

## THE GRAND CAÑON OF THE COLORADO.

BY CHARLES F. LUMMIS.

**T**HE opening of the new stage-line from Flagstaff has at last made the Grand Cañon of the Colorado easily accessible at its noblest point. For the first time in its history, this sublimest wonder of earth is really open to all sight-seers. Before, the seeing it was at the cost of a journey uncertain, troublesome and exhausting. Now it is easy, even for women and children—as easy as I hope to see it. Far be the day when a railroad shall profane creation's masterpiece, with its infestation of the vulgar, to kill the joy of those with souls. For when a glory of nature is absolutely facile to the herd, it reeks with their inanity and is never again the same. Cheapened sublimity is no more as sublime. What is worth having is worth paying for in some way, and nature's utmost drama is as worthy the protection of some barrier as are our cheap shows. A money admittance might shut out the deserving poor; but the slight physical tax will deter only those whose epidermis is more important than their brains; and they are the class I would see kept out. If people could know what the Grand Cañon really is, an army with banners could not stand them back from it; but all the writers and all the artists and all the photographers cannot tell. Omnipotence itself could only put it there to wait to be seen, and sight is the sole teacher of this most ineffable thing that exists within the range of Man.

Flagstaff, the little lumber town which plays at hide-and-seek amid its stately pines with the noble San Francisco range, is an interesting point of departure from the rail, and may itself well claim some attention. Its scenery is unusual and fine, its climate stimulant as champagne, and its surroundings fascinating. Only ten miles away through the pineries is the great gash of a cañon—a forty-mile split in the level plateau—along whose 600 foot cliffs cling the most easily accessible cliff-builders' ruins in North America. There are many hundreds of these strange, dumb relics of forgotten days; and many of them are excellently preserved. No further from town are equally interesting cave-dwellings. The view from the 13,000 foot peak of Mt. Agassiz—whose top is reached by a good trail only twelve miles long from town—is of almost unmatched extent, and of characteristic beauty. Large game abounds in the superb pine forests, and in the wild cañon of Oak Creek, twenty miles from Flagstaff, is excellent trout-fishing amid such scenery as the gentle Izaak never saw. If one can take time to go down Oak creek, there are the Verde country and the Tonto basin, crowded with matchless wonders—Montezuma's Well, Montezuma's Castle, and the hugest natural bridge on earth. Even the industries of Flagstaff are not uninteresting—the great lumber business, and the quarries whose exquisite red sandstone is being exported in enormous blocks even to Chicago. Down

THE CAÑON FROM BISSELL'S POINT



GENERAL VIEW OF THE GRAND CAÑON.



in the Verde country is an extensive and important mining region; but the pine-belt has never figured as an ore-producer heretofore. Now, however, promising discoveries of asbestos, gold, silver and copper are being made in the Grand Cañon, and are being gradually developed by earnest prospectors.

The Grand Cañon can be reached only from the Atlantic and Pacific Railroad and at three points. The nearest route is from Peach Springs, where the gorge is only twenty-three miles from the railroad. This route takes one to the bottom of the Cañon, via the Peach Springs and Diamond Creek Cañons, and is the route to be chosen between December and May, as it never has snow. It taps a far less noble part of the cañon than the two easterly routes, but a part still nobler than any scenery outside this wonderland. The route from Williams, whence one may also visit the wildly

romantic Cataract Cañon by a ninety-mile drive, is about the same length as that from Flagstaff; and the scenery is very like. But it is a much harder road and offers no such accommodations for the traveler.

The Flagstaff route is really the only one to be taken into consideration. It is open from May 1st to December 1st; both it and the Williams road being closed by snow during the winter. It has the best long mountain-road in the Southwest; and the trip is an easier one than that into the Yosemite. Leaving the comfortable hotel at Flagstaff after an early breakfast, we rattle eastward in a very easy-riding stage, skillfully handled. The morning air is a benediction. Clear and fresh as the mountain snows and pines whose breath it brings, it bathes the skin and swells the chest.

One would be all lungs, to swallow it in bigger draughts. We are nearly



A HALFWAY HOUSE.



THE CAÑON FROM HOVEY'S POINT.

seven thousand feet above the sea, and will improve upon that altitude before the day is done. To our left towers the noble bulk of Mt. Agassiz, and his brethren, still snow-crowned in May; ahead, through the columns of the pines, the brown, enchanted vistas of the beginning plains. For three or four miles the road parallels the railway, and then turns northward among the pines and through the smooth, grassy glades. Flocks of the piñon bluejay chatter from tree to tree. Gray squirrels scamper aloft; and in the openings the querulous prairie-dog ogles us and dives down his casemate. Yonder a sleek antelope stares a moment and then trots leisurely away from view. And all the way the white peak, over-topping the tall pines, looks down upon us, more impressive with each turn, more mighty with each receding step.

Fifteen miles out is a little relay-station, and here we get fresh horses and have a moment for stretching. Then off again through the ever-charming aisles of pine, over volcanic ridges, down the verge of desolate plains which look across to the won-

drous Painted Desert, and past a file of extinct craters of fascinating curve and color. By eleven o'clock we are at the white tents of the Halfway Station, where the horses are again changed, and we wash, stretch, and comfort the within by an excellent meal—thanking fate for the enterprise which has at last made it possible to get to the Grand Cañon unstarved.

The next fifteen miles is through more open country, with view ahead to the vast, dark line of timber which stretches east and west beyond the range of sight. With the third change of horses we enter the outskirts of this forest, and plunge deeper with every mile. Now and then Mt. Agassiz still sees us through some rift in the pinetops, and his squattier brother, Bill Williams. Fifty miles away now, these five peaks are apparently larger and certainly more beautiful than when we left their base.

The ride has been a delight. Unworn horses, comfortable seats, fascinating vistas, and the endless joy of that glorious air—words have given out long ago, and now only an occasional grunt of deep physical sat-





HALT FOR LUNCH.

isfaction tells how they are enjoyed.

It is one of the beauties of this route that it brings one to the greatest sight on earth almost without warning. Only once through the columnar trunks we catch a glimpse of a purple front so vast, so shadowy, so unearthly that the heart seems to stop for an instant; and as swiftly the vision is gone. At half-past five we rattle down a wooded hill to a picturesque hollow, glad with the greenness that hems a spring in the desert. There are people

and the shimmer of a pool, and snowy tents; and in a moment more we are at the camp, none the worse for our stage ride of sixty-seven miles.

The sun is still upon the pine-tops; and while the driver is putting up his team, and the hotel man is hurrying supper, we run up a slope and in less than a hundred yards from camp stand upon the brink of—It. And where the Grand Cañon begins, words stop. In looking back across the years with all their blunders and follies, it is comforting to remember that at least I have



HANCE AND HIS BURROS.

never thought to describe the cañon of the Colorado. A hint, a suggestion, a faint and ridiculously inadequate comparison are all that are possible. Whoso tries more, a sense of the balance of things is not in him.

The cañon at this point is eighteen miles from rim to rim, and a mile and a quarter in perpendicular depth.

tossed in here, neck and crop, it would be lost among what seem to us rocks and not mountains. The cañon is no sheer-walled fissure. It is a gigantic trough, an infinite trap into which seem to have been swept all the huge peaks missing on an upland as big as an empire. It fairly bristles with their mighty crests; but it holds



"AS THE SUN FALLS LOWER A MATCHLESS CHANGE CREEPS IN."

From this first vantage-ground we see only about forty miles to the east; but by walking out to the end of a promontory we can command a view of about a hundred miles up and down the gorge. The cañon is an ineffable chasm split across the floor of this vast upland. From the dead level, which stretches hundreds of miles from either side to the very rim, one steps into view of this matchless wilderness of peaks. We stand on a plain and look across over the tops of five hundred mountains, each greater than the noblest peak east of the Rockies. If Mt. Washington were

them safe. Not one can peer over its strange prison walls.

As the sun falls lower, a matchless change creeps in. There is probably no other place on earth where one can sit still and have the infinite scene-shifters change the stage-setting so strangely and so fast. With every hour there is a new cañon. Every degree of the sun loses mountains that have awed us, and carves out new ones more terrific still. There are more colors in a day there than man ever saw in any other one spot—"the last still loveliest." One cannot say which is supreme; the infinite, un-





LOOKING ACROSS THE GORGE.

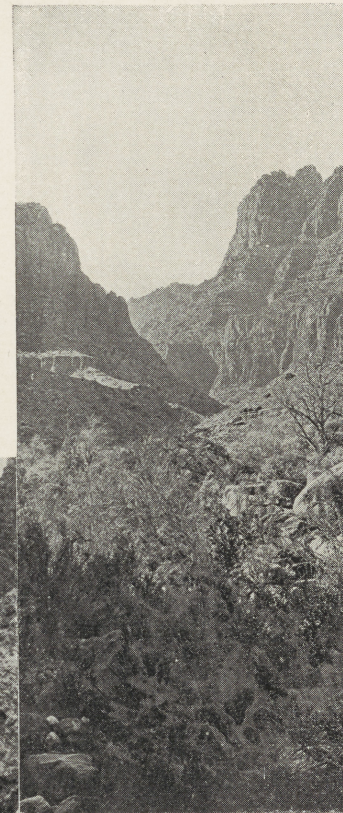
earthly refulgence of color by midday, or the sunset pallor when color is gone, and when through an air that is itself blue the receding giants peer back heavenly dim. The one overwhelms the eye; the other is vision turning to memory even as we gaze.

There are comfortable fare and good beds and the sleep-insistent air to fortify us for the morrow's tramp. First thing of all, when the sun shall lift across the Painted Desert, be up for a good morning to that view at the campside. Then, when breakfast shall have warmed the body to the mind's wakefulness, off along the rim-rock to a promontory three miles east. There are new marvels at every turn. And at last, where that gray rock juts into the vast abyss, is the one finishing touch—Ruskin's "human interest." A hundred feet ahead of the promontory a titanic column of rock, 2,000 feet high, less than 100 in diameter, towers aloft alone. Its top is 100 feet below the rim, with which a narrow neck of sandstone connects it. And as we admire its columnar grace, there is a sudden clutch at the heart-strings. Yes! Those are masonries upon its flat top!

To find the narrow and gruesome trail—to slide, clamber, cling, balance and at last to gain that wondrous castle is the work of ten minutes. But that is for want of opposition. Were a boy with a pebble to dispute our passage, the pluckiest would turn back.

If ever stone walls held romance, these are they. Upon that aerial islet, whose oval top is seventy-five feet in its longest diameter, was a human home. The outer wall hugs the rim of the cliff everywhere; and behind it are the little rooms. Two unassailable climbing-places to it are there; the rest is impregnable as a star. From the outer (northern) rooms, one can lean over the wall, still breast high, and drop a pebble 2,000 uninterrupted feet. Such was a *home*, in the immemorial days before Columbus when the Pueblos bought safety from the nomads at such a price. But there was something besides fear writ in the hearts of those stubborn who declined the courteous attentions of the scalper—those brown first Americans who lived and looked ever across such scenery as no king of earth ever saw or conceived.

We say we have seen the Grand Cañon—with very much the same liberality of language with which we speak of having "seen" the stars. Our sight is about as exhaustive of the one as of the other. Our eyes blunder over a wilderness of wonders and bring away a few impressions. No man will ever *really* "see" the Grand Cañon—it is inexhaustible, incomprehensible, endless. But it is well to see as much of it as one can. Its boundless majesty does not open to one point of view. Above all, after gazing from the rim, go down to the turbid river and look up. John Hance, the pioneer whose cabin is close to the stage camp, has built an admirable trail clear to the stream. A young man too recently from Boston to feel humble in



A RIM OF THE CAÑON.



DOWN THE TRAIL.

the presence of the infinite, once wrote a gruesome tale of the terrors of this path—of course making himself the adequate hero to overcome them. Whereat I fancy the heavy-laden burros who tramp this trail weekly must have mocked him—not to mention the girls and middle-aged ladies who have made the trip without seeing a chance for heroics. Any trail which climbs over 6,500 feet in seven miles is of course warm climbing; but Hance's trail is harmless, if provocative of perspiration, and it gives an idea of the cañon which Humboldt himself could not have figured out from the rim.





A GLIMPSE OF THE CAÑON FROM HANCE'S TRAIL.

There is one Grand Cañon of the Colorado. Nothing else on earth is like it, or approaches it, or prepares for it, or suggests it. If you would see the first and the last place in the world,

go to it. That is, of course, if you are a foreigner. If you are an American, snub the Cañon and dodder off across seas for some sight more befitting patriotic eyes.

## DYNAMICAL GEOLOGY OF THE GRAND CAÑON.

BY RICHARD HAY DRAYTON.

**T**ERRACE beyond terrace; palisades rising above palisades; buttes, platforms, domes, temples, towers, pinnacles, in endless profusion, water-worn cliffs and precipices for miles and miles away to right and

left of us. A wild confusion of noble architectural forms; a multiplicity of ornamental designs; a divine splendor of rich coloring; a visible representation of the invisible Almighty's unseen industry—peopleless cities falling into

ruins on every side. The effect of time and meteoric forces over material hardness and ponderosity; the battlefield of a Titanic contest, and the final scene before accomplished victory in the long struggle between active persistence and passive endurance. An exhibition of stubbornness and unyielding, but futile opposition to the inevitable—opposition to slow destruction. Corroding time, erosive elements, and transporting waters on one side; granite, lime and sandstone rocks on the other—antagonists pitted against each other in the vast arena of the American Desert. Solidity resisting the assaults of light air and instable water; a mighty individuality harassed to death by an infinite succession of fresh foemen individually weak and insignificant. Nature fighting against herself, her right hand assailing her left hand; a destructive contest resulting in reconstruction, and displaying, during its long continuance, the workings of her economic laws. Such is the disorderly confusion of thoughts and impressions that assails the mind as one gazes on the Grand Cañon of the Colorado from Point Sublime, and the truth seizes upon the soul that it is a portion of the framework of a continent exposed to view by Time's disrobing hand.

What length of time, how many millions of centuries it required for the operation of these laws to cut that great chasm through the bed-rocks of the plains, no man knoweth. Long before the river sawed by corrasion its deep channel, a vast lake had to be drained, and its bed of sedimentary deposits carried away by the slow process of erosion. The drainage of this lake was caused by the gradual upheaval of the region which it occupied leaving a river in the deepest part of its basin. This ancient lacustrine region is now called the Grand Cañon district, a land of cliffs and cañons fashioned by the operations of nature during an incalculable period of geological time. It lies principally in the northwestern portion of Arizona, hav-

ing a northerly extension into Utah. In its northwesterly and southeasterly direction its length is about 180 miles, while its width from northeast to southwest is about 125 miles. The area included may be roughly estimated at from 13,000 to 16,000 square miles, according to Clarence E. Dutton, Captain of Ordnance, U. S. A., who surveyed the Grand Cañon district during 1880 and preceding years. Across the middle of this district the Colorado by the irresistible process of corrasion has cut its highway with so tortuous a course, that the Grand Cañon is more than 200 miles long, and with such immensity of time that it has eaten into the bowels of the earth from 5,000 to 6,000 feet. The meteoric forces that break up rocks, rain, wind and frost have aided the river in producing the most magnificent and terrific water course in the world, and as soon as lateral exposure of rock occurred, erosion continued the work until the mighty cañon now varies in width from five to twelve miles. It is no narrow gorge, no deep, gloomy gash with perpendicular cliffs from brink to base; no dreadful abyss wrought by some terrific earthquake; no gaping wound in the planets' crust inflicted by a convulsive spasm. No sudden and violent effort formed this wonderful water-channel, this great highway of a resistless river. It is the work of Nature's laws of progression and improvement, a work carried on during an incomprehensible lapse of time. It is a work of vast proportions, of divine magnificence and inconceivable variety of ornamental design and coloring. Doomed to destruction, silent cities grand with cathedrals and castles, domes, pinnacles and towers; colossal buttes and cliffs slowly yielding to decay; amphitheater recesses and niches present themselves in unimaginable profusion. And beneath this grand array of architectural structures, on the floor of this stupendous picture gallery of nature, the waters of the Colorado, down cataracts and rapids, with turmoil and



uproar, impetuously rush ever onward, grinding, tearing and biting the hard rocks, and cutting with their sand-charged volume, whirled onward with fierce energy, deeper and deeper into their rocky bed.

In its passage through the cañon the Colorado varies from 250 to 450 feet in width, yet its volume of water is enormous. Its tributaries bring into it nearly all the western drainage of the Rocky Mountains running from north to south of Colorado, and most of the drainage of southwestern Wyoming. The Green, Grand, and San Juan rivers, with their countless affluents, pour their waters into the Colorado above the Grand Cañon and combine to form a fluid mass whose volume is immense, and whose velocity and impetus have been and are irresistible. Mr. Henry Gannette, geographer of the census, estimates the area of the drainage system of the Colorado above the Grand Wash at 165,000 square miles. The pace and depth of the river in its race through the cañon constitute its might. Fluvial velocity depends upon declivity of the river bed, and the fall of the Colorado in the Grand Cañon between the junction of the Little Colorado and the Grand Wash, a distance of 218 miles, is 1,640 feet, giving an average of 7.52 feet per mile. Although the rate of descent varies greatly in different parts of the cañon, this declivity gives a fearful velocity to the water when the rains of winter fill each rill and stream of the Rocky Mountains, and their united contributions rush headlong into the Grand Cañon, causing rises in the Colorado varying from thirty to sixty feet. Then it is that the river displays its corrosive power. Great boulders, many tons in weight, and fallen fragments of all sizes from the impending cliffs are tossed about and whirled along, battering the side walls and each other, grinding up themselves and undermining the cliffs, pounding out niches and holes, deep recesses and cav-

erns. But its corrosive might is not wholly due to the high velocity given to its waters by its great declivity; there is another most important element of destruction, and that is the presence of large quantities of hard sand and fine material which are brought down to the Colorado by its numerous affluents. The scouring, rasping and filing action of this fine sand constitutes a very effective process, and the river is annually cutting deeper and deeper into the subjacent strata.

Thus an inner gorge is carved out, meandering along the wide flooring of the upper chasm—a flooring cut up into innumerable water-chiseled rifts, rents and cracks. The depth of this inner gorge varies from 1,000 feet to over 2,100 feet. Captain Dutton thus describes his impressions and perceptions, while standing on the brink of this chasm, at the foot of the Toroweap Valley: "The river is clearly defined below, but it looks about large enough to turn a village grist-mill; yet we know it is a stream three or four hundred feet wide. Its surface looks as motionless as a lake seen from a distant mountain top. We know it is a rushing torrent."



MARBLE COLUMN, KANAB CAÑON.



COLORADO RIVER NEAR DIAMOND CREEK.

The ear is strained to hear the roar of its waters, and catches it faintly at intervals as the eddying breezes waft it upward; but the sound seems exhausted by the distance. We perceive dimly a mottling of light and shadow upon the surface of the stream, and the flecks move with a barely perceptible cloud-like motion. They are the fields of white foam lashed up at the foot of some cataract, and sailing swiftly onward. \* \* \* It seems as if a strong, nervous arm could hurl a stone against the opposing wall-face; but in a moment we catch sight of vegetation growing upon the very brink. There are trees in scattered groves which we might at first have mistaken for sage or desert furze." On another occasion, writing of his view of this chasm from Point Sublime, he remarks: "Its upper 200 feet is a vertical ledge of sandstone of a dark rich brownish color. Beneath it lies the granite of a dark iron-gray shade, verging toward black, and lending a gloomy aspect to the lowest depths. Perhaps half a mile of the river is disclosed. A pale, dirty red, without glimmer or sheen, a motionless surface, a small featureless spot, inclosed in the dark shade of granite, is all of it that is here visible. Yet we know it is a large river, 150 yards

wide, with a headlong torrent foaming and plunging over rocky rapids."

And this fearful chasm, that strikes the beholder with a feeling of terror, aye, of horror, is the production of corrasion and erosion. Vast is the effect of erosion; prodigious is the amount of work it accomplishes, and immense the periods of time during which its ceaseless industry is carried on. It is estimated by geologists that from the Grand Cañon district, with its area of about 16,000 square miles, 10,000 feet of strata have been swept away by the process of erosion. For æons after æons the cliffs, terraced by disintegration, receded farther and farther from the shore-line of the ancient sea, till they now exhibit a series of terraces at the high plateaus in southern Utah, where, like Titan's stairways, they lead down to the lower platform through which the Colorado has rasped out its latest water chasm. The uppermost formation of this entire platform is the Carboniferous; but where are the Permian, Mesozoic and Tertiary formations which ought to be lying above the Carboniferous one, and which are found in their proper places in the great terraces alluded to? They have been swept away by the slow process of erosion, to form new land. Destruction and reconstruction



far away from the source of supplies of material have been the principles at work in the denudation of the Grand Cañon district. The whole region has been repeatedly upheaved and submerged. During the period of the last elevation the great inland lake was drained, and the river scooped out its first wide channel and became the great receiver of the drainage system of an immense region. Then began the removal of the lacustrine bed. The slow, deliberate upheaval continued; lateral tributaries poured their avalanches of water into the main river through gorges which they plowed out for themselves; and for untold milleniums the proceeds of erosion were carried into the Colorado and borne away, until the old lake-bed was denuded down to the Carboniferous formation, and in the center of its wide highway the river was gradually cutting a deeper and narrower path to which its waters were

confined at their low stages. It was slow work, and for thousands of years the river alternately swept over its ancient bed and retired to its new channel, as the rainy and dry seasons followed each other; but the time came when the new gorge had been carved out so deep that its brinks were rarely overflowed, and at last, never. The process of corrasion, however, did not cease, and lower and lower the river has sunk until its surface is many hundreds of feet below the broad pathway of its by-gone youth.

High above the narrow bed to which it has retired in its old age, on right and left of it, stand legions of mute witnesses to the part it played in archaic days in the transformation of a region. It has not only been the vehicle of transportation, but the motive power of those keen tools of Nature—sand and disintegrated rock—a power of simultaneous duality.

