

NON-FICTION

John Muir

The Grand Canon of the Colorado



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A PUBLIC DOMAIN BOOK

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THE GRAND CANON OF THE COLORADO

by John Muir

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Happy nowadays is the tourist, with earth's wonders, new and old, spread invitingly open before him, and a host of able workers as his slaves making everything easy, padding plush about him, grading roads for him, boring tunnels, moving hills out of his way, eager, like the devil, to show him all the kingdoms of the world and their glory and foolishness, spiritualizing travel for him with lightning and steam, abolishing space and time and almost everything else. Little children and tender, pulpy people, as well as storm-seasoned explorers, may now go almost everywhere in smooth comfort, cross oceans and deserts scarce accessible to fishes and birds, and, dragged by steel horses, go up high mountains, riding gloriously beneath starry showers of sparks, ascending like Elijah in a whirlwind and chariot of fire.

First of the wonders of the great West to be brought within reach of the tourist were the Yosemite and the Big Trees, on the completion of the first transcontinental railway; next came the Yellowstone and icy Alaska, by the Northern roads; and last the Grand Canon of the Colorado, which, naturally the hardest to reach, has now become, by a branch of the Santa Fe, the most accessible of all.

Of course with this wonderful extension of steel ways through our wilderness there is loss as well as gain. Nearly all railroads are bordered by belts of desolation. The finest wilderness perishes as if stricken with pestilence. Bird and beast people, if not the dryads, are frightened from the groves. Too often the groves also vanish, leaving nothing but ashes. Fortunately, nature has a few big places beyond man's power to spoil--the ocean, the two icy ends of the globe, and the Grand Canon.

When I first heard of the Santa Fe trains running to the edge of the Grand Canon of Arizona, I was troubled with thoughts of the disenchantment likely to follow. But last winter, when I saw those trains crawling along through the pines of the Cocanini Forest and close up to the brink of the chasm at Bright Angel, I was glad to discover that in the presence of such stupendous scenery they are nothing. The locomotives and trains are mere beetles and caterpillars, and the noise they make is as little disturbing as the hooting of an owl in the lonely woods.

In a dry, hot, monotonous forested plateau, seemingly boundless, you come suddenly and without warning upon the abrupt edge of a gigantic sunken landscape of the wildest, most multitudinous features, and those features, sharp and angular, are made out of flat beds of limestone and sandstone forming a spiry, jagged, gloriously colored mountain-range countersunk in a level gray plain. It is a hard job to sketch it even in scrawniest outline; and try as I may, not in the least sparing myself, I cannot tell the hundredth part of the wonders of its features--the side-canons, gorges, alcoves, cloisters, and amphitheatres of vast sweep and depth, carved in its magnificent walls; the throng of great architectural rocks it contains resembling castles, cathedrals, temples, and palaces, towered and spired and painted, some of them nearly a mile high, yet beneath one's feet. All this, however, is less difficult than to give any idea of the impression of wild, primeval beauty and power one receives in merely gazing from its brink. The view down the gulf of color and over the rim of its wonderful wall, more than any other view I know, leads us to think of our earth as a star with stars swimming in light, every radiant spire pointing the way to the heavens.

But it is impossible to conceive what the canon is, or what impression it makes, from descriptions or pictures, however good. Naturally it is untellable even to those who have seen something perhaps a little like it on a small scale in this same plateau region. One's most extravagant expectations are indefinitely surpassed, though one expect much from what is said of it as "the biggest chasm on earth"--"so big is it that all other big things,--Yosemite, the Yellowstone, the Pyramids, Chicago,--all would be lost if tumbled into it." Naturally enough, illustrations as to size are sought for among other canons like or unlike it, with the common result of worse confounding confusion. The prudent keep silence. It was once said that the "Grand Canon could put a dozen Yosemites in its vest pocket."

The justly famous Grand Canon of the Yellowstone is, like the Colorado, gorgeously colored and abruptly countersunk in a plateau, and both are mainly the work of water. But the Colorado's canon is more than a thousand times larger, and as a score or two new buildings of ordinary size would not appreciably change the general view of a great city, so hundreds of Yellowstones might be eroded in the sides of the Colorado Canon without noticeably augmenting its size or the richness of its sculpture. But it is not true that the great Yosemite rocks would be thus lost or hidden. Nothing of their kind in the world, so far as I know, rivals El Capitan and Tissiack, much less dwarfs or in any way belittles them. None of the sandstone or limestone precipices of the canon that I have seen or heard of approaches in smooth, flawless strength and grandeur the granite face of El Capitan or the Tenaya side of Cloud's Rest. These colossal cliffs, types of permanence, are about three thousand and six thousand feet high; those of the canon that are sheer are about half as high, and are types of fleeting change; while glorious-domed Tissiack, noblest of mountain buildings, far from being overshadowed or lost in this rosy, spiry canon company, would draw every eye, and, in serene majesty, "aboon them a" she would take her place--castle, temple, palace, or tower. Nevertheless a noted writer, comparing the Grand Canon in a general way with the glacial Yosemite, says: "And the Yosemite--ah, the lovely Yosemite! Dumped down into the wilderness of gorges and mountains, it would take a guide who knew of its existence a long time to find it." This is striking, and shows up well above the levels of commonplace description; but it is confusing, and has the fatal fault of not being true. As well try to describe an eagle by putting a lark in it. "And the lark--ah, the lovely lark! Dumped down the red, royal gorge of the eagle, it would be hard to find." Each in its own place is better, singing at heaven's gate, and sailing the sky with the clouds.

Every feature of nature's big face is beautiful,—height and hollow, wrinkle, furrow, and line,—and this is the main master furrow of its kind on our continent, incomparably greater and more impressive than any other yet discovered, or likely to be discovered, now that all the great rivers have been traced to their heads.

The Colorado River rises in the heart of the continent on the dividing ranges and ridges between the two oceans, drains thousands of snowy mountains through narrow or spacious valleys, and thence through canons of every color, sheer-walled and deep, all of which seem to be represented in this one grand canon of canons.

It is very hard to give anything like an adequate conception of its size, much more of its color, its vast wall-sculpture, the wealth of ornate architectural buildings that fill it, or, most of all, the tremendous impression it makes. According to Major Powell, it is about two hundred and seventeen miles long, from five to fifteen miles wide from rim to rim, and from about five thousand to six thousand feet deep. So tremendous a chasm would be one of the world's greatest wonders even if, like ordinary canons cut in sedimentary rocks, it were empty and its walls were simple. But instead of being plain, the walls are so deeply and elaborately carved into all sorts of recesses—alcoves, cirques, amphitheatres, and side-canons—that were you to trace the rim closely around on both sides your journey would be nearly a thousand miles long. Into all these recesses the level, continuous beds of rock in ledges and benches, with their various colors, run like broad ribbons, marvelously beautiful and effective even at a distance of ten or twelve miles. And the vast space these glorious walls inclose, instead of being empty, is crowded with gigantic architectural rock forms gorgeously colored and adorned with towers and spires like works of art.

Looking down from this level plateau, we are more impressed with a feeling of being on the top of everything than when looking from the summit of a mountain. From side to side of the vast gulf, temples, palaces, towers, and spires come soaring up in thick array half a mile or nearly a mile above their sunken, hidden bases, some to a level with our standpoint, but none higher. And in the inspiring morning light all are so fresh and rosy-looking that they seem new-born; as if, like the quick-growing crimson snow-plants of the California woods, they had just sprung up, hatched by the warm, brooding, motherly weather.

In trying to describe the great pines and sequoias of the Sierra, I have often thought that if one of those trees could be set by itself in some city park, its grandeur might there be impressively realized; while in its home forests, where all magnitudes are great, the weary, satiated traveler sees none of them truly. It is so with these majestic rock structures.

Though mere residual masses of the plateau, they are dowered with the grandeur and repose of mountains, together with the finely chiseled carving and modeling of man's temples and palaces, and often, to a considerable extent, with their symmetry. Some, closely observed, look like ruins; but even these stand plumb and true, and show architectural forms loaded with lines strictly regular and decorative, and all are arrayed in colors that storms and time seem only to brighten. They are not placed in regular rows in line with the river, but "a' through ither," as the Scotch say, in lavish, exuberant crowds, as if nature in wildest extravagance held her bravest structures as common as gravel-piles. Yonder stands a spiry cathedral nearly five thousand feet in height, nobly symmetrical, with sheer buttressed walls and arched doors and windows, as richly finished and decorated with sculptures as the great rock temples of India or Egypt. Beside it rises a huge castle with arched gateway, turrets, watch-towers, ramparts, etc., and to right and left palaces, obelisks, and pyramids fairly fill the gulf, all colossal and all lavishly painted and carved. Here and there a flat-topped structure may be seen, or one imperfectly domed; but the prevailing style is ornate Gothic, with many hints of Egyptian and Indian.

Throughout this vast extent of wild architecture—nature's own capital city—there seem to be no ordinary dwellings. All look like grand and important public structures, except perhaps some of the lower pyramids, broad-based and sharp-pointed, covered with down-flowing talus like loosely set tents with hollow, sagging sides. The roofs often have disintegrated rocks heaped and dragged over them, but in the main the masonry is firm and laid in regular courses, as if done by square and rule.

Nevertheless they are ever changing: their tops are now a dome, now a flat table or a spire, as harder or softer strata are reached in their slow degradation, while the sides, with all their fine moldings, are being steadily undermined and eaten away. But no essential change in style or color is thus effected. From century to century they stand the same. What seems confusion among the rough earthquake-shaken crags nearest one comes to order as soon as the main plan of the various structures appears. Every building, however complicated and laden with ornamental lines, is at one with itself and every one of its neighbors, for the same characteristic controlling belts of color and solid strata extend with wonderful constancy for very great distances, and pass through and give style to thousands of separate structures, however their smaller characters may vary.

Of all the various kinds of ornamental work displayed,—carving, tracery on cliff-faces, moldings, arches, pinnacles,—none is more admirably effective or charms more than the webs of rain-channeled taluses. Marvelously extensive, without the slightest appearance of waste or excess, they cover roofs and dome-tops and the base of every cliff, belt each spire and pyramid and massy, towering temple, and in beautiful continuous lines go sweeping along the great walls in and out around all the intricate system of side-canons, amphitheatres, cirques, and scallops into which they are sculptured. From one point hundreds of miles of this fairy embroidery may be traced. It is all so fine and orderly that it would seem that not only had the clouds and streams been kept harmoniously busy in the making of it, but that every raindrop sent like a bullet to a mark had been the subject of a separate thought, so sure is the outcome of beauty through the stormy centuries. Surely nowhere else are there illustrations so striking of the natural beauty of desolation and death, so many of nature's own mountain buildings wasting in glory of high desert air—going to dust. See how steadfast in beauty they all are in their going. Look again and again how the rough, dusty boulders and sand of disintegration from the upper ledges wreath in beauty the next and next below with these wonderful taluses, and how the colors are finer the faster the waste. We oftentimes see nature giving beauty for ashes,—as in the flowers of a prairie

after fire,--but here the very dust and ashes are beautiful.

Gazing across the mighty chasm, we at last discover that it is not its great depth nor length, nor yet these wonderful buildings, that most impresses us. It is its immense width, sharply defined by precipitous walls plunging suddenly down from a flat plain, declaring in terms instantly apprehended that the vast gulf is a gash in the once unbroken plateau, made by slow, orderly erosion and removal of huge beds of rocks. Other valleys of erosion are as great,--in all their dimensions some are greater,--but none of these produces an effect on the imagination at once so quick and profound, coming without study, given at a glance. Therefore by far the greatest and most influential feature of this view from Bright Angel or any other of the canon views is the opposite wall. Of the one beneath our feet we see only fragmentary sections in cirques and amphitheatres and on the sides of the outjutting promontories between them, while the other, though far distant, is beheld in all its glory of color and noble proportions--the one supreme beauty and wonder to which the eye is ever turning. For while charming with its beauty it tells the story of the stupendous erosion of the canon--the foundation of the unspeakable impression made on everybody. It seems a gigantic statement for even nature to make, all in one mighty stone word, apprehended at once like a burst of light, celestial color its natural vesture, coming in glory to mind and heart as to a home prepared for it from the very beginning. Wilderness so godful, cosmic, primeval, bestows a new sense of earth's beauty and size. Not even from high mountains does the world seem so wide, so like a star in glory of light on its way through the heavens.

I have observed scenery-hunters of all sorts getting first views of yosemites, glaciers. While Mountain ranges, etc. Mixed with the enthusiasm which such scenery naturally excites, there is often weak gushing, and many splutter aloud like little waterfalls. Here, for a few moments at least, there is silence, and all are in dead earnest, as if awed and hushed by an earthquake--perhaps until the cook cries "Breakfast!" or the stable-boy "Horses are ready!" Then the poor unfortunates, slaves of regular habits, turn quickly away, gasping and muttering as if wondering where they had been and what had enchanted them.

Roads have been made from Bright Angel Hotel through the Cocanini Forest to the ends of outstanding promontories, commanding extensive views up and down the canon. The nearest of them, three or four miles east and west, are McNeil's Point and Rowe's Point; the latter, besides commanding the eternally interesting canon, gives wide-sweeping views southeast and west over the dark forest roof to the San Francisco and Mount Trumbull volcanoes--the bluest of mountains over the blackest of level woods.

Instead of thus riding in dust with the crowd, more will be gained by going quietly afoot along the rim at different times of day and night, free to observe the vegetation, the fossils in the rocks, the seams beneath overhanging ledges once inhabited by Indians, and to watch the stupendous scenery in the changing lights and shadows, clouds, showers, and storms. One need not go hunting the so-called "points of interest." The verge anywhere, everywhere, is a point of interest beyond one's wildest dreams.

As yet, few of the promontories or throng of mountain buildings in the canon are named. Nor among such exuberance of forms are names thought of by the bewildered, hurried tourist. He would be as likely to think of names for waves in a storm. The Eastern and Western Cloisters, Hindu Amphitheater, Cape Royal, Powell's Plateau, and Grand View Point, Point Sublime, Bissell and Moran points, the Temple of Set, Vishnu's Temple, Shiva's Temple, Twin Temples, Tower of Babel, Hance's Column--these fairly good names given by Dutton, Holmes, Moran, and others are scattered over a large stretch of the canon wilderness.

All the canon rock-beds are lavishly painted, except a few neutral bars and the granite notch at the bottom occupied by the river, which makes but little sign. It is a vast wilderness of rocks in a sea of light, colored and glowing like oak and maple woods in autumn, when the sun-gold is richest. I have just said that it is impossible to learn what the canon is like from descriptions and pictures. Powell's and Dutton's descriptions present magnificent views not only of the canon but of all the grand region round about it; and Holmes's drawings, accompanying Dutton's report, are wonderfully good. Surely faithful and loving skill can go no further in putting the multitudinous decorated forms on paper. But the *colors*, the living, rejoicing *colors*, chanting morning and evening in chorus to heaven! Whose brush or pencil, however lovingly inspired, can give us these? And if paint is of no effect, what hope lies in pen-work? Only this: some may be incited by it to go and see for themselves.

No other range of mountainous rock-work of anything like the same extent have I seen that is so strangely, boldly, lavishly colored. The famous Yellowstone Canon below the falls comes to mind, but, wonderful as it is, and well deserved as is its fame, compared with this it is only a bright rainbow ribbon at the roots of the pines. Each of the series of level, continuous beds of carboniferous rocks of the canon has, as we have seen, its own characteristic color. The summit limestone-beds are pale yellow; next below these are the beautiful rose-colored cross-bedded sandstones; next there are a thousand feet of brilliant red sandstones; and below these the red wall limestones, over two thousand feet thick, rich massy red, the greatest and most influential of the series, and forming the main color-fountain. Between these are many neutral-tinted beds. The prevailing colors are wonderfully deep and clear, changing and blending with varying intensity from hour to hour, day to day, season to season; throbbing, wavering, glowing, responding to every passing cloud or storm, a world of color in itself, now burning in separate rainbow bars streaked and blotched with shade, now glowing in one smooth, all-pervading ethereal radiance like the alpenglow, uniting the rocky world with the heavens.

The dawn, as in all the pure, dry desert country, is ineffably beautiful; and when the first level sunbeams sting the domes and spires, with what a burst of power the big, wild days begin! The dead and the living, rocks and hearts alike, awake and sing the new-old song of creation. All the massy headlands and salient angles of the walls, and the multitudinous temples and palaces, seem to catch the light at once, and cast thick black shadows athwart hollow and gorge, bringing out details as well as the main massive features of the architecture; while all the rocks, as if wild with

life, throb and quiver and glow in the glorious sunburst, rejoicing. Every rock temple then becomes a temple of music; every spire and pinnacle an angel of light and song, shouting color halleluiahs.

As the day draws to a close, shadows, wondrous, black, and thick, like those of the morning, fill up the wall hollows, while the glowing rocks, their rough angles burned off, seem soft and hot to the heart as they stand submerged in purple haze, which now fills the canon like a sea. Still deeper, richer, more divine grow the great walls and temples, until in the supreme flaming glory of sunset the whole canon is transfigured, as if all the life and light of centuries of sunshine stored up and condensed in the rocks was now being poured forth as from one glorious fountain, flooding both earth and sky.

Strange to say, in the full white effulgence of the midday hours the bright colors grow dim and terrestrial in common gray haze; and the rocks, after the manner of mountains, seem to crouch and drowse and shrink to less than half their real stature, and have nothing to say to one, as if not at home. But it is fine to see how quickly they come to life and grow radiant and communicative as soon as a band of white clouds come floating by. As if shouting for joy, they seem to spring up to meet them in hearty salutation, eager to touch them and beg their blessings. It is just in the midst of these dull midday hours that the canon clouds are born.

A good storm-cloud full of lightning and rain on its way to its work on a sunny desert day is a glorious object. Across the canon, opposite the hotel, is a little tributary of the Colorado called Bright Angel Creek. A fountain-cloud still better deserves the name "Angel of the Desert Wells"--clad in bright plumage, carrying cool shade and living water to countless animals and plants ready to perish, noble in form and gesture, seeming able for anything, pouring life-giving, wonder-working floods from its alabaster fountains, as if some sky-lake had broken. To every gulch and gorge on its favorite ground is given a passionate torrent, roaring, replying to the rejoicing lightning--stones, tons in weight, hurrying away as if frightened, showing something of the way Grand Canon work is done. Most of the fertile summer clouds of the canon are of this sort, massive, swelling cumuli, growing rapidly, displaying delicious tones of purple and gray in the hollows of their sun-beaten bosses, showering favored areas of the heated landscape, and vanishing in an hour or two. Some, busy and thoughtful-looking, glide with beautiful motion along the middle of the canon in flocks, turning aside here and there, lingering as if studying the needs of particular spots, exploring side-canons, peering into hollows like birds seeking nest-places, or hovering aloft on outspread wings. They scan all the red wilderness, dispensing their blessings of cool shadows and rain where the need is the greatest, refreshing the rocks, their offspring as well as the vegetation, continuing their sculpture, deepening gorges and sharpening peaks. Sometimes, blending all together, they weave a ceiling from rim to rim, perhaps opening a window here and there for sunshine to stream through, suddenly lighting some palace or temple and making it flare in the rain as if on fire.

Sometimes, as one sits gazing from a high, jutting promontory, the sky all clear, showing not the slightest wisp or penciling, a bright band of cumuli will appear suddenly, coming up the canon in single file, as if tracing a well-known trail, passing in review, each in turn darting its lances and dropping its shower, making a row of little vertical rivers in the air above the big brown one. Others seem to grow from mere points, and fly high above the canon, yet following its course for a long time, noiseless, as if hunting, then suddenly darting lightning at unseen marks, and hurrying on. Or they loiter here and there as if idle, like laborers out of work, waiting to be hired.

Half a dozen or more showers may oftentimes be seen falling at once, while far the greater part of the sky is in sunshine, and not a raindrop comes nigh one. These thunder-showers from as many separate clouds, looking like wisps of long hair, may vary greatly in effects. The pale, faint streaks are showers that fail to reach the ground, being evaporated on the way down through the dry, thirsty air, like streams in deserts. Many, on the other hand, which in the distance seem insignificant, are really heavy rain, however local; these are the gray wisps well zigzagged with lightning. The darker ones are torrent rain, which on broad, steep slopes of favorable conformation give rise to so-called "cloudbursts"; and wonderful is the commotion they cause. The gorges and gulches below them, usually dry, break out in loud uproar, with a sudden downrush of muddy, boulder-laden floods. Down they all go in one simultaneous gush, roaring like lions rudely awakened, each of the tawny brood actually kicking up a dust at the first onset.

During the winter months snow falls over all the high plateau, usually to a considerable depth, whitening the rim and the roofs of the canon buildings. But last winter, when I arrived at Bright Angel in the middle of January, there was no snow in sight, and the ground was dry, greatly to my disappointment, for I had made the trip mainly to see the canon in its winter garb. Soothingly I was informed that this was an exceptional season, and that the good snow might arrive at any time. After waiting a few days, I gladly hailed a broad-browed cloud coming grandly on from the west in big promising blackness, very unlike the white sailors of the summer skies. Under the lee of a rim-ledge, with another snow-lover, I watched its movements as it took possession of the canon and all the adjacent region in sight. Trailing its gray fringes over the spiry tops of the great temples and towers, it gradually settled lower, embracing them all with ineffable kindness and gentleness of touch, and fondled the little cedars and pines as they quivered eagerly in the wind like young birds begging their mothers to feed them. The first flakes and crystals began to fly about noon, sweeping straight up the middle of the canon, and swirling in magnificent eddies along the sides. Gradually the hearty swarms closed their ranks, and all the canon was lost in gray gloom except a short section of the wall and a few trees beside us, which looked glad with snow in their needles and about their feet as they leaned out over the gulf. Suddenly the storm opened with magical effect to the north over the canon of Bright Angel Creek, inclosing a sunlit mass of the canon architecture, spanned by great white concentric arches of cloud like the bows of a silvery aurora. Above these and a little back of them was a series of upboiling purple clouds, and high above all, in the background, a range of noble cumuli towered aloft like snow-laden mountains, their pure pearl bosses flooded with sunshine. The whole noble picture, calmly glowing, was framed in thick gray gloom, which soon closed over it; and the storm went on, opening and closing until night covered all.

Two days later, when we were on a jutting point about eighteen miles east of Bright Angel and one thousand feet

higher, we enjoyed another storm of equal glory as to cloud effects, though only a few inches of snow fell. Before the storm began we had a magnificent view of this grander upper part of the canon and also of the Cocanini Forest and Painted Desert. The march of the clouds with their storm-banners flying over this sublime landscape was unspeakably glorious, and so also was the breaking up of the storm next morning--the mingling of silver-capped rock, sunshine, and cloud.

Most tourists make out to be in a hurry even here; therefore their few days or hours would be best spent on the promontories nearest the hotel. Yet a surprising number go down the Bright Angel trail to the brink of the inner gloomy granite gorge overlooking the river. Deep canons attract like high mountains; the deeper they are, the more surely are we drawn into them. On foot, of course, there is no danger whatever, and, with ordinary precautions, but little on animals. In comfortable tourist faith, unthinking, unfearing, down go men, women, and children on whatever is offered, horse, mule, or burro, as if saying with Jean Paul, "fear nothing but fear"--not without reason, for these canon trails down the stairways of the gods are less dangerous than they seem, less dangerous than home stairs. The guides are cautious, and so are the experienced, much-enduring beasts. The scrawniest Rosinantes and wizened-rat mules cling hard to the rocks endwise or sidewise, like lizards or ants. From terrace to terrace, climate to climate, down one creeps in sun and shade, through gorge and gully and grassy ravine, and, after a long scramble on foot, at last beneath the mighty cliffs one comes to the grand, roaring river.

To the mountaineer the depth of the canon, from five thousand to six thousand feet, will not seem so very wonderful, for he has often explored others that are about as deep. But the most experienced will be awe-struck but the vast extent of strange, countersunk scenery, the multitude of huge rock monuments of painted masonry built up in regular courses towering above, beneath, and round about him. By the Bright Angel trail the last fifteen hundred feet of the descent to the river has to be made afoot down the gorge of Indian Garden Creek. Most of the visitors do not like this part, and are content to stop at the end of the horse-trail and look down on the dull-brown flood from the edge of the Indian Garden Plateau. By the new Hance trail, excepting a few daringly steep spots, you can ride all the way to the river, where there is a good spacious camp-ground in a mesquit-grove. This trail, built by brave Hance, begins on the highest part of the rim, eight thousand feet above the sea, a thousand feet higher than the head of Bright Angel trail, and the descent is a little over six thousand feet, through a wonderful variety of climate and life. Often late in the fall, when frosty winds are blowing and snow is flying at one end of the trail, tender plants are blooming in balmy summer weather at the other. The trip down and up can be made afoot easily in a day. In this way one is free to observe the scenery and vegetation, instead of merely clinging to his animal and watching its steps. But all who have time should go prepared to camp awhile on the riverbank, to rest and learn something about the plants and animals and the mighty flood roaring past. In cool, shady amphitheaters at the head of the trail there are groves of white silver fir and Douglas spruce, with ferns and saxifrages that recall snowy mountains; below these, yellow pine, nut-pine, juniper, hop-hornbeam, ash, maple, holly-leaved berberis, cowania, spiraea, dwarf oak, and other small shrubs and trees. In dry gulches and on taluses and sun-beaten crags are sparsely scattered yuccas, cactuses, agave, etc. Where springs gush from the rocks there are willow thickets, grassy flats, and bright flowery gardens, and in the hottest recesses the delicate abronia, mesquit, woody compositae, and arborescent cactuses.

The most striking and characteristic part of this widely varied vegetation are the cactaceae--strange, leafless, old-fashioned plants with beautiful flowers and fruit, in every way able and admirable. While grimly defending themselves with innumerable barbed spears, they offer both food and drink to man and beast. Their juicy globes and disks and fluted cylindrical columns are almost the only desert wells that never go dry, and they always seem to rejoice the more and grow plumper and juicier the hotter the sunshine and sand. Some are spherical, like rolled-up porcupines, crouching in rock hollows beneath a mist of gray lances, unmoved by the wildest winds. Others, standing as erect as bushes and trees or tall branchless pillars crowned with magnificent flowers, their prickly armor sparkling, look boldly abroad over the glaring desert, making the strangest forests ever seen or dreamed of. *Cereus giganteus*, the grim chief of the desert tribe, is often thirty or forty feet high in southern Arizona. Several species of tree yuccas in the same deserts, laden in early spring with superb white lilies, form forests hardly less wonderful, though here they grow singly or in small lonely groves. The low, almost stemless *Yucca baccata*, with beautiful lily-flowers and sweet banana-like fruit, prized by the Indians, is common along the canon rim, growing on lean, rocky soil beneath mountain-mahogany, nut-pines, and junipers, beside dense flowery mats of *Spiraea caespitosa* and the beautiful pinnate-leaved *Spiraea millefolium*. The nut-pine, *Pinus edulis*, scattered along the upper slopes and roofs of the canon buildings, is the principal tree of the strange Dwarf Cocanini Forest. It is a picturesque stub of a pine about twenty-five feet high, usually-with dead, lichened limbs thrust through its rounded head, and grows on crags and fissured rock tables, braving heat and frost, snow and drought, and continues patiently, faithfully fruitful for centuries. Indians and insects and almost every desert bird and beast come to it to be fed.

To civilized people from corn and cattle and wheat-field countries the canon at first sight seems as uninhabitable as a glacier crevasse, utterly silent and barren. Nevertheless it is the home of a multitude of our fellow-mortals, men as well as animals and plants. Centuries ago it was inhabited by tribes of Indians, who, long before Columbus saw America, built thousands of stone houses in its crags, and large ones, some of them several stories high, with hundreds of rooms, on the mesas of the adjacent regions. Their cliff-dwellings, almost numberless, are still to be seen in the canon, scattered along both sides from top to bottom and throughout its entire length, built of stone and mortar in seams and fissures like swallows' nests, or on isolated ridges and peaks. The ruins of larger buildings are found on open spots by the river, but most of them aloft on the brink of the wildest, giddiest precipices, sites evidently chosen for safety from enemies, and seemingly accessible only to the birds of the air. Many caves were also used as dwelling-places, as were mere seams on cliff-fronts formed by unequal weathering and with or without outer or side walls; and some of them were covered with colored pictures of animals. The most interesting of these cliff-dwellings had pathetic little ribbon-like strips of garden on narrow terraces, where irrigating-water could be carried to them--most romantic of sky-gardens, but eloquent of hard times.

In recesses along the river and on the first plateau flats above its gorge were fields and gardens of considerable size, where irrigating-ditches may still be traced. Some of these ancient gardens are still cultivated by Indians, descendants of cliff dwellers, who raise corn, squashes, melons, potatoes, etc., to reinforce the produce of the many wild food-furnishing plants, nuts, beans, berries, yucca and cactus fruits, grass and sunflower seeds, etc., and the flesh of animals, deer, rabbits, lizards, etc. The canon Indians I have met here seem to be living much as did their ancestors, though not now driven into rock dens. They are able, erect men, with commanding eyes, which nothing that they wish to see can escape. They are never in a hurry, have a strikingly measured, deliberate, bearish manner of moving the limbs and turning the head, are capable of enduring weather, thirst, hunger, and over-abundance, and are blessed with stomachs which triumph over everything the wilderness may offer. Evidently their lives are not bitter.

The largest of the canon animals one is likely to see is the wild sheep, or Rocky Mountain bighorn, a most admirable beast, with limbs that never fail, at home on the most nerve-trying precipices, acquainted with all the springs and passes and broken-down jumpable places in the sheer ribbon cliffs, bounding from crag to crag in easy grace and confidence of strength, his great horns held high above his shoulders, wild red blood beating and hissing through every fiber of him like the wind through a quivering mountain pine.

Deer also are occasionally met in the canon, making their way to the river when the wells of the plateau are dry. Along the short spring streams beavers are still busy, as is shown by the cotton-wood and willow timber they have cut and peeled, found in all the river drift-heaps. In the most barren cliffs and gulches there dwell a multitude of lesser animals, well-dressed, clear-eyed, happy little beasts--wood-rats, kangaroo-rats, gophers, wood-mice, skunks, rabbits, bob cats, and many others, gathering food, or dozing in their sun-warmed dens. Lizards, too, of every kind and color are here enjoying life on the hot cliffs, and making the brightest of them brighter.

Nor is there any lack of feathered people. The golden eagle may be seen, and the osprey, hawks, jays, humming-birds, the mourning-dove, and cheery familiar singers--the black-headed grosbeak, robin, bluebird, Townsend's thrush, and many warblers, sailing the sky and enlivening the rocks and bushes through all the canon wilderness.

Here at Hance's river camp or a few miles above it brave Powell and his brave men passed their first night in the canon on their adventurous voyage of discovery thirty-three years ago. They faced a thousand dangers, open or hidden, now in their boats gladly sliding down swift, smooth reaches, now rolled over and over in back-combing surges of rough, roaring cataracts, sucked under in eddies, swimming like beavers, tossed and beaten like castaway drift--stout-hearted, undaunted, doing their work through it all. After a month of this they floated smoothly out of the dark, gloomy, roaring abyss into light and safety two hundred miles below. As the flood rushes past us, heavy-laden with desert mud, we naturally think of its sources, its countless silvery branches outspread on thousands of snowy mountains along the crest of the continent, and the life of them, the beauty of them, their history and romance. Its topmost springs are far north and east in Wyoming and Colorado, on the snowy Wind River, Front, Park, and Sawatch ranges, dividing the two ocean waters, and the Elk, Wasatch, Uinta, and innumerable spurs streaked with streams, made famous by early explorers and hunters. It is a river of rivers--the Du Chesne, San Rafael, Yampa, Dolores, Gunnison, Cotchetopa, Uncompahgre, Eagle, and Roaring rivers, the Green and the Grand, and scores of others with branches innumerable, as mad and glad a band as ever sang on mountains, descending in glory of foam and spray from snow-banks and glaciers through their rocky moraine-dammed, beaver-dammed channels. Then, all emerging from dark balsam and pine woods and coming together, they meander through wide, sunny park valleys, and at length enter the great plateau and flow in deep canons, the beginning of the system culminating in this grand canon of canons.

Our warm canon camp is also a good place to give a thought to the glaciers which still exist at the heads of the highest tributaries. Some of them are of considerable size, especially those on the Wind River and Sawatch ranges in Wyoming and Colorado. They are remnants of a vast system of glaciers which recently covered the upper part of the Colorado basin, sculptured its peaks, ridges, and valleys to their present forms, and extended far out over the plateau region--how far I cannot now say. It appears, therefore, that, however old the main trunk of the Colorado may be, all its wide-spread upper branches and the landscapes they flow through are new-born, scarce at all changed as yet in any important feature since they first came to light at the close of the glacial period.

The so-called Grand Colorado Plateau, of which the Grand Canon is only one of its well-proportioned features, extends with a breadth of hundreds of miles from the flanks of the Wasatch and Park Mountains to the south of the San Francisco Peaks. Immediately to the north of the deepest part of the canon it rises in a series of subordinate plateaus, diversified with green meadows, marshes, bogs, ponds, forests, and grovy park valleys, a favorite Indian hunting-ground, inhabited by elk, deer, beaver, etc. But far the greater part of the plateau is good sound desert, rocky, sandy, or fluffy with loose ashes and dust, dissected in some places into a labyrinth of stream-channel chasms like cracks in a dry clay-bed, or the narrow slit crevasses of glaciers,--blackened with lava-flows, dotted with volcanoes and beautiful buttes, and lined with long continuous escarpments,--a vast bed of sediments of an ancient sea-bottom, still nearly as level as when first laid down after being heaved into the sky a mile or two high.

Walking quietly about in the alleys and byways of the Grand Canon City, we learn something of the way it was made; and all must admire effects so great from means apparently so simple: rain striking light hammer-blows or heavier in streams, with many rest Sundays; soft air and light, gentle sappers and miners, toiling forever; the big river sawing the plateau asunder, carrying away the eroded and ground waste, and exposing the edges of the strata to the weather; rain torrents sawing cross-streets and alleys, exposing the strata in the same way in hundreds of sections, the softer, less resisting beds weathering and receding faster, thus undermining the harder beds, which fall, not only in small weathered particles, but in heavy sheer-cleaving masses, assisted down from time to time by kindly earthquakes, rain torrents rushing the fallen material to the river, keeping the wall rocks constantly exposed. Thus the canon grows wider and deeper. So also do the side-canons and amphitheaters, while secondary gorges and cirques gradually isolate masses of the promontories, forming new buildings, all of which are being weathered and pulled and shaken down

while being built, showing destruction and creation as one. We see the proudest temples and palaces in stateliest attitudes, wearing their sheets of detritus as royal robes, shedding off showers of red and yellow stones like trees in autumn shedding their leaves, going to dust like beautiful days to night, proclaiming as with the tongues of angels the natural beauty of death.

Every building is seen to be a remnant of once continuous beds of sediments--sand and slime on the floor of an ancient sea, and filled with the remains of animals, and that every particle of the sandstones and limestones of these wonderful structures was derived from other landscapes, weathered and rolled and ground in the storms and streams of other ages. And when we examine the escarpments, hills, buttes, and other monumental masses of the plateau on either side of the canon, we discover that an amount of material has been carried off in the general denudation of the region compared with which even that carried away in the making of the Grand Canon is as nothing. Thus each wonder in sight becomes a window through which other wonders come to view. In no other part of this continent are the wonders of geology, the records of the world's auld lang syne, more widely opened, or displayed in higher piles. The whole canon is a mine of fossils, in which five thousand feet of horizontal strata are exposed in regular succession over more than a thousand square miles of wall-space, and on the adjacent plateau region there is another series of beds twice as thick, forming a grand geological library--a collection of stone books covering thousands of miles of shelving tier on tier conveniently arranged for the student. And with what wonderful scriptures are their pages filled--myriad forms of successive floras and faunas, lavishly illustrated with colored drawings, carrying us back into the midst of the life of a past infinitely remote. And as we go on and on, studying this old, old life in the light of the life beating warmly about us, we enrich and lengthen our own.