Where Scientists Work Above Timberline . . .

Sheltered from ocean - bred storms by the nearby High Sierras, the 14,240 foot White Mountains on the California-Nevada border afford an excellent vantage point for scientists interested in high altitude research. This is Nell Murbarger's story of her spur-of-the-moment drive over the highest auto road on the North American continent north of Mexico, to the scientific stations on the lofty mountain.

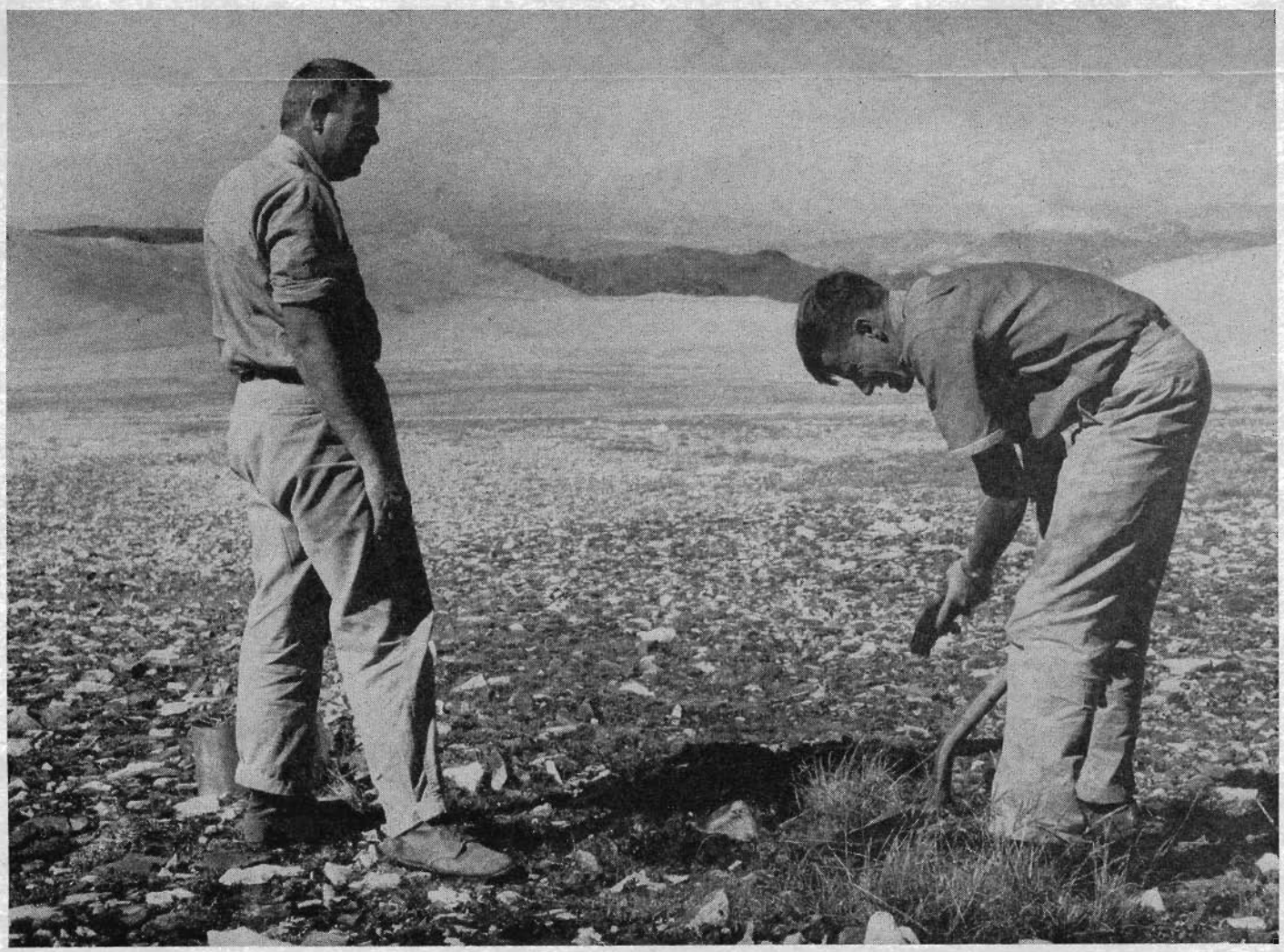
By NELL MURBARGER
Photographs by the author
Map by Norton Allen

BETWEEN OWENS and Fish Lake valleys on the California-Nevada boundary, the White Mountains rise to a height of two-and-a-half miles—their gaunt flanks rent by steep canyons, their summits sown with brown malpais. In years past, when business took me into the valleys below this range, I looked curiously at that aloof barrier and wondered what secrets it held, remembering that folks had said this was "good country to stay out of."

Last summer while crossing the southern tip of the Whites on the sunny juniper-fringed road between Big Pine and Lida, I was thinking of that high desolate desert range spreading away for 50-odd miles to the north. Then, almost before I knew it, Temptation took the wheel — and my car was bumping over the trail that leads north from the summit of Westgard Pass!

The little sideroad climbed doggedly through juniper and pinyon forests and past wild gardens splashed with penstemons, paintbrushes and lupines. After the needle on my altimeter moved from 7276 feet at the pass to 9000 feet, the steep narrow road began skirting high windswept promontories from which I could see all the sprawling length of Owens Valley, and a whole necklace of majestic peaks in the white-topped Sierra 30 miles to the west. My car had been pulling hard in low gear for several miles and the altimeter was hovering around 10,000 feet, when I seemed to burst into another world! It was an impossible, impractical, outer-space world, fabricated of stone and snow, sky and

Dr. G. Ledyard Stebbins, right, and Joshua Lee, both of the University of California at Davis, plant high elevation grasses above timberline on White Mountain.

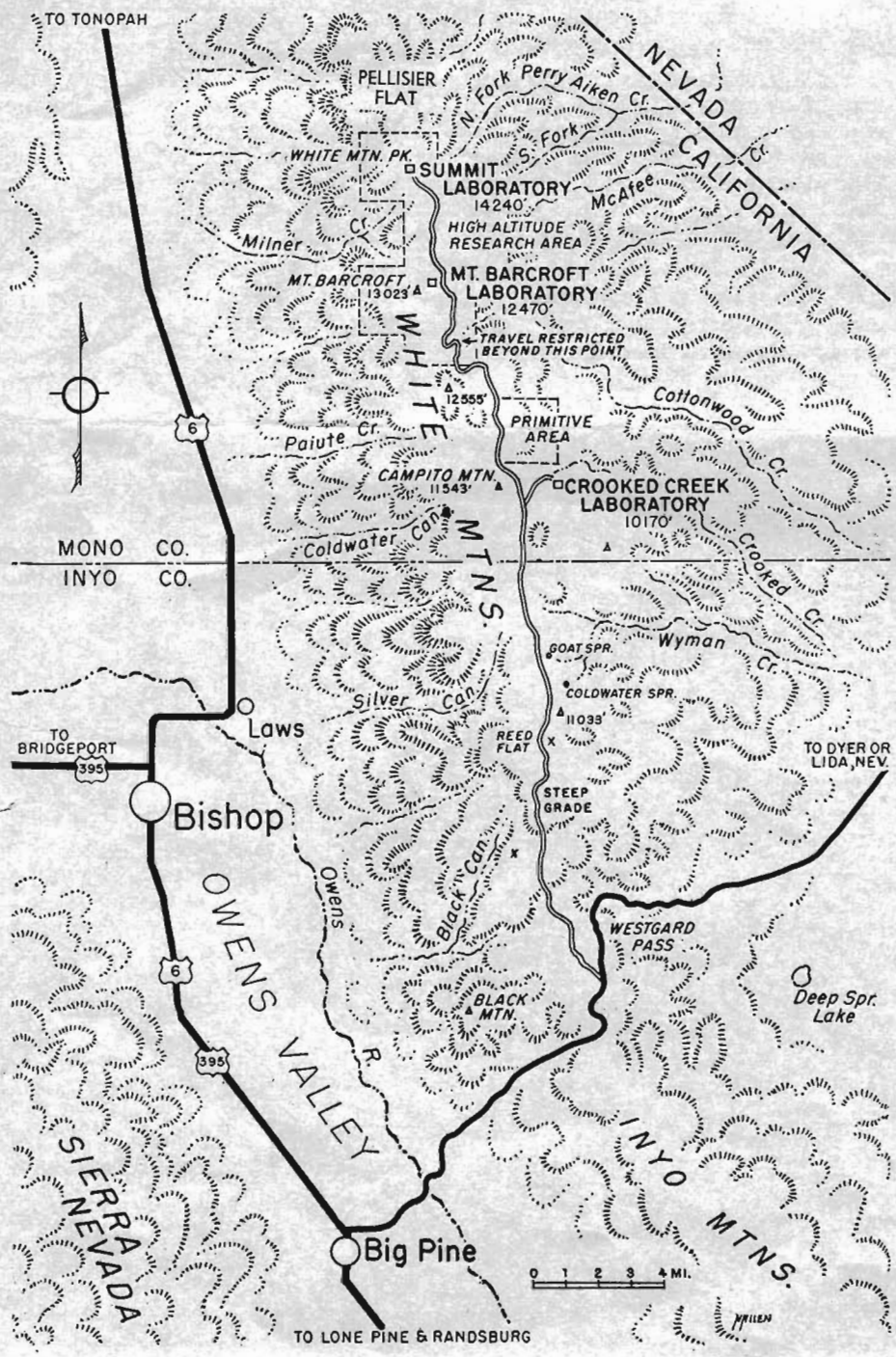


space, and endlessness and timelessness—all wonderfully big and frightening, and terribly beautiful.

For three days I prowled the roof of this strange lofty land. I crossed July snowbanks to photograph delicate Alpine plants—and from them looked down upon the parched borax flats of southwestern Nevada, 9000 feet below! The highest auto road on the American continent north of Mexico took me to the second highest research station in the world.

The one quality about the White Mountains that pleased and thrilled me most during my three-day stay was finding them open and quiet, and marvelously bare of humankind and clutter! In all the 600-square-miles of this range there is not one town—not even a gasoline station. Neither are there ski runs, dude ranches, fishing or hunting lodges, riding stables, boating or swimming, improved campgrounds — not a mile of hard-surfaced road save that over Westgard Pass—and all the permanent residents in the range could be evacuated in one truck load!

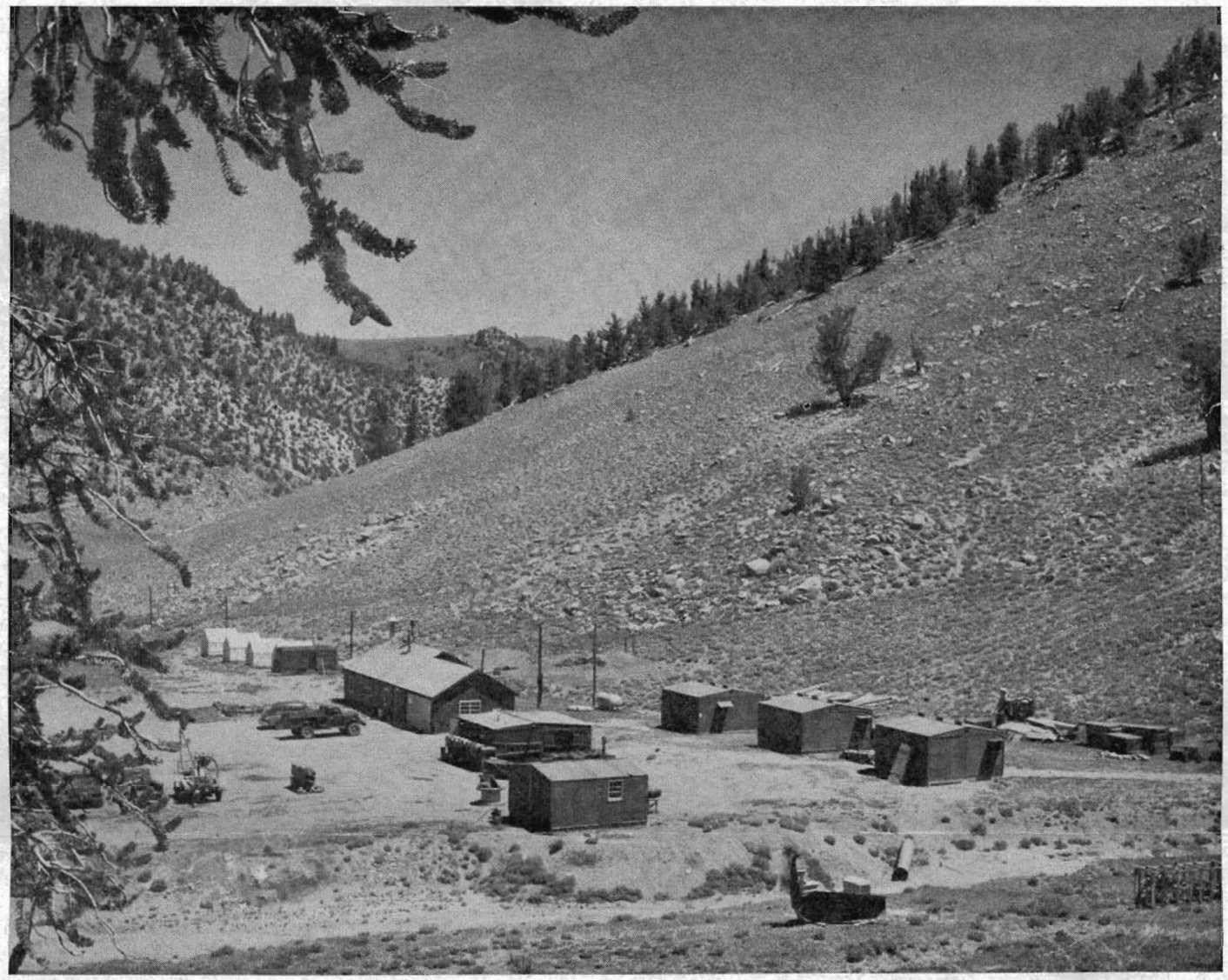
Most of these folks are in the employ of White Mountain High Altitude Research Station, operated by the University of California and financially aided by the Office of Naval Research, Rockefeller Foundation and National Science Foundation. At the Crooked Creek laboratory of this station, I was made welcome by Paul Manis and Joe Wentworth, operations director and maintenance foreman, respectively. I headquartered in a tenthouse on the laboratory "campus"—using a station jeep for my explorations, sharing Joe's good cooking with half-a-dozen working scientists, and taking my daily turn at the dishpan.



Established in 1948 when the Office of Naval Ordnance required a high altitude station from which to conduct guided missile and other classified research, the Crooked Creek laboratory was transferred in 1950 to the Office of Naval Research and its operation delegated to U.C. This development came at a time when Drs. S. F. Cook and Nello Pace, then professor and associate professor of physiology at the University, were seeking a site where research could be conducted into problems incident to life at high altitudes. Although situated at 10,170 feet elevation—more than half a mile higher than any point in the United States east of the Rockies — the Crooked Creek installation was not deemed sufficiently lofty to enable the high altitude tests contemplated by Drs. Cook and Pace, and in 1951, on the east slope of Mt. Barcroft nine miles north of Crooked Creek and 12,470 feet above sea-level, construction of a new laboratory was begun.

The new lab and the road leading to it were built by 14 graduate students in physiology, two Ph.D.s, and three physiologists at the professional level, led by Engineer Robert B. Choate. Three years later, a still-higher installation was built atop White Mountain Peak, at 14,225 feet elevation—only 270 feet lower than the summit of Mt. Whitney, highest point in the continental United States. With addition of this facility, White Mountain High Altitude Research Station became the second - highest establishment of its type in the world, with Barcroft and Summit labs the only U.S. research stations at elevations in excess of 12,000 feet able to operate throughout the year.

This fact of year-around accessibility does not mean that winters in the White Mountains are mild, except in a comparative sense. During the four years weather data has been kept at Mt. Barcroft lab, the lowest temperature recorded was in March, 1956, when the mercury fell to 32 degrees below zero. Wind velocity averaging 82 miles per hour for a full hour has been measured at the same station. Weather at Crooked Creek, naturally, is milder—lowest temperature recorded there since commissioning of the sta-



Crooked Creek laboratory in its setting of bristlecone and limber pines. Altitude here is 10,170 feet.

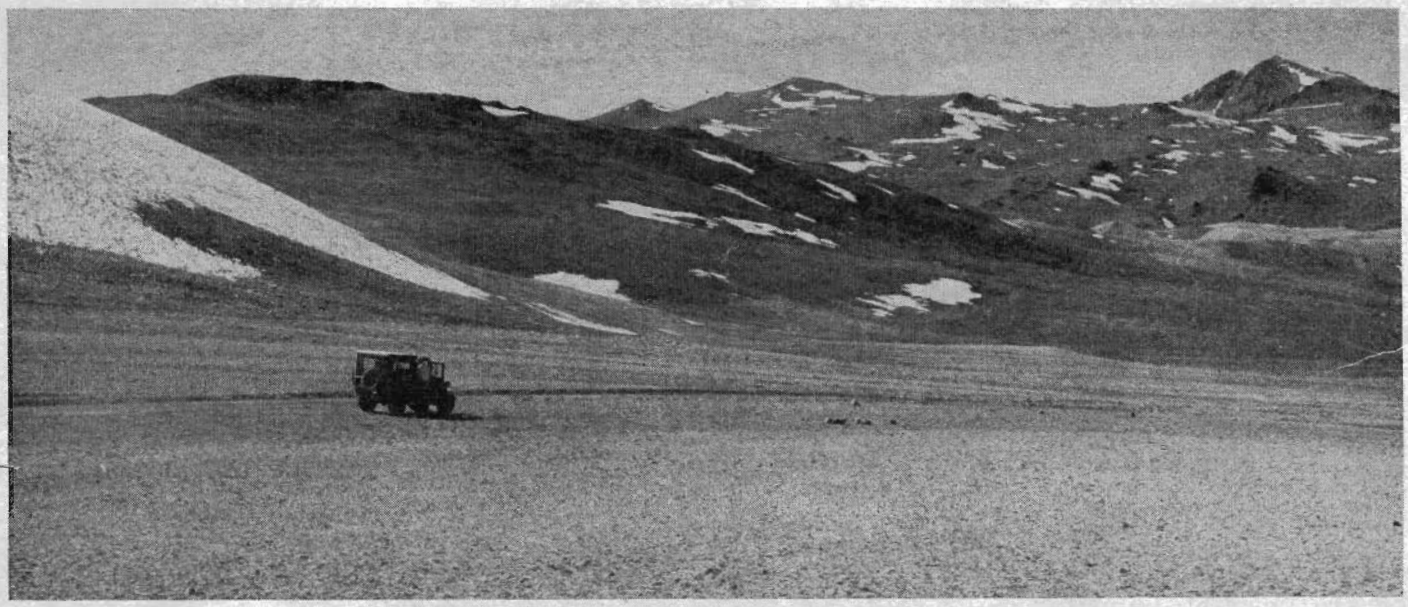
tion in 1948 was 20 degrees below zero. Summer days are pleasant and sunny, but never more than 75 degrees in the shade; and during my July visit, ice half - an - inch thick froze nightly.

Main advantage White Mountain has over other ranges insofar as high altitude research is concerned, is its position behind the so-called "rain shadow" of the Sierra Nevada. As a majority of storms in this section of the country originate over the Pacific and sweep in from the west, most of their moisture is deposited upon the high summits of the Sierra. Only a fraction is carried past that range to fall on the White Mountains and the Great Basin area beyond. Thus, a point in the High Sierra may receive 400 or 500 inches of snow in the course of a winter, while a comparable elevation and latitude in the Whites is fortunate to receive even as much as 100 inches. Approximately two-thirds of the annual precipitation of 7 to 12 inches comes in the form of snow—the remainder falling as rain during midsummer months when the region occasionally is visited by hard electrical storms.

Use of facilities at these stations is not restricted to the University of California. Any qualified university in the world—any individual, as far as that goes—is welcome to use the stations while conducting research into high altitude. Fee for such use is $6 per day, which includes dormitory or tent-house lodging and three hearty meals. Additional charges are made for use of station vehicles, storage of materials, care of experimental animals and extraordinary use of power, fuel, equipment or time of station personnel.

Use of station facilities is available only through prior arrangement with the Berkeley office. The station is not set up to handle gasoline sales or the feeding and lodging of casual visitors. No public facilities of any kind—gasoline, oil, tire repairs, motels or meals—are available in the entire area between Big Pine and U.S. Highway 95, a distance of nearly 100 miles.

Research follows no prescribed course. Several scientific groups have made this their headquarters while studying cosmic radiation and electrical conductivity. Others have concerned themselves with the effects of low oxygen and low temperatures on living organisms. At the time of my visit, investigation was being conducted into the keeping qualities of various foods stored in a cold low-oxygen environment; Dr. Arthur H. Smith, associate professor of animal husbandry at the University of California at Davis, was testing the hatching potential of eggs produced by the experimental poultry flock maintained at Mt. Barcroft laboratory; Fulton Fisher, botanist from Melbourne, Australia, and Carnegie Institute, was collecting spe-



Jeep parked on 11,800 foot plateau. Highest point in range, 14,240 foot White Mountain Peak, is at right.

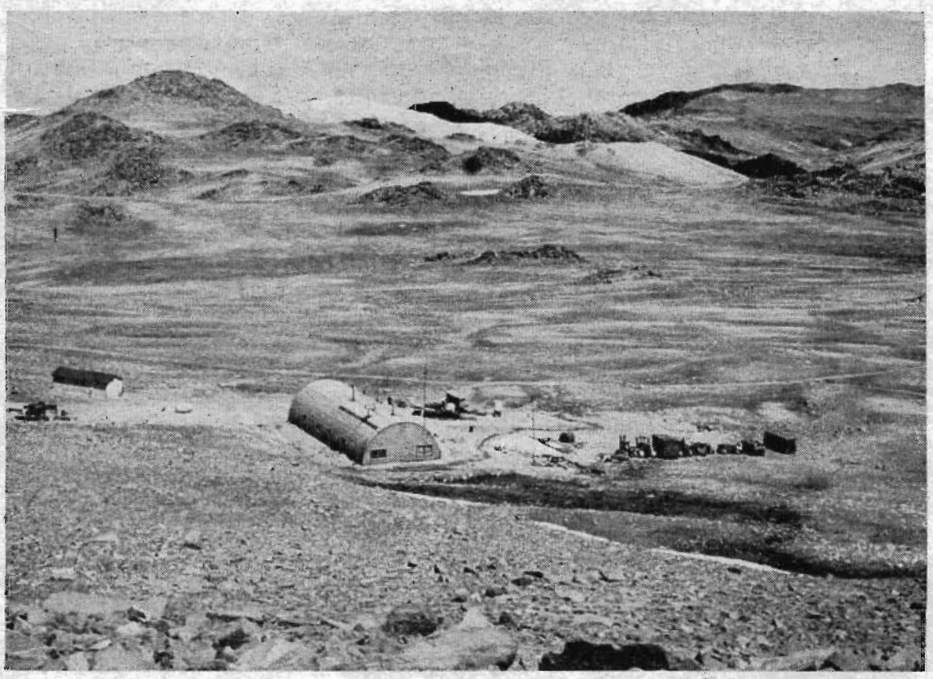
cimens of the 500-odd species of plants native to the area; and Dr. G. Ledyard Stebbins, assisted by Joshua Lee and Roman Gankin, all of the Davis campus, were making experimental plantings of timberline grasses from the Atlas Mountains of Spain. At the same time, but less academically, Carl and Martin Grauer, a father-son team from Castro Valley, were running a power line survey to the top of White Mountain Peak; I was collecting notes and making black - and - white photos for this article, and color slides of the range for a natural history program; and Paul Manis and Joe Wentworth were engrossed in their 24-hours-a-day jobs of management, coordination and maintenance.

But despite the fact that each of us was dedicated to his individual task, we also felt a sympathetic interest toward work and problems of the others. We all ate at the same long table and cheerfully shared the duties of K.P.

Despite the important position this facility holds among high altitude research stations of the world—and despite the significant research programs being pursued all around me—I found it difficult to tear my attention from the land itself, and the plants and wild life inhabiting it.

Due to excessive winds and general aridity, the range supports but few species of trees. Scattered sparsely over the rounded limey hills at the head of Crooked Creek are limber and bristlecone pines (*Pinus flexilis* and *P. aristata*) in about equal numbers; but from approximately 11,000 feet to timberline at 12,000 feet I noted only the latter species. Twisted and tortured by the high winds, their stubby dead limbs sandblasted to gleaming white, the bristlecone pines of the White Mountains are as distinctive as any tree in the world. From the first one I saw, until I left the range I was fascinated by them—but never so completely as during those moments when I stood beneath the patriarchal bristlecone believed to be the largest representative of its species in the world!

Mt. Barcroft laboratory at 12,470 feet. University of California photo.



It is a short thick tree, its bunty trunk 35 feet in circumference at the smallest point, and its entire height not over 40 feet. It is a fine stout old fellow, and my pride in having made its acquaintance is depreciated only by the fact I failed to meet three other notable bristlecones simply because they were not discovered to science until the month following my visit.

These last mentioned trees are much smaller than the giant bristlecone — being only 20 to 50 inches in diameter at the base and 15 to 20 feet high—but according to Dr. Edmund Schulman of the University of Arizona, they are quite possibly the oldest living things on earth! While investigating tree rings in furtherance of research into weather cycles of past years, he found these ancient pines breasting the elements on a high exposed ridge between Westgard Pass and Wyman Canyon. Their ages, established by the reliable

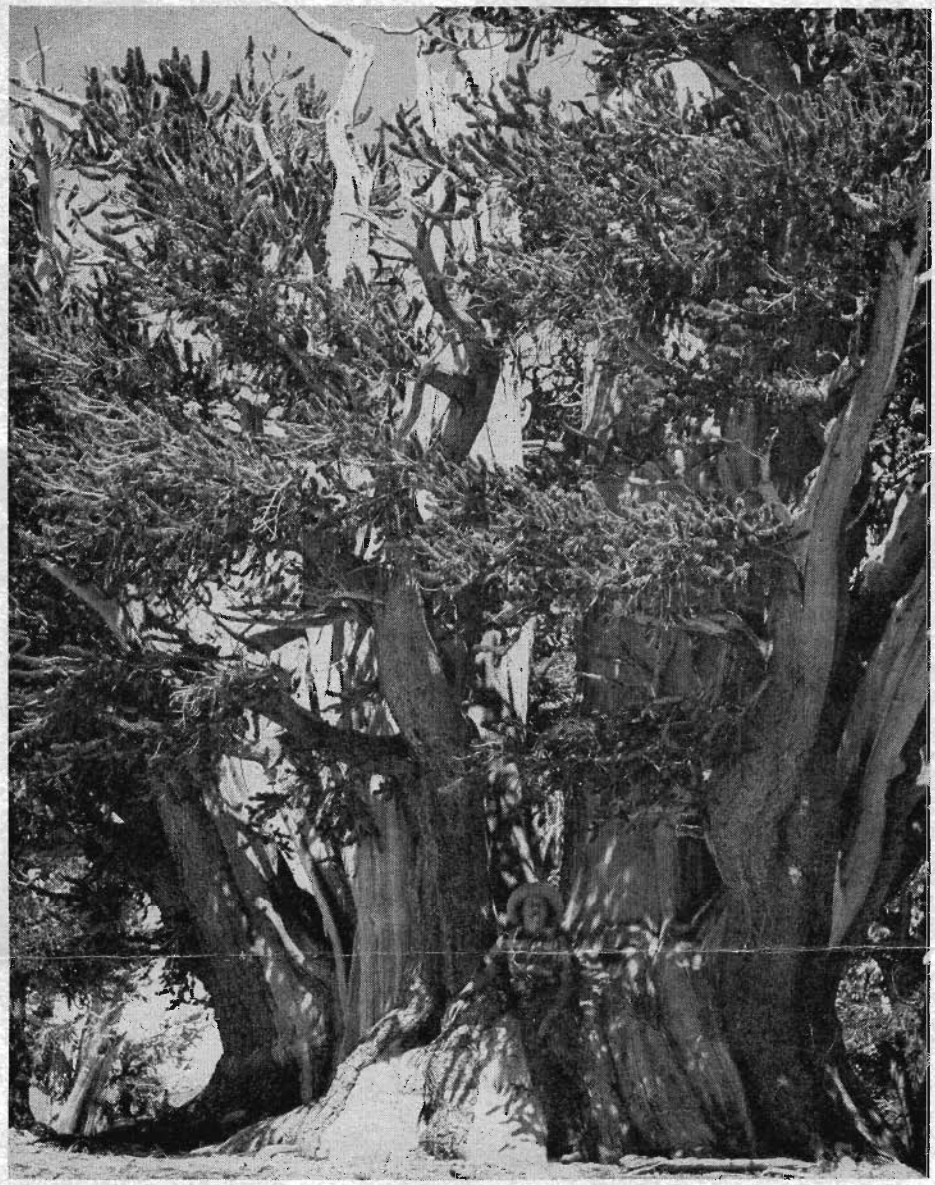
tree-ring system of dating, are 4100, 4050 and 4000 years—indicating that this patriarchal trio may have been battling for existence on this wind-riven ridge for as long as 10 centuries before the oldest sequoia now living sprouted in its seed!

What is believed to be the finest stand of bristlecones in the White Mountains—including the largest, but not the three oldest trees—is assured perpetual preservation by the U. S. Forest Service which has set aside a Natural Area of 2330 acres surrounding and embracing White Mountain Peak. Near the south boundary of this tract, at an elevation of about 12,000 feet, private vehicular travel is halted by a padlocked chain across the road. Only horseback riders, hikers, station-owned vehicles and motorists having special permission of the operations director — and a key — may proceed beyond this point. On the second day of my stay I accompanied the four botanists — Stebbins, Fisher, Gankin and Lee—on an all-day trip into this area.

With our cameras, binoculars, canteens, lunches and collecting gear stowed in two jeeps, we set forth at mid-morning. Stopping occasionally to collect plants and shoot pictures—and once to observe a pair of fat marmots ambling over a rock slide, and another time to watch the antics of a big buck deer—we drove to Mt. Barcroft station where we tarried about an hour. While Dr. Stebbins and his volunteer assistants planted high elevation grasses, I climbed to the rounded summit of Mt. Barcroft, 553 feet above the 12,470 foot high station. Then we got back into the jeeps and headed for the still higher country beyond.

Having seen the last bristlecones long before reaching Mt. Barcroft, the remainder of our out-bound journey was made well above timberline in the strangest alpine world one can imagine. Nothing about these summits suggested the dizzy heights and depths associated with mountain climbing. As we neared 13,500 feet, our road still followed the gentle undulations of the land which could have passed for the rolling hill country of Nebraska or Iowa—except these naked heights wore no concealing cover of prairie grass, shrubs or trees. Yet, plant life was not lacking. Botanists believe there are not less than 500 species of plants native to this portion of the range above timberline. Many of these varieties never have been described botanically.

Examination of the ground surface between the closely-set rocks revealed that almost every cupful of topsoil held its abundance of vegetation — wirey tufts of grass, dry mosses, cotyledons and myriad species of alpine flowers. Few of these representatives were more than an inch or two in height, and some were almost microscopic—yet, that warm July day found each driving forward toward its budding, flowering and seeding phases in mighty thrusts of vigor aimed at completion of its life cycle and perpetuation of its kind in the few brief weeks allotted between snow and snow.



Author at base of world's largest known bristlecone pine (Pinus aristata) in White Mountains, at about 11,500 ft. Tree measures 35 feet in circumference at smallest point between base and crown.

With the long snowy Sierra Nevadas hemming our world on the west, and the bald head of White Mountain Peak at our back, we halted for noon lunch at the edge of a deep snowbank between 13,000 and 14,000 feet. Northward stretched the remainder of the White Mountain range, terminating in 13,145-foot Boundary Peak, highest point in Nevada. Spreading to the east were 10,000 square miles of Nevada's desert mountains — the Silver Peaks, the Monte Cristos, the Cactus, the Kawich, the Reveilles, range beyond range until the rim of the world was lost in the blue-shadowed haze of infinity.

From the snowbank at our feet we looked down more than 9000 feet to the heat-shimmering flats of Fish Lake Valley, almost directly below us, and on the slopes surrounding those flats we saw pin-point clusters of trees that marked the home buildings of ranches, and the spidery line of the main valley road.

In three days I had learned a little, at least, about this strange world beyond timberline. I was glad Temptation had taken the wheel and turned my car into the dim dirt road that leads upstairs from Westgard Pass.

Mountains Are For Everyone

Pellisier Flat, a unique strip of desert high country that rises gently from 12,000 to 13,500 feet in seven miles in the White Mountains of east central California. Seen from the Nevada side. These cirques show signs of glaciation. Photo by Arnold Shulman.

The Desert Peaks Section of the Sierra Club, a group that makes a hobby of exploring the desert mountain ranges of the Southwest, has scheduled a trip to this bristlecone pine area in White Mountains. Here is advanced information for readers who may wish to join them.

By LOUISE TOP WERNER

JUNE 8-9
Bristlecone Pine Area and Reed Flat (11,033 ft. el.)

ACCESSIBLE ONLY via the narrow, steep, unimproved road along the backbone of the White Mountains. The leader warns that only drivers experienced in forcing their cars up such roads should attempt it in a stock car. Four-wheel drive or low-geared trucks are recommended.

Beautiful camping area at Reed Flat, at 10,000 feet. Bring water for the entire week-end. Easy five mile hike to the peak affords unsurpassed view of 85 miles of the Sierra Nevada under snow.

Driving: 600 miles roundtrip from Los Angeles, via highway 395 to Big Pine, California, (last gas at Big Pine) then east to the summit of Westgard Pass where the party will rendezvous at 8 a.m. Saturday, to caravan from there up the road.

Leader: Bob Bear, 1980 Rangeview Dr., Glendale 1, California. Phone TH 8-0819.

The highest desert mountain in the U.S., (14,240 feet) White Mountain Peak in the southern end of the White Mountain Range, was a favorite objective of Desert Peakers until the armed forces took it over as a station for high altitude research, cutting a jeep road almost to the summit.

North of the peak, between it and Mount Montgomery, lies a unique bit of high desert called Pellisier Flat, a strip roughly half a mile wide and seven miles long, rising gently from 12,000 to 13,500 feet. Formerly denuded by sheep-grazing, it is now coming back with carpets of miniature alpine flowers.

During several exploratory trips into the area the Desert Peakers identified dozens of plants, found a scattering of obsidian chips at about 13,500 feet (probably the highest ancient Indian workshop yet uncovered in the United States), and several low, crescent-shaped stone walls of ancient vintage, such as Indians used for blinds while hunting bighorn sheep.

The Desert Peakers, through the Board of Directors of the Sierra Club, have asked the Forest Service to set this plateau aside as a Wilderness Area. For such high country, Pellisier Flat is easy of access. An old Indian trail coming up the east side, from Post Meadow, Nevada, was widened in the 1860s by a lumbering concern, one of whose wagons may still be seen smashed against a pine just below the rim of the Flat. In this vicinity grow some of the Bristlecone Pines recent research has proclaimed as a species that may date back even farther than the Sequoia, making it our oldest living thing.

A road to a tungsten mine makes the lower end of the Flat almost accessible by jeep; planes have already landed on the carpets of Alpine flowers that are trying to reclaim the soil. Unless it receives protection soon, another exceptional bit of desert wilderness will be lost to those who love to explore the virgin mountain areas.

The Desert Peakers presented to the Forest Service a photographic exhibit, a botanical report and a map marking the proposed boundaries. When we jogged them about it months later, they said they had lost the data. Another file was made up and sent to them. They have now postponed further consideration until the issuance of a new topographic map of the area.

June and July are the best months to hike on Pellisier Flat. The flowers are then at their best; run-off from snowbanks usually makes it unnecessary to carry water. We know of no other place where mountain terrain so gently rises from 12,000 to 13,500 feet.