

THE CENTURY MAGAZINE.

VOL. XL.

AUGUST, 1890.

No. 4.

THE TREASURES OF THE YOSEMITE.



THE Yosemite Valley, in the heart of the Sierra Nevada, is a noble mark for the traveler, whether tourist, botanist, geologist, or lover of wilderness pure and simple. But those who are free may find the journey a long one; not because of the miles, for they are not so many,—only about two hundred and fifty from San Francisco, and passed over by rail and carriage roads in a day or two,—but the way is so beautiful that one is beguiled at every step, and the great golden days and weeks and months go by uncounted. How vividly my own first journey to Yosemite comes to mind, though made more than a score of years ago. I set out afoot from Oakland, on the bay of San Francisco, in April. It was the bloom-time of the year over all the lowlands and ranges of the coast; the landscape was fairly drenched with sunshine, the larks were singing, and the hills were so covered with flowers that they seemed to be painted. Slow indeed was my progress through these glorious gardens, the first of the California flora I had seen. Cattle and cultivation were making few scars as yet, and I wandered enchanted in long, wavering curves, aware now and then that Yosemite lay to the eastward, and that, some time, I should find it.

One shining morning, at the head of the Pacheco Pass, a landscape was displayed that after all my wanderings still appears as the most divinely beautiful and sublime I have ever beheld. There at my feet lay the great central plain of California, level as a lake, thirty or forty miles wide, four hundred long,

one rich furred bed of golden *Compositæ*. And along the eastern shore of this lake of gold rose the mighty Sierra, miles in height, in massive, tranquil grandeur, so gloriously colored and so radiant that it seemed not clothed with light, but wholly composed of it, like the wall of some celestial city. Along the top, and extending a good way down, was a rich pearl-gray belt of snow; then a belt of blue and dark purple, marking the extension of the forests; and stretching along the base of the range a broad belt of rose-purple, where lay the miners' gold and the open foothill gardens—all the colors smoothly blending, making a wall of light clear as crystal and ineffably fine, yet firm as adamant. Then it seemed to me the Sierra should be called, not the Nevada or Snowy Range, but the Range of Light. And after ten years in the midst of it, rejoicing and wondering, seeing the glorious floods of light that fill it,—the sunbursts of morning among the mountain-peaks, the broad noonday radiance on the crystal rocks, the flush of the alpenglow, and the thousand dashing waterfalls with their marvelous abundance of irised spray,—it still seems to me a range of light. But no terrestrial beauty may endure forever. The glory of wildness has already departed from the great central plain. Its bloom is shed, and so in part is the bloom of the mountains. In Yosemite, even under the protection of the Government, all that is perishable is vanishing apace.

The Sierra is about 500 miles long, 70 miles wide, and from 7000 to nearly 15,000 feet high. In general views no mark of man is visible

upon it, nor anything to suggest the wonderful depth and grandeur of its sculpture. None of its magnificent forest-crowned ridges seems to rise much above the general level to publish

which find anchorage on a thousand narrow steps and benches, the whole enlivened and made glorious with rejoicing streams that come dancing and foaming over the sunny brows of



VIEW OF THE YOSEMITE VALLEY FROM POINT LOOKOUT—EL CAPITAN ON THE LEFT, THE BRIDAL VEIL FALL ON THE RIGHT, THE HALF DOME IN THE DISTANCE.

its wealth. No great valley or river is seen, or group of well-marked features of any kind standing out as distinct pictures. Even the summit peaks, marshaled in glorious array so high in the sky, seem comparatively smooth and featureless. Nevertheless the whole range is furrowed with cañons to a depth of from 2000 to 5000 feet, in which once flowed majestic glaciers, and in which now flow and sing the bright Sierra rivers.

Though of such stupendous depth, these cañons are not raw, gloomy, jagged-walled gorges, savage and inaccessible. With rough passages here and there, they are mostly smooth, open pathways conducting to the fountains of the summit; mountain streets full of life and light, graded and sculptured by the ancient glaciers, and presenting throughout all their courses a rich variety of novel and attractive scenery—the most attractive that has yet been discovered in the mountain ranges of the world. In many places, especially in the middle region of the western flank, the main cañons widen into spacious valleys or parks of charming beauty, level and flowery and diversified like landscape gardens with meadows and groves and thickets of blooming bushes, while the lofty walls, infinitely varied in form, are fringed with ferns, flowering plants, shrubs of many species, and tall evergreens and oaks

the cliffs, and through side cañons in falls of every conceivable form, to join the shining river that flows in tranquil beauty down the middle of each one of them.

The most famous and accessible of these cañon valleys, and also the one that presents their most striking and sublime features on the grandest scale, is the Yosemite, situated on the upper waters of the Merced at an elevation of 4000 feet above the level of the sea. It is about seven miles long, half a mile to a mile wide, and nearly a mile deep, and is carved in the solid granite flank of the range. The walls of the valley are made up of rocks, mountains in size, partly separated from each other by side cañons and gorges; and they are so sheer in front, and so compactly and harmoniously built together on a level floor, that the place, comprehensively seen, looks like some immense hall or temple lighted from above.

But no temple made with hands can compare with Yosemite. Every rock in its walls seems to glow with life. Some lean back in majestic repose; others, absolutely sheer or nearly so for thousands of feet, advance beyond their companions in thoughtful attitudes, giving welcome to storms and calms alike, seemingly conscious, yet heedless of everything going on about them. Awful in stern, immovable majesty, how softly these mountain rocks

are adorned and how fine and reassuring the company they keep — their feet set in groves and gay emerald meadows, their brows in the thin blue sky, a thousand flowers leaning confidently against their adamant bosses, bathed in floods of booming water, floods of light, while snow, clouds, winds, avalanches, shine and sing and wreath about them as the years go by! Birds, bees, butterflies, and myriads of nameless wings stir the air into music and give glad animation. Down through the midst flows the crystal Merced — river of mercy — peacefully gliding, reflecting lilies and trees and the onlooking rocks, things frail and fleeting and types of endurance meeting here and blending in countless forms, as if into this one mountain mansion Nature had gathered her choicest treasures, whether great or small, to draw her lovers into close and confiding communion with her.

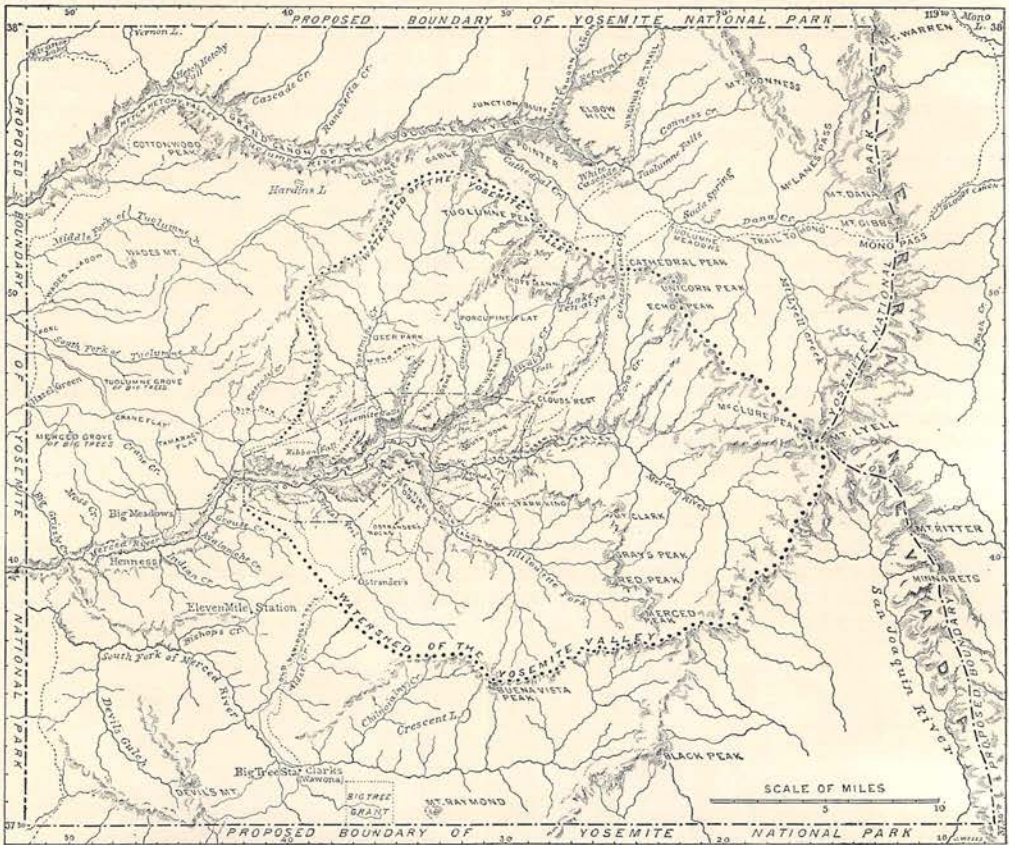
Sauntering towards Yosemite up the foothills, richer and wilder become the forests and streams. At an elevation of 6000 feet above the level of the sea the silver firs are 200 feet high, with branches whorled around the colos-

sal shafts in regular order, and every branch beautifully pinnate like a fern leaf. The Douglas spruce and the yellow and sugar pines here reach their highest developments of beauty and grandeur, and the rich, brown-barked libocedrus with warm, yellow-green plumes. The majestic sequoia, too, is here, the king of conifers, "the noblest of a noble race." All these colossal trees are as wonderful in the fineness of their beauty and proportions as in stature, growing together, an assemblage of conifers surpassing all that have yet been discovered in the forests of the world. Here, indeed, is the tree-lover's paradise, the woods, dry and wholesome, letting in the light in shimmering masses half sunshine, half shade, the air indescribably spicy and exhilarating, plushy fir boughs for beds, and cascades to sing us asleep as we gaze through the trees to the stars.

On the highest ridges passed over on our way to Yosemite the lovely silver fir (*Abies amabilis*) forms the bulk of the woods, pressing forward in glorious array to the very brink of the walls on both sides and far beyond to a



DOWN GRADE INTO THE VALLEY



height of from 8000 to 9000 feet above the level of the sea. Thus it appears that Yosemite, presenting such stupendous faces of bare granite, is nevertheless embedded in magnificent forests. All the main species of pine, fir, spruce, and libocedrus are also found in the valley itself. But there are no "big trees" (*Sequoia gigantea*) in the valley or about the rim of it. The nearest are about ten miles beyond the boundary wall of the grant, on small tributaries of the Merced and Tuolumne. The sequoia belt extends along the western flank of the range, from the well-known Calaveras Grove on the north to the head of Deer Creek on the south, a distance of about two hundred miles, at an elevation of from about 5000 to 8000 feet above sea level. From the Calaveras to the south fork of King's River the species occurs only in small isolated groves or patches so sparsely distributed along the belt that two of the gaps that occur are nearly forty miles wide, one of them between the Stanislaus and Tuolumne groves, the other between those of the Fresno and King's River. Hence southward, instead of forming small sequestered groups among

the other conifers, the big trees sweep majestically across the broad, rugged basins of the Kaweah and Tule in noble forests a distance of nearly seventy miles, with a width of from three to ten miles, the continuity of this portion of the belt being interrupted only by deep cañons.

The Fresno, the largest of the northern groves, occupies an area of three or four square miles, and is situated a short distance to the southward of the famous Mariposa Grove. Along the beveled rim of the cañon of the south fork of King's River there is a stately forest of sequoia about six miles long and two miles wide. This is the northernmost assemblage of big trees that may fairly be called a forest. Descending the precipitous divide between King's River and the Kaweah one enters the grand forests that form the main continuous portion of the belt. Advancing southward the trees become more and more irrepressibly exuberant, heaving their massive crowns into the sky from every ridge, and waving onward in graceful compliance with the complicated topography. The finest of the Kaweah portion of the belt is on the broad ridge between Mar-

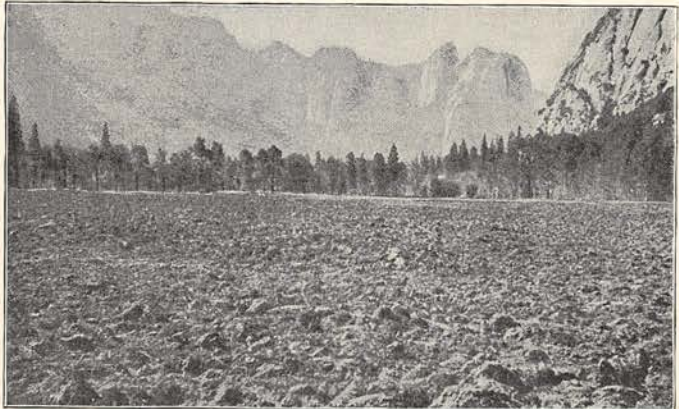
ble Creek and the middle fork, and extends from the granite headlands overlooking the hot plains back to within a few miles of the cool glacial fountains. The extreme upper limit of the belt is reached between the middle and south forks of the Kaweah, at an elevation of 8400 feet. But the finest block of sequoia in the entire belt is on the north fork of the Tule River. In the northern groups there are comparatively few young trees or saplings. But here for every old, storm-stricken giant there is one or more in all the glory of prime, and for each of these there are many young trees and crowds of eager, hopeful saplings growing heartily everywhere — on moraines, rocky ledges, along watercourses, and in the deep, moist alluvium of meadows, seemingly in hot pursuit of eternal life.

Though the area occupied by the species increases so much from north to south, there is no marked increase in the size of the trees. A height of two hundred and seventy-five feet and a diameter of twenty is perhaps about the average for full-grown trees: specimens twenty-five feet in diameter are not rare, and a good many are nearly three hundred feet high. The largest I have yet met in the course of my explorations is a majestic old monument in the new King's River forest. It is thirty-five feet and eight inches in diameter inside the bark four feet from the ground, and a plank of solid wood the whole width of the tree might be hewn from it without the slightest decay.

Under the most favorable conditions these giants live five or six thousand years, though few of even the larger specimens are more than half as old. The sequoia seems to be entirely exempt from the diseases that afflict and kill other conifers — mildew, dry rot, or any other kind of rot. I never saw a sick sequoia, or one that seemed to be dying of old age. Unless destroyed by man, they live on indefinitely until burned, smashed by lightning, or cast down by the giving way of the ground on which they stand.

These king trees, all that there are of their kind in the world, are surely worth saving, whether for beauty, science, or bald use. But as yet only the isolated Mariposa Grove has been reserved as a park for public use and pleasure. Were the importance of our forests at all understood by the people in general, even from an economic standpoint their preservation

would call forth the most watchful attention of the Government. At present, however, every kind of destruction is moving on with accelerated speed. Fifteen years ago I found five mills located on or near the lower margin of the main sequoia belt, all of which were cutting big-tree lumber. How many more have been built since that time I am unable to say, but most of the Fresno group are doomed to feed the large mills established near them, and a company with ample means is about ready for work on the magnificent forests of King's River. In these mill operations waste far exceeds use. For after the young, manageable trees have been cut, blasted, and sawed, the woods are fired to clear the ground of limbs and refuse, and of course the seedlings and saplings, and many of the unmanageable giants, are destroyed, leaving but little more than black, charred monuments. These mill ravages, however, are small as yet compared with the comprehensive destruction caused by "sheepmen." Incredible numbers of sheep are driven to the mountain pastures every summer, and desolation follows them. Every garden within reach is trampled, the shrubs are stripped of leaves as if devoured by locusts, and the woods are burned to improve the pasturage. The entire belt of forests is thus swept by fire, from one end of the range to the

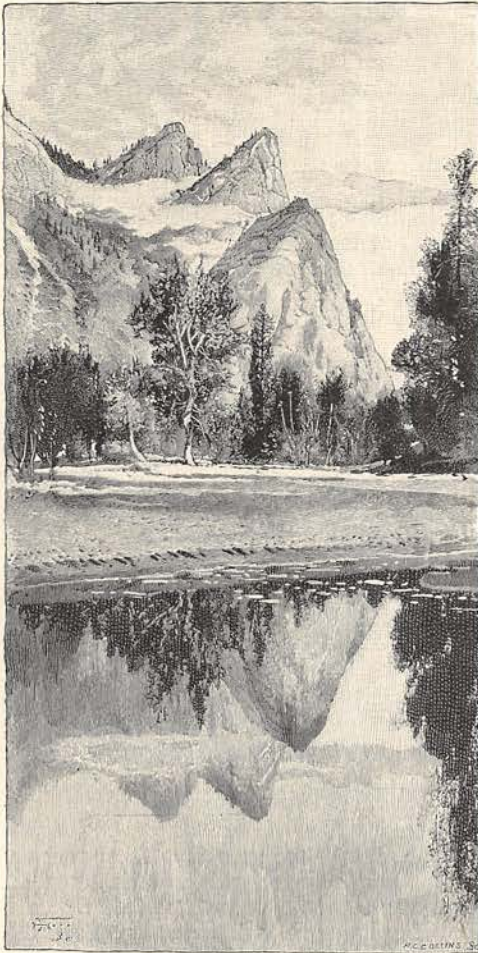


DESTRUCTIVE WORK IN YOSEMITE VALLEY: THE "LEIDIG MEADOWS" PLOWED UP IN OCTOBER, 1888, TO RAISE HAY. ("PROCESS" REPRODUCTION FROM A PHOTOGRAPH.)

other; and, with the exception of the resinous *Pinus contorta*, the sequoia suffers most of all. Steps are now being taken towards the creation of a national park about the Yosemite, and great is the need, not only for the sake of the adjacent forests, but for the valley itself. For the branching cañons and valleys of the basins of the streams that pour into Yosemite are as closely related to it as are the fingers to the palm of the hand — as the branches, foliage, and flowers of a tree to the trunk. Therefore, very

naturally, all the fountain region above Yosemite, with its peaks, cañons, snow fields, glaciers, forests, and streams, should be included in the park to make it an harmonious unit instead of a fragment, great though the fragment be; while to the westward, below the valley, the boundary might be extended with great advantage far enough to comprehend the Fresno, Mariposa, Merced, and Tuolumne groves of big trees, three of which are on roads leading to the valley, while all of them are in the midst of conifers scarcely less interesting than the colossal brown giants themselves.

From the heights on the margin of these glorious forests we at length gain our first general view of the valley—a view that breaks



MIRROR VIEW OF THE THREE BROTHERS.

suddenly upon us in all its glory far and wide and deep; a new revelation in landscape affairs that goes far to make the weakest and meanest spectator rich and significant evermore.

Along the curves and zigzags of the road, all the way down to the bottom, the valley is in sight with ever-changing views, and the eye ranges far up over the green grovy floor between the mighty walls, bits of the river gleaming here and there, while as we draw nearer we begin to hear the song of the waters. Gazing at random, perhaps the first object to gain concentrated attention will be the Bridal Veil, a beautiful waterfall on our right. Its brow, where it first leaps free from the rock, is about nine hundred feet above us; and as it sways and sings in the wind, with gauzy, sun-sifted spray half falling, half floating, it seems infinitely gentle and fine; but the hymn it sings tells the solemn power that is hidden beneath the soft clothing it wears.

On the other side of the valley, opposite the Veil, there is another magnificent fall, called the Ribbon Fall, or Virgin's Tears. The "tears" fall from a height of about 3000 feet, and are most extravagantly copious when the snow is melting, coming hissing and roaring with force enough to drive a mile of mills, suggesting the "weeping skies" of cyclones and hurricanes.

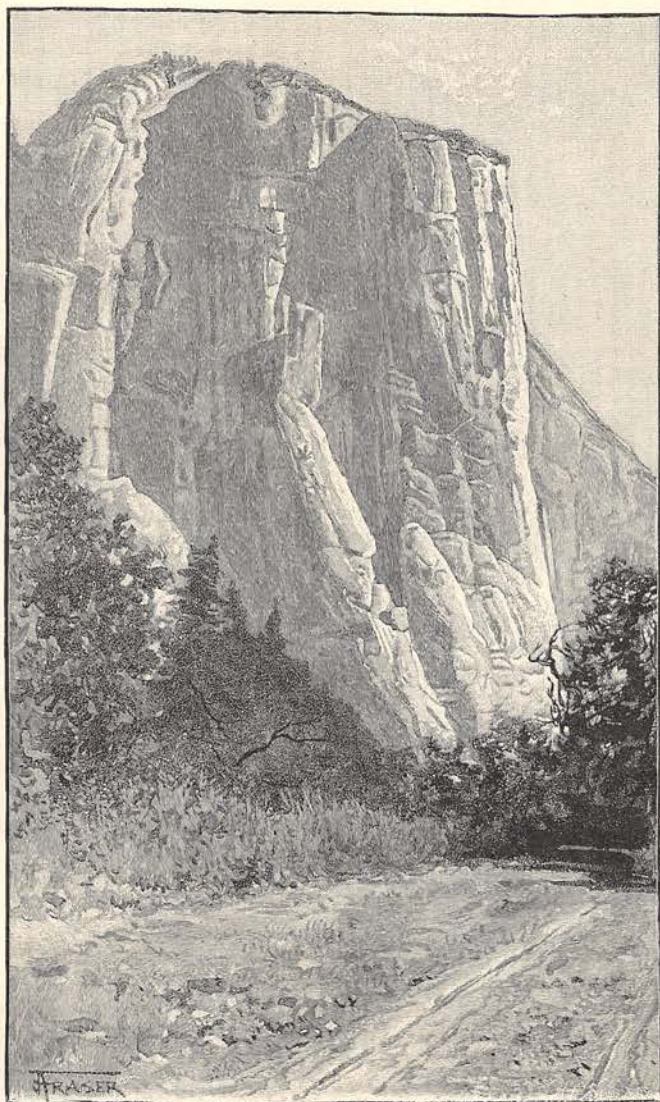
Just beyond this glorious flood the El Capitan rock is seen through the pine groves pressing forward beyond the general line of the wall in most imposing grandeur. It is 3300 feet high, a plain, severely simple, glacier-sculptured face of granite, the end of one of the most compact and enduring of the mountain ridges, standing there in supreme height and breadth, a type of permanence.

Across the valley from here, above the Bridal Veil, are the picturesque Cathedral Rocks, nearly 2700 feet high, making a noble display of fine yet massive sculpture. They are closely related to El Capitan, having been hewn from the same mountain ridge by the Yosemite glacier when the valley was in process of formation.

Beyond El Capitan the next in succession of the most striking features of the north wall are the Three Brothers, an immense mountain mass with three gables fronting the valley one above the other, the topmost nearly 4000 feet high. They were named for three brothers captured here during the Indian war, sons of Tenaya, the old Yosemite chief.

On the south wall opposite the Brothers towers the Sentinel Rock to a height of more than 3000 feet, a telling monument of the icy past.

Sauntering up the valley through meadow and grove, in the company of these majestic rocks, which seem to follow as we advance gazing, admiring, looking for new wonders ahead where all about us is wonderful, the thunder of the Yosemite Fall is heard, and when we arrive in front of the Sentinel it is



EL CAPITAN.

revealed in all its glory from base to summit, half a mile in height, and seeming to gush direct from the sky. But even this fall, perhaps the most wonderful in the world, cannot at first control our attention, for now the wide upper portion of the valley is displayed to view, with the North Dome, Royal Arches, and Washington Column on our left; Glacier Point Rock, with its magnificent sculpture, on the right; and in the middle Tissiack or Half Dome, the most beautiful and most sublime of all the mountain rocks about the valley. It rises in serene majesty from the fertile level into the sky to a height of 4750 feet.

Here the valley divides into three branches, the Tenaya, Nevada, and Illilouette cañons and valleys, extending back into the fountains

of the High Sierra, with scenery every way worthy the relation they bear to Yosemite.

In the south branch, a mile or two from the main valley, is the Illilouette Fall, 600 feet high, one of the most beautiful of all the Yosemite choir, but to most people inaccessible as yet on account of its rough, boulder-choked cañon. Its principal fountains of ice and snow lie in the beautiful and interesting mountains of the Merced group, while its broad, open basin in general is noted for the beauty of its lakes and extensive forests.

Going up the north branch of the valley, we pass between the North Dome and the Half Dome, and in less than an hour come to Mirror Lake, the Dome Cascades, and Tenaya Fall, each interesting in its own way. Beyond



MIRROR VIEW OF YOSEMITE FALLS.

the fall, on the north side of the cañon, is the sublime El Capitan-like rock called Mount Watkins; on the south the vast granite wave of Cloud's Rest, a mile in height; and between them the fine Tenaya Cascade with silvery plumes outspread on smooth, glacier-polished folds of granite, making a vertical descent in all of about 700 feet.

Just beyond the Dome Cascades, on the shoulder of Mount Watkins, there is an old trail once used by the Indians on their way across the range to Mono, but in the cañon above this point there is no trail of any sort. Between Mount Watkins and Cloud's Rest the cañon is accessible only to mountaineers, and it is so dangerous in some places that I hesitate to advise even good climbers anxious to test their nerve and skill to pass through it. Beyond the Cascades no great difficulty will be encountered. A succession of charming lily

gardens and meadows occur in filled up lake basins among the rock-waves in the bottom of the cañon, and everywhere the surface of the granite has a smooth-wiped appearance, and in many places, reflecting the sunbeams, shines like glass—phenomena due to glacial action, the cañon having been the channel of one of the main tributaries of the ancient Yosemite glacier.

Ten miles above the valley we come to the beautiful Tenaya Lake, and here the cañon terminates. A mile or two above the lake stands the grand Sierra Cathedral, a building of one stone, hewn from the living rock, with sides, roof, gable, spire, and ornamental pinnacles, fashioned and finished symmetrically like a work of art, and set on a well-graded plateau about 9000 feet high, as if Nature in making so fine a house had also been careful that it should be finely seen. From every direction its peculiar form and graceful beauty of expression never fail to charm. Its height from the floor to the ridge of the roof is about 2500 feet, and among the pinnacles that adorn the front glorious views may be gained of the upper basins of the Merced and Tuolumne.

Passing on each side of the Cathedral we descend into the delightful Tuolumne Valley, from which excursions may be made to Mount Dana, Mono Lake, Mount Lyell, to the many curious peaks that rise above the meadows on the south, and to the Big Tuolumne Cañon with its glorious abundance of rocks and falling, gliding, tossing water. For all these the spacious meadows near the Soda Springs form a delightful center.

Returning now to Yosemite, and ascending the middle or Nevada branch of the valley, which is occupied by the main Merced River, we come within a few miles to the Vernal and Nevada falls, 400 and 600 feet high, and set in the midst of most novel and sublime rock-work. Above these, tracing the river, we are led into the Little Yosemite, a valley like the great Yosemite in form, sculpture, and vegetation. It is about three miles long, with walls 1500 to 2000 feet high, cascades coming over them, and the river flowing through the meadows and groves of the level bottom in tranquil crystal reaches.

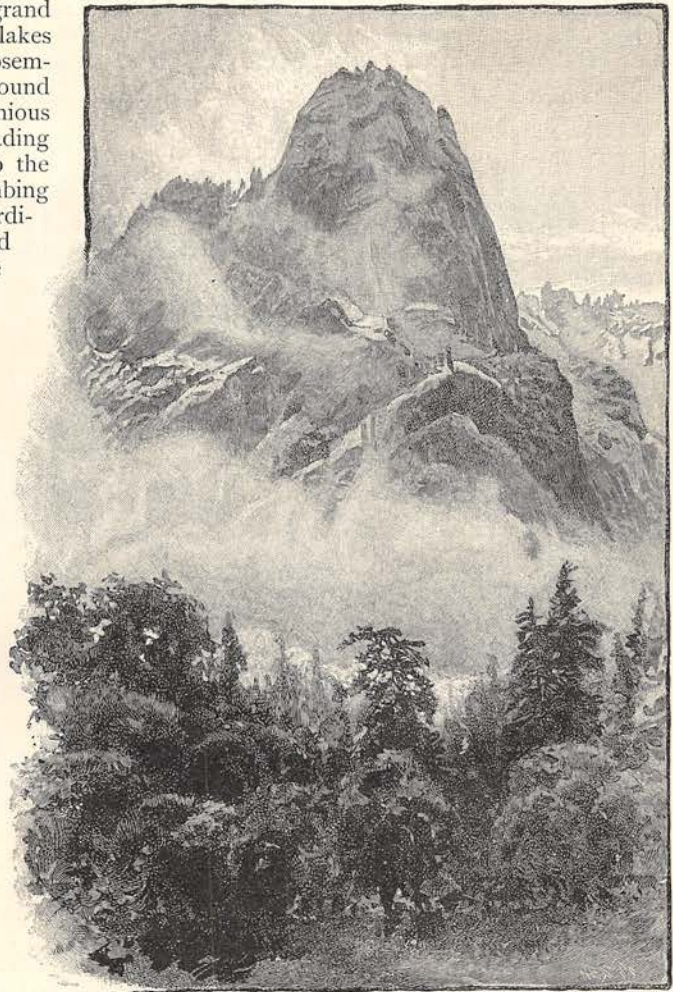
Beyond this there are four other little Yosemitees in the main cañon, making a series of five in all, the highest situated a few miles below the base of Mount Lyell, at an elevation of about 7800 feet above the sea. To describe these, with all their wealth of Yosemite furniture, and the wilderness of lofty peaks above them, the home of the avalanche and treasury of the fountain snow, would take us far beyond the bounds of a magazine article. We cannot here consider the formation of these mountain landscapes—how the crystal rocks with

crystal snow were brought to the light, making beauty whose influence is so mysterious on everybody who sees it; the blooming of the clouds; the fall of the snow; the flight of the avalanches; the invisible march of the grinding glaciers; the innumerable forms of the falling streams.

Of the small glacier lakes so characteristic of these upper regions, there are no fewer than sixty-seven in the basin of the main middle branch, besides countless smaller pools, all their waters crisp and living and looking out on beautiful skies. In the basin of the Illilouette there are sixteen, in the Tenaya and its branches thirteen, in the Yosemite Creek basin fourteen, and in the Pohono or Bridal Veil one, making a grand total of a hundred and eleven lakes whose waters come to sing at Yosemite. So glorious is the background of the great valley, so harmonious its relations to its widespreading fountains. On each side also the same harmony prevails. Climbing out of the valley by the subordinate cañons, we find the ground rising from the brink of the walls—on the south side to the fountains of Pohono or Bridal Veil Creek, the basin of which is noted for the extent and beauty of its meadows and its superb forests of silver fir; on the north side through the basin of the Yosemite Creek to the dividing ridge along the Tuolumne Cañon and the fountains of the Hoffman spur.

In general views the Yosemite Creek basin seems to be paved with domes and smooth whaleback masses of granite in every stage of development—some showing only their crowns; others rising high and free above the girdling forests, singly or in groups. Others again are developed only on one side, forming bold outstanding bosses usually well fringed with shrubs and trees, and presenting the polished shining surfaces given them by the glacier that brought them into relief. On the upper portion of the basin broad moraine beds have been deposited, and on these fine, thrifty forests are growing. Lakes and meadows and small spongy bogs may be found hiding here and there among

the domes, in the woods, or back in the fountain recesses of Mount Hoffman, while a thousand gardens are planted along the banks of the streams. All the wide, fan-shaped upper portion of the basin is covered with a network of small rills that go cheerily on their way to their grand fall in the valley, now flowing on smooth pavements in sheets thin as glass, now diving under willows and laving their red roots, oozing through bogs, making tiny falls and cascades, whirling and dancing, calming again, gliding through bits of smooth glacier meadows with sod of Alpine agrostis mixed with blue and white violets and daisies, breaking, tossing among rough boulders and fallen trees, flow-



SENTINEL ROCK.

ing together until, all united, they go to their fate with stately, tranquil air like a full-grown river. At the crossing of the Mono trail, about two miles above the head of the Yosemite Fall, the stream is nearly forty feet wide, and when the

snow is melting rapidly in the spring it is about four feet deep, with a current of two and a half miles an hour. This is about the volume of water that forms the fall in May and June when there has been much snow the preceding winter; but it varies greatly from month to month. The snow rapidly vanishes from the open portion of the basin, which faces southward, and only a few of the tributaries reach back to perennial snow and ice fountains in the shadowy amphitheaters on the northern slopes of Mount Hoffman. The total descent made by the stream from its highest sources to its confluence with the Merced in the valley is about 6000 feet, while the distance is only about ten miles, an average fall of 600 feet per mile. The last mile of its course lies between the sides of sunken domes and swelling folds of the granite that are clustered and

as if leaving a lake, it slips over the polished lip of the pool down another incline and out over the brow of the precipice in a magnificent curve thick sown with rainbow spray.

In tracing the stream for the first time, getting acquainted with the life it lived in the mountains, I was eager to reach the extreme verge to see how it behaves in flowing so far through the air; but after enjoying this view and getting safely away I have never advised any one to follow my steps. The last incline down which the stream journeys so gracefully is so steep and smooth one must slip cautiously forward on hands and feet alongside the rushing water, which so near one's head is very exciting. But to gain a perfect view one must go yet farther, over a curving brow to a slight shelf on the extreme brink. This shelf, formed by the flaking off of a fold of the granite, is



CATHEDRAL ROCKS. (2660 FEET HIGH.)

pressed together like a mass of bossy cumulus clouds. Through this shining way Yosemite Creek goes to its fate, swaying and swirling with easy, graceful gestures and singing the last of its mountain songs before it reaches the dizzy edge of Yosemite to fall 2600 feet into another world, where climate, vegetation, inhabitants, all are different. Emerging from this last cañon the stream glides, in flat, lace-like folds, down a smooth incline into a small pool where it seems to rest and compose itself before taking the grand plunge. Then calmly,

about three inches wide, just wide enough for a safe rest for one's heels. To me it seemed nerve-trying to slip to this narrow foothold and poise on the edge of such a precipice so close to the confusing whirl of the waters; and after casting longing glances over the shining brow of the fall and listening to its sublime psalm, I concluded not to attempt to go nearer, but did, nevertheless, against reasonable judgment. Noticing some tufts of artemisia in a cleft of rock, I filled my mouth with the leaves, hoping their bitter taste might help to keep

caution keen and prevent giddiness; then I reached the little ledge, got my heels well set, and worked side-wise twenty or thirty feet to a point close to the out-plunging current. Here the view is perfectly free down into the heart of the bright irised throng of comet-like streams into which the whole ponderous volume of the fall separates a little below the brow. So glorious a display of pure wildness, acting at close range while one is cut off from all the world beside, is terribly impressive.

About forty yards to the eastward of the Yosemite Fall on a fissured portion of the edge of the cliff a less nerve-trying view may be obtained, extending all the way down to the bottom from a point about two hundred feet below the brow of the fall, where the current, striking a narrow ledge, bounds out in the characteristic comet-shaped masses. Seen from here towards noon, in the spring, the rainbow on its brow seems to be broken up and mingled with the rushing comets until all the fall is stained with iris colors, leaving no white water visible. This is the best of the safe views from above, the huge steadfast rocks, the flying waters, and the rainbow light forming one of the most glorious pictures conceivable.

The Yosemite Fall is separated into an upper and a lower fall with a series of falls and cascades between them, but when viewed in front from the bottom of the valley they all appear as one.

The Nevada Fall usually is ranked next to the Yosemite in general interest among the five main falls of the valley. Coming through the Little Yosemite in tranquil reaches, charmingly embowered, the river is first broken into rapids on a moraine boulder bar that crosses the lower end of the valley. Thence it pursues its way to the head of the fall in a very rough channel, cut in the solid granite, dashing on side angles, heaving in heavy, surging masses against bossy knobs, and swirling and swashing in potholes without a moment's rest. Thus, already chafed and dashed to foam, over-folded and twisted, it



DESTRUCTIVE WORK IN YOSEMITE VALLEY: STUMP FOREST, MOSTLY OF YOUNG PINE, IN "STATE PASTURE," COVERING SOME EIGHT ACRES. CUT IN JUNE, 1887, AND STUMPS LEFT STANDING AND PERFECTLY SOUND. ABOUT 2000 TREES, OR MORE, FELLED IN THIS ONE SPOT. ("PROCESS" REPRODUCTION OF PHOTOGRAPH.)

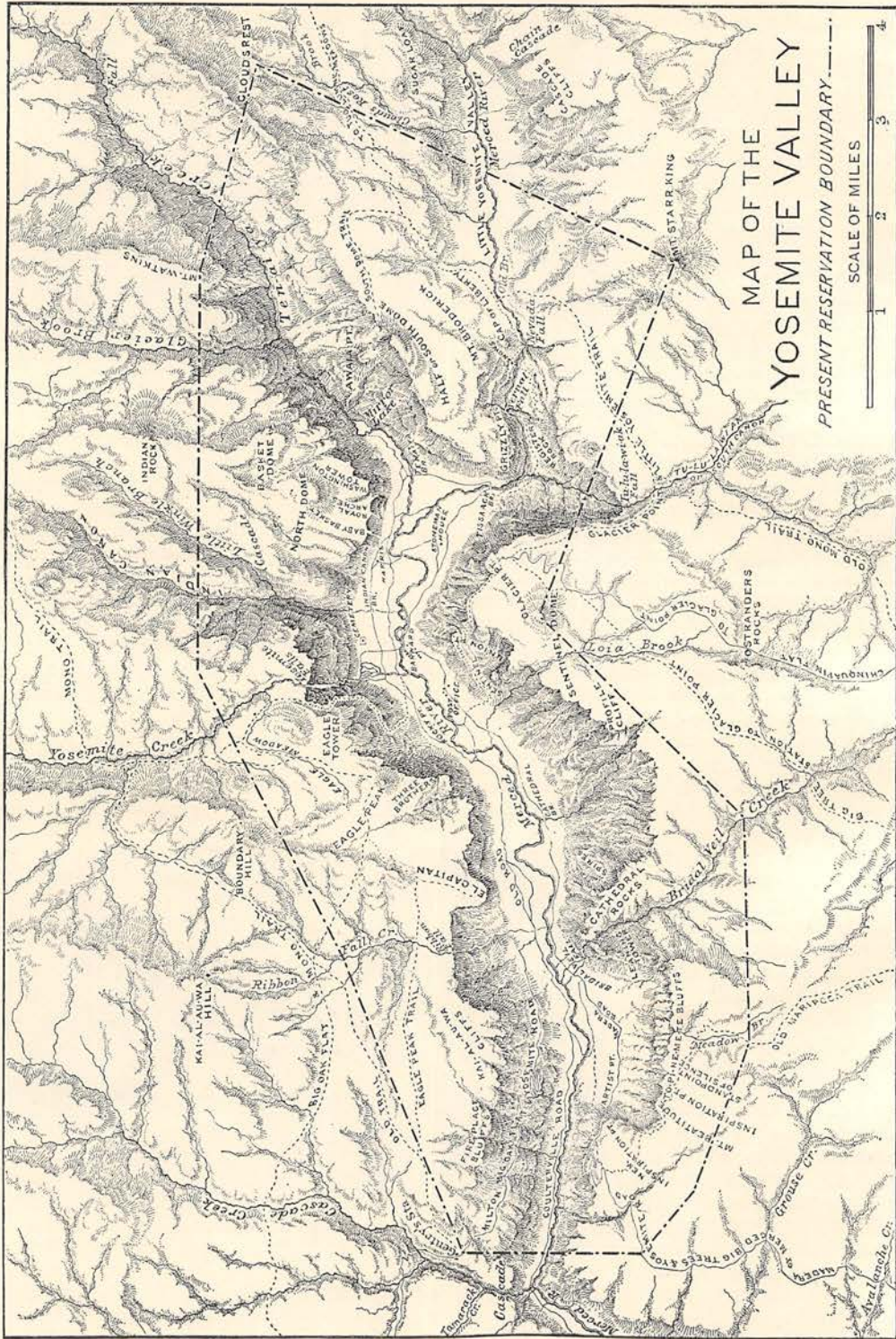
plunges over the brink of the precipice as if glad to escape into the open air. But before it reaches the bottom it is pulverized yet finer by impinging upon a sloping portion of the cliff about half way down, thus making it the whitest of all the falls of the valley, and altogether one of the most wonderful in the world.

On the north side, close to the head of the fall, a slab of granite projects over the brink, forming a fine point for a view over the throng of streamers and wild plunging thunderbolts; and through the broad drifts of spray we see the river far below gathering its spent waters and rushing on again down the cañon in glad exultation into Emerald Pool, where at length it grows calm and gets rest for what still lies before it. All the features of the view



DESTRUCTIVE WORK IN YOSEMITE VALLEY: SPECIMEN TREE TRIMMING DONE IN 1887-88. MUCH SIMILAR WORK HAS BEEN DONE IN OTHER PARTS OF THE VALLEY. ("PROCESS" REPRODUCTION OF PHOTOGRAPH.)

correspond with the waters. The glacier-sculptured walls of the cañon on either hand, with the sublime mass of the Glacier Point Ridge in front, form a huge triangular, pit-like basin,



MAP OF THE
YOSEMITE VALLEY

PRESENT RESERVATION BOUNDARY. - - - -

SCALE OF MILES



which, filled with the roar of the falling river, seems as if it might be the hopper of one of the mills of the gods in which the mountains were being ground to dust.

The Vernal, famous for its rainbows, is a staid, orderly, easy-going fall, proper and exact in every movement, with scarce a hint of the passionate enthusiasm of the Yosemite or the Nevada. Nevertheless it is a favorite with most visitors, doubtless because it is better seen than any other. A good stairway ascends the cliff beside it, and the level plateau at the head enables one to saunter safely along the edge of the stream as it comes from Emerald Pool and to watch its waters, calmly bending over the brow of the precipice, in a sheet 80 feet wide and changing from green to purplish gray and white until dashed on the rough boulder talus below. Thence issuing from beneath the clouds of the out-wafting spray we can see the adventurous stream, still unspent, beating its way down the rugged cañon in gray continuous cascades, dear to the ousel, until it sweeps around the shoulder of the Half Dome on its approach to the head of the main valley.

The Illilouette in general appearance most resembles the Nevada. The volume of water is less than half as great, but it is about the same height (600 feet), and its waters receive the same kind of preliminary tossing in a rocky, irregular channel. Therefore it is a very white and fine-grained fall. When it is in full spring-time bloom it is partly divided by rocks that roughen the lip of the precipice, but this division amounts only to a kind of fluting and grooving of the column, which has a beautiful effect. It is not nearly so grand a fall as the upper Yosemite, or so symmetrical as the Vernal, or so airily graceful and simple as the Bridal Veil, nor does it ever display so tremendous an outgush of snowy magnificence as the Nevada; but in the exquisite fineness and richness of texture of its flowing folds it surpasses them all.

One of the finest things I ever saw in Yosemite or elsewhere I found on the brow of this beautiful fall. It was in the Indian summer, when the leaf colors were ripe and the great cliffs and domes were transfigured in the hazy golden air. I had wandered up the rugged talus-dammed cañon of the Illilouette, admiring the wonderful views to be had there of the great Half Dome and the Liberty Cap, the foliage of the maples, dogwoods, rubus tangles, etc., the late goldenrods and asters, and the extreme purity of the water, which in motionless pools on this stream is almost perfectly invisible. The voice of the fall was now low, and the grand flood had waned to floating gauze and thin-broidered folds of linked and arrowy lace-work. When I reached the fall slant sunbeams were glinting across the head of it,

leaving all the rest in shadow; and on the illumined brow a group of yellow spangles were playing, of singular form and beauty, flashing up and dancing in large flame-shaped masses, wavering at times, then steadying, rising and falling in accord with the shifting forms of the water. But the color changed not at all. Nothing in clouds or flowers, on bird-wings or the lips of shells, could rival it in fineness. It was the most divinely beautiful mass of yellow light I ever beheld— one of nature's pre-



STAIRWAY ON CLOUD'S REST TRAIL.

cious sights that come to us but once in a lifetime.

For about a mile above Mirror Lake the cañon is level and well planted with fir, spruce, and libocedrus, forming a remarkably fine grove, at the head of which is the Tenaya Fall. Though seldom seen or described, this is, I think, the most picturesque fall in the valley. For a considerable distance above it Tenaya Creek comes rushing down, white and foamy, over a flat pavement inclined at an angle of about eighteen degrees. In time of high water this sheet of bright rapids is nearly seventy feet wide, and is varied in a very striking way by three parallel furrows that extend in the direction of the flow. These furrows, worn by the action of the stream upon cleavage joints, vary in width, are slightly sinuous, and have large boulders firmly wedged in them here and there in narrow places, giving rise, of course,

to a complicated series of wild dashes, doublings, and arching bounds in the swift torrent. Just before it reaches the sheer precipice of the fall the current is divided, the left division making a vertical fall of about eighty feet in a romantic leafy nook, while the other forms a rugged cascade.

Lunar rainbows or spraybows also abound; their colors as distinct as those of the sun, and

the moon came round the domes and sent her beams into the wild uproar, I ventured out on the narrow bench that extends back of the fall from Fern Ledge and began to admire the dim-veiled grandeur of the view. I could see the fine gauzy threads of the outer tissue by having the light in front; and wishing to look at the moon through the meshes of some of the denser portions of the fall, I ventured to



LOOKING UP MERCED RIVER, ON THE WAY TO VERNAL FALLS.

as obviously banded, though less vivid. Fine specimens may be found any night at the foot of the upper Yosemite Fall, glowing gloriously amid the gloomy shadows of the cañon whenever there is plenty of moonlight and spray, silent interpreters of the heart-peace of Nature in the stormy darkness. Even the secondary bow is at times distinctly visible.

The best point from which to observe them is on Fern Ledge. For some time after moonrise the arc has a span of about five hundred feet, and is set upright; one end planted in the boiling spray at the bottom, the other in the edge of the fall, creeping lower, of course, and becoming less upright as the moon rises higher. This grand arc of color, glowing in mild, shapely beauty in so weird and huge a chamber of night shadows, and amid the rush and roar and tumultuous dashing of this thunder-voiced fall, is one of the most impressive and most cheering of all the blessed evangels of the mountains.

A wild scene, but not a safe one, is made by the moon as it appears through the edge of the Yosemite Fall when one is behind it. Once after enjoying the night-song of the waters, and watching the formation of the colored bow as

creep farther behind it while it was gently wind-swayed, without taking sufficient thought about the consequences of its swaying back to its natural position after the wind pressure should be removed. The effect was enchanting. Fine, savage music sounded above, beneath, around me; while the moon, apparently in the very midst of the rushing waters, seemed to be struggling to keep her place, on account of the ever-varying form and density of the water masses through which she was seen, now darkened by a rush of thick-headed comets, now flashing out through openings between them. I was in fairyland between the dark wall and the wild throng of illumined waters, but suffered sudden disenchantment; for, like the witch scene in Alloway Kirk, "in an instant all was dark." Down came a dash of spent comets, thin and harmless-looking in the distance, but desperately solid and stony in striking one's shoulders. It seemed like a mixture of choking spray and gravel. Instinctively dropping on my knees, I laid hold of an angle of the rock, rolled myself together with my face pressed against my breast, and in this attitude submitted as best I could to my thundering baptism. The heavier masses seemed to strike like cobblestones, and

there was a confused noise of many waters about my ears — hissing, gurgling, clashing sounds that were not heard as music. The situation was easily realized. How fast one's thoughts burn at such times! I was weighing the chances of escape. Would the column be swayed a few inches away from the wall, or would it come yet closer? The fall was in flood, and not so lightly would its ponderous mass be swayed. My fate seemed to depend on a breath of the "idle wind." It was moved gently forward, the pounding ceased, and I once more revisited the glimpses of the moon. But fearing I might be caught at a disadvantage in making too hasty a retreat, I moved only a few feet along the bench to where a block of ice lay. Between the ice and the wall I wedged myself, and lay face downwards until the steadiness of the light gave encouragement to get away. Somewhat nerve-shaken, drenched, and benumbed, I made out to build a fire, warmed myself, ran home to avoid taking cold, reached my cabin before daylight, got an hour or two of sleep, and awoke sane and comfortable, better, not worse, for my wild bath in moonlit spray.

Owing to the westerly trend of the valley and its vast depth there is a great difference between the climates of the north and south sides — greater than between many countries far apart; for the south wall is in shadow during the winter months, while the north is bathed in sunshine every clear day. Thus there is mild spring weather on one side of the valley while winter rules the other. Far up the north-side cliffs many a nook may be found closely embraced by sun-beaten rock-bosses in which flowers bloom every month of the year. Even butterflies may be seen in these high winter gardens except when storms are falling and a few days after they have ceased. Near the head of the lower Yosemite Fall in January I found the ant lions lying in wait in their warm sand-cups, rock ferns being unrolled, club mosses covered with fresh growing points, the flowers of the laurel nearly open, and the honeysuckle rosetted with bright young leaves; every plant seemed to be thinking about summer and to be stirred with good vital sunshine. Even on the shadow side of the valley the frost is never very sharp. The lowest temperature I ever observed during four winters was $+7^{\circ}$. The first twenty-four days of January had an average temperature at 9 A. M. of 32° , minimum 22° ; at 3 P. M. the average was $40^{\circ} 30'$, the minimum 32° .

Throughout the winter months the spray of the upper Yosemite Fall is frozen while falling thinly exposed and is deposited around the base of the fall in the form of a hollow truncated cone, which sometimes reaches a

height of five hundred feet or more, into the heart of which the whole volume of the fall descends with a tremendous roar as if pouring down the throat of a crater. In the building of this ice-cone part of the frozen spray falls directly to its place, but a considerable portion is first frozen upon the face of the cliff on both sides of the fall, and attains a thickness of a foot or more during the night. When the sun strikes this ice-coating it is expanded and cracked off in masses weighing from a few pounds to several tons, and is built into the walls of the cone; while in windy, frosty weather, when the fall is swayed from side to side, the cone is well drenched, and the loose ice-masses and dust are all firmly frozen together. The thundering, reverberating reports of the falling ice-masses are like those of heavy cannon. They usually occur at intervals of a few minutes, and are the most strikingly characteristic of the winter sounds of the valley, and constant accompaniments of the best sunshine. While this stormy building is in progress the surface of the cone is smooth and pure white, the whole presenting the appearance of a beautiful crystal hill wreathed with folds of spray which are oftentimes irised. But when it is wasting and breaking up in the spring its surface is strewn with leaves, pine branches, stones, sand, etc., that have been brought over the fall, making it look like a heap of avalanche detritus.

After being engulfed and churned in the stormy interior of the crater the waters of the fall issue from arched openings at the base, seemingly scourged and weary and glad to escape, while belching spray spouted up out of the throat past the descending current is wafted away in irised drifts to the rocks and groves.

Anxious to learn what I could about the structure of this curious ice-hill, I tried to climb it, carrying an ax to cut footsteps. Before I had reached the base of it I was met by a current of spray and wind that made breathing difficult. I pushed on backward, however, and soon gained the slope of the hill, where by creeping close to the surface most of the blast was avoided. Thus I made my way nearly to the summit, halting at times to peer up through the wild whirls of spray, or to listen to the sublime thunder beneath me, the whole hill sounding as if it were a huge, bellowing, exploding drum. I hoped that by waiting until the fall was blown aslant I should be able to climb to the lip of the crater and get a view of the interior; but a suffocating blast, half air, half water, followed by the fall of an enormous mass of ice from the wall, quickly discouraged me. The whole cone was jarred by the blow, and I was afraid its side might fall in. Some fragments of the mass sped past me danger-

ously near; so I beat a hasty retreat, chilled and drenched, and laid myself on a sunny rock in a safe place to dry.

The Bridal Veil, upper Yosemite, and the Tu-ee-u-la-la of Hetch Hetchy (the next cañon to the north), on account of their height and exposure, are greatly influenced by winds. The common summer winds that come up the river cañon from the plains are never very strong, partly on account of the roughness of the way they have to travel. But the north winds of winter do some very wild work, worrying the falls and the forests, and hanging snow banners, a mile long, on the peaks of the summit of the range. One morning I was awakened by the pelting of pine cones on the roof of my cabin, and found, on going out, that the north wind had taken possession of the valley, filling it with a sea-like roar, and, arousing the pines to magnificent action, made them bow like supple willows. The valley had been visited a short time before by a succession of most beautiful snowstorms, and the floor, and the cliffs, and all the region round about were lavishly laden with winter jewelry. Rocks, trees, the sandy flats and the meadows, all were in bloom, and the air was filled with a dust of shining petals. The gale increased all day, and branches and tassels and empty burs of the silver pine covered the snow, while the falls were being twisted and torn and tossed about as if they were mere wisps of floating mist. In the morning the great ponderous column of the upper Yosemite Fall, increased in volume by the melting of the snow during a warm spell, was caught by a tremendous blast, bent upwards, torn to shreds, and driven back over the brow of the cliff whence it came, as if denied admission to the valley. This kind of work would be kept up for ten or fifteen minutes, then a partial lull in the storm would allow the vast torrent to arrange its tattered skirts, and come back again to sing on in its accustomed course. Amid all this rocking and bending and baffling of the waters they were lighted by a steady glare of sunlight, strangely white from spicules of snow crystals. The lower fall, though less exposed, was yet violently swirled and torn and thrashed about in its narrow cañon, and at times appeared as one resplendent mass of iris colors from top to bottom, as if a hundred rainbows had been doubled up into a mass four or five hundred feet in diameter. In the afternoon, while I watched the upper fall from the shelter of a pine tree, it was suddenly arrested in its descent at a point about half way down, and was neither blown upward nor driven aside, but was simply held stationary in mid air, as if gravitation below that point in the path of its descent had ceased

to act. The ponderous flood, weighing hundreds of tons, was sustained hovering, hesitating, like a bunch of thistledown, while I counted 190. All this time the ordinary amount of water was coming over the cliff and accumulating in the air, swedging and widening and forming an irregular cone 700 feet high tapering to the top of the wall, the whole standing still, resting on the invisible arm of the north wind. At length, as if commanded to go on again, scores of arrowy comets shot forth from the bottom of the suspended mass as if escaping from separate outlets.

The brow of El Capitan was decked with long streamers of snow-like hair, Cloud's Rest was enveloped in drifting gossamer films, and the Half Dome loomed up in the garish light like some majestic living creature clad in the same gauzy, wind-woven drapery, upward currents meeting overhead sometimes making it smoke like a volcano.

Glorious as are these rocks and waters when jumbled in storm winds, or chanting rejoicing in everyday dress, there is a glory that excelleth, when rare conditions of weather meet to make every valley, hollow, gorge, and cañon sing with flood waters. Only once have I seen Yosemite in full bloom of flood during all the years I have lived there. In 1871 the early winter weather was delightful; the days all sunshine, the nights clear and serene, calling forth fine crops of frost crystals for the withered ferns and grasses, the most luxuriant growths of hoar-frost imaginable. In the afternoon of December 16, when I was sauntering on the meadows, I noticed a massive crimson cloud growing in solitary grandeur above Cathedral Rocks, its form scarcely less striking than its color. It had a picturesque, bulging base like an old sequoia, a smooth, tapering stem, and a bossy, down-curling crown like a mushroom; all its parts colored alike, making one mass of translucent crimson. Wondering what the meaning of that lonely red cloud might be, I was up betimes next morning looking at the weather, but all seemed tranquil as yet. Towards noon gray clouds began to grow which had a close, curly grain like bird's-eye maple, and late at night rain fell, which soon changed to snow; next morning about ten inches lay on the meadows, and it was still falling in a fine, cordial storm.

During the night of the 18th a torrent of rain fell on the snow, but as the temperature was 34°, the snow line was only a few hundred feet above the bottom of the valley, and to get out of the rainstorm into the snowstorm one had only to climb a little above the tops of the pines. The streams, therefore, instead of being increased in volume, were diminished by the storm, because the snow sponged up

part of their waters and choked the smaller tributaries. But about midnight the temperature suddenly rose to 42°, carrying the snow line far beyond the valley, over the upper basins perhaps to the summit of the range, and next morning Yosemite was rejoicing in a glorious flood. The warm, copious rain falling on the snow was at first absorbed and held back, and so also was that portion of the snow that the rain melted, and all that was melted by the warm wind, until the whole mass of snow was saturated and became sludgy, and at length slipped and rushed simultaneously from a thousand slopes into the channels in wild extravagance, heaping and swelling flood over flood, and plunging into the valley in one stupendous avalanche.

Awakened by the roar, I looked out and at once recognized the extraordinary character of the storm. The rain was still pouring in torrents, and the wind, blowing a gale, was working in passionate accord with the flood. The section of the north wall visible from my cabin was covered with a network of falls—new visitors that seemed strangely out of place. Eager to get into the midst of the show, I snatched a piece of bread for breakfast and ran out. The mountain waters, suddenly liberated, seemed to be holding a grand jubilee. The two Sentinel cascades rivaled the great falls at ordinary stages, and across the valley by the Three Brothers I caught glimpses of more falls than I could readily count; while the whole valley throbbed and trembled, and was filled with an awful, massive, solemn, sea-like roar. After looking about me bewildered for a few moments I tried to reach the upper meadows, where the valley is widest, that I might be able to see the walls on both sides, and thus gain general views. But the meadows were flooded, forming an almost continuous lake dotted with blue sludgy islands, while innumerable streams roared like lions across my path and were sweeping forward rocks and logs with tremendous energy over ground where tiny gillias had been growing but a short time before. Climbing into the talus slopes, where these savage torrents were broken among earthquake boulders, I succeeded in crossing them, and forced my way up the valley to Hutchings' Bridge, where I crossed the river and waded to the middle of the upper meadow. Here most of the new falls were in sight, probably the most glorious assemblage of waterfalls ever displayed from any one standpoint in the world. On that portion of the south wall between Hutchings' and the Sentinel there were ten falls plunging and booming from a height of nearly 3000 feet, the smallest of which might have been heard miles away. In the neighborhood of Glacier Point there

were six; between the Three Brothers and Yosemite Fall, nine; between Yosemite and Royal Arch Falls, ten; from Washington Column to Mount Watkins, ten; on the slopes of Half Dome, facing Mirror Lake, eight; on the shoulder of Half Dome, facing the valley, three—fifty-six new falls occupying the upper end of the valley, besides a countless host of silvery threads gleaming everywhere. In all the valley there must have been upward of a hundred. As if celebrating some great event, falls and cascades came thronging in Yosemite costume from every groove and cañon far and near.

All summer visitors will remember the comet forms of the Yosemite Fall and the laces of the Bridal Veil and Nevada. In the falls of this winter jubilee the lace forms predominated, but there was no lack of thunder-toned comets. The lower portion of one of the Sentinel cascades was composed of two main white shafts, the space between them filled in with chained and beaded gauze of intricate pattern, through the singing threads of which the purplish-gray rock could be dimly seen. The series above Glacier Point was still more complicated in structure, displaying every form that one would imagine water might be dashed and combed and woven into. Those on the north wall between Washington Column and the Royal Arch Fall were so nearly related that they formed an almost continuous sheet, and these again were but slightly separated from those about Indian Cañon. The group about the Three Brothers and El Capitan, owing to the topography and cleavage of the cliffs back of them, were more broken and irregular. The Tissiack cascades were comparatively small, yet sufficient to give that noblest of mountain rocks a glorious voice. In the midst of all this rejoicing the Yosemite Fall was scarce heard until about three o'clock in the afternoon. Then I was startled by a sudden thundering crash as if a rock avalanche had come to join the chorus. This was the flood wave of Yosemite Creek, which had just arrived, delayed by the distance it had to travel, and by the choking snows of its widespread fountains. Now, with volume tenfold increased beyond its springtime fullness, it took its place as leader of the glorious choir. No idle, silent water was to be found anywhere; all sang loud or low in divine harmony.

And the winds sang too, playing on every pine, leaf, and rock, surging against the huge brows and domes and outstanding battlements, deflected hither and thither, broken into a thousand cascading currents that whirled in the hollow. And these again, reacting on the clouds, eroded immense cavernous spaces in their gray depths, sweeping forward the resulting detritus in ragged trains like the mo-

raines of glaciers. These cloud movements in turn published the work of the winds, giving them a visible body, and enabling us to trace their wild career. As if endowed with independent motion, some detached cloud would rise hastily upon some errand to the very top of the wall in a single effort, examining the faces of the cliffs, and then perhaps as suddenly descend to sweep imposingly along the meadows, trailing draggled fringes through the pines, fondling their waving spires with infinite gentleness, or gliding behind a grove or a single tree bring it into striking relief, while all bowed and waved in solemn rhythm. Sometimes as they drooped and condensed, or thinned to misty gauze, half the valley would be veiled at once, leaving here and there some lofty headland cut off from all visible connection with the walls, looming alone, dim, spectral, as if belonging to the sky — visitors, like the new falls, come to take part in the festival. Thus for two days and nights in measureless extravagance the storm went on, and mostly without spectators, at least of a terrestrial kind. I saw nobody out — bird, bear, squirrel, or man.

Tourists had vanished months before, and the hotel people and laborers were out of sight, careful about getting cold and wet, and satisfied with views from doors and windows. The bears, I suppose, were in their boulder dens in the cañons, the squirrels in their knot-hole nests, the grouse in close fir groves, and the small singers in the chaparral. Strange to say, I did not see even the water-ousel, though he must have greatly enjoyed the storm.

This was the most sublime waterfall flood I ever saw — clouds, winds, rocks, waters, throbbing together as one. And then to contemplate what was going on simultaneously with all this in other mountain temples: the Big Tuolumne Cañon — how the white waters were singing there, and the winds, and how the clouds were marching. In Hetch Hetchy Valley also, and the great King's River Yosemite, and in all the other cañons and valleys of the Sierra from Shasta to the southernmost fountains of the Kern — five hundred miles of flooded waterfalls chanting together. What a psalm was that!

John Muir.

THE MAKING OF THE PEARL.

SO soft, so warm, the water lay,
Its chambers paved with amberous lights,
The sunbeams sliding there forgot
Their home among the skyey heights.

With the rose-tangle's stems they played,
They blushed beneath the purple dulse,
They swung from tide to tide, and gave
All swimming things their joyous pulse.

The little creature at their touch
Felt the fresh force of gathering cells,
And happy seemed this rhythmic life
That swept its currents through his shells.

Happy the swell of bay and bight
Dimpling with kisses of a wind
Blown from the royal cinnamon,
From jasmine and from tamarind.

Happy the shadow of the palms
Seemed to him, wavering o'er his reef,
Happy the rippling scarf of light
Tossed from the long banana leaf.

Firmer he fixed him to his rock,
And wider opened to the tide
That softly rose, and fell, and left
A grain of sand along his side.

A tiny rasping grain of sand
It was, whose never-ceasing prick
Dispelled the charm of summer seas
And pierced him to the very quick.

Ah, what a world of trouble now!
But straight he bent him to the strife,
And poured around that hostile thing
The precious ichor of his life.

A trail of jewels in the gleam
The dolphins dart, above, below,
With sinuous side and silvery flash,
Roll a great eye on him and go.

He saw them only as he felt
Sore scath beneath his mantle lay,
And mending as he could his hurt
He spent himself day after day.

Or halcyons rocking on the wave,
Or sailing birds of Paradise,
Softly their plumes swept upper air,
Idly his ooze received their dyes.

And summer moons might draw the floods
With their white magic, and wide calm
Shed from the wells of midnight blue,—
He knew but never felt their balm.

FEATURES OF THE PROPOSED YOSEMITE NATIONAL PARK.



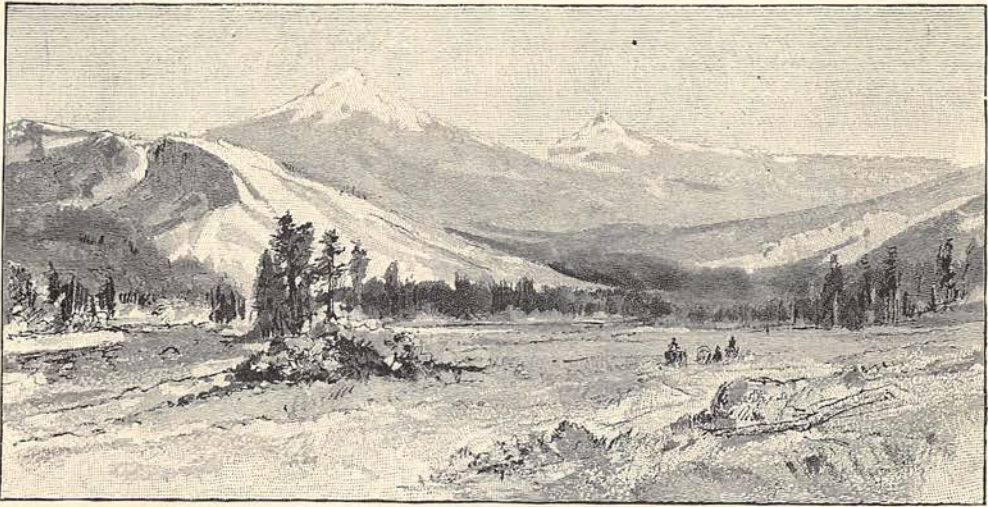
THE upper Tuolumne Valley is the widest, smoothest, most serenely spacious, and in every way the most delightful summer pleasure park in all the high Sierra. And since it is connected with Yosemite by two good trails, and with the levels of civilization by a broad, well-graded carriage-road that passes between Yosemite and Mount Hoffman, it is also the most accessible. It lies in the heart of the high Sierra at a height of from 8500 to 9000 feet above the level of the sea, at a distance of less than ten miles from the northeastern boundary of the Yosemite reservation. It is bounded on the southwest by the gray, jagged, picturesque Cathedral range, which extends in a southeasterly direction from Cathedral Peak to Mount Lyell and Mount Ritter, the culminating peaks of the grand mass of icy mountains that form the "crown of the Sierra"; on the northeast, by a similar range or spur, the highest peak of which is Mount Conness; on the east, by the smooth, majestic masses of Mount Dana, Mount Gibbs, Mount Ord, and others, nameless as yet, on the axis of the main range; and on the west by a heaving, billowy mass of glacier-polished rocks, over which the towering masses of Mount Hoffman are seen. Down through the open sunny levels of the valley flows the bright Tuolumne River, fresh from many a glacial fountain in the wild recesses of the peaks, the highest of which are the glaciers that lie on the north sides of Mount Lyell and Mount McClure.

Along the river are a series of beautiful glacier meadows stretching, with but little interruption, from the lower end of the valley to its head, a distance of about twelve miles. These form charming sauntering grounds from which the glorious mountains may be enjoyed as they look down in divine serenity over the majestic swaths of forest that clothe their bases. Narrow strips of pine woods cross the meadow-carpet from side to side, and it is somewhat roughened here and there by groves, moraine boulders, and dead trees brought down from the heights by avalanches; but for miles and miles it is so smooth and level that a hundred horsemen may ride abreast over it.

The main lower portion of the meadow is about four miles long and from a quarter to

half a mile wide; but the width of the valley is, on an average, about eight miles. Tracing the river we find that it forks a mile above the Soda Springs, which are situated on the north bank opposite the point where the Cathedral trail comes in — the main fork turning southward to Mount Lyell, the other eastward to Mount Dana and Mount Gibbs. Along both forks strips of meadow extend almost to their heads. The most beautiful portions of the meadows are spread over lake basins, which have been filled up by deposits from the river. A few of these river-lakes still exist, but they are now shallow and are rapidly approaching extinction. The sod in most places is exceedingly fine and silky and free from rough weeds and bushes; while charming flowers abound, especially gentians, dwarf daisies, ivesias, and the pink bells of dwarf vaccinium. On the banks of the river and its tributaries Cassiope and Bryanthus may be found where the sod curls over in bosses, and about piles of boulders. The principal grass of these meadows is a delicate Calamagrostis with very slender leaves, and when it is in flower the ground seems to be covered with a faint purple mist, the stems of the spikelets being so fine that they are almost invisible, and offer no appreciable resistance in walking through them. Along the edges of the meadows beneath the pines and throughout the greater part of the valley tall ribbon-leaved grasses grow in abundance, chiefly Bromus, Triticum, and Agrostis.

In October the nights are frosty, and then the meadows at sunrise, when every leaf is laden with crystals, are a fine sight. The days are warm and calm, and bees and butterflies continue to waver and hum about the late-blooming flowers until the coming of the snow, usually late in November. Storm then follows storm in close succession, burying the meadows to a depth of from ten to twenty feet, while magnificent avalanches descend through the forests from the laden heights, depositing huge piles of snow mixed with uprooted trees and boulders. In the open sunshine the snow lasts until June, but the new season's vegetation is not generally in bloom until late in July. Perhaps the best time to visit this valley is in August. The snow is then melted from the woods, and the meadows are dry and warm, while the weather is mostly sunshine, reviving



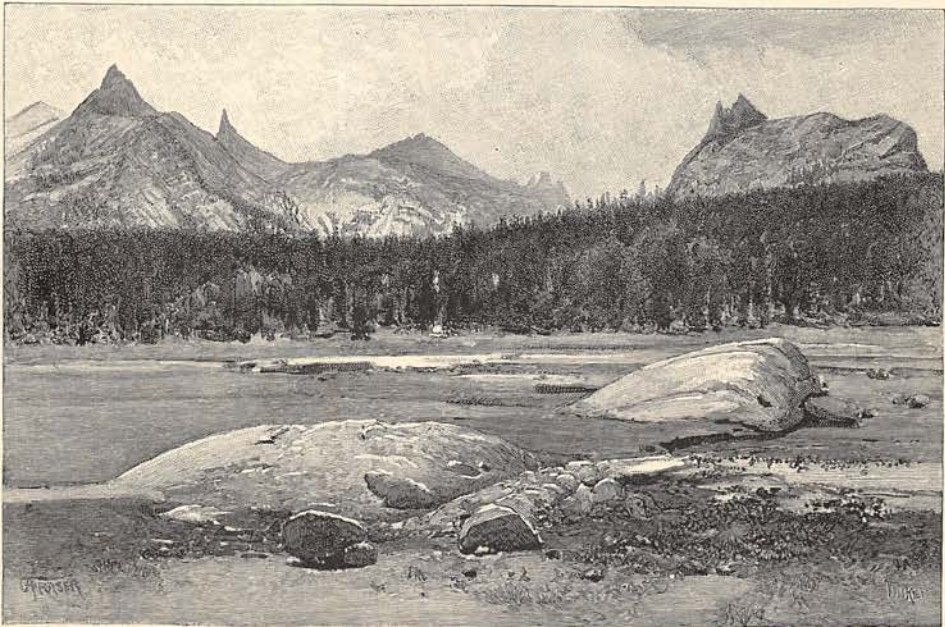
BIG TUOLUMNE MEADOWS WITH MOUNT DANA AND MOUNT GIBBS, FROM NEAR THE SODA SPRINGS.

and exhilarating in quality; and the few clouds that rise and the showers they yield are only enough for freshness, fragrance, and beauty.

The groves about the Soda Springs are favorite camping-grounds on account of the pleasant-tasting, ice-cold water of the springs, charged with carbonic acid, and because of the fine views of the mountains across the meadow—the Glacier Monument, Cathedral Peak, Cathedral Spires, Unicorn Peak, and their many nameless companions rising in grand beauty above a noble swath of forest that is growing on the left lateral moraine of the ancient Tuol-

umne Glacier, which, broad and deep and far-reaching, exerted vast influence on the scenery of this portion of the Sierra. But there are fine camping-grounds all along the meadows, and one may move from grove to grove every day all summer enjoying a fresh home and finding enough to satisfy every roving desire for change.

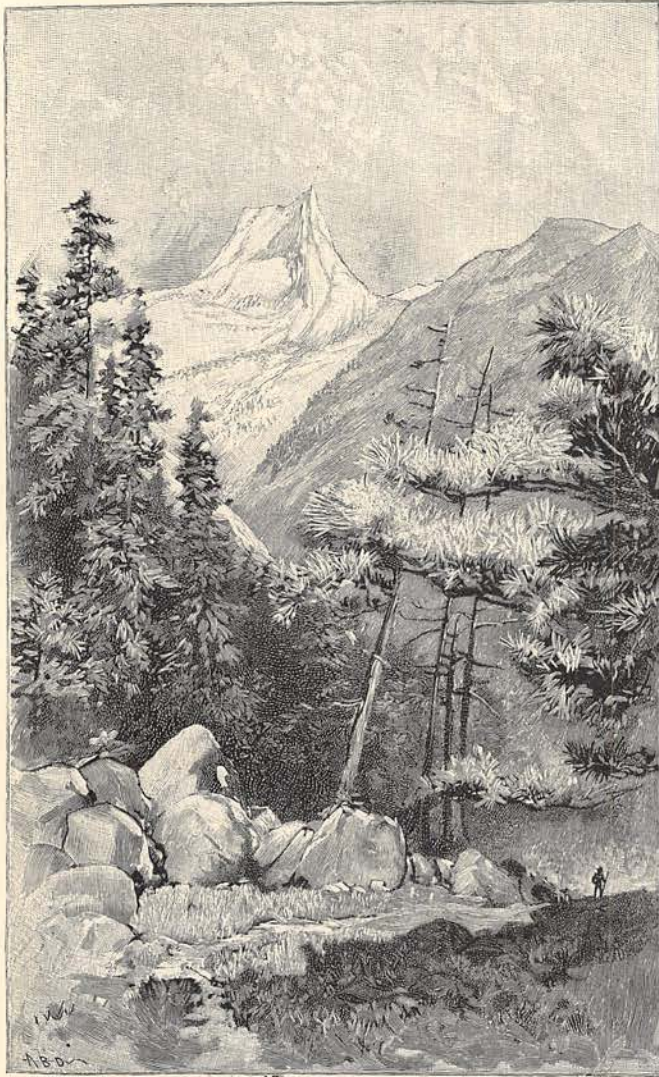
There are four capital excursions to be made from here—to the summits of Mounts Dana and Lyell; to Mono Lake and the volcanoes, through Bloody Cañon; and to the great Tuolumne Cañon as far as the foot of the



TUOLUMNE MEADOWS, LOOKING SOUTH. UNICORN PEAK AND CATHEDRAL PEAK.

main cascades. All of these are glorious, and sure to be crowded with joyful and exciting experiences; but perhaps none of them will be remembered with keener delight than the days spent in sauntering in the broad velvet lawns

dom hidden by irregular foregrounds. As you gradually ascend, new mountains come into sight, enriching the landscape; peak rising above peak with its individual architecture, and its masses of fountain snow in endless



VIEW OF CATHEDRAL PEAK FROM THE WEST, ABOVE LAKE TENAYA.

by the river, sharing the pure air and light with the trees and mountains, and gaining something of the peace of nature in the majestic solitude.

The excursion to the top of Mount Dana is a very easy one; for though the mountain is 13,000 feet high, the ascent from the west side is so gentle and smooth that one may ride a mule to the very summit. Across many a busy stream, from meadow to meadow, lies your flowery way, the views all sublime; and they are sel-

dom hidden by irregular foregrounds. As you gradually ascend, new mountains come into sight, enriching the landscape; peak rising above peak with its individual architecture, and its masses of fountain snow in endless variety of position and light and shade. Now your attention is turned to the moraines, sweeping in beautiful curves from the hollows and cañons of the mountains, regular in form as railroad embankments, or to the glossy waves and pavements of granite rising here and there from the flowery sod, polished a thousand years ago and still shining. Towards the base of the mountain you note the dwarfing of the trees, until at a height of about 11,000 feet you find patches of the tough white-barked pine pressed so flat by the ten or twenty feet of snow piled upon them every winter for centuries that you may walk over them as if walking on a shaggy rug. And, if curious about such things, you may discover specimens of this hardy mountaineer of a tree, not more than four feet high and about as many inches in diameter at the ground, that are from two hundred to four hundred years old, and are still holding on bravely to life, making the most of their short summers, shaking their tasseled needles in the breeze right cheerily, drinking the thin sunshine, and maturing their fine purple cones as if they meant to live forever. The general view from the summit is one of the most extensive and sublime to be found in all the range. To the eastward you gaze far out over

the hot desert plains and mountains of the "Great Basin," range beyond range extending with soft outlines blue and purple in the distance. More than six thousand feet below you lies Lake Mono, overshadowed by the mountain on which you stand. It is ten miles in diameter from north to south and fourteen from east to west, but appears nearly circular, lying bare in the treeless desert like a disk of burnished metal, though at times it is swept by stormwinds from the mountains and streaked with



LYELL GLACIER, FROM THE EDGE OF THE GREAT FISSURE.

foam. To the south of the lake there is a range of pale-gray volcanoes, now extinct, and though the highest of them rise nearly two thousand feet above the lake, you can look down into their well-defined circular, cup-like craters, from which, a comparatively short time ago, ashes and cinders were showered over the surrounding plains and glacier-laden mountains.

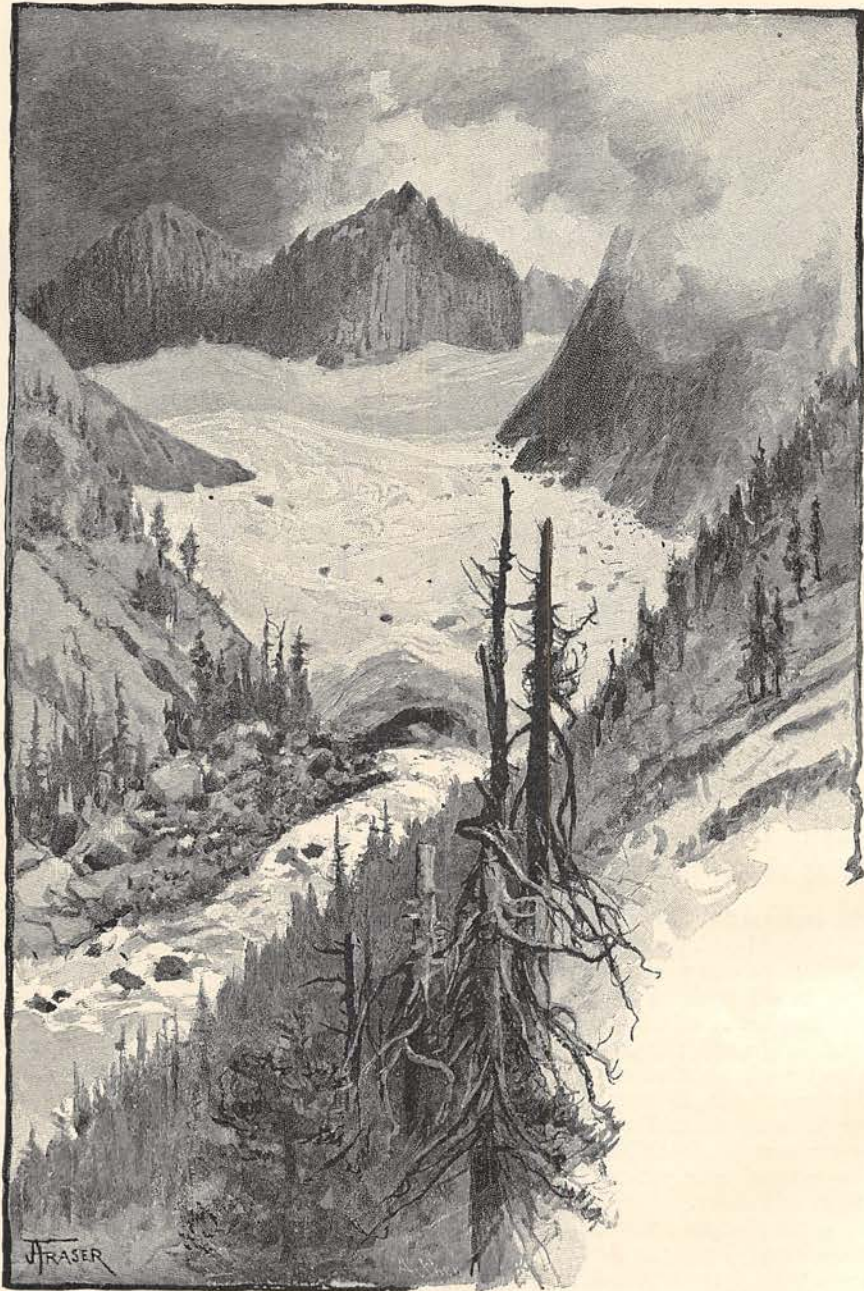
To the westward the landscape is made up of gray glaciated rocks and ridges, separated by a labyrinth of cañons and darkened with lines and broad fields of forest, while small lakes and meadows dot the foreground. Northward and southward the jagged peaks and towers that are marshaled along the axis of the range are seen in all their glory, crowded together in some places like trees in groves, making landscapes of wild, extravagant, bewildering magnificence, yet calm and silent as the scenery of the sky.

Some eight glaciers are in sight. One of these is the Dana Glacier on the northeast side of the mountain, lying at the foot of a precipice about a thousand feet high, with a lovely pale-green lake in the general basin a little below the glacier. This is one of the many small shrunken remnants of the vast glacial system of the Sierra that once filled all the hollows and valleys of the mountains and covered all the lower ridges below the immediate summit fountains, flowing to right and left away from the axis of the range, lavishly fed by the snows of the glacial period.

In the excursion to Mount Lyell the immedi-

ate base of the mountain is easily reached on horseback by following the meadows along the river. Turning to the southward above the forks of the river you enter the Lyell branch of the valley, which is narrow enough and deep enough to be called a cañon. It is about eight miles long and from 2000 to 3000 feet deep. The flat meadow bottom is from about 300 to 200 yards wide, with gently curved margins about 50 yards wide, from which rise the simple massive walls of gray granite at an angle of about thirty-three degrees, mostly timbered with a light growth of pine and streaked in many places with avalanche channels. Towards the upper end of the cañon the grand Sierra crown comes into sight, forming a sublime and finely balanced picture, framed by the massive cañon walls. In the foreground you have the purple meadow fringed with willows; in the middle distance, huge swelling bosses of granite that form the base of the general mass of the mountain, with fringing lines of dark woods marking the lower curves, but smoothly snow-clad except in the autumn.

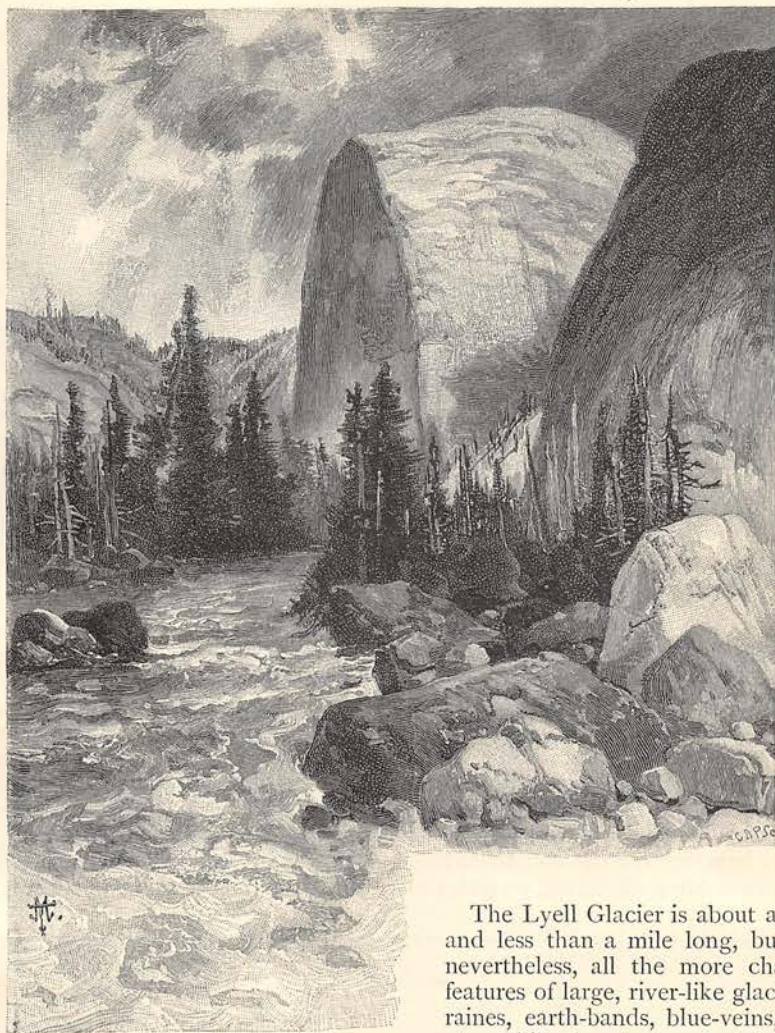
There is a good camping-ground on the east side of the river about a mile above. A fine cascade comes down over the cañon wall in telling style and makes fine camp music. At one place near the top careful climbing is necessary, but it is not so dangerous or difficult as to deter any climber of ordinary strength and skill, while the views from the summit are glorious. To the northward are Mammoth Mountain, Mounts Gibbs,



THE SOUTH SIDE OF MOUNT LVELL.

Dana, Warren, Conness, and many others, unnumbered and unnamed; to the southeast the indescribably wild and jagged range of Mount Ritter and the Minarets; southwestward stretches the dividing ridge between the North Fork of the San Joaquin and the Merced, uniting with the Obelisk or Merced group of peaks that form the main fountains

of the Illilouette branch of the Merced River; and to the northwestward extends the Cathedral spur. All these spurs, like distinct ranges, meet at your feet. Therefore you look over them mostly in the direction of their extension, and their peaks seem to be massed and crowded together in bewildering combinations; while immense amphitheatres, cañons, and subordi-

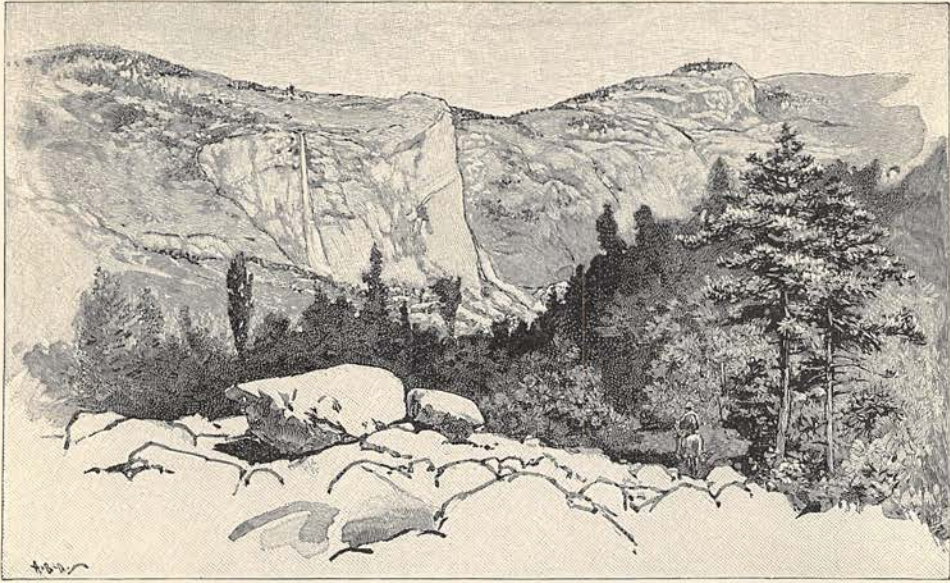


TUOLUMNE RIVER NEAR THE HEAD OF THE GREAT CAÑON.

nate masses, with their wealth of lakes, glaciers, and snow-fields, maze and cluster between them. In making the ascent in June or October the glacier is easily crossed, for then its snow mantle is smooth or mostly melted off. But in midsummer the climbing is exceedingly tedious, because the snow is then weathered into curious and beautiful blades, sharp and slender, and set on edge in a leaning position. They lean towards the head of the glacier, and extend across from side to side in regular order in a direction at right angles to the direction of greatest declivity, the distance between the crests being about two or three feet, and the depth of the troughs between them about three feet. No more interesting problem is ever presented to the mountaineer than a walk over a glacier thus sculptured and adorned.

The Lyell Glacier is about a mile wide and less than a mile long, but presents, nevertheless, all the more characteristic features of large, river-like glaciers — moraines, earth-bands, blue-veins, crevasses, etc., while the streams that issue from it are turbid with rock-mud, showing its grinding action on its bed. And it is all the more interesting since it is the highest and most enduring remnant of the great Tuolumne Glacier, whose traces are still distinct fifty miles away, and whose influence on the landscape was so profound. The McClure Glacier, once a tributary of the Lyell, is much smaller. Eighteen years ago I set a series of stakes in it to determine its rate of motion, which towards the end of summer, in the middle of the glacier, I found to be a little over an inch in twenty-four hours.

The trip to Mono from the Soda Springs can be made in a day, but Bloody Cañon will be found rough for animals. The scenery of the cañon, however, is wild and rich, and many days may profitably be spent around the shores of the lake and out on its islands and about the volcanoes.



ENTRANCE TO HETCH HETCHY VALLEY FROM SMITH TRAIL.

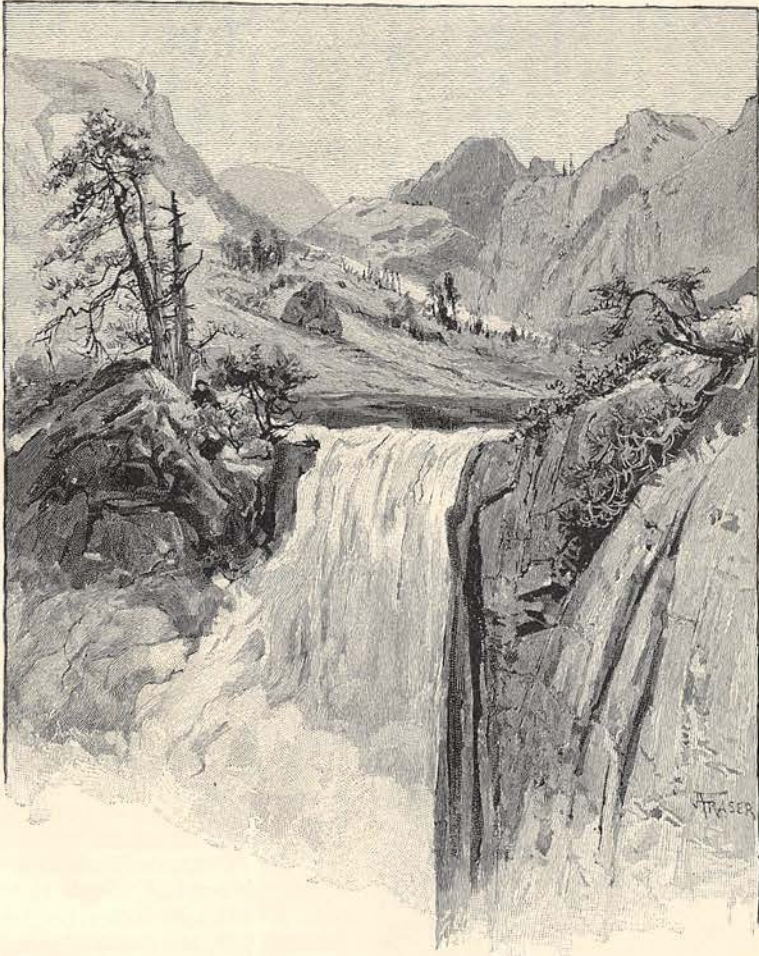
In making the trip down the Big Tuolumne Cañon animals may be led as far as a small, grassy, forested lake basin that lies below the crossing of the Virginia Creek trail. And from this point any one accustomed to walk on earthquake boulders, carpeted with cañon chaparral, can easily go down the cañon as far as the big cascades and return to camp in one day. Many, however, are not able to do this, and it is far better to go leisurely, prepared to

camp anywhere, and enjoy the marvelous grandeur of the place.

The cañon begins near the lower end of the meadows and extends to the Hetch Hetchy Valley, a distance of about eighteen miles, though it will seem much longer to any one who scrambles through it. It is from 1200 to about 5000 feet deep, and is comparatively narrow, but there are several fine, roomy, park-like openings in it, and throughout its



LOOKING DOWN ON LAKE TENAYA.



VIEW OF A PART OF THE GRAND CASCADES, BIG TUOLUMNE CAÑON.

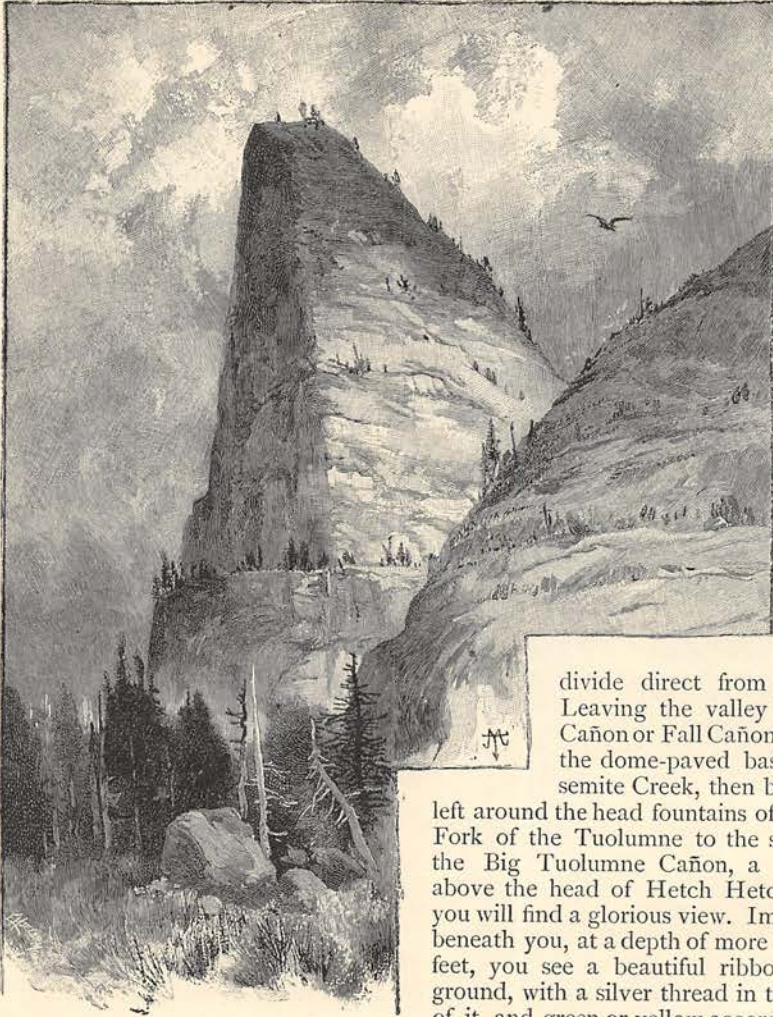
whole extent Yosemite features are displayed on a grand scale — domes, El Capitan rocks, gables, Sentinels, Royal Arches, glacier points, Cathedral Spires, etc. There is even a Half Dome among its wealth of rock forms, though less sublime and beautiful than the Yosemite Half Dome. It also contains falls and cascades innumerable. The sheer falls, except when the snow is melting in early spring, are quite small in volume as compared with those of Yosemite and Hetch Hetchy; but many of them are very beautiful, and in any other country would be regarded as great wonders. But it is the cascades or sloping falls on the main river that are the crowning glory of the cañon, and these in volume, extent, and variety surpass those of any other cañon in the Sierra. The most showy and interesting of the cascades are mostly in the upper part of the cañon, above the point where Cathedral Creek and Hoffman Creek enter.

For miles the river is one wild, exulting, on-rushing mass of snowy purple bloom, spreading over glacial waves of granite without any definite channel, and through avalanche taluses, gliding in silver plumes, dashing and foaming through huge boulder-dams, leaping high into the air in glorious wheel-like whirls, tossing from side to side, doubling, glinting, singing in glorious exuberance of mountain energy.

Every one who is anything of a mountaineer should go on through the entire length of the cañon, coming out by Hetch Hetchy. There is not a dull step all the way. With wide variations it is a Yosemite Valley from end to end.

THE HETCH HETCHY VALLEY.

Most people who visit Yosemite are apt to regard it as an exceptional creation, the only valley of its kind in the world. But nothing in Nature stands alone. She is not so poor as



KOLÁNA ROCK, HETCH HETCHY VALLEY.

to have only one of anything. The explorer in the Sierra and elsewhere finds many Yosemiteites, that differ not more than one tree differs from another of the same species. They occupy the same relative positions on the mountain flanks, were formed by the same forces in the same kind of granite, and have similar sculpture, waterfalls, and vegetation. The Hetch Hetchy Valley has long been known as the Tuolumne Yosemite. It is said to have been discovered by Joseph Screech, a hunter, in 1850, a year before the discovery of the great Merced Yosemite. It lies in a northwesterly direction from Yosemite, at a distance of about twenty miles, and is easily accessible to mounted travelers by a trail that leaves the Big Oak Flat road at Bronson's Meadows, a few miles below Crane Flat. But by far the best way to it for those who have useful limbs is across the

divide direct from Yosemite. Leaving the valley by Indian Cañon or Fall Cañon, you cross the dome-paved basin of Yosemite Creek, then bear to the left around the head fountains of the South Fork of the Tuolumne to the summit of the Big Tuolumne Cañon, a few miles above the head of Hetch Hetchy. Here you will find a glorious view. Immediately beneath you, at a depth of more than 4000 feet, you see a beautiful ribbon of level ground, with a silver thread in the middle of it, and green or yellow according to the time of year. That ribbon is a strip of meadow, and the silver thread is the main Tuolumne River. The opposite wall of the cañon rises in precipices, steep and angular, or with rounded brows like those of Yosemite, and from this wall as a base extends a fine wilderness of mountains, rising dome above dome, ridge above ridge, to a group of snowy peaks on the summit of the range. Of all this sublime congregation of mountains Castle Peak is king: robed with snow and light, dipping unnumbered points and spires into the thin blue sky, it maintains amid noble companions a perfect and commanding individuality.

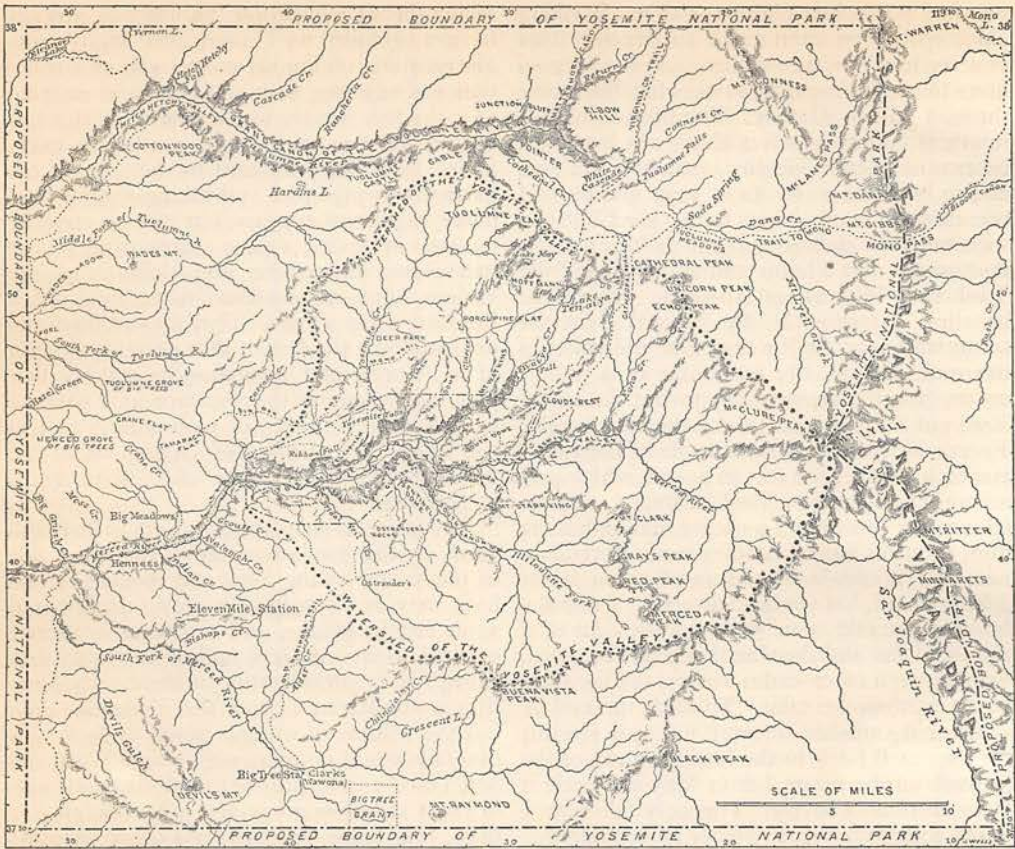
You will not encounter much difficulty in getting down into the cañon, for bear trails may readily be found leading from the upper feeding-grounds to the berry gardens and acorn orchards of Hetch Hetchy, and when you reach the river you have only to saunter by its side a mile or two down the cañon before

you find yourself in the open valley. Looking about you, you cannot fail to discover that you are in a Yosemite valley. As the Merced flows through Yosemite, so does the Tuolumne through Hetch Hetchy. The bottom of Yosemite is about 4000 feet above sea level, the bottom of Hetch Hetchy is about 3800 feet, and in both the walls are of gray granite and rise abruptly in precipices from a level bottom, with but little debris along their bases. Furthermore it was a home and stronghold of the Tuolumne Indians, as Ahwahne was of the grizzlies. Standing boldly forward from the south wall near the lower end of the valley is the rock Kolána, the outermost of a picturesque group corresponding to the Cathedral Rocks of Yosemite, and about the same height. Facing Kolána on the north side of the valley is a rock about 1800 feet in height, which presents a bare, sheer front like El Capitan, and over its massive brow flows a stream that makes the most graceful fall I have ever seen. Its Indian name is Tu-ee-u-la-la, and no other, so far as I have heard, has yet been given it. From the brow of the cliff it makes a free descent of a thousand feet and then breaks up into a ragged, foaming web of cascades among the boulders of an earthquake talus. Towards the end of summer it vanishes, because its head streams do not reach back to the lasting snows of the summits of the range, but in May and June it is indescribably lovely. The only fall that I know with which it may fairly be compared is the Bridal Veil, but it excels even that fall in peaceful, floating, swaying gracefulness. For when we attentively observe the Bridal Veil, even towards the middle of summer when its waters begin to fail, we may discover, when the winds blow aside the outer folds of spray, dense comet-shaped masses shooting through the air with terrible energy; but from the top of the cliff, where the Hetch Hetchy veil first floats free, all the way to the bottom it is in perfect repose. Again, the Bridal Veil is in a shadow-haunted nook inaccessible to the main wind currents of the valley, and has to depend for many of its gestures on irregular, teasing side currents and whirls, while Tu-ee-u-la-la, being fully exposed on the open cliff, is sun drenched all day, and is ever ready to yield graceful compliance to every wind that blows. Most people unacquainted with the behavior of mountain streams fancy that when they escape the bounds of their rocky channels and launch into the air they at once lose all self-control and tumble in confusion. On the contrary, on no part of their travels do they manifest more calm self-possession. Imagine yourself in Hetch Hetchy. It is a sunny day in June, the pines sway dreamily, and you are shoulder-deep in grass and flowers. Looking across the

valley through beautiful open groves you see a bare granite wall 1800 feet high rising abruptly out of the green and yellow vegetation and glowing with sunshine, and in front of it the fall, waving like a downy scarf, silver bright, burning with white sun-fire in every fiber. In coming forward to the edge of the tremendous precipice and taking flight a little hasty eagerness appears, but this is speedily hushed in divine repose. Now observe the marvelous distinctness and delicacy of the various kinds of sun-filled tissue into which the waters are woven. They fly and float and drowse down the face of that grand gray rock in so leisurely and unconfused a manner that you may examine their texture and patterns as you would a piece of embroidery held in the hand. It is a flood of singing air, water, and sunlight woven into cloth that spirits might wear.

The great Hetch Hetchy Fall, called Wa-páma by the Tuolumnes, is on the same side of the valley as the Veil, and so near it that both may be seen in one view. It is about 1800 feet in height, and seems to be nearly vertical when one is standing in front of it, though it is considerably inclined. Its location is similar to that of the Yosemite Fall, but the volume of water is much greater. No two falls could be more unlike than Wa-páma and Tu-ee-u-la-la, the one thundering and beating in a shadowy gorge, the other chanting in deep, low tones, and with no other shadows about it than those of its own waters, pale-gray mostly, and violet and pink delicately graded. One whispers, "He dwells in peace," the other is the thunder of his chariot wheels in power. This noble pair are the main falls of the valley, though there are many small ones essential to the perfection of the general harmony.

The wall above Wa-páma corresponds, both in outlines and in details of sculpture, with the same relative portion of the Yosemite wall. Near the Yosemite Fall the cliff has two conspicuous benches extending in a horizontal direction 500 and 1500 feet above the valley. Two benches similarly situated, and timbered in the same way, occur on the same relative position on the Hetch Hetchy wall, and on no other portion. The upper end of Yosemite is closed by the great Half Dome, and the upper end of Hetch Hetchy is closed in the same way by a mountain rock. Both occupy angles formed by the confluence of two large glaciers that have long since vanished. In front of this head rock the river forks like the Merced in Yosemite. The right fork as you ascend is the main Tuolumne, which takes its rise in a glacier on the north side of Mount Lyell and flows through the Big



MAP OF THE YOSEMITE REGION, SHOWING PRESENT RESERVATION, WATER-SHED OF THE VALLEY, AND APPROXIMATE LIMITS OF THE PROPOSED NATIONAL PARK.¹

Cañon. I have not traced the left fork to its highest source, but, judging from the general trend of the ridges, it must be near Castle Peak. Upon this left or North Fork there is a remarkably interesting series of cascades, five in number, ranged along a picturesque gorge, on the edges of which we may saunter safely and gain fine views of the dancing spray below. The first is a wide-spreading fan of white, crystal-covered water, half leaping half sliding over a steep polished pavement, at the foot of which it rests and sets forth clear and shining on its final flow to the main river. A short distance above the head of this cascade you discover the second, which is as impressively wild and beautiful as the first, and makes you sing with it as though you were a part of it. It is framed in deep rock walls that are colored yellow and red with lichens, and fringed on the jagged edges by live-oaks and sabine pines, and at the bottom in damp nooks you may see ferns, lilies, and azaleas.

Three or four hundred yards higher you come to the third of the choir, the largest of the five. It is formed of three smaller ones inseparably combined, which sing divinely, and

make spray of the best quality for rainbows. A short distance beyond this the gorge comes to an end, and the bare stream, without any definite channel, spreads out in a thin, silvery sheet about 150 feet wide. Its waters are, throughout almost its whole extent, drawn out in overlapping folds of lace, thick sown with diamond jets and sparks that give an exceedingly rich appearance. Still advancing, you hear a deep muffled booming, and you push eagerly on through flowery thickets until the last of the five appears through the foliage. The precipice down which it thunders is fretted with projecting knobs, forming polished keys upon which the wild waters play.

The bottom of the valley is divided by a low, glacier-polished bar of granite, the lower portion being mostly meadow land, the upper

¹ The above map represents the limits of the park as proposed by Mr. Muir and as advocated before the Committee on Public Lands of the House of Representatives. As we go to press, the Committee seems disposed to extend the north and south limits eastward to the Nevada line, thus adding an equal amount to the area here indicated. The honor of introducing the National Park bill belongs to General William Vandever of California.—EDITOR.

dry and sandy, and planted with fine Kellogg oaks, which frequently attain a diameter of six or seven feet. On the talus slopes the pines give place to the mountain live-oak, which forms the shadiest groves in the valley and the greatest in extent. Their glossy foliage, warm yellow-green and closely pressed, makes a kind of ceiling, supported by bare gray trunks and branches gnarled and picturesque. A few specimens of the sugar pine and tamarack pine are found in the valley, also the two silver firs. The Douglas spruce and the libocedrus attain noble dimensions in certain favorable spots, and a few specimens of the interesting *Torreya Californica* may be found on the south side. The brier-rose occurs in large patches, with tall, spiky mints and arching grasses. On the meadows lilies, larkspurs, and lupines of several species are abundant, and in some places reach above one's head. Rock-ferns of rare beauty fringe and rosette the walls from top to bottom — *Pellaea densa*, *P. mucronata* and *P. Bridgesii*, *Cheilanthes gracillima*, *Allosorus*, etc. *Adiantum pedatum* occurs in a few mossy corners that get spray from the falls. *Woodwardia radicans* and *Asplenium felix-femina* are the tallest ferns of the valley—six feet high, some of them. The whole valley was a charming garden when I last saw it, and the huts of the Indians and a lone cabin were the only improvements.

As will be seen by the map, I have thus briefly touched upon a number of the chief features of a region which it is proposed to reserve out of the public domain for the use and

recreation of the people. A bill has already been introduced in Congress by Mr. Vandever creating a national park about the reservation which the State now holds in trust for the people. It is very desirable that the new reservation should at least extend to the limits indicated by the map, and the bill cannot too quickly become a law. Unless reserved or protected the whole region will soon or late be devastated by lumbermen and sheepmen, and so of course be made unfit for use as a pleasure ground. Already it is with great difficulty that campers, even in the most remote parts of the proposed reservation and in those difficult of access, can find grass enough to keep their animals from starving; the ground is already being gnawed and trampled into a desert condition, and when the region shall be stripped of its forests the ruin will be complete. Even the Yosemite will then suffer in the disturbance effected on the water-shed, the clear streams becoming muddy and much less regular in their flow. It is also devoutly to be hoped that the Hetch Hetchy will escape such ravages of man as one sees in Yosemite. Ax and plow, hogs and horses, have long been and are still busy in Yosemite's gardens and groves. All that is accessible and destructible is being rapidly destroyed — more rapidly than in any other Yosemite in the Sierra, though this is the only one that is under the special protection of the Government. And by far the greater part of this destruction of the fineness of wildness is of a kind that can claim no right relationship with that which necessarily follows use.

John Muir.

OUR NEW NAVAL GUNS.¹



THE interest in military and naval affairs due to the general awakening of the public to the pitiful condition of the national defenses warrants a brief notice of the modern gun-building begun in America in 1883 at the Washington Navy Yard.

For years this country had been standing still in the matter of cannon, trusting to the creations of Rodman and Dahlgren, those former masters of gun-construction, while other nations were adopting weapons of greater and constantly increasing power. The change from

the old to the new has at last set in on our side of the Atlantic, and to-day the efforts of those charged with the armament of our ships and forts are bent towards restoring us to at least a creditable position in the race wherein once we led all competitors.

The gun has developed steadily along certain well-defined lines. It will tend to brevity and clearness to devote a few words to the reasons why, following these lines, the cast-iron muzzle-loading smooth bore has given way to the forged-steel breech-loading rifle. Through its greater weight an elongated shot holds its velocity better than a round shot of the same caliber. If fired from a smooth bore, however, the former is apt to turn end over end and miss its mark; so the bores of guns designed to throw such projectiles are *rifled*, which means that they have spiral grooves that engage a

¹ Thanks are due to Ensign Philip R. Alger, U. S. N., for invaluable assistance, particularly in those parts of this article relating to recent developments.