I

THE SIERRA NEVADA

The Sierra Nevada is defined as "limited on the north by the gap south of Lassen Peak, and on the south by Tehachapi Pass." It is about four hundred miles long and varies in breadth from forty to eighty miles. Save for a small angle of the state of Nevada that penetrates Lake Tahoe, it lies entirely in California. To the geologist the Sierra Nevada "constitutes a magnificent unit, one of the finest examples on the face of the globe of a single range, the type of its class."[1]

To the geographer it is of equal interest. In more than one sense it constitutes a barrier—a barrier to human migration, and a barrier to the winds and storms that press upon it. As a barrier to weather the range has a beneficial effect. In winter the storm clouds deposit their watery burden in successive layers of snow, which in due time give birth to streams that merge into rivers and bring life to the land below.

Water, in all its forms, is indeed the crowning glory of the Sierra. The crystalline snows harden beneath the rocky peaks and crests into perpetual snowfields, disclosing here and there beds of blue ice, reminders of the vaster glaciers that ages ago sculptured the cirques and canyons. The cirques now enfold little lakes, sapphire and emerald in hue; sometimes half-frozen, even in summer. Here, in these granite heights, all is silent—silent and undisturbed. But from below comes the tinkling sound of running water; then a murmuring and a splashing as the newborn streams glide into pools irradiated by beams of sunlight. Now comes the great drama of the Sierra. The streams gather volume and begin a boisterous journey, plunging to the depths of canyons in leaping and twisting cascades. In Yosemite, heart of the Sierra, the forms of water attain their most exciting expression. There the great waterfalls leap from lofty cliffs in magnificent variety. In contrast, there are throughout the range hundreds of quiet lakes, lapped in rock basins, bordered by pines and alders. Whether in motion or at rest, the waters of the Sierra are a constant joy to the beholder. Above all, they are the Sierra's greatest contribution to human welfare.

The Sierra Nevada is generally considered by geologists to be a portion of the earth's crust that has been detached and uplifted on its eastern margin so as to be tilted to the west in a long moderate slope, segmented laterally by deep canyons. The eastern profile is more complicated. Along much of its

length there is a precipitous escarpment, but toward the north this abruptness disappears and the rise to the main crest is more gradual, though sometimes tortuous. At the midway point the crest is so flattened that an interior range has sometimes been mistaken for the summit until more closely examined. Conversely, farther north, at Lake Tahoe, the main crest is separated from the adjacent valley by a trough that contains the lake, with a subordinate range to the east.

The fundamental basis of this great tilted block is igneous rock—granite in varied forms and textures. This granitic bedrock is exposed in large areas of serrated ridges and peaks, in domes and bosses, in perpendicular cliffs, and the clean-swept flanks of canyons. There are glaciated surfaces polished smooth as glass and there are surfaces roughened by ages of weathering. The granite is found in exfoliated slabs and in massive rectangular blocks, in broken talus, and in the boulders and gravel of streambeds. Yet even the casual observer must notice that all is not granite in the Sierra. There are red mountains and there are black ones, such as Mount Dana and Red Slate Peak, Mount Lyell and Mount Goddard, and the Kaweah Peaks. Geologists tell us that these are the remains of an ancient range of metamorphic rock that stood on top of the granite before the uplift. Most of this was eroded away long ago, but substantial portions remain to give variety to the landscape. Another geologic agency, vulcanism, has enhanced the variety. Although there are no huge volcanic cones as in the Cascades, there is ample evidence of enormous eruptions in some early period. The famous Table Mountain and the curious Dardanelles in the Stanislaus region indicate that the land was once flooded with lava. Smaller and more recent volcanic remnants are found in a number of places. The most remarkable is the Devil's Postpile,[2] rivaling in the perfection of its geometric forms the Giant's Causeway in Ireland and Fingal's Cave on the Scottish island of Staffa. In the higher regions of the Sierra metals occur, but only sparsely. A few copper claims have been worked, but no appreciable amount of ore has ever been taken out. Silver has been found, but the hoped-for bonanzas never materialized. The story of gold belongs largely to the western foothills, and with the exception of Gold Lake and Mariposa (to be touched upon later) is purposely excluded from this history lest it obscure all other subjects.

On the long western slope is the unique forest belt that distinguishes the Sierra Nevada, unique in its relatively restricted area and in the variety and quality of its trees. The conifers, which are the dominant feature, are among the finest specimens of their kind in the world, towering to heights rarely excelled, beautiful in their proportions and in the texture of their bark and foliage. Famous above all others is the Big Tree, the *Sequoia gigantea*, found in its natural state only in the Sierra Nevada of California. More extensive, and quite as much to be admired, are the two great pines, the Yellow Pine

Ansel Adams

Sugar Pine cones.

and the Sugar Pine. These are the trees that the lumbermen seek for their massive beams and their broad, clear boards. Of the Sugar Pine John Muir wrote: "This is the noblest pine yet discovered, surpassing all others not merely in size but also in its kingly beauty and majesty. The trunk is a smooth, round, delicately tapered shaft, mostly without limbs, and colored rich purplish-brown, usually enlivened with tufts of yellow lichen. At the top of this magnificent bole, long curving branches sweep gracefully outward and downward. The needles are about three inches long, finely tempered and arranged in rather loose tassels at the end of slender branchlets that close the long, outsweeping limbs. How well they sing in the wind, and how strikingly harmonious an effect is made by the immense cylindrical cones that depend loosely from the ends of the main branches!"[3]

Above and below the two great pines are other varieties, less valuable commercially, yet not to be overlooked. As one ascends from the bare foothills

to the forest belt one encounters the Digger Pine with its long needles and big hook-encrusted cones. It is worthless for lumber, but makes good firewood. At higher altitudes is the Lodgepole, also known as the Tamrac Pine. It is the characteristic tree of the Tuolumne Meadows and other frequented campgrounds and is remembered by campers for the little cones, the last of which can never quite be found and removed from underneath the sleeping bag. In the southern part of the Sierra, in the plateau region near Mount Whitney, the Foxtail Pine commands attention for its sturdy weather-beaten trunk and its branchlets rounded with needles in a form that suggests its name. Still higher is the Whitebark Pine, the timberline tree of the Sierra. Sometimes it is found solitary, standing straight and slim, but more often it grows in clumps, flattened by storms, barely higher than a man's shoulder. Nothing can compare with it for a high-mountain bivouac—a bed of soft needles beneath a weatherproof covering of closely knit branches. A smoldering bit of pitchy wood outside the nest completes the comfort and happiness of the mountaineer. The Pinyon, although a dominant tree in the Southwest, is a novelty in the Sierra. It is found scattered along the eastern wall, rarely west of the main crest. It has but one needle to a socket, instead of the two, three, or five of other pines. The nuts, hard-won from the compact cones, when cracked open present a small kernel, highly esteemed as a delicacy.

One might continue to dwell among the pines, but there are other trees to consider. There are the Douglas Fir (which is not a fir at all, but is *sui generis*), the graceful Mountain Hemlock, the Western White Pine, and the handsome Incense Cedar. And there are the true firs, the White Fir and the Red Fir, which constitute a large part of the forest belt. On rocky slopes and high plateaus stands the Juniper, an uncompromising individualist. There is unlimited variety in its stocky trunks, strong limbs, and crowns of massed foliage—dark green, laced with clusters of turquoise-blue berries. A Juniper that stands above the South Fork of the Stanislaus, the "Bennett Tree," is claimed as a rival of the Sequoia and the Bristlecone Pine for the honor of being "the oldest living thing."[4]

In autumn, at one of the passes, Ebbetts perhaps, or Carson, the landscape is illuminated by a sea of golden Aspen, tying the Sierra to similar scenes in the Rockies and the Appalachians; for the Aspen is almost the only tree that is common throughout the land. Maples and Birches, local varieties, add color to canyon walls. In the spring the Dogwood lights up the forest with its large white flowers. Great Oaks adorn the floors of canyons, and smaller Live Oaks ornament the ledges of the canyon walls.

It is but a step from forest to chaparral. Manzanita, though at times almost a tree, is ordinarily only a few feet high, sometimes even trailing on the ground. In whatever form, its smooth red stems and bright green leaves attract the eye. Little clusters of delicate pink flowers, which later turn to

berries (*manzanitas*=little apples) belie the hostility of the bush to any penetration of its territory. Other forms of chaparral are equally attractive and equally defensive–Buckthorn, Chinquapin, and the fragrant, blossoming Ceanothus.

In early summer, and at high altitudes all summer long, the Sierra is one great garden of flowers. There is no massed color, and one is hardly aware of them from an automobile. One has to approach on foot, lovingly, and with time to enjoy their beauty. On entering Yosemite Valley early in summer one is greeted by the Azalea. The white sweet-smelling flowers hang over the Merced like the "bower of roses by Bendemeer's stream," and like the roses not to be forgotten. Nor will one forget the bright yellow Evening Primroses that adorn Yosemite's meadows. In the forest belt the Snow Plant raises its scarlet spike while patches of snow still lie round about. Lovelier by far is the Mariposa Lily, varying in color from nearly white to pale lavender to pale rose, each petal marked by a red-brown eyespot. Above the forest belt are hanging gardens, where little streams trickle down through moss and grass, adorned with brilliant spots of color–scarlet Pentstemon and Columbine, bright blue Larkspur and Monkshood, yellow Mimulus, the orange Leopard Lily, and the lavender-pink blossoms of the Wild Onion. The hanging gardens are the home of the White Violet and the Rein Orchis, the latter a spiral of miniature white flowers. Nearby in open alpine meadows are the red-and-yellow Paintbrush, the blue Gentian, and a galaxy of pink Shooting Stars. Higher still are rock gardens trimmed with the Sierra Primrose and the Scarlet Gilia. Here are the alpine heathers–the rose-purple Bryanthus and the little white bells of Cassiope. All around are carpets of Phlox and Pussy Paws and the minutiae of mosses and lichens. For one who climbs to the high passes or ventures out upon granite ledges there is a supreme reward, the fragrant cerulean blue flower clusters of the Polemonium. On the return to lower levels one is accompanied all the way by Lupine, varying from little blue-and-white mats near the peaks to many-branched leafy bushes below, in all shades of blue and yellow.

There are said to be ten thousand kinds of insects in the Sierra Nevada. But let us leave them to the entomologists and the fishermen–all, that is, save the butterflies. Of these there are any number of spectacular ones to enliven the scene, floating and dancing in glade and meadow. And there are some rare ones, such as Behr's Sulfur, to rejoice the collector–if he can get them. The herpetologist will find amphibians and reptiles in abundance, all harmless except one, the Rattlesnake. However, he is most considerate and gives fair warning not to come too near. Casualties are rare.[5]

The birds of the Sierra are numerous, beautiful, and interesting. Although all are worthy of notice, three stand out as distinctive examples of their kind, the Water Ouzel, the Clark Nutcracker, and the Rosy Finch. John Muir, in

one of the most delightful of bird biographies, describes the Ouzel: "He is a singularly joyous and loveable little fellow, about the size of a robin, clad in a plain waterproof suit of bluish gray, with a tinge of chocolate on the head and shoulders. In form he is about as smoothly plump as a pebble that has been whirled in a pot-hole, the flowing contour of his body being interrupted only by his strong feet and bill, the crisp wing-tips, and the up-slanted wren-like tail."[6] The Ouzel is never far from water, usually in its most turbulent form. He flies behind waterfalls and dives into racing rapids. His song is as exquisite as the lark's. The Nutcracker, on the other hand, is a raucous, cawing bird, related to the jays. He lives in the open upper reaches of the timber and is often seen restlessly flying from one dead treetop to another, conspicuous in his mantle of contrasting white and black feathers. He is a great destroyer of pine cones, extracting their seeds with blows of his sharp, powerful beak. Despite his uncouth manner, his harsh voice, and solitary aloofness, the Clark Nutcracker has a place all his own in the nostalgic memory of high-mountain campers.

The Rosy Finch, the third representative of bird life of the Sierra, has little of voice or plumage to commend him. His tuneless chirp is beguiling to no one save the climber of mountain peaks. To him it is a cheerful, companionable sound, for the Rosy Finch, as he flutters out on the snowfields to pick up frost-deadened insects, is often the only sign of life.

The larger animals have never been as conspicuous in the Sierra Nevada as in the Rocky Mountains and the Northwest, although once they were more numerous than they are now. The Grizzly Bear, largest and most ferocious animal of the region, was once common in the forest belt and canyons of the Sierra, but his mode of life was incompatible with that of civilized man, and he was doomed to extinction. Pioneer literature is full of encounters with Grizzlies. Most picturesque of all is the story of "Grizzly Adams." He had a way with animals and was able to tame even Grizzlies. He captured several not far from Yosemite Valley and took them, together with other animals, to San Francisco, where he displayed them during the late 1850's in what he called a "Mountaineer Museum." There he attracted the attention of Theodore Hittell, who wrote newspaper articles about him, and eventually a book.[7] In the spring of 1860 Adams took his menagerie around the Horn to New York and entered into a contract with P. T. Barnum for a traveling exhibit. It did not last long, for after a few weeks Adams died of an old injury. Barnum in his *Autobiography* quotes the dying hunter: "I have attended preaching every day, Sundays and all, for the last six years. Sometimes an old grizzly gave me the sermon, sometimes it was a panther; often it was the thunder and lightning, the tempest, or the hurricane on the peaks of the Sierra Nevada; but whatever preached to me, it always taught me the majesty of the Creator, and revealed to me the undying and unchanging love of our kind Father in

heaven." Not one California Grizzly remains alive today; the last record of one is dated 1924.

The Black Bear, however, is common enough, especially in tourist centers and campgrounds—harmless, amusing, frequently a nuisance. One hears of "Cinnamon Bears" or "Brown Bears," but they are merely color phases of the Black Bear, even occasionally of the same litter.

The "panther" mentioned by Adams was the Mountain Lion (Puma or Cougar), still an inhabitant of the Sierra despite many years of his attempted suppression as a predator. For a long time there was a bounty on his head, but that has been removed, for it is now realized that he is not a menace to human society, but only to deer, his principal diet. There are many reports of hearing the "scream" of a Mountain Lion, but rarely has there been any substantiation that would connect it with the Mountain Lion. According to naturalists he is a singularly silent animal, and the "scream" probably comes from an owl or perhaps a wildcat. The Wildcat (Bobcat or Lynx) is shy and when seen is usually bounding away for cover. The Red Fox, too, is a wary animal and keeps out of sight as much as possible. The only truly savage animals in the Sierra are the members of the weasel family—the Wolverine, the Fisher, the Otter, the Mink, the Pine Marten, and the little Weasel himself, and they are savage only to other small animals. All except the Wolverine. He is powerful and fearless and never retreats and is not to be trifled with. The Wolverine is a nocturnal hunter, except in winter, and so is seldom seen by man.

Wolves are mentioned in travelers' accounts, but it is doubtful if Wolves ever inhabited the Sierra Nevada, except for an occasional "stray" from farther east. In most instances it is the big Mountain Coyote that is mistaken for a Wolf. The Coyote, at a distance, may look like a Wolf, but he has a voice that is unmistakably his own. One naturalist describes his high-pitched howls: "Sometimes a single animal will call, at other times there will be a chorus, seemingly joined in from every direction. It is a weird wild sound sufficient to chill the blood of the inexperienced camper, but always a thrill to those who love the wilderness and its inhabitants."[8]

There is an abundance of lesser folk in the Sierra—the Marmot, the Badger, the Cony or Pika, the Snowshoe Rabbit, the Belding Ground Squirrel and the Golden-Mantled Ground Squirrel, and many others, including the Chickaree or Douglas Squirrel, subject of another of John Muir's essays.[9] Of hoofed animals there are two kinds in the Sierra, the Mule Deer and the Mountain Sheep. The Mule Deer outnumbers all the other larger mammals. He is protected by refuge in the National Parks and by state game laws; but in open season many a buck falls before the marksmanship of the intrepid sportsman. The Deer population shows no sign of diminishing. Not so with the Mountain Sheep (Bighorn), which have almost reached the point of extinction. Once

there were many bands along the crest of the Sierra, but during years of excessive grazing by domestic flocks they were crowded out in all save a very few places.[10] The surviving bands may increase with protection and management, or they may be wiped out.

In the Sierra Nevada *fish* and *trout* are synonymous. There are two kinds of native trout, the Cutthroat and the Rainbow, with their several subdivisions. Of the former, the Lake Tahoe Trout and the Royal Silver reach their maximum development in Lake Tahoe. At one time, years ago, they were caught commercially in enormous quantities and, before the days of "limits," sportsmen vied with each other for records both in size and numbers, hastening the species toward extinction. Happily these practices were curbed, and the big fish of Lake Tahoe now seem assured of survival. The Rainbow varieties are more widely distributed and have not been subjected to such avarice and plunder. The Golden Trout, originally found in small streams of the upper Kern, not only has survived in its natural habitat but has been transplanted in many other streams and lakes, which have proved hospitable.[11] It has all the refinements of its species and in addition distinctive colors that rival those of the exotic fishes of tropical seas. Other varieties of Trout and Char have been introduced—the Mackinaw in the Tahoe region, and the Brown Trout and Eastern Brook Trout all through the Sierra—so that if one gets far enough away from the odor of gasoline he may count on a plentiful catch for the evening meal.[12]