIXON

THE TOTEM POLE

Several years of effort came to an end last June when Bill Feuerer joined Jerry Gallwas, Mark Powell, and me to complete the first ascent of the Totem Pole in Monument Valley. This effort began with an agreement between the three to try to climb what they considered to be the three most important of the Southwest's desert spires: Spider Rock, Cleopatra's Needle, and the Totem Pole. At that time none of the desert's great sandstone spires had been attempted. Both of the first two were climbed on the first try. Spider Rock was the highest, Cleopatra's Needle the softest and therefore least safe, but the last turned out to be the most difficult.

Two attempts were made on the Totem Pole by Colorado climbers last spring. During one try lightning hit the rock and jolted the leader. They had climbed the initial fourth-class chimney and the short rotten face to the large ledge at the base of the main tower, about 80 feet off the talus. From here to the summit averaged vertical.

Bill, Mark, and I made a camp at Sand Springs a half-mile across the dunes from the monument. As this was one of the few water holes around, the camp was visited regularly in the evening by Navajos and also by horses, cows, sheep, goats, and dogs. Another feature of this camp was the soft sand which trapped the cars.

On the first afternoon we decided to use the same route that had been tried, namely, a large ledge about one-third of the way up. The previous party had removed their bolt screws, but we managed to use two of the same anchors by screwing Rawl studs backward into the threads. Above the big ledge a blank face took several bolts, and we gained another 70 feet on pitons. The next two days we leisurely advanced our fixed lines to within 30 feet of the summit. This was nearly all direct aid with angle pitons in very large soft cracks with an occasional bolt for safety. We found small ledges just where needed for belays. These ledges were followed by overhangs. The last 100 feet of the route all overhung slightly.

We then waited for Jerry to arrive so he could lead the summit pitch, all bolts. It rained for two days and we had nothing to do but sit around Goulding's Post. We are certainly indebted to Harry Goulding for the hospitality we were shown there, including pulling our cars out of Camp Sand Springs.

The last morning we drove to the base of the talus in Jerry's jeep, and a caravan of spectators from the Post followed after breakfast. On the prussik lines we were harassed by gusts of wind which swung us 30 or 40 feet across the rock face. We reached the summit after about 13 hours of upward progress spread over the several days. As we descended, a little rain fell, reminding us of the lightning which had stopped the earlier party.

DON WILSON

WHEELER PEAK NORTHEAST FACE

A stupendous vertical unclimbed rock wall was the challenge that brought Don Clarke, Harvey Hickman, Si Ossofski, and me to the northeast face of Wheeler Peak, Nevada, on Memorial Day weekend, 1957. After driving all night from Los Angeles, we drove

to the public campground to the north of Lehman Caves National Monument. From there a six-mile trail goes to Stella Lake, but we soon lost it as the snow level was down to about 8,000 feet. One and a half miles from Stella Lake, we turned southwest and pushed our way uphill through knee- to waist-deep snow. Our base camp was finally made just below timberline.

Fortunately for us it froze that night, so at 4 A.M. when we left camp, we were able to walk up a long snow gully which took us directly to the great Wheeler cirque, and onto the Matthes Glacier. From there the northeast face began to look even more formidable.

A series of unconnected chimneys divides the face, with the right side appearing to have a somewhat less severe angle. By this time we were willing to settle for a route that would "go," not one that would add to the climbing difficulties. A short snow tongue led to the first chimney. Here we started working our way up the lower part of the face, going up over a series of small high-angle ledges.

After approximately 700 to 800 feet of moderately severe fourth- and fifth-class climbing, we reached a high-angle snow field. At this point we were about 100 feet to the right of the chimneys but decided to stay out of them because of the rock-fall danger, and also because of their difficulty. The face directly ahead was almost overhanging for 200 to 300 feet. We traversed to the right on the snow field and were able to continue up. Short fifth- and easy fourth-class pitches were intermingled. We kept going until 8:30 P.M. and then looked for a place large enough for four of us to spend the night sitting up in a planned bivouac at about 12,300 feet.

At 4:30 A.M. we were on our way again. The morning sun was most welcome. After two pitches of easy rock work we came to a long, steep snow gully that led directly to the summit rim. Step kicking became hard work, but at 7:30 we were on top. A first ascent of the northeast face was back of us, with half of Nevada and part of Utah before us.

ROY GORIN

MOUNT TEMPLE, CANADA

An apparent first ascent of Mount Temple, Canada, from the northwest was made by Ruth Mendenhall and me on August 9, 1957. The route lay up the north portion of the west face, with loose cracks and icy gullies requiring four pitons. Then the rocks, snow, and glacier of the northwest arête were followed to the summit.

JOHN D. MENDENHALL

SIERRA NEVADA

THE THUMB NORTHEAST RIDGE

This peak in the Palisade group, spectacular when viewed from the north, was ascended by a new route on September 12, 1957. Before 1957 none of the nine parties which had ascended the peak had used the north or northeast or east routes. From a high camp at the edge of the southern Middle Palisade Glacier, Irene Ortenburger and I noticed a deep couloir leading up the northeast side of the peak to the sharp northeast ridge. This couloir, which may be described as the couloir closest to The Thumb which actually reaches the northeast ridge, was climbed the next morning. The three chockstones offered only momentary problems, but there was much troublesome loose rock. We abandoned the couloir near its top since the notch there would

probably require direct aid. The walls forming the notch were vertical. So we ascended the right-hand wall to a knife-edge subridge leading to the main northeast ridge. The climbing was enjoyable all the way to the final very steep step in the ridge, which we passed by means of a slightly awkward fifth-class ledge system on the left face of the step. Once above this step the summit was easily reached. On the descent a rappel was necessary to pass the steep step in the ridge; with that one exception, the same route down was used. Although this route is probably the best done yet on the peak, others of greater difficulty and probably less loose rock remain on the impressive north face.

LEIGH ORTENBURGER

MOUNT SILL

In early September, John Mathias and I were climbing in the Palisades. We made a two-day traverse from Mount Sill to Thunderbolt Peak, climbing the former via the north buttress, and touching along the way North Palisade and Northwest Peak of North Palisade. I believe that this traverse has been done in a day traversing the other direction, from Thunderbolt to Sill, but I do not know whether our traverse has been done before. Our traverse could probably be done in 24 hours or less, non-stop, from a high camp above timberline.

A couple of days later, we believe we made a first ascent, climbing the prominent snow and ice couloir to the near left (northeast) of the couloir leading to the top of the "U" Notch. We called this couloir "North Couloir"; it offers yet another route up Mount Sill, requiring about 600 feet of climbing with snow and ice equipment. We had some climbing to do to get past the bergschrund. Near the top, we traversed right (west) onto rock slopes, avoiding the upper glare ice slopes.

JOHN OHRENSCHALL

MOUNT WILLIAMSON and TEMPLE CRAG

The northern cliffs of Mount Williamson present an intriguing sight from Owens Valley. The lure of this virgin side was irresistible to Ruth Mendenhall and me, so we backpacked from 5,900 feet at Symmes Creek, over Shepherd Pass, crossed the plateau north of Tyndall at 12,500 feet, and dropped down to a small tarn northwest of Williamson, on July 4 and 5, 1957.

Early morning of July 6 found us cutting steps in the hard snow of the couloirs. Difficulties above increased gradually but inexorably, and it became necessary to rappel to a more promising buttress. A piton protected the start in a floorless chimney, and steep, firm granite followed above. Then we carefully ascended an ice gully with loose rocks in rapidly deteriorating weather, a wet snowfall beginning just as we gained the summit plateau between peaks 14,211 and 14,384. We climbed the former on slippery rocks, and the latter summit by a tiring snow trudge. Time was saved by descending southwesterly, rappelling down the low ice cliff in the couloir.

We climbed the imposing north side of Temple Crag from the northeast cirque on June 9, 1957. The first pitch (fifth-class) was in a chimney just southeast of Route 4 (see *A Climber's Guide to the High Sierra*). Third- and fourth-class climbing led to the lowest notch separating the North Peak from the summit. Without passing through the notch, the way led upward to the left. A few fourth-class pitches, and

the crest was reached northeast of the summit. We descended to Contact Pass in a wet snowstorm and the rocks just above the Pass were disagreeably slippery.

JOHN D. MENDENHALL

YOSEMITE VALLEY

EAST ARROWHEAD BUTTRESS OVERHANG BYPASS

The first ascent was made on March 10, 1957, by Warren Harding, Wally Reed, and me. Prominent from the Government Center, this buttress is cleft by East Arrowhead Chimney on the west and Indian Canyon on the east. We approached by the route toward Arrowhead East Face and upon entering the East Chimney climbed slightly right 200 feet (third- and fourth-class) to the base of a large rectangular white scar. At this point the two buttress climbs divide: the Overhang Route goes left and Overhang Bypass proceeds right. From the scar's east edge the route ascends 20 feet directly, then traverses right across the open face to a small ledge. The second pitch was the most difficult on this climb and advances 40 feet up a V-shaped crack, moves right on friction and straight up another 15 feet. This was followed by moderate face climbing and a short left traverse to a tree-covered ledge where three more fine pitches (on one of which Harding exhibited his narrow-chimney prowess) led to an open area. Scrambling, an easy pitch, and more third-class climbing ended at the cairn overlooking the East Chimney and the spectacular Arrowhead Arête. This is a good climb where most parties will consider a piton or two desirable on many pitches. The best descent from this area is via rappel of West Arrowhead Chimney, rather than a 1,000-foot bushwhack and talus climb to the Yosemite Falls-North Dome trail.

MARK POWELL

EAST ARROWHEAD BUTTRESS OVERHANG ROUTE

Mark Powell and I made the first ascent on September 2, 1957. The approach is identical with that of East Arrowhead Buttress Overhang Bypass. About 20 feet below the white scar, we traversed horizontally left 20 feet, then straight up 80 feet on difficult fifth-class to a large ledge overlooking East Arrowhead Chimney. Two easy fourth-class pitches led to a convenient belay tree where the face rises steeply to overhangs 100 feet higher. Several sixth-class pitons were found necessary to gain a small ledge directly beneath the overhang. A particularly interesting pitch followed requiring 3 direct-aid pitons to surmount the overhang, a delicate 15-foot leftward traverse on a 4-inch ledge (good exposure!), and a difficult fifth-class move straight up to a small bay tree. Two moderate leads up a shallow chimney terminated at a large tree. From this point it is possible to traverse right onto easier climbing on the bypass route. However, we proceeded slightly left, attacking the face directly. Two fine pitches where we used an occasional protecting piton completed the ascent.

On the final pitch, rounding a corner, we had a splendid view of the depths of East Arrowhead Chimney and the inspiring profile of the great Arrowhead Arête.

WAYNE MERRY

SUNSET LEDGE

Above the Ahwahnee Hotel, and west of the Royal Arches, the Ahwahnee Buttress rises 1,500 feet to the valley rim. On November 23, 1957, Frank Wright and I made

the first ascent of Sunset Ledge, the first big tree-covered ledge 500 feet above the talus.

From the base of the wall, we hiked left and up 100 yards until easy third- and fourth-class cracks led east toward the buttress to a sandy ledge. One more lead up and to the right to a bush put us in position to tackle the overhanging wall which led out onto the buttress face. Using a bush and then bolts left by a previous party, Frank worked up 40 feet and tension-traversed right to nubbins and another bolt. Above, delicate climbing led to a vertical mossy lie-back crack which was followed to a belay tree.

After a quick lunch, I started out on a limb of the tree leading to the vertical south face and overhanging the hotel 500 feet below. Placing a bolt, I swung over to a lie-back crack and followed this up 50 feet, using direct-aid in one spot. Above, the face overhung, but a solid crack took an angle-piton ladder to a belay ledge. We finished the last easy pitch to the spacious ledge as the sun disappeared behind the Cathedral Rocks.

This climb is like Phantom Pinnacle in difficulty, although not so long. The difficulty, together with its quick approach, makes it an attractive, short day route.

GEORGE SESSIONS

ARCHES TERRACE

On December 29, 1957, Richard Calderwood and I completed this sixth-class climb. About midway between the Royal Arches regular route and Washington Column, and directly below the main overhanging arch, a flattened buttress extends to a large bushy ledge. This ledge, approximately two-thirds of the distance to the overhang, we named Arches Terrace.

The route begins on the left side of the buttress at the base of a crack. From the top of the crack we made a traverse across a friction face and up past a bay bush to a large ledge and an expansion bolt. We reached a large pine by a short traverse east and climbing up a difficult crack. From the pine we climbed up from the east end of the ledge, then one more moderate pitch followed by a short lead up a water-polished gully put us on Arches Terrace.

We placed nine pitons and four bolts on the eight pitches, one bolt and three pitons being for direct aid. The climb took us six hours. It was led fifth-class during the second ascent made by John Ohrenschall, George Sessions, Richard Calderwood and myself.

MERLE ALLEY

NORTH DOME, SOUTH FACE

This fine dome, which is prominent from many view points in Yosemite Valley, had long interested both Mark Powell and me. On August 25, 1957, the two of us sweated our way up the North Dome Gully for a dry camp on top of Washington Column. The following morning a short bushwhack and some scrambling brought us to the base of the climb. After three pitches of easy friction and lie-back climbing we were at the base of a 15-foot overhanging wall which diagonals to the left across the lower third of the face. Three sixth-class pitons overcame that problem, which was followed by two moderate friction pitches. After struggling through a small clump of bushes, we ascended a short chimney and a lie-back to the crux of the climb: 200 feet of very difficult lie-back climbing. Arranging a belay stance from a lie-back position 100 feet

up was difficult, as was the single crack which continued to a small ledge above, and which was partly filled with dirt and grass. Thirty feet beyond the ledge all cracks terminated. By placing a piton at his feet, Mark was able to make a difficult pull-up and a delicate friction step to easy scrambling and the summit. It took six hours for about 600 feet of roped climbing.

WALLY REED

LOWER WATKINS PINNACLE

The climbing history of this 100-foot pinnacle is vague, but its reputation has not suffered since attempts began 11 years ago. The two upper pinnacles had been climbed in 1946 and 1947, but the lower, with vertical walls and few piton cracks had defeated many efforts. In 1957, there were four attempts by various climbers before Mark Powell, Wally Reed, Herb Swedlund, Merle Alley, and George Sessions succeeded in late July. The approach from the valley floor to the summit of Mount Watkins and descent to the pinnacles is miserable, but any direct route would be a major undertaking. Our party descended from the Tioga Road to Snow Flat, and out the ridge that culminates in Mount Watkins. Fixed ropes were found advisable in two places before the lower pinnacle could be reached. From the notch, twelve expansion bolts and seven questionable pitons were used to gain the summit in a three-hour lead. Seven of the bolts were Rawl-drives (hangers removed) placed about six feet apart and not very reliable. The top bolt came out by hand and the pitons were removed nearly as easily. Considering the hike and climbing necessary to reach the pinnacle, it is definitely an all-day climb.

MARK POWELL

LIBERTY CAP SOUTHERN BUTTRESS

An hour's walk by trail from Happy Isles, the lower southwest buttress of Liberty Cap rises 600 feet to the prominent break that diagonals up the west and south faces of Liberty Cap. Early on June 16, 1957, Dick Armstrong and I started up the buttress at a clump of trees a few feet from the trail. After 300 feet of remarkably continuous and enjoyable fourth-class, the angle and difficulty of the buttress increased appreciably. Dick led up 120 feet of moderate fifth- and sixth-class climbing to the bottom of a 40-foot vertical crack, 3 inches wide and 2 inches deep, which had stopped a previous attempt in April amid snow flurries. We overcame the crack by using two pitons, driven part way into crackless rotten granite, for limited direct aid. Above, several more poor pitons were used in climbing two small overhangs. With bolt protection, direct aid can probably be eliminated on this pitch. Dick led the final fifth-class pitch, and I followed, arriving at the top of the buttress 5 hours and 17 pitons after we had started. We descended the center of the south face by a series of delicate traverses and free rappels. Several faster, but far less spectacular, routes of descent are obvious. We feel the route is one of the most varied and interesting short climbs in the Valley and should become popular.

MIKE LOUGHMAN

GLACIER POINT APRON

In late June Bea Vogel and I made the first ascent of Glacier Point Apron. In general, the route runs along the westerly side of the apron at its junction with the main face. The climbing is predominantly fifth-class, although I used a couple of pitons for direct aid on one pitch. We reached the "summit," a cute little pinnacle, at 6 P.M., after 8 hours of very enjoyable climbing, difficult enough to hold one's interest. About 30 pitons were used. We descended by the Terrace route.

WARREN J. HARDING

PHANTOM PINNACLE

On September 8, 1957, Mike Borghoff and I made the sixth ascent and the first all fifth-class ascent of Phantom Pinnacle. The route followed was the same as that used in all previous climbs except that the sixth-class parts were by-passed through the use of lie-back and jam-crack techniques. The climb was broken into six pitches. From a deep recess marking the end of the short third pitch a wide chimney leads up to a small ledge where a sixth-class crack begins. To the left of this crack is a wide crack which will allow jamming. The crack overhangs a little and is difficult but negotiable. We avoided direct aid on the overhanging part of the summit pitch in a similar manner. To the left of the offset piton crack is a flake. Cross pressure between hands on the flake and feet on the offset crack makes it possible to complete the climb fifth-class. Climbing time was less than five hours. RICHARD E. CALDERWOOD

PENNY PINNACLE EAST ARETE

Penny and Nickel pinnacles are located on the Southeast Buttress of Middle Cathedral Rock at the entrance to Cathedral Chimney. On Penny, the south face offers an easy though exposed fifth-class pitch. The west face thus far has required one or two direct-aid pitons. On May 28, 1957, William Feuerer and I ascended the sharp east arête of Penny from the Penny-Nickel notch. Moderate climbing for 60 feet was followed by 15 feet of very severe fifth-class. Another 25 feet of easier climbing led to the summit. The final 40 feet was quite difficult and exposed to a 400-foot drop on the south face. These routes, along with Nickel Pinnacle, afford some of the most enjoyable climbing in Yosemite Valley. MARK POWELL

MIDDLE CATHEDRAL ROCK NORTHWEST FACE

On September 29, 1957, George Ewing, Jerry Gray, and I ascended Middle Cathedral Rock by a new route. From the base of the regular Northwest Buttress route we proceeded to the left (northwest) 300 feet to a wide tree-covered ledge. The climb then ascends a large bulge of exfoliation slabs to the left of a broad, shallow depression. Belay positions are not obvious for the first two pitches and will be at the discretion of the climber. The second pitch ends at a small brush-covered ledge. From there we ascended a brush-filled chimney to a steep, short, open chimney leading to a small pine. The route proceeds directly up again to another brush-covered ledge. At this point, about 200 feet below a large overhang, we traversed left around the corner onto a brush-covered ledge on the Valley side of Middle Cathedral Rock. We ascended a wide ledge, slanting at about 60 degrees, to a pine tree at the bottom of an open chimney. We used two direct-aid pitons on this pitch. The rest of the route we continued up the chimney until easy fourth- or third-class climbing lead to the tree-covered shoulder of the rock. Descent can easily be made by climbing over the top of the rock to the notch between Middle and Upper Cathedral rocks. The climb can be made in a full but not overflowing day. LES OVERSTREET

MIDDLE CATHEDRAL ROCK NORTHEAST FACE

Flanked by the North and East buttresses, this great face shoots skyward 1,400 feet. Early morning of July 20, 1957, found Wally Reed and me walking up 200 feet of talus to the base where serious climbing begins immediately. Our plan was to ascend the right side by small holds and thin cracks to a platform 800 feet up; then traverse

upward to the left side of the face into a large U-shaped bowl. From below, we were uncertain about the exit of this bowl. We went up, foot by foot, moving relatively rapidly on severe rock, and climbing intermittent fifth- and sixth-class with difficult piton-placing in bottomed cracks. Overcome by darkness 600 feet up, we made an uncomfortable bivouac on tiny ledges. At dawn, refreshed in spirit if not in body, we continued. Sixth-class climbing interspersed with stretches of free climbing offering improved cracks led 200 feet up the side of a huge right-angle slab to the long awaited platform. At last, after 800 feet and 28 hours we reached a ledge large enough to stretch out. We celebrated our temporary good fortune with two slurps of water and a short rest. The upward traverse 300 feet into the large bowl (third- and fourth-class) presented no problems. However, after a glimpse at the bowl our hearts sank. Because of verticalness and unconnected piton cracks, any direct ascent would be extremely difficult. One apparent weakness, an open chimney curling upward 300 feet, lay to the left. From the edge of the bowl, by ascending 60 feet of difficult fifth-class on unsound rock and by cautious traversing, we reached the chimney. After three moderate pitches the chimney leveled off into ledges and easy ground. With raised spirits we moved quickly up third-class rock leading to the Kat Walk, the summit, and safety. Statistics: Climbing time was one and two-thirds days; 21 pitches; 125 pitons, all removed. This face, comparable with Sentinel Rock North Face, ranks among Yosemite's most difficult ascents.

MARK POWELL

LOWER CATHEDRAL ROCK (NORTH BUTTRESS)

This great buttress sweeps sharply upward 1,100 feet. Indefinite crack patterns at high angle appear to present few ledges and much difficulty. On August 9, 1957, with certain misgivings, Mark Powell and I accepted the ancient challenge of those who would climb.

With 25 assorted pitons we began the ascent, climbing increasingly difficult sixth-class. Two cracks, about 40 feet apart, rise upward in the form of a Gothic arch to a point below an overhang. Two pitches up the left crack took us to a belay in slings below and left of the overhang. The 100-foot third pitch over the overhang, led by Mark, took three hours and proved severe; it necessitated high-level piton placing in poor cracks. We then surmounted 400 feet more of exposed fourth- and fifth-class to a fine tree ledge by nightfall. While settling in for the night we agreed that the pendulum above the overhang was a fine variation adding to the assortment of techniques used. The following morning we went upward two pitches, traversing west to a sloping 60-degree corner shelf. An excellent crack enabled Mark to overcome a 70-foot slightly overhanging wall in the corner in 15 minutes. Again we went west a little and up, until an 80-degree, 50-foot severe fifth-class jam crack confronted us. From the overhang above this crack, we traversed left on delicate small holds and up 15 feet to a large pine. Fourth-class and scrambling took us to the northwest shoulder for the finish at noon. The ascent took a day and a half, 15 pitches, 4 bolts, approximately 80 pitons (nearly all removed), and lots of energy.

WILLIAM FEUERER

BRIDALVEIL FALL EAST SIDE

Last June, Warren Harding and I spied a potential route 100 yards left of Bridalveil Fall. On August 30, 1957, an attempt was made. The approach up talus and third-

class rock is identical with Lower Cathedral Rock northwest face until it is possible to traverse right to the last ledge east of the fall. Three excellent fifth-class pitches and a short traverse were followed by a huge 100-foot overhanging chimney. Two chockstones topping the chimney proved very difficult before easing up into moderate rock. Higher, the necessity of clinging with both hands caused a 70-foot overhanging face to a gnarled tree to be led bereft of pitons. Two more leads up a chimney brought us to the base of a tremendous block suspiciously smooth. The vertical crack above appeared built for a midget, so abandoning all thoughts of free climbing, we made a diagonal traverse upward to the left terminating at the largest tree visible on the face, using 4 sixth-class pitons. Elated by this success, we found the two easy pitches ending on the shoulder just above Bridalveil Creek anticlimactical. After a bath in the creek we totaled up our experience: 600 near-vertical feet, 11 pitches, 21 pitons, 7 hours. This fine climb is not feasible until late summer or fall because of the proximity of the falls which causes water spray and wet rock.

MARK POWELL

LEANING TOWER TRAVERSE

Several years in the past, while trudging up to the conventional beginning of the Leaning Tower Chimney, I noticed the beginning of a ledge running back across the face of the Leaning Tower in the direction of the Valley. Later observation from the Bridalveil parking lot revealed a definite line of demarkation traversing the entire west face of the tower.

On Labor Day, 1957, Chuck Wilts and I swung leads with Ellen Wilts providing her usual reliable, cheerful belay. The eight-pitch first ascent was completed between 8 A.M. and 2:30 P.M. The route is obvious and requires a minimum of muscular exertion. The principal characteristics of the climb are delicacy, exposure, and unsound rock. Physical activity varies from strolling on "Broadway" to squirming on the belly along the "Crawl." The final pitch is particularly interesting. A cairn and register will be found just before the finale.

The Leaning Tower Traverse is recommended to the medium and experienced climber, but not to the beginner. A variety of hardware is required as well as experience on loose rock. A tumble from either end of the rope would provide an interesting rescue problem: The wall above overhangs and the face below drops off at 80 to 90 degrees for about 1,000 feet.

G. B. HARR

PULPIT ROCK TRAVERSE ROUTE

On July 18, 1957, Wally Reed and I accomplished a fifth-class route to supplement the two existing sixth-class routes on Pulpit Rock. The first pitch follows the tree route (third tree below the notch) to within 20 feet of the overhang at a small ledge. The next lead, a most improbable looking traverse, goes around a doubtful corner to the right on an 80-degree roof overhanging above and nearly vertical below. It covers about 40 feet on small holds, then proceeds straight up 20 feet to a large ledge on the northeast ridge. An easy pitch directly up the ridge leads to the summit. For such a short climb (3 pitches) it offers an excellent summit, fair exposure, and moderately difficult face climbing.

MARK POWELL

Reviews

Edited by VIVIAN BRECKENFELD

NATURE AND THE AMERICAN. By Hans Huth. University of California Press, Berkeley and Los Angeles, 1957. 250 pages, 40 plates, bibliography. \$7.50.

Only four life spans separate "the waste and howling wilderness" described by a settler in 1662 from the creation of the first Wilderness Area (the Gila) in 1924. In the years between, America destroyed nearly all her wilderness, wasted her resources, spoiled scenic beauty—and then began to cherish the remnants. This book tells the story of that revolution in thought and of the men who led, persuaded, and sometimes pushed a reluctant America along the road to conservation. Far more than a history of events it is a broad study of the reaction of a whole people to the natural setting in which they found themselves.

The author is Curator of Research at the Art Institute of Chicago and his intense interest in conservation combined with his special knowledge of history and art give his work unusual depth and scope. Particularly interesting is his appreciation of the part which artists and writers of the early nineteenth century played in the conservation story by presenting nature in visual appeal to a sentimental public. Artist George Catlin, exploring the Missouri in 1832, writes that these regions "might in future be seen [by some great protecting policy of government] preserved in their pristine beauty and wildness, in a magnificent park," an idea forty years ahead of its time but one which grew steadily as Catlin and others exhibited their paintings and wrote their descriptions of the scenic West.

Mr. Huth also understands that public interest in conservation moves no faster than the ability of people to get out and see nature for themselves. The canals of the 1820's, the bicycle of the 90's, played their part in raising interest in scenery, the railroads were foster mothers to the National Parks, and the automobile creates both appreciation and problems today.

Developing alongside the love of scenery for its own sake is the concept of conservation solely for the perpetuation of material resources, a school of thought ably and sincerely represented by Gifford Pinchot. The inevitable clash of these two principles and their intertwined history, from Hetch Hetchy to Niagara Falls and Dinosaur National Monument is well presented with understanding of these essential but often incompatible forms of conservation.

The book is rich in historical material, quotations, and anecdotes. There are forty pages of notes, bibliography, and index. Much careful research is to be found here, for example, the notes on the legend that Yellowstone National Park owes its origin to a campfire discussion when in fact, though such a conversation may have taken place, the roots of the idea went much further back and the National Park title was only introduced because the area was not yet part of any state. The illustrations are a fascinating part of the book: the forty plates, reproductions of paintings and photographs from 1790 to the present day, are of unusual interest. The vignettes scattered through the book are woodcuts, etchings, and cartoons of the nineteenth century and are themselves an amusing commentary on the times. Turn to the last drawing, "Climbing in Yosemite" 1861 to see tall hats and long-tailed coats clinging precariously to the granite wall.

This is a book to own for both pleasure and reference. It is easy to read though it requires close attention, for the writer frequently retraces his steps into history without warning. He is, however, most careful to include dates throughout the text and notes. We are fortunate that Mr. Huth combines such rare historical knowledge with enthusiasm for the cause of conservation of our scenic resources.

CICELY M. CHRISTY

INTERPRETING OUR HERITAGE. By Freeman Tilden. University of North Carolina Press, Chapel Hill, 1957. 110 pages, 42 photographs. \$3.50.

Freeman Tilden is ploughing a virgin field in presenting a philosophy of park interpretation. He is eminently qualified to do so: for years as a collaborator to the National Park Service (in an unpaid advisory capacity) he has devoted himself to the problem of how to interpret properly our parks and monuments to the ever increasing numbers of visitors. This slim volume is an important guideline of interpretive thinking for park naturalists, archeologists, and historians—those specialists whose job it is to reveal the meaning of the parks beyond what the visitor would ordinarily perceive.

Some may question whether park features need to be interpreted; certainly the visitor who stands for the first time on the rim of the Grand Canyon of the Colorado may realize a deep emotional experience without ever having learned how the canyon was formed. Nevertheless, chances are that his appreciation of the grand scene will be even greater after he has heard its story. In parks where interest is primarily scientific or historic, interpretation will be obviously valuable to the visitor. Through a stimulating interpretive program, our parks offer an unparalleled opportunity to meet our increasing national dilemma, says Tilden: more leisure coupled with less ability by the people to use that time profitably. On the other hand, Tilden speaks of the "happy amateur," a person whose leisure hours are so thoroughly engaged in some pursuit such as history or nature study that he can't find time to become a "weekend neurotic." Tilden issues a challenge to park interpreters to convert the casual visitor into a "happy amateur" who will really benefit from park values.

Besides setting forth Tilden's own philosophy of the need for interpretation, the book, written in a highly readable style, outlines the basic principles upon which good interpretation may be built. His ideas are supported by many illustrations and examples. The book will be of interest to those who wish to learn something about how the story of our national heritage is being told today; for the specialist, the work is a must.

WILLIAM W. DUNMIRE

CONSERVATION: An American Story of Conflict and Accomplishment. By David Cushman Coyle. Rutgers University Press, New Brunswick, N. J., 1957. 271 pages. \$5.

The publication of this book coincides with the fiftieth anniversary of the conservation movement in the United States, engendered by Gifford Pinchot in 1908. It is a well-written, very readable account of the development of commodity conservation during the past half century. Although Mr. Coyle sketches a brief history of conservation before "the coming of the prophet," he views his subject matter almost entirely through Mr. Pinchot's spectacles. And, with an enthusiasm like his mentor's, he broadens the concept to include the very conservation of man himself, through disease control.

The various fields of commodity conservation—forestry, water, soil, minerals, metals—are examined and discussed in detail. This is done in separate chapters, making for easy reference. The author stresses particularly the political aspects of conservation development. Under "River Basin Development," he devotes an entire chapter to the TVA, finding it a model example of comprehensive conservation, since it embraces flood control, water and power development, rural electricity, and recreation.

Mr. Coyle also has an excellent chapter on the noncommodity subjects of wild life and "the outdoors" in general. He makes an ardent plea for their conservation and advances a novel reason for reserving large areas of undeveloped, untouched land (such as our national parks and game refuges). In the event of a near-cataclysm, he reasons with many of our natural resources already nearly drained, such undeveloped lands could alone provide a few survivors on the earth with the resources to rebuild a civilization.

Mr. Coyle subscribes completely to the definition of conservation originated by Pinchot's associate, W. J. McGee: "The use of natural resources for the greatest good of the greatest number for the longest time."

Mr. Coyle sees in conservation not only a gospel for America, but for all mankind. "Conservation," he writes, "is a vital part of what we have to offer a distracted world." To which, a hearty amen.

PEGGY WAYBURN

THE FEDERAL LANDS: THEIR USE AND MANAGEMENT. By Marion Clawson and Burnell Held. Published for Resources for the Future by Johns Hopkins Press, Baltimore, Md., 1957. 501 pages, illustrated. \$8.50.

Need conservationists no longer to fear successful attacks on our federal forest, park, and grazing lands? Will tomorrow's concerns center on how best to administer the rich assets we now have; how best to get maximum money returns from the sale of products and services without destroying their noncommercial values, including wilderness? These problems are analyzed in much detail by the economist-authors. Presenting a gold mine of financial and legislative statistics on the 376,000,000 acres in nonurban, nonmilitary federal holdings, Clawson and Held aver that our public properties are much too valuable to be administered under the old methods. They propose law reforms and intensive and continuing management studies to achieve a level of operating efficiency consonant with the multiplying wealth of federal lands.

The authors' proposals seem eminently sound but they assume more than seems warranted in pushing for optimum financial management. Actually we still lack the physical and biological information needed to determine scientifically, not only what public land resources we have, but also, how best to handle them. For example, we have only slight usable knowledge of the soils of even the relatively well-managed national forests. Studies of wild life habitat and recreational technology are equally weak; and we know woefully little about their hydrologic characteristics. We are just starting to acquire information—or to find out how best to acquire it! Except for a very few localities, the interpretation of such information as is available has barely begun. Until these deficiencies are corrected, it seems premature to promote a level of management more befitting a factory operation.

The book gives scant recognition to the wide variations in physical productivity of the federal lands. As these become better known, they must inevitably affect the

decisions as to where commercialization is feasible at all, let alone at what intensities. Nor does the book sufficiently consider the advances in technology that may so greatly increase the productivity of the higher-grade private lands for forest products and forage as to render economically marginal the opportunities for profitable use of the generally lower-grade federal holdings. Already the most intensive—and most profitable—practices, like fertilization, pasture irrigation, and brush removal—are more often found on the better-managed private holdings than on federal lands. It is quite possible to conceive that contrary to the authors' assumption many of the less productive public lands may thus be relieved of pressures for commercial utilization. This would leave them freer to serve the burgeoning public demands for noncommercial recreation, wild life management and enjoyment, nature-appreciation training, and basic field research in the natural sciences.

The authors observe that conservation and production-oriented groups are so nicely balanced as to congressional influence that neither can obtain special legislation without the support or compliance of the other. This thesis may soon be tested in the National Wildernes Preservation bill.

BERNARD FRANK

OUR NATIONAL FORESTS. By Bernard Frank. University of Oklahoma Press, Norman, Oklahoma, 1955. xx + 238 pages. \$4.00.

This is an account of our National Forests—their history and current status, and the problems that the future holds for them. All of us are part owners of a magnificent 180,000,000-acre forest empire. It is essential, therefore, emphasizes the author, that citizens everywhere maintain the integrity of these areas and their administration by keeping informed on their status and taking necessary action to preserve them.

Following an introduction by Justice William O. Douglas the author relates a brief history of the national forests from the initiation of the idea (in a resolution passed by the American Association for the Advancement of Science in 1873) to the present time. National forests as we know them today began in 1905 with a basic policy that they were to be protected and operated to maintain continued maximum social benefits. This has been applied on the national forests as the "multiple use" concept: Water, timber, grazing, mining, fish and game, and recreation are among the categories of uses which often are combined in one forest. The inevitable conflicts that arise are put into perspective by the author by ranking the value of the products from our forests. Water ranks highest with an annual product of \$300,000,000, timber growth is next being equivalent to \$50,000,000 per year, cash receipts from timber and grazing amount to \$36,000,000 a year, and recreation and wild life yield a value equivalent to \$25,000,000 per year. A major task of the Forest Service is described as coördinating the yield of these products with a minimum of conflict. However, certain areas are limited to specialized uses. As a matter of particular interest to Sierra Club members it is mentioned that the Forest Service is one of only two federal agencies (the Bureau of Indian Affairs is the other) which have set aside roadless areas designated specifically for wilderness use.

The national forests are then described by regions and we become acquainted with many of the personnel of the Forest Service and their day-by-day work.

The book concludes with a discussion of current problems in the management of the forests. Shall they remain publicly owned? How can the forests yield an abundant variety of benefits to all people? How can the demands of certain groups for permanent rights to use certain resources be met? And what can be done to improve pro-

fessional forestry education to meet the technical requirements of multiple-use management? Mr. Frank points out that it behooves us as the owners of these forests to take part in answering these questions. Despite the problems, he points out that the national forests are one of the world's outstanding examples of coordinated conservation of resources in action.

Statements made in the book are well documented. There are appendices with information about individual forests and with data about national forests in general. Excellent photographs illustrate the wide range of conditions in the forests and the scope of the work of the Forest Service.

PAUL ZINKE

HISTORY OF NEVADA. By Thompson and West, 1881. Introduction to 1958 edition by David F. Myrick. Howell-North, Berkeley, 1958. 680 pages. \$20.

The reproduction of this great source book of Nevada history with all the original illustrations should be of special interest to the Toiyabe chapter of the Sierra Club. Originally published in 1881 and never reprinted, it has long been hard to find except in large libraries. Nevada citizens who own copies regard them as heirlooms and seldom let them go. This old "Mug Book," so called because it was paid for by men whose reward was inclusion of their pictures in the volume, is a rich mine of early lore for the writer, the student, or plain sentimentalist.

JOHN AND WILLIAM BARTRAM'S AMERICA. Selections from the writings of the Philadelphia naturalists. Edited by Helen Gere Cruickshank. Foreword by B. Bartram Cadbury. Illustrations by Francis Lee Jacques. Devin-Adair Co., New York, 1957. xxii + 418 pages. \$5.00.

John Bartram (1699-1777) and his son, William (1739-1823), were pioneer naturalists, encouraged in their interests and explorations by English sponsors to whom they sent their specimens and observations. "As they discovered new species of plants and animals, they also observed the soil and ecological relationships existing between the animate and inanimate. Information concerning Indians and their ways, plantation owners' methods of operation, birds, reptiles, insects, soil—as well as plants—were grist for their journals; blunt and brief as a captain's log were the entries by John; vivid and joyous by William" (p. xiii). William's writings, which comprise the greater part of the book, are imbued with a love of the natural scene, and are surprisingly modern in outlook and even in scientific philosophy.

The fifth son in a family of eleven children, William was a trader by his father's wish, later a farmer, and always an artist and naturalist by choice. Twelve of his drawings are reproduced. His father, a farmer by vocation, established the first botanical garden in the colonies. He planted native flowers collected by himself and others, and also exotic flowers which were sent to him from Europe. Both John's stone house, built with his own hands, and the botanical garden are still preserved as a part of the park system of the city of Philadelphia.

In at least half the book the selections are arranged by topics, with a resultant loss in geographic continuity. However, many excerpts describe the Bartrams' travels on foot or horseback through unexplored territory. There is a matter-of-fact report by John of a trip in 1743 from Philadelphia to Oswego on Lake Ontario and an account of his journey with William in the winter of 1765-66 to St. Johns River in Florida. William, with no family ties, was able to devote five years, from 1773 to 1778, to exploration from the Carolinas to Florida and west to the Mississippi.

This volume of excerpts will doubtless interest most those who know intimately the country traversed and who can best appreciate the changes which have since taken place. Those, who like the reviewer, are not so fortunate, will be left with an impression of a primeval countryside with abundant game, with great flocks of birds, including passenger pigeons, Carolina parakeets, and turkeys, and with crystal-clear rivers abundantly stocked with fish. One of the most effective bits of description concerns an assemblage of alligators "in such incredible numbers and so close together from shore to shore that it would have been easy to have walked across on their heads, had the animals been harmless."

M. L. B.

EXPLORATION

KANGCHENJUNGA, THE UNTRODDEN PEAK. By Charles Evans. E. P. Dutton & Co., Inc., New York, 1957. 187 pages, 32 pages of illustrations, 2 maps and 5 route diagrams. \$5.

Charles Evans attempts to analyze the reasons for the climbing success on high Himalayan peaks in recent years. Evans feels that the large accumulation of knowledge and development of equipment and in particular the use of oxygen has made the difference. On Kangchenjunga oxygen made the final stages swifter and more sure. Besides all this the expedition brought together a group of fine and experienced climbers, several of whom had been on high Himalayan peaks in the past.

This book tells the story of the first ascent of a peak that has been considered by some as one of the most dangerous and difficult of the 8,000-meter peaks. Evans's party by necessity had to approach the mountain through Nepal and attempt the Yalung face since most of the mountain is located in closed Sikkim. The climbing was not easy in many places, the route also proved dangerous in spots, and the weather played the usual Himalayan tricks. Despite these problems two separate parties managed to get almost to the summit, but due to a promise to the Sikkimese did not actually stand on the top. The story is well written and moves at a fair pace, although the real adventure doesn't start until Camp I is reached. From there to the summit and return, the climb is well portrayed and the problems of life above 20,000 feet take on meaning for the reader.

For the serious mountaineer the several appendices are well worth considering. Here are noted important ideas by a man that has been on several high climbs and knows his mountains. The equipment and food lists are simple and yet all inclusive. These are lists that may well help any expedition to remote mountains. The food has been broken down into average man-day rations by ounces and a final food list is offered that reconsiders everything after the trip and suggests a ration based on the group's experience.

While climbing, the reader is led along by several excellent route diagrams. The photographs are average but the last series of pictures dramatically shows the view from near the summit.

RICHARD C. HOUSTON

THE EVEREST-LHOTSE ADVENTURE. By Albert Eggler. Translated by Hugh Merrick. Harper and Brothers, New York, 1957. 222 pages, 24 pages of photographs. \$4.50.

Probably no Himalayan expedition has been so outstandingly successful in the field as the Swiss expedition of 1956 that not only made ascents of Everest on two

separate days, but also reached the top of the hitherto virgin summit of Lhotse. The story is told here in a quiet but effective way by the leader of the team.

Ever since the heroic near miss on Everest by the Swiss in 1952, the Swiss Foundation for Alpine Research has felt a compelling interest in that mountain. Conveniently, the highest summit yet unclimbed at that time, Lhotse, could be reached from the same base camp as Everest, so the team had the choice of either peak for an objective.

Although only one member had previous Himalayan experience, the party was clearly a strong one. But a run of bad luck threatened the expedition at an early stage when one member was stricken with acute appendicitis and when their Sherpa Sirdar had to retire from the field due to illness. Yet the team continued its methodical establishment of camps into the Western Cwm, and up the Lhotse Glacier, and when the weather held through the end of May, the venture was crowned with success by ascents of both Everest and Lhotse.

The early part of the book offers little new interest for those who have read previous Everest accounts; chapters titled "The Team," "The Journey," "The Glacier," "The Western Cwm," etc., tell the familiar story. Interest soon quickens on the mountain itself, and the story builds up to a climax with the ascent of Lhotse's great couloir. It was not at all certain that the slender snow tongue to the summit of Lhotse could be climbed, and the ascent proved extremely demanding. Amazingly, one of that party of two was the man whose very life had been threatened with acute appendicitis less than two months earlier. Among numerous excellent photographs included in the book are some outstanding aerial views of the high country.

WILLIAM W. DUNMIRE

MAKALU. By Jean Franco. Translated from the French by Denise Morin. Jonathan Cape, London, 1957. 256 pages, 21 photographs. 25 shillings.

This is the first and may possibly be the last book written entirely about Makalu. This giant peak, 27,790 feet, the fifth highest, was almost unknown and untouched while the climbing world struggled with nearby Everest and the other 8,000-meter peaks of the Himalaya. It is indeed remarkable that the climbing history of such a peak should be almost over within approximately a year of its first approach.

Four major expeditions have attempted Makalu, three in 1954 and the successful French team in 1955. Jean Franco tells of the final triumphant assault and gives brief snatches from the French reconnaissance in the fall of 1954. Here is a remarkable story of a team triumphant since the entire climbing party of eight French and the Sherpa, Sirdar Gyalzen, straddled the unique summit in three successive days. Franco doesn't detail every step, camp, or trying incident, but does relate the humor, comradeship, feelings, and important events leading to the summit. This is mountaineering in grand style. It might at first appear that luck alone was responsible for the success of this climb until one reads on and discovers the part that expert planning, equipment and superb conditioning played in the events. Also, their route fitted together without a hitch, ending on the north face almost 180 degrees from Base Camp. This was the route that Hillary started in the spring of 1954 and the French reconnoitered in the fall of that year. Interestingly enough, it was on the opposite side of the mountain from the California attempt in 1954.

This story probably starts to usher out the era of the 8,000-meter peaks. The book

makes one feel that these peaks are really just mountains after all, and that, when everything is right, the wonderful joy of climbing can be found even in the Himalaya.

RICHARD C. HOUSTON

THE MOUNTAIN WORLD 1956-57. Swiss Foundation for Alpine Research, Zürich.

Edited under the direction of Othmar Gurtner and Marcel Kurz; English version by Malcolm Barnes. Harper & Brothers, New York, 1957. 200 pages, many illustrations, maps, and sketches. \$6.

The latest number of *The Mountain World*, English language version of *Berge der Welt*, continues to fulfill the promise of the Swiss Foundation for Alpine Research, made when the series was inaugurated in 1946, to present an authoritative and comprehensive survey of current international mountaineering activities. The first few volumes were in German and French only, but beginning with 1953 we have had the benefit of translations into English. For years to come these volumes will stand as the most available references and refresher sources for the great events of the past decade, which embraces the ascents of the highest mountains in the world. In previous volumes we have had the stories of Everest, Annapurna, Cho Oyu, and the reconnaissances of a number of others. The current volume is one of the richest of all, with the accounts of Kangchenjunga, Lhotse, the second ascent of Everest, and the French success on Makalu. George Band's lively story of the Kangchenjunga achievement is a worthy companion to Charles Evans's book on the subject. For American readers, Bradford Washburn's "History and Evaluation of Mount McKinley," accompanied by a reproduction of the central section of his superb map of that mountain, will be of special interest. Nor should one overlook Sheldon Brooks's account of the first ascent of University Peak, one of the most difficult to climb of Alaska's mountains. The Alps are represented by three splendidly illustrated articles, in which we meet several of the Swiss Everest-Lhotse climbers in preparation for their great achievements in the Himalayas. Arnold Heim's report on his comprehensive reconnaissance of the Virungas, in Central Africa, gives us insight into a different part of the mountain world. For one whose library space is limited, *The Mountain World* series could not be better for a current and widely varied coverage of mountaineering activities.

FRANCIS P. FARQUHAR

THE EXPLORATION OF THE COLORADO RIVER. By John Wesley Powell.

Abridged from the first edition of 1875, with an introduction by Wallace Stegner. The University of Chicago Press, 1957. xxi + 138 pages. \$3.75.

The Sierra Club is in part responsible for this new publication of an old classic. John Wesley Powell's exploration of the Green and Colorado rivers in 1869 forged the first link in the chain which has led to the Sierra Club's modern river trips, and these trips in turn have aroused a fresh interest in Powell and his book. Wallace Stegner's biography: *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West* (1954) described Powell's explorations and ideas, but his historic book has remained out of print for almost a half century. Now Mr. Stegner adds an introduction to a new edition of it.

Anyone who has taken or who plans to take one of the river trips will be grateful to find Powell's book available in this convenient form. (Incidentally, the "abridgement" consists only in the omission of sections of scientific material, which have become obsolete.) Although the *Exploration* is not the best book of travel literature

ever written, it is one of the most genuine, and it successfully communicates the emotions as well as the factual adventures in the first successful navigation of the Colorado River. Powell possessed a keen eye for natural beauty and geology, and if he sometimes used the stock rhetorical devices of descriptive writing, he nevertheless wrote far better than most scientists and explorers of his time or of ours.

Mr. Stegner's introduction supplies an admirable summary of Powell's life, his ideas, and of the particular conditions of his most famous exploration. But unfortunately the editors have not seen fit to supply any of the paraphernalia which would help the modern reader to follow the incidents of Powell's voyage: there is no map, and there are no notes of any kind to explain the many name changes which have occurred during the past ninety years. But the book is well printed and of a convenient size to be taken along on any of our modern river trips.

FREDERIC I. CARPENTER

HUNTING WITH THE CAMERA. By Allen D. Cruickshank and others. Harper and Brothers, New York, 1957. 215 pages, 42 photographs. \$4.50.

This book discusses the special problems faced by the photographer of animals and plants. Separate sections cover six categories of nature photography, with each chapter written by an expert: birds and mammals (in separate chapters by Allan D. Cruickshank), amphibians and reptiles (Charles E. Mohr), insects (Edward S. Ross), marine life (Herman W. Kitchen), and plants (Rutherford Platt).

The authors write with an infectious enthusiasm and give sound advice gleaned from their own experience. It is assumed that the reader has already learned how to operate the camera. However, each writer discusses the possible types of photographic equipment which may be used. Technical data on the pictures are included.

The authors stress that the photographer-naturalist develops along two parallel lines. As a naturalist he is learning the habits and reactions of his wild-life photographic subjects. In applying this knowledge he becomes more proficient in attaining good camera shots. For example, if one were interested in photographing an insect in flight it would be a good bet to focus the camera near the opening of the insect's nest hole. The photographer would soon learn to recognize the nest hole of the insect he is after.

Emphasis is placed on ethics in nature photography with the welfare of the subject having precedence over getting the picture. A photographer might wish to pull aside protective foliage in order to get more light on a bird's nest. However, according to Allan Cruickshank, some newly hatched birds are killed in only two minutes when exposed to direct sunlight. It is also pointed out that unnatural situations should not be created to make a more eye-catching photograph.

In the chapter on plant photography the author makes suggestions for year-round photography. However, with most of the problems described the flower photographer is already familiar. Besides, the author does not go into sufficient detail in describing possible solutions or compromises for users of color film.

This is a fascinating book for the camera owner who has exhausted the possibilities of photographing peaks, streams, meadows, and lakes of the Sierra from all angles, in different weather conditions and seasons. It opens new vistas also, for those who enjoy going to the nearby countryside with their cameras for the day. Among the many nature subjects here offered, the photographer should find at least one specialty to challenge his ingenuity and interest.

BETTY RANDALL

THE MOUNT SHASTA STORY. Being a Concise History of the Famous California Mountain. By Arthur Francis Eichorn, Sr. Mount Shasta, California: The Mount Shasta Herald. 112 pages, illustrated. Price \$3.50.

This little book, while modestly called "concise," is in fact rather comprehensive. It ranges in time from glacial and volcanic origins to record summit climbs and modern ski-bowl projects; and in subject matter from Indians, geology and geodetic observations, and climbers, to occult "dwellers on two continents" and elusive Lemurians. Mr. Eichorn, who lives in Redding, within daily sight of the great white pyramid—no relation, by the way, to Sierra Club mountaineer Jules Eichorn—has consulted all known sources of information about the mountain and, in addition, has sought out men whose personal knowledge has verified and amplified the story. For the earlier period the author has drawn substantially, but not exclusively, upon Ansel Hall's *Sierra Club Bulletin* article of 1926; for later events he has ranged widely and effectively.

The sections on the occult dwellers within the fastnesses of the mountain enliven the book, but you are left to your own conclusions about such mysteries. More interesting to mountaineers, however, are the records of those who have performed outside rather than inside of the mountain. The accounts of the "record" climbs, given rather briefly in the *Sierra Club Bulletin* (1926, 12:3, p. 260; and 1942, 27:4 pp. 130-131), are here expanded. The story of David Lawyer, the unexpected winner and record maker of 1925, as told by Mr. Eichorn, makes his book original source material for those concerned with the physiology of climbing. Norman Clyde climbed from the Sierra Club Lodge to the summit in 2 hours, 43 minutes in 1923; Lawyer, in 1925, made it in 2 hours, 24 minutes, after losing not a little time on a mistaken route. If you want to test your own abilities, take this book along with you and see what you can do on Mount Shasta some July morning.

FRANCIS P. FARQUHAR

MONT BLANC TO EVEREST. By Gaston Rébuffat. Translated by Geoffrey Sutton, foreword by Wilfred Noyce. Studio Publications, Inc., with Thomas Y. Crowell Company, New York, 1956. 158 pages, 69 photogravure plates (8 in color). \$6.95.

Any person picking up this book for the first time will immediately be enthusiastic about the magnificent pictures. As he takes it up again he finds that the text is as revealing as are the illustrations of the author's love of mountain beauty. There are stories of conquest here, to be sure, but in them the accounts of hardship and striving are merely a part of the story of attaining the beauty of high places.

The text is brief—only thirty-eight pages—and seems at first like a collection of loosely connected essays until it reveals itself as one central story: the story of exhilaration in climbing; of the rich pleasure of good companionship; of delight in the architecture and ornamentation of the mountains and all the lights and shadows upon them. "In the heart of every mountaineer there is . . . room both for a very difficult first ascent and for the contemplation of a flower."

The illustrations have been selected from the work of many mountaineers; twelve are photographs by the author, and there are acknowledgments to thirty-four others. They are grouped with the chapters to which they relate, with brief legends; the reader's wondering about who and where and why is recognized in a separate 18-page section, "The Story Behind the Pictures," which may give anything from historic notes or quotes from others' writings to the author's own philosophical musings.

Rébuffat's own achievements are notable, but this is a book of testimony to beauty rather than recording of exploits. One understands that the author is an able and sound climber, but capable of much more than physical conquest; he shows a reader what he sees rather than describing what he does.

C.E.M.

NATURAL SCIENCES

THE BIRD WATCHER'S ANTHOLOGY. Edited by Roger Tory Peterson. Harcourt, Brace; New York, 1957. 401 pages, illustrated. \$7.50.

Like his field guides, Roger Tory Peterson's "Bird Watcher's Anthology" is an invitation to go out into the field and observe. More than a mere collection of good writing on birds, the book illustrates the development (or, more precisely, growing pains) of a bird watcher. From the initial spark that kindles an interest, through the urge to list all birds seen, awareness of migration, the search for unusual and for foreign birds, high adventure in the field and, finally, studies of life histories, Dr. Peterson charts the bird-watcher's career by a purposeful selection and arrangement of the articles for this anthology.

The birder reading this book will recognize himself in one of the stages of development and be inspired to progress with the book. How much of a stimulus this will be to the now recognized pursuit of birding is questionable, because both the price and length of this anthology probably will keep it out of general circulation.

The anthology introduces the reader to a wealth of literature, and it seems unfortunate that the selections are not better identified so that the reader could more easily track down the original work to pursue in its entirety. Indeed, in some cases, knowing the publication date would aid considerably in understanding a reference. The fine print of the copyright acknowledgments is hardly the place for ferreting out this information.

PHYLLIS LINDLEY

PLANT CLASSIFICATION. By Lyman Benson. D. C. Heath and Co., Boston, 1957. 688 pages. \$9.

This work discusses only the woody or vascular plants which comprise the major elements of the various types of vegetation that cover the earth. Vascular plants include the seed plants, which are divided into the flowering and the cone-bearing plants, and the ferns which have no seeds but produce spores. The parts, or organs, comprising the body of the plant in each of these groups are described and illustrated. Also the arrangements of these organs as the basis for division into smaller categories (subclasses, orders, families, genera, and species) is explained. Since the flowering plants are by far the largest groups of vascular plants, the chapters describing them comprise the larger part of the book.

Included is a list of regional and local floras and manuals for identification of plants in various parts of the United States. Favorable seasons for collection of plants in flower as well as the natural vegetation in different regions of North America are described. The construction and use of keys as an aid to identification are also explained.

This is a useful reference work in the fundamentals of classification of woody plants, their identification and nomenclature, their evolution, and their adaptations to their environment. The book is profusely illustrated with line drawings and photographs.

ELIZABETH McCLINTOCK

FOR YOUNGER READERS

THE PACIFIC COASTAL WILDLIFE REGION. By Charles Yocum and Raymond Dasmann. Naturegraph Co., San Martin, California, 1957. 108 pages, 500 illustrations. \$1.75 paper, \$2.75 cloth.

A simple handbook for beginners in nature study. Contains basic information about the commoner plants and animals of the Pacific coast between Monterey County and British Columbia.

WILD ANIMALS OF THE FAR WEST. By Adrien Stoutenburg. Foreword by Dr. Robert T. Orr, curator of mammals at the California Academy of Sciences. Parnassus Press, Berkeley, 1958. 150 pages. \$3.75.

The lives and habits of mammals that eat meat, gnaw, leap, hop, fly, or live in the sea are delightfully presented and even more delightfully illustrated in this new addition to the lore of the outdoor world by Parnassus Press. It is a beautiful book to handle and makes one long to be ten years old, or twelve, or even twenty—with a birthday just around the corner.

WHITE WATER. By Vivian Breck. Doubleday and Company, Inc., New York, 1958. 192 pages. \$2.95.

Teenagers who have enjoyed Sierra Club river trips will find a familiar world in this novel about fold-boating on the Green River in Colorado and Utah. Here Andy Dawson meets not only danger and excitement from the water itself, but Lance Ferrier, who changes her conviction that boys are something to avoid.

White Water is the Junior Literary Guild selection for older girls in July of this year.

More Books from the Sierra Club

For the convenience of members, the Sierra Club office carries a few books by other publishers 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."

Arctic Wilderness, by Robert Marshall (Univ. Calif. Press, \$3.75). Exciting travels in Alaska by one of the originators of the wilderness-system idea, beautifully illustrated. Foreword by A. Starker Leopold.

The Singing Wilderness, by Sigurd Olson (Knopf, \$5), re-creates the sights and sounds and meaning of the Quetico-Superior country, where the trails are for canoes. Beautifully written, illustrated, and designed.

This Is Dinosaur: Echo Park Country and Its Magic Rivers, edited by Wallace Stegner. The great controversy over the proposed Echo Park dam has brought wide recognition to Dinosaur National Monument. *This Is Dinosaur* will let you see why there has been furore. The book puts you there, through the ages; it gives the place meaning and perspective. (Knopf, \$5.)

Birds and Mammals of the Sierra Nevada, by Lowell Sumner and Joseph Dixon (\$7.50); *The Incomparable Valley: A Geologic Interpretation of the Yosemite* (\$1.95); and *Sequoia National Park: A Geological Album* (\$1.95), both by François E. Matthes; and *The Sierra Nevada: The Range of Light* (various authors, \$6.00); *Sunset Sportsman's Atlas: The High Sierra and Its Environs*, maps by C. E. Erickson (\$1.75)—all these add greatly to an understanding of the Sierra scene.

Sierra Club Bulletin ANNUAL MAGAZINES

• A rewarding source of Sierra adventure, history, photography, and science, 1893 to date. Each contains from 80–160 pages, 16–42 plates.

Complete set, 1893–1958 and index, unbound, but with bound 1950 edition of vols. 1–5, \$150.

Volumes 1–5 (1893–1905), 1950 edition (offset), in buckram, \$32.50.

Separate issues, 1906–1958, paper, \$1.50; cloth (1951–54), \$2.00.

Available only in sets: Jan. 1913, 1914, 1921, 1922, 1923, 1928.

Fifty-seven-year Index, 144 pp., paper, \$3.75; cloth, \$4.50.

Architecture of the California Missions

Text by KURT BAER, *Photographs* by HUGO P. RUDINGER. The plan of the mission complex was patterned after that set in Mexico in the years after the Conquest: a church and its adjoining structures around an open quadrangle. For the first time the characteristic structures and architectural features are analyzed and reference is made to specific missions and their distinct architectural properties.

This volume brings together a text, which for the first time objectively discusses, compares, and evaluates the architecture of the missions, and a collection of superbly interpretive photographs which offers to the reader something of the atmosphere of a past age, a glimpse, in permanent form, of the California mission buildings in their simple, pastoral setting. These magnificent plates are accompanied by a descriptive and historical sketch of each of the twenty missions existing today. *216 pages, 128 pages of illustrations*

\$10.00

Landscapes of Alaska Their Geologic Evolution

HOWEL WILLIAMS, *Editor*. Prepared by members of the United States Geological Survey and published in cooperation with the National Park Service *Landscapes of Alaska*, is an introduction to the terrain of this extraordinarily scenic new state.

"The photographs alone . . . were enough to stir the spirit of adventure in me."—WALTER RUE, SEATTLE POST-INTELLIGENCER.

160 pages, 23 pages of photographs, 6 maps.

\$5.00

NATURE AND THE AMERICAN

HANS HUTH. This book presents the basic developments which led to the conservation movement in the United States and shows how these developments were both causes and effects of changes in the American attitude toward nature.

268 pages, plus 64 pages of illustrations

\$7.50

GUNS ON THE EARLY FRONTIERS

CARL P. RUSSELL. A history of firearms from colonial times through the years of the western fur trade, this is an account of the guns which helped shape the history of the American West. Also included is a discussion of the antecedents of the western arms together with the significant European influences which affected both the mechanisms of guns and the politics of the traders of guns.

412 pages, illustrations

\$8.50

A FLORA OF THE MARSHES OF CALIFORNIA

HERBERT L. MASON. This work, five years in preparation, gives descriptions of currently known species of flowering plants and ferns that occur in wet lands, including many significant as waterfowl food. The text provides identification keys, descriptions of the plants, and indications of habitat and geographic range. For a large proportion of plants, common names as well as botanical names are given. "The drawings are excellent, and the volume has been attractively designed and handsomely produced."

—AUDUBON MAGAZINE

888 pages, about 350 illustrations.

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