

# RUNNING THE CAÑONS OF THE RIO GRANDE

## A CHAPTER OF RECENT EXPLORATION.

BY ROBERT T. HILL, UNITED STATES GEOLOGICAL SURVEY,  
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SO far as man's conception of time is concerned, the American desert is, always has been, and always will be. Its vast oval area of sterile plain, relieved here and there by mountain-ranges, extends between higher bordering crests—those of the Rocky Mountains on the east and the Pacific Sierras on the west—from British Columbia to the end of the southern plateau of Mexico. Of the feeble streams which originate within the great desert only three cross the barrier sierras and ultimately reach the sea. These three are the Columbia of the north, the Colorado of the southwest, and the Rio Grande of the southeast.

The wonders of the Colorado of the West were made known to the world through the dangerous trip of Major J. W. Powell, in 1869,<sup>1</sup> and are now brought within easy reach of the Pullman-car tourist. The cañons of the Rio Grande are longest and least known; they have been and still are the least accessible to man, and have not hitherto been fully described.

Before describing the passage of the cañons of the Rio Bravo, the middle portion of the Rio Grande, let us glance a moment at the country through which they pass—the matrix, so to speak, out of which the cañons are carved. The widest and lowest part of the great American desert closely follows the international border, and is traversed by the Southern Pacific Railway. The railway on the north and the Rio Grande on the south inclose a vast triangular area known in Texas as the Big Bend Country.

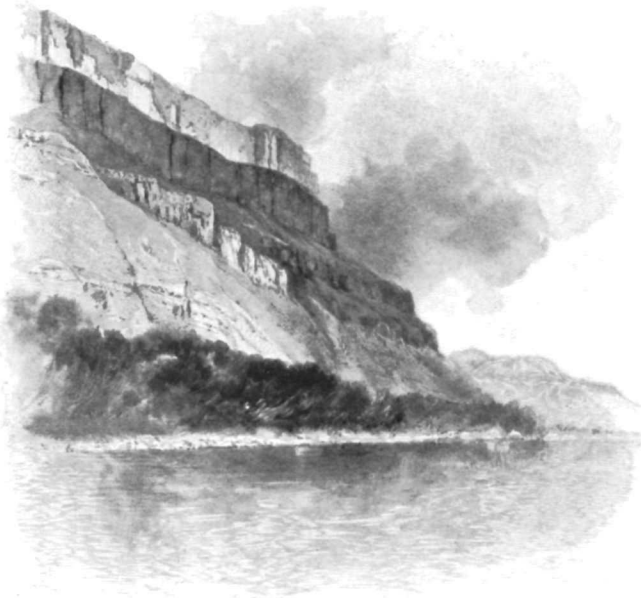
Away from the railway the Big Bend—sometimes called the Bloody Bend—is known as a "hard country," that is, one in which, through lack of water, civilization finds it difficult to gain a foothold. Although abundantly supplied with waterworks, such as scarped and cañoned streamways, it possesses a minimum of water. These great arroyos are mocking travelers, which suggest that nature became tired of making this country before turning on the water.



FROM A PHOTOGRAPH.  
ROBERT T. HILL.

<sup>1</sup> The narrative of which, illustrated by Thomas Moran, was published in this magazine.

Every other aspect of the Big Bend Country—landscape, configuration, rocks, and vegetation—is weird and strange and of a type unfamiliar to the inhabitants of civilized lands. The surface is a peculiar combination of desert plain and volcanic hills and mountains, the proportions of which are increased by the vast distance which the vision here reaches through the crystalline atmosphere. There is no natural feature that can be described in familiar words.



DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY C. W. CHADWICK.

BLACK ROCK CAÑON.

There are no true forests except upon the tips of the highest peaks, but shrubby plants abound, which are as strange and unfamiliar as the names they bear. Each of these plants is armed with thorns. You are wounded, caught, held, or anchored by this spiteful vegetation at every step away from the beaten trails first made, long centuries ago, by the Mescalero Apaches and the Lipans. One is also roasted unmercifully by day by 130° of sunshine, and cooled almost to the freezing-point at night. These great extremes of temperature shatter even the very rocks into fragments.

Around the southern side of the Big Bend Country flows the Rio Bravo, separating this hard portion of Texas from a similar and still harder portion of Mexico. Between the two republics the river serves as a permanent frontier which is virtually impassable. Few

Americans realize the impregnability and isolation of this frontier, or that it represents a portion of our national boundaries which heretofore has never been completely traversed or explored.

When the expedition was first announced many witty remarks were made concerning it. The idea was ridiculed that there were either mountains or cañons in this region, and one facetious correspondent said that he had lived upon the Rio Grande for twenty

years, and added that, owing to the absence of water in its sandy bed, the only way the river could be explored was in a buggy. As I drew nearer the region, more serious obstacles were suggested. As we reached San Antonio the already familiar story that the trip could not be made for want of water began to be supplemented by other dangers. At the Pecos we first heard from old frontiersmen, what proved to be the truth, that too much water was to be dreaded rather than too little, which, coming in sudden floods, would be likely to dash to pieces any craft that entered the stream. At Alpine and Marfa, the only two villages of con-

sequence in the desert stretch of three hundred miles between the Pecos and El Paso, graver warnings were received. Oneman who had spent considerable time upon the river stated that huge obstacles had fallen into the cañons, which made them utterly impassable; others warned us that smallpox was ravaging Presidio del Norte, our proposed point of embarkation, and that in the semi-open country along a portion of the river below Presidio there were murderers, thieves, and bandits, who would destroy any one invading their domain by shooting volleys at night into sleeping camps. These stories of danger, apparently from authentic sources, grew in magnitude as we neared our destination, so that when we finally reached the river two men who had engaged to go upon the expedition backed out from sheer fright.



DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY J. TINKEY.

#### THE SENTINEL OF THE GRAND CAÑON.

Many obstacles had to be overcome in order to undertake the journey. Lumber for the boats, purchased at San Antonio, was shipped one hundred and fifty miles by rail to Del Rio, where it was made into three strong, flat-bottomed rowboats, each thirteen feet long and three feet wide, their bottoms protected with longitudinal cleats to provide against the constant scraping over rocks. The finished boats were sent nearly two hundred miles by rail to Marfa, where they were placed upon hay-wagons and hauled overland seventy-five miles due south across the desert to the river at Presidio del Norte.

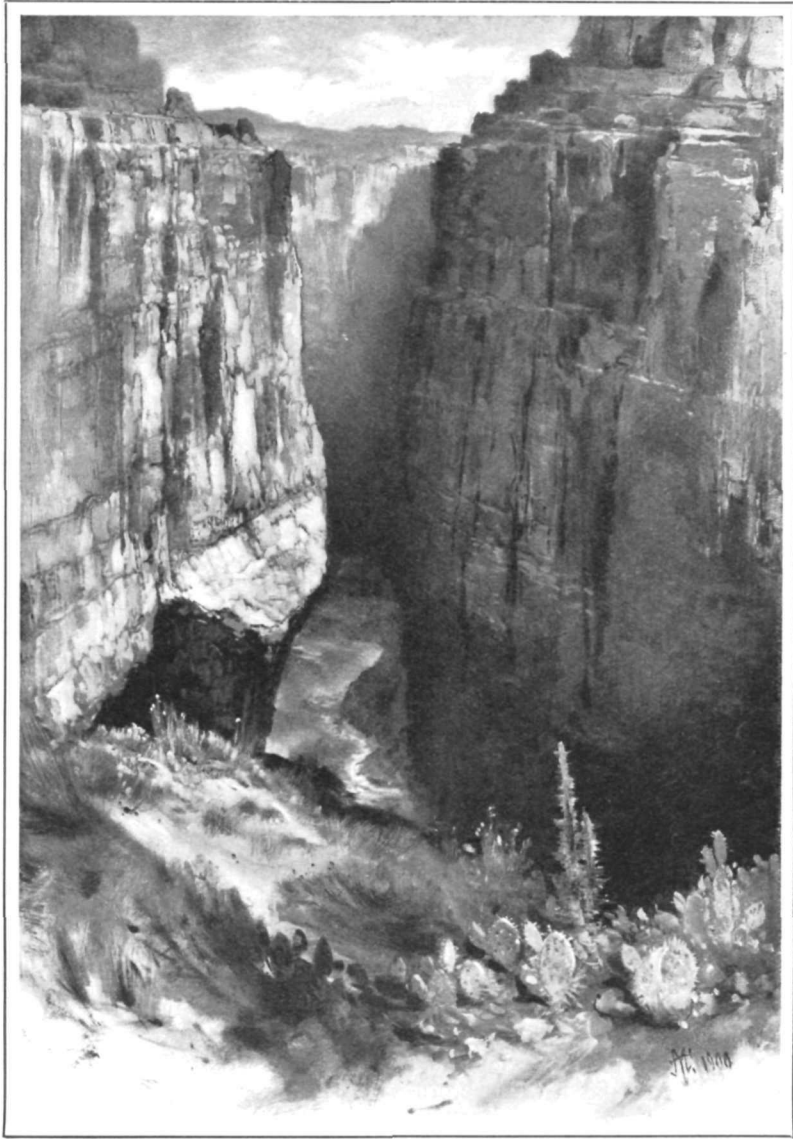
For the trip a crew of men who could shoot as well as row a boat had to be provided. By great good fortune we secured the services of James MacMahon, an old-time trapper, and of Henry Ware, both of whom were frontiersmen of great strength, inured to hardships, skilled with oar and gun, and capable of unlimited endurance. These, with my nephew Prentice Hill, a lad of nineteen who was in for any venture, an extra boatman, a Mexican cook, and the writer, made a party of six, two men to a boat.

At Marfa, tents and other camp luxuries were packed and shipped back to Marathon. We carried only photographic and surveying apparatus, guns, ammunition, and supplies. No personal baggage was permitted except such as one could roll in his bedding. Tents may seem superfluous in the arid

region, but, strange to say, it rained for five nights in succession after we disposed of them. These rains proved a blessing, for they caused a sufficient rise in the river to save us an incalculable amount of drudgery in dragging boats over the shoals.

As far as Shafter our road to Presidio was over grass-covered but waterless plains of not unpleasing aspect. Beyond Shafter the road suddenly descends from the upland grassy plains to one of the horrible ocotillo deserts characteristic of the outer basins of this portion of the Rio Grande valley. These basins are old alluvial plains, covered with gravel and yellow adobe soils, extending far away from the river in successive terraces and reaching five hundred feet above it. They are covered by a spiteful, repulsive vegetation, the chief feature of which is the ocotillo, a plant with small green leaves on long and slender stalks that reach above a sub-structure of lechuguilla, cactus, sotol, and other thorny plants, like serpents rising from a Hindu juggler's carpet. In this belt lies Presidio del Norte, a village with a few miserable adobe houses, opposite the older and larger Mexican town of Ojinaga.

Just above Presidio the Rio Conchos enters the Rio Grande from Chihuahua. This is a long stream, and brings the first permanent water to the main river. In fact, the Conchos is the mother stream of the Rio Grande. Above the mouth of the Conchos the Rio Grande was a dry sand-bed. Below,



DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY S. DAVIS.

VIEW OF THE GRAND CAÑON DE SANTA HELENA FROM THE BEACH NEAR THE MOUTH.

it was a good stream one hundred feet wide, with a strong current, which was to carry us along at a rate of three miles an hour. At this season of the year the Conchos is flooded by the summer rains that come from the Pacific. Our plans were based upon the assistance of one of these rises, and we were not disappointed. Two days after our arrival at Presidio the river rose a foot, giving exactly the desired stage of water.

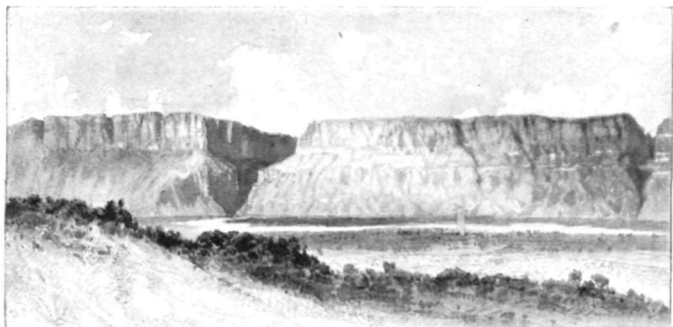
At noon, October 5, 1899, we pushed out into the river at Presidio, and started on our long journey into the unknown. I do not claim to be the only man who has traveled

the tortuous and dangerous channel of the frontier stream; for one man, and one only, James MacMahon, has made at least three trips down the river. Mine, however, was the first exploring expedition to pass the entire length of the cañons, and, with the exception of MacMahon's, was the only attempt that succeeded. Others, like Gano and Neville, have passed the fearful twelve miles of the Grand Cañon de Santa Helena. The only government expedition, the International Boundary Survey, pronounced the cañons impassable, and gave up the attempt to survey them, except the lower hundred

miles of the course, which Lieutenant Mich-  
 eler passed through.<sup>1</sup>

MacMahon was interested neither in sci-  
 ence, exploration, nor travel. He ventured  
 the stream without knowledge of its dangers,  
 and merely because, as a lifelong hunter  
 and trapper, he knew that the beaver prob-  
 ably lived along its unmolested banks.  
 These animals alone interested him, and a  
 map made by him, if he could make such a

came from seething and dangerous torrents  
 of water foaming over huge rounded boul-  
 ders of volcanic rock which everywhere form  
 the bottom of the river. Reaching these  
 rapids, we had to get out of the boats and  
 wade beside them, pushing them off or over  
 the stones, or holding them back by the  
 stern-lines. This process had to be repeated  
 many times a day for the entire distance,  
 and, as a consequence, all hands were con-  
 stantly wet. The swift cur-  
 rent and uncertain footing  
 of the hidden rocks make  
 these rapids very dangerous.  
 A loss of balance or a fall  
 meant almost certain death.  
 It was our very good fortune  
 not to upset a boat or lose  
 a man. Ware was especially  
 cautious at such places, for  
 only a year before, while  
 upon a hunting and fishing



EAST SCARP OF THE PLATEAU  
 AND OUTLET OF THE GRAND  
 CAÑON DE SANTA HELENA.

thing, would note only  
 beaver banks and danger-  
 spots, for these were all  
 that he saw. Unguided and  
 alone, he loaded his boat  
 with traps, placed it in the  
 stream, and slowly drifted down to Del Rio,  
 braving a thousand dangers and making the  
 first successful passage. This man, whose  
 name has perhaps never before appeared in  
 print, had spent his long life in such exploits,  
 and is one of the few old-time trappers still  
 to be found in the West.

The finding of MacMahon was the first of  
 the dozen fortuitous circumstances which  
 made my trip possible, and there was not a  
 day that his knowledge of the dangers of the  
 stream did not save us from loss and de-  
 struction. Always kind and unobtrusive, he  
 was as cautious as a cat, being at times ap-  
 parently over-careful. He was ever on the  
 lookout for a safe channel in the treacherous  
 current, beaver slides on the banks, and  
 border Mexicans in the bushes.

Hardly had we begun to enjoy the pleas-  
 ant sensation of drifting down the stream  
 when a roaring noise was heard ahead. This



DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY R. C. COLLINS.

SUMMIT OF THE GRAND CAÑON PLATEAU.

expedition on the Lower Rio Grande, his  
 companion had been drowned in a place of  
 this character.

The first twenty miles lay through a low,  
 broken desert country. The river-banks  
 were of muddy silt, with here and there a  
 lone cottonwood or willow. Ahead of us  
 loomed the Bofecillos Mountains of Texas  
 and the San Carlos Sierra of Mexico, closing  
 in upon the river.

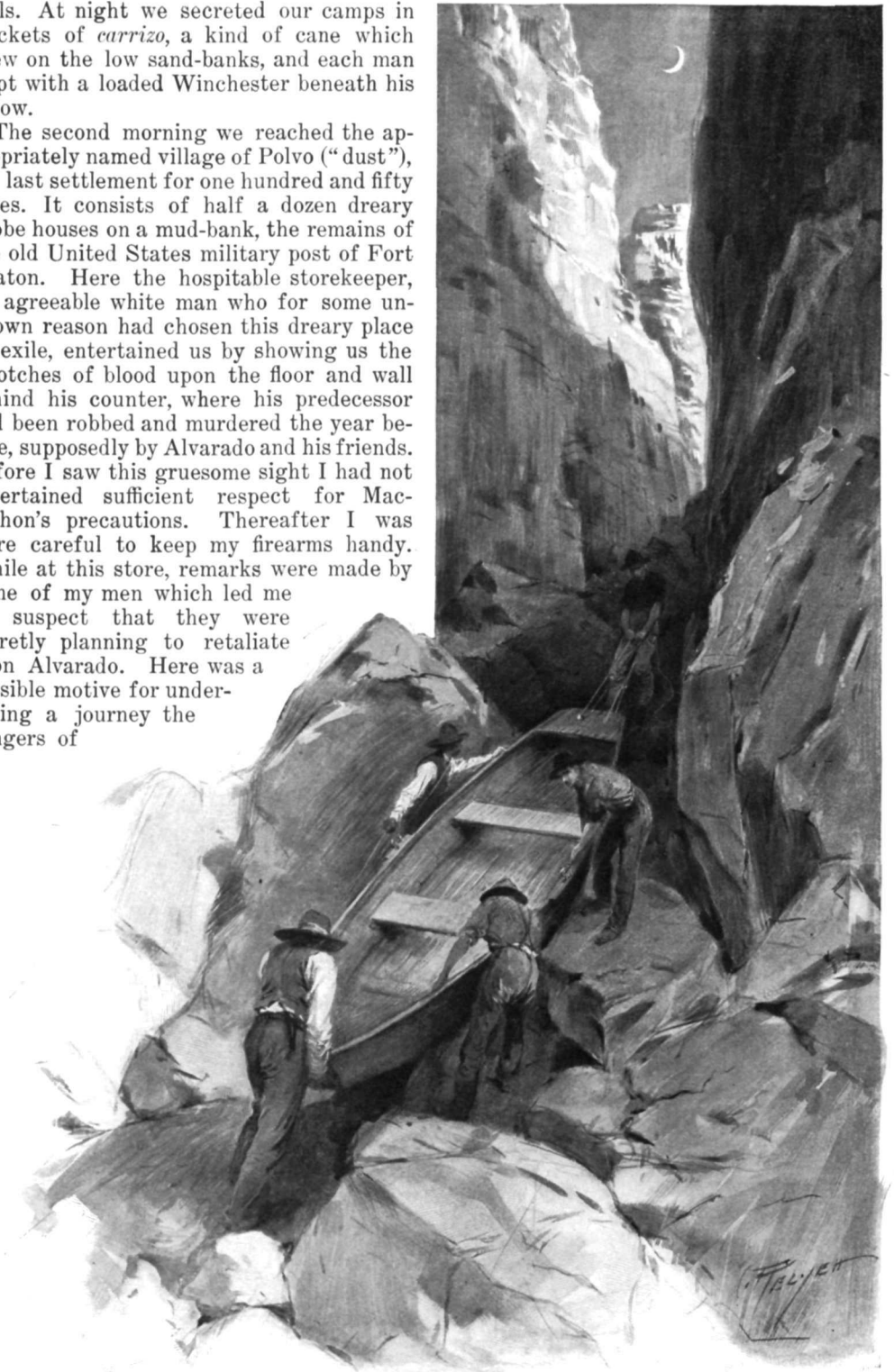
This region is infested by thieves and  
 murderers, and MacMahon was watchful.  
 Our loaded rifles lay beside our oars, and  
 every bush and stone was closely scanned  
 for men in ambush. The special objects of  
 terror were a famous Mexican, Alvarado,  
 and his associates. Alvarado possessed a  
 mustache one side of which was white and  
 the other black. From this he was called  
 "Old White Lip." To his hand had been  
 charged the murder of several men who had  
 attempted the river route, and it was he  
 who, MacMahon avowed, the year before  
 had riddled his sleeping camp with rifle-

<sup>1</sup> See "Report of the United States and Mexican  
 Boundary Survey," by William H. Emory, Vol. I. (Wash-  
 ington, 1857).



balls. At night we secreted our camps in thickets of *carrizo*, a kind of cane which grew on the low sand-banks, and each man slept with a loaded Winchester beneath his pillow.

The second morning we reached the appropriately named village of Polvo ("dust"), the last settlement for one hundred and fifty miles. It consists of half a dozen dreary adobe houses on a mud-bank, the remains of the old United States military post of Fort Leaton. Here the hospitable storekeeper, an agreeable white man who for some unknown reason had chosen this dreary place of exile, entertained us by showing us the splotches of blood upon the floor and wall behind his counter, where his predecessor had been robbed and murdered the year before, supposedly by Alvarado and his friends. Before I saw this gruesome sight I had not entertained sufficient respect for MacMahon's precautions. Thereafter I was more careful to keep my firearms handy. While at this store, remarks were made by some of my men which led me to suspect that they were secretly planning to retaliate upon Alvarado. Here was a possible motive for undertaking a journey the dangers of



DRAWN BY C. M. RELVEA. HALF-TONE PLATE ENGRAVED BY H. C. MERRILL.  
CROSSING THE ROCKS IN THE GRAND CAÑON DE SANTA HELENA.

which they depicted in vigorous terms. In vain I protested that this expedition was for scientific purposes, and not for vengeance. They only replied that they would shoot Alvarado on sight, "like any other varmint."

A few miles below Polvo the huge chocolate-colored cliffs and domes of the Bofecillos Mountains began to overhang the river, and before night we entered the first of the series of cañons of the Rio Grande, in which we were to be entombed for the succeeding weeks. This bears the cheerful name of Murderer's Cañon, for here, a year or two before, the body of a supposed victim of Alvarado was found lodged on a sand-bar. This and the Fresno Cañon, a few miles below, are vertical cuts about six hundred feet deep through massive walls of red volcanic rock. All the other cañons are of massive limestone. The rocks are serrated into vertical columns of jointed structure, and when touched by the sunlight become a golden yellow. The sky-line is a ragged crest, with many little side cañons nicking the profile. When evening came we were glad to camp on a narrow bank of sandy silt between the river and its walls. Lying upon our backs and relieved of the concentration of our wits upon the cares of navigation, we were able to study and appreciate the beauties of this wild gorge.

The river itself, here as everywhere, is a muddy yellow stream. In places, patches of fine white silt form bordering sand-bars; about twenty-five feet above these there is a second bench, covered by a growth of dark-green mesquite. The whole is inclosed by vertically steep, jointed rock walls. The thread of water and the green ribbon of the mesquite bench are refreshing sights, for immediately above the latter, on both sides, the desert vegetation always sets in.

Toward sunset I scaled a break in the cañon to reach the upland and obtain a lookout. Above the narrow alluvial bench forming the green ribbon of river verdure I suddenly came upon the stony, soilless hills forming the matrix out of which the valley is cut, glaring in the brilliant sunshine and covered with the mocking desert flora. The sight of this aridity almost within reach of the torrent of life-giving waters below, the blessing of which it was never to receive, was shocking and repulsive. It also recalled a danger which ever after haunted us. Should we lose our boats and escape the cañons, what chance for life should we have in crossing these merciless, waterless wastes

of thorn for a hundred miles or more to food and succor?

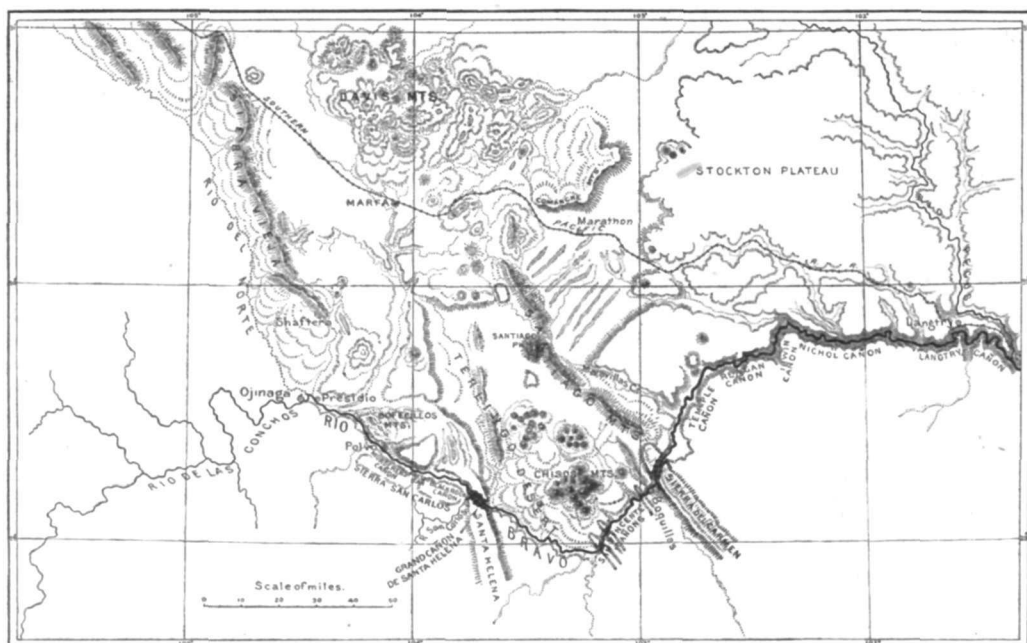
Below the mouth of Murderer's Cañon the rapids were unusually bad and dangerous, and it required all hands but one, who stood guard with cocked rifle, to wade beside the boats and preserve them from destruction. As this cañon suddenly ends, its vertical walls continue north and south, as the front of the mountain which it has crossed. We then entered a valley which presents a beautiful panorama of desert form and color. The hills are of all sizes and shapes. Those on the outer border are dazzlingly white, chalky rocks, surmounted here and there by black caps of volcanic rock. The slopes are vermillion foot-hills of red clay. Still lower are the river terraces of the desert yellow clay and gravel, the whole threaded by the narrow fringe of fresh green along the river.

In this wild country lived the notorious Alvarado. Only a most fortunate mistake prevented my men from carrying out their threat to exterminate this bandit. Alvarado had a surname as well as a Christian name, and when they were told that the next ranch down the river was Ordóñez's, they did not understand that this was another name for Alvarado until after we had passed him with an infant in his arms, serenely watching us float down the stream. I breathed easier on finding this out, but the men swore audibly and long at their misfortune in not recognizing the supposed monster.

Still lower down the river this region becomes more weird. Immediately adjacent to the stream there are great bluffs of a dirty yellow volcanic tuff, which weather into many fantastic, curvilinear forms. One of these, two hundred feet high, stands out conspicuously from its surroundings, an almost perfect reproduction of the Egyptian Sphinx. This, with the sterility of the surroundings and the dirty mud colors, constantly recalled the character of the Nile.

We were relieved to see before us the entrance of another vertical "shut-out," or cañon, into which we passed at about four o'clock in the afternoon, and found a suitable camping-ground, hemmed in on each side by vertical walls and out of rifle-range from above. This cañon was only a mile or two long, and was very similar to Murderer's Cañon in its scenic and geologic features.

The next day the river followed a sinuous course through a most picturesque district which we named the Black Rock Cañon. This was a widely sloping, terraced cañon cut one thousand feet below the summit of



REGION OF THE RIO GRANDE CAÑONS.

a level plateau. The edges of this plateau were lozenged by erosion into symmetrical buttes with great flat caps and scarp lines above terraced slopes, the graceful curves of which wound back and forth from the river's edge. The tabled tops and lower slopes of these buttes were thick strata of dazzling white chalk, while between them was an immense bed of black lava, which always occupied the same relative position between the white bands, as if kind nature had painted a stripe of black about the hills to break the monotony of the desert glare. All day we wound through these hills, now beneath vast bluffs at the water's edge, and then again in more open places, each revealing a new and more beautiful vista.

Toward evening a graceful sweep of the river brought us into a more open basin opposite the mouth of the San Carlos Creek. This stream, which can barely be said to flow, comes in from the Mexican side, and is the only flowing tributary of the Rio Grande that we passed between the Conchos and the Pecos. Near its headwaters in the wild and rugged San Carlos Mountains is a little settlement of Indians, the remnant of a once famous, desperate tribe from which the creek and the mountains take their names. Opposite is a wide, sloping plain of limestone, from the center of which rises a wonderful symmetrical butte a thousand feet high, the summit of which is a head presenting the

profile of an old man, which we named the Sentinel, from the watch which it kept over the entrance of the Grand Cañon.

We traveled fully one hundred miles to this point by river, but as the crow flies it is only about fifty miles below Presidio. We camped upon the Texas side, beneath a limestone bluff. A mile below us down the river was a vast mountain wall, the vertical escarpment of which ran directly north and south across the path of the river, and through which the latter cuts its way. The river disappears in a narrow vertical slit in the face of the escarpment. This mountain is the Sierra Santa Helena, and the rift in its face is the entrance to the so-called Grand Cañon of the Rio Grande. Why this particular cañon is called Grand is not known, for many of the cañons below were not only as deep, but far longer and in every way equally deserving of the name. But Texas is poor in topographic names; most of the features are without names at all. This was the case even with the great mountain through which this cañon passed. Later the Mexicans told us that the feature was called the Sierra de Santa Helena, and this particular cañon will be spoken of as the Grand Cañon de Santa Helena.

The Sierra de Santa Helena is an elongated, quadrangular mountain block half a mile high, twelve miles wide, and fifty miles long, and lies directly across the path of the



river. Its summit is a plane surface slightly tilted to the west. The edges are precipitous scarps. Imagine this block cut through vertically with the finest saw, and the rift of the saw will represent the cañon of the river.

Before entering the cañon, let us look at it as did Dr. G. G. Parry of the Mexican Boundary Survey, who, deeming it impassable, climbed the heights and saw it from above. The general surface of the plateau presents no indication of a river-course, and you are not aware of its presence till you stand suddenly on its abrupt brink. Even here the running water is not always visible, unless advantage be taken of the projecting points that form angles along the general course of the river. From this dizzy height the stream below looks like a mere thread, passing in whirling eddies or foaming over broken rapids; and a stone hurled from above into this chasm passes completely out of sight behind the overhanging ledges. From the point formed by its last projecting ledge the view is grand beyond all conception. You can here trace backward the line of the immense chasm which marks the course of the river till it emerges from its stupendous outlet.

The next morning, after the customary involuntary wetting at the rapids by which we made our nightly camps, we rowed straight for the narrow slit in the mountain. The river makes a sudden bend as it enters the cañon, and almost in the twinkling of an eye we passed out of the desert glare into the dark and silent depths of its gigantic walls, which rise vertically from the water's edge to a narrow ribbon of sky above. Confined in a narrow channel less than twenty-five feet wide, without bench or bank upon which to land, our boats glided along without need of oars, as we sat in admiration of the superb precipices which hemmed us in on each side. The solemnity of the scene was increased by the deathlike stillness which prevailed and by the thought of those who had tried the

journey and either lost their lives or narrowly escaped destruction. The walls rose straight toward the sky, unbroken by bench or terrace, and marked only by an occasional line of stratification in the cream-colored marbles and limestones which composed them. The waters flowed noiselessly and swiftly through this cañon, with hardly a ripple or gurgle except at one place. Their flow is so silent as to be appalling. With the ends of our oars we could almost touch either wall. The solemnity and beauty of the spectacle were overwhelming.

We had gone only a few miles when a halt was suddenly forced upon us. Directly ahead was a place where one side of the great cliffs had caved away, and the debris spread across the narrow passage of the river. This obstacle was composed of great blocks of stone and talus rising two hundred feet high, which, while obstructing the channel, did not dam the waters, but gave them way through the interstices of the rocks. The boulders were mostly quadrangular masses of limestone fifty feet or more in height, dumped in a

heterogeneous pile, like a load of bricks from a tip-cart, directly across the stream. At this place, which we appropriately named "Camp Misery," trouble began. Although the obstruction was hardly a quarter of a mile in length, it took us three days to get our boats across it.

A landing was made upon the rocks, and scouts were sent out to explore a route across them. In the course of three or four hours we found that it would be necessary to pack the contents of the three boats over these stones, first uphill to an altitude of one hundred and eighty feet, and then down again to the stream below the obstruction. Crevices were found between the boulders where a foothold could be obtained, and the articles were passed hand over hand to a height of one hundred feet. Our faithful Mexican, with ax in hand, then cut away



THE RIO GRANDE WATERSHED.

the thorns and daggers, and made a path along the base of the cliff for the remainder of the way. It was not until the following night that the last piece of baggage was transferred.

The handling of the equipment was an easy task in comparison with a greater difficulty that lay before us. The three boats, each weighing three hundred pounds, were yet to be lifted over the vast cubes of limestone along the immediate course of the river, around and between which the water dashed with the force of a mill-race, and where a slip of the foot on the smooth rocks meant certain death.

Foothold had to be sought on these great stones, and often precious hours were lost in seeking a means to ascend them. This was sometimes accomplished by throwing lariats, the dangling ends of which were scaled hand over hand. Once upon the summit of the rocks, the boats were pulled and pushed up by the exertion of all the crew. Three days were consumed in this task before we passed our final night at Camp Misery, ready to resume our journey the following morning. At the place where we ate and slept there was not a foot of flat earth to lie upon, and we sought such perches as we could obtain upon the sharp-cut edges of the fallen limestone blocks, above danger of flood. For myself, by a liberal use of the geologic hammer, I widened out a crevice in the stone, in which, by lying crooked, I managed to pass the nights.

During our three days' stay at Camp Misery we had abundant opportunity to observe the majestic features of the great gorge in which we were entombed. The scene within this cañon is of unusual beauty. The austerity of the cliffs is softened by colors which camera or pen cannot reproduce. These rich tints are like the yellow marbles of Portugal and Algiers, warmed by reddening tones which become golden in the sunlight. The cliffs are often rigid and geometrically vertical, but usually the severity is modulated by gently swelling curves which develop at the edges of the horizontal strata or vertical joint-seams. In many instances the profiles are overhanging or toppling. This was forcibly illustrated on one occasion, when, having selected a spot upon which to make my bed, my attention was directed by the men to an immense boulder so delicately poised upon the very edge of the cliff immediately above me that the vibration of a rifle-shot would apparently have dislocated it and sent it thundering down.

Here and there the surging waters at the angle of a bend, beating straight against the limestone, have bored great caves beneath the bluffs at the water's edge. In places gigantic columns five hundred feet high have been undermined and dropped down a few feet without tumbling, so that they now lean in uncertain stability against the main wall.

From above, the sky-line was of never-ceasing interest, whether bathed in sunshine while shadows filled the vast crevices below, or flooded with the glorious moonlight which is one of the characteristics of the desert. Frequently there were vast caverns a hundred feet or more below the crest-line, into which we could look from below and see their other ends opening out upon the plain above. Castellated and turreted forms in natural mimicry of the feudal structures of the Rhine were frequent. One of these, opposite our camp, was so natural that upon awakening one moonlight night and seeing it above me it took several moments for me to dispel the idea that it was a genuine castle, with towers, bastions, portcullis, and port-holes.

A striking feature of this cañon was the absence of animal life. There was little sign of bird, rabbit, wolf, squirrel, or other animal, so common upon the uplands above. The only indigenous creature we saw was a small species of bat, new and unknown to me, which fluttered about at night. A single covey of blue quail, which in some manner had made their way into these depths, were so frightened by our intrusion that it was pitiful to see their vain attempts to fly out to the cliffs above. Time and again the mother bird called her flock together and led an attempted flight to the summit. The quail is not noted as a soarer, the trajectory of its flight being almost as flat as that of a rifle-ball. They rose two hundred or three hundred feet, with a desperate whirring of their wings, and then fell back almost exhausted into the rocky debris of the cañon.

While buried in this cañon at Camp Misery we were constantly impressed by the impossibility of escaping from it in case we should lose our boats or be overwhelmed by sudden floods. Leisure moments were devoted to looking for some possible manner by which the vertical walls could be scaled. For its entire length there is no place where this cliff can be climbed by man. In order to reach its summit, after finishing my river trip, I made a special overland journey from Marathon, and succeeded in surmounting its

north end some ten miles from the river and in making a photographic view of the cañon from above.

Having finally succeeded in crossing the obstruction early one morning, we transported our baggage to the boats, preparatory to leaving. Before the boats were loaded a tremendous roaring sound like distant thunder was heard up the cañon, and we saw that what we most dreaded was happening—the river was rising. A big flood of the ordinary kind would have veneered the dangerous rocks with water, and our prospects for escape would have been small. We hastily piled our baggage into the boats and sprang aboard. It was either stay and starve or go and chance it. Fortunately, this particular rise proved to be a small one, just sufficient to give the desired impetus to our craft, and our course through the cañon was rapid. The walls increased in altitude as we descended the stream, and just as they reached their greatest height, some seventeen hundred and fifty feet, our boats suddenly emerged into the sunlit desert.

Looking back, the beautiful outlines of the east cliff of the plateau of Santa Helena, from which we had emerged, were seen. We lingered long in contemplation of this most remarkable feature. It is an abrupt escarpment of massive limestone which rises in a vertical wall to a height of seventeen hundred and fifty feet and extends northwest and southeast for sixty miles, fifty miles in Mexico and ten miles in Texas. Its sky-line is as square-cut and horizontal as the top of a table. The face of the cliff appears absolutely vertical, although it is marked by one slight bench. Nicking the summit here and there at wide intervals are deep V-shaped rifts of minor waterless cañons whose mouths are suspended in the air. As bold and extensive as is this mountain, it has hitherto found no place or name on published maps. For a week after passing out of the cañon this great escarpment could be seen behind us.

This majestic wall of rock forming the eastern escarpment of the Santa Helena owes its contour to the geologic process known as faulting. Along a great fracture developed parallel to its face the rocks have dropped down over five thousand feet. Some forty miles to the east there is another scarp line, parallel to that of the Sierra del Carmen. This faces in the opposite direction, or toward the west, so that these gigantic cliffs oppose each other. Between these two

walls of rock the strata once met in an arch, making the great crest of the regional mountain uplift. The intervening region, or lower country, represents a downfallen wedge. Such a country constitutes a rift valley, just as if a longitudinal slice were made in the crust of a watermelon and then pushed in until its area was below that of the remaining surface. In this case it was the arch of the Rocky Mountains which had dropped down, constituting a peculiar belt of country, into which we suddenly emerged as we left the cañon, and which may be called the Terlingo Desert. Although this desert is only forty miles wide, the river pursues a circuitous course through it of fully one hundred miles. For days we followed vast bends or ox-bows until we had made the great south bend of the river.

The Terlingo Desert is one of the most bizarre pieces of landscape that can be imagined. Though called a plain, this is only out of courtesy to its more mountainous perimeter. Its surface is covered by nearly every form of relief within the topographic category, including stretches of level plain, vast terraces, deep arroyos, lava-capped hills, necks and dikes of old volcanoes, huge mesas, summits and small mountain-ranges, collectively forming one of the hottest and most sterile regions conceivable.

The crowning feature of this desert is the lofty and peculiar group of peaks known as Los Chisos ("the ghosts"). These weird forms are appropriately named. They are ragged points of a reddish granitic rock, weathering into yellow and orange colors like those from which the Yellowstone derives its name; they rise almost straight into the air to a total altitude of nine thousand feet, or sixty-five hundred feet above the river. The vertical slopes of the peaks, rifted here and there by joints and seams, give to them the aspect of being clad in filmy drapery. Wherever one climbs out of the low stream groove these peaks stare him in the face like a group of white-clad spirits rising from a base of misty gray shadow and vegetation. Many are the weird forms and outlines which the peaks assume. Two specially conspicuous rocks are known as "Mule Ears," and, seen from a distance of twenty miles or more, are remarkably suggestive of the objects for which they are named. They are separated from the main summits by a valley which, from its inaccessibility, the cow-boys have named "Cow Heaven." Surrounding these peaks on all sides is an area of lower hills and old terraces covered with desert gravel and

vegetation, some of which are black-capped volcanic hills; others are of dazzling yellow sandstone; still others show stripes of stratified vermilion and chocolate colors.

Day after day we drifted through this weird desert, hemmed in by low bluffs of dirty yellow soil, and seeing few signs of human habitation. One day we ran across three or four Mexicans leisurely driving a herd of stolen cattle across the river into Mexico. This is the chief occupation of the few people who choose this wild region for a habitation. A little later we were greeted at our camp on the Mexican side by a white man accompanied by seven or eight Mexicans, all fully armed. We recognized him as a notorious ex-convict known in Texas as "Greasy Bill." Later, upon my return to Marathon, I learned from the rangers that he was the outlaw most wanted in Texas, and that only the year before he had murdered an old man named Reed, who kept a store on the Texas side.

We were now nearing the apex of the Great Bend. The river had never been correctly meandered, and we naturally looked for the point where the stream which we had followed so many miles in a southwesterly direction should turn toward the north. Five times we came to the southern apex of bends in the stream, each time thinking we had made the turn, before we finally reached the most southern point in our journey. Our general course then changed from a southwest to a northwest direction, which we were to follow for many days.

Just after making the turn we entered the first of the two cañons known as the Little and the Big San Vincente cañons respectively. These cut through a long, low sierra within the general area of the Terlingo valley. Directly through and across the front of the sierra a vertical black line could be seen marking the vast chasm through which the stream makes its way. As we neared the entrance, the river presented the appearance of apparently plunging into a seething hole without visible outlet. This cañon, like the Grand Cañon de Santa Helena, is cut through limestone, but the strata are tilted and bent into many picturesque effects. The bends of the stream in its depths are more numerous, and the walls are broken by the entrance of many lateral cañons presenting pinnaced and terraced cream-colored sides.

In this cañon we saw a Rocky Mountain sheep far above us upon an inaccessible ledge. Serafino took one shot at him, and he tumbled back in a majestic leap.

The passage of the San Vincente cañons took only a few hours, and at noon we found ourselves in the eastern or Tornillo extension of the Terlingo Desert, near the ruins of the old Mexican Presidio de San Vincente. These ruins were seen in 1852 by the Mexican Boundary Survey, and were apparently as ancient and deserted then as to-day. They consist of extensive roofless walls of old adobe buildings standing in an uninhabited region, upon a low mesa a mile or two from the river. The people of the Big Bend region have a tradition that in the days of the Spanish régime they were the site of a prison where convicts were kept and worked in certain mythical mines in the Chisos Mountains. They are the ruins of an old Spanish frontier military post.

The following morning we passed another short cañon, through a mountain region similar to that of San Vincente, which was picturesque in every detail. Beyond this we arrived at the village of Boquillas, where we encountered the first and only American civilization upon our expedition.

At this point, and for about fifty miles down its course, the river is reinforced by a remarkable series of hot springs bursting out of vertical fissures. The first noted of these was in the middle of the stream, and its presence was made apparent by the beautiful, limpid water welling up in the midst of the muddy current. Roughly estimated, the volume of the stream is doubled by springs of this character as it passes through these mountain gorges.

Boquillas is a widely divided settlement that owes its existence to a near-by silver mine in the adjacent mountains of Mexico. Upon the American side there are a store, a custom-house, and a post-office. These are connected with the Mexican side of the river by a great wire-cable carrier a quarter of a mile long, terminating in Mexico at a smelter where enterprising Americans are reducing the ore found in a vast pocket twelve miles away in the Sierra del Carmen.

Two miles below the smelting-works is a densely crowded village of two thousand Mexican inhabitants. This, like other Mexican towns along the Rio Grande, presents none of the neatness or artistic suggestion of the villages of other parts of Mexico. There is no sign of stucco, whitewash, or of ornamentation of other kind. Streets and walls and interiors are all a continuation of the dirty adobe soil of which the houses are built, made no less repulsive by the filthy pigs, burros, chickens, and other inhabitants



which seem to possess no separate apartments. It is rumored that the ore is becoming exhausted, and that within a few months the industry will cease. Then the inhabitants of the three Boquillas will disperse like the flakes of white cloud that sometimes dot the sky, and the solitude of the desert will again reign the entire length of the Big Bend.

East of the Boquillas group of settlements the wonderful western escarpment of the Sierra del Carmen rises straight above our path. Although the crest, which makes a gentle arch, is less regular than that of the opposing escarpment of the plateau of Santa Helena, it is higher and of grander relief. Surmounting the center of the arch of the plateau is a single steeple-like peak, which may be termed the Boquillas Finger. This landmark, like the Chisos summits, was often in sight from points one hundred miles away.

Across the center of the Sierra del Carmen, which rises seventy-five hundred feet above the sea, the river cuts another vertical chasm, which is even more worthy of the name of the Grand Cañon than that of the Sierra de Santa Helena. The Mexican Boundary Surveyors, upon encountering it, were obliged to make a detour of fifty miles around the mountain to approach the river again, where they finally gave up the attempt of further exploration, and reached the lower Texas country by a long journey through Mexico. The cañon profile presents a summit nearly five thousand feet above the river. The river itself, in approaching this mountain, first turns from side to side in short stretches, as if trying to avoid the mighty barrier above it, and then, as if realizing that it is constantly becoming involved in the maze of foot-hills, suddenly starts across the sierra.

In crossing this mountain the river pursues a tortuous course made of many small rectangular bends, around each of which a new and more surprising panorama is presented. The walls of the cañon are of the same rich cream-colored limestone rocks as those which make the cañons of Santa Helena and San Vicente. Owing to the dislocation of the strata, the rocks are more varied in form, and are broken into beautiful pointed salients and vertical columns. Wonderful indeed are the remarkable forms of rock sculpture. Among these was a vast cylindrical tower like the imaginary pictures of Babel, standing outward of the cliff-line and rising, through perspective, far above.

Upon the opposite side was another great Rhine castle. Frequently lonely columns of rock five hundred feet or more in height stood out from the front of the cliff in an apparent state of unstable equilibrium. Caverns of gigantic proportions also indented the cliff at many places. Again, the great yellow walls were cut from base to summit by wonderful fissures filled with white calcite or vermilion-colored iron ore. Huge piles of talus here and there encumbered the bases of the cliffs.

The moon was full while we were in this cañon, and the effects of its illuminations were indescribably beautiful. Long before its face could be seen, its light would tip the pinnacles and upper strata of the cliffs, still further gilding the natural yellows of the rocks. Slowly this brilliant light sank into the magma of darkness which filled the cañon, gently settling from stratum to stratum as the black shadows fled before it, until finally it reached the silent but rapid waters of the river, which became a belt of silver. Language cannot describe the beauty of such nights, and I could never sleep until the glorious light had ferreted out the shadows from every crevice and driven darkness from the cañon.

After several days our boats suddenly drifted out of the shades and beauties of the Carmen Cañon and emerged into the last of the open desert basins. As we did so, we suddenly came upon a thousand goats, accompanied by their shepherds and dogs, which were drinking at the water's edge. Startled by the unusual appearance of boats, they quickly fled.

In this small desert, known as Stillwell's Valley, which is only ten or twelve miles across, we again see the remarkable alluvial deposits of the Rio Grande rising in wonderful terraces back to the bases of the mountains. The human mind is almost incapable of conceiving the vast quantity of boulders which in times past have poured out of these vertical cañons into such open plains.

Evidence of animal life, hitherto so rare, now began to appear. A lizard was noted, and two immense ravens, half hopping, half flying, defied us to shoot them. Everywhere along the muddy banks beaver slides were found, and the willows had been cut by them. Three deer were also seen, while now and then a covey of blue quail scrambled up the stony banks and scattered in the cactus-shrub. A mocking-bird sang in the thorny bush. Only one who is accustomed to the



animal life of the desert can imagine the joy with which we greeted these lowly friends.

Beyond the little Stillwell Desert we entered Temple Cañon. The severity of its walls was frequently broken by ravines, so that at nearly every bend there stood before one a beautifully sculptured mountain, golden in the sunlight, with pinnacled summits, and cliffs carved into exquisite panels and grottoes.

Our journey was just half accomplished, and we had crossed to the eastern side of the Cordilleras, and were upon the Atlantic slope. The general direction of the river now bent due north, and although the true mountains of folded structure had ceased, the stream continued to be indented to a depth of two thousand feet or more in cañons of limestone cut out of the great plateau which flanks the eastern side of the Mexican sierra. This lower course is almost a continuous cañon to Del Rio, and from an esthetic point of view is even more picturesque and beautiful than the portion of the river already described.

Beyond Temple Cañon the cliffs recede, leaving a valley from one to five miles in width between the distant walls. Through a huge gap in these the mouth of Maravillas Creek has been cut. This is a horrible desert arroyo, leading northward for one hundred miles or more to Marathon. It has a channel sufficient for the Hudson, but is utterly void of water. Now and then, in the intervals of years, great floods pour down its stony bottom, giving the boulders and other desert debris a further push toward the Rio Grande and the sea. Such floods, however, are so unusual and sporadic that I have never found a man who knew this stream to run from source to mouth. No profounder testimonial to the slowness of nature's great geological processes can be found than these vast waterless waterways. The mouth of Maravillas Creek marks the end of the great northerly stretch of the Rio Grande, and from there on the algebraic sum of the direction of the river's course is almost due east to the mouth of the Pecos.

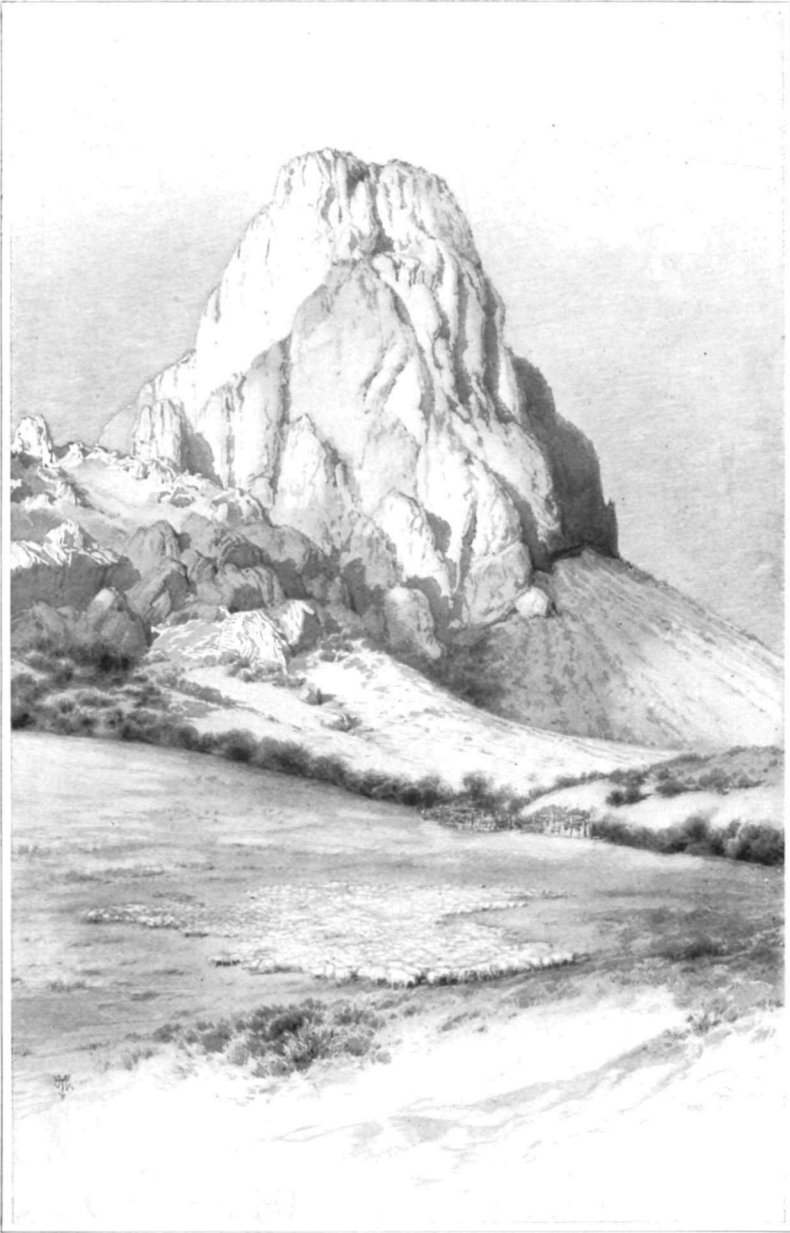
Below the mouth of the Maravillas the river continues in a narrow valley between the now more widely separated cliffs of the cañon, which are great buttes and mesas, the dissected fringe of a high limestone plateau above us. These cliffs are cut into many lobes and buttes. Occasionally one of these stands out and apart from the main cliff-line in lonely grandeur. Of this nature

is Castle Butte, a notable landmark. This rises fully fifteen hundred feet above the river. Its circular, flat top, the square-cut escarpment cornice, and the gracefully sloping pediment are beautiful illustrations of the wonderful symmetrical sculpture seen along the river. These wider vistas are only of brief duration. Soon the rocky walls again approach each other, and the stream resumes its crowded channel between vertical walls, presenting only at rare intervals a place where one can land and find a small spot to camp.

We had now been nearly a month on the river, and the necessities of the occasion forced us to push on as fast as possible. In the steep cañons there had always been a tense feeling of anxiety, accompanied by a longing to escape their dangers as soon as possible. This feeling, as well as our limited commissary, ever drove us onward.

Shortly after making the turn to the east, and in the depths of a beautifully terraced cañon, we came upon another copious hot spring running out of the bluff upon a low bench, where it made a large, clear pool of water. We reached this place one Sunday noon. The sight of this natural bath of warm water was tempting to tired and dirty men, and here we made our first and only stop for recreation. After lunch, most of the party proceeded to the warm pool, and, stripping, we literally soaked for hours in its delightful waters, stopping occasionally to soap and scrub our linen. While here the party indulged in guessing the height of the inclosing cliffs. The air was so clear in this country that one always underestimated the magnitude of the relief. None of our estimates exceeded five hundred feet. Seeing a good place for the first time in all our course to scale the cañon walls, I climbed them and measured the exact height, which was sixteen hundred and fifty feet. The view from the summit was superb, revealing the panorama of the uplands, which is completely shut out while traversing the chasm below.

In the eastern course of the river the rock forms and sculpture become more varied, and one is constantly surprised by new types of sculpture and scenery. For miles we passed through a perpendicular cañon the cliffs of which were serrated by rough and cavernous indentations and great vertical seams, between which the ledges were molded into ragged forms like the Bad Lands of Dakota. Below this, in another cañon, the sculpture is marked by



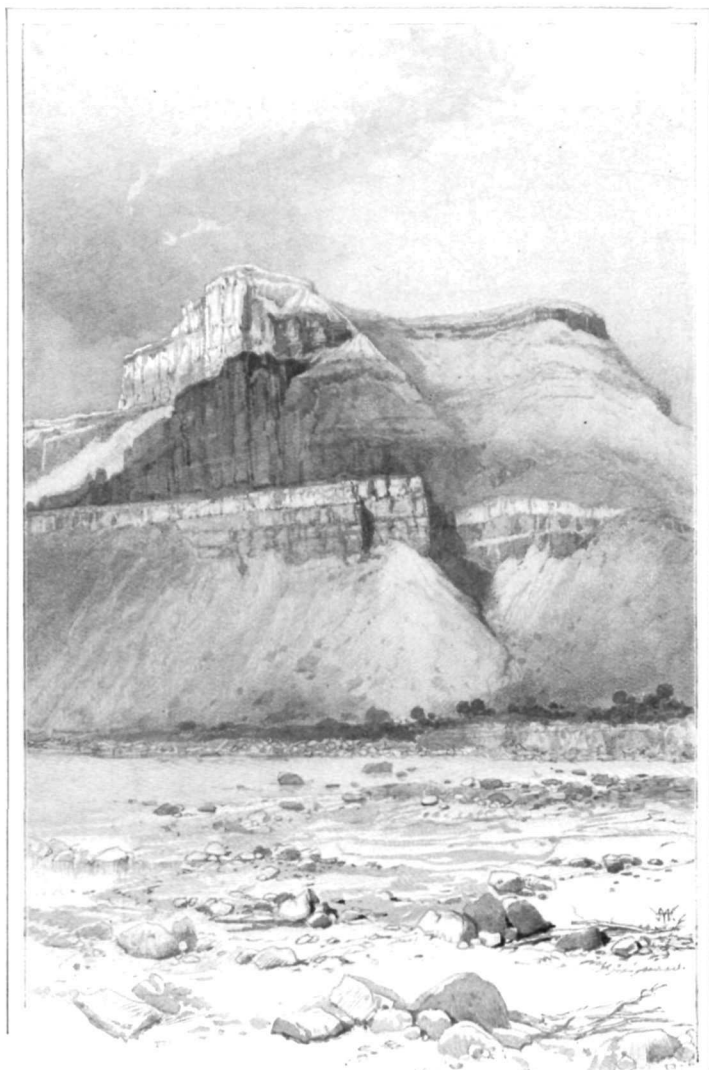
DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY F. H. WELLINGTON.

NORTH PEAK OF THE LOS CHISOS MOUNTAINS.

queer, eccentric pinnacles projecting above the ragged sky-line—spires, fingers, needles, natural bridges, and every conceivable form of peaked and curved rocks.

About the center of the eastern stretch of the river the altitudes of the cañon walls decrease slowly and almost imperceptibly until the river completely surmounts the great limestone formation which has been the chief matrix of its prison walls. These

walls, to their termination, lock in the river securely from approach. In this eastern stretch the immediate gorge of the river is generally a cañon within a cañon. Within a double cañon of this type MacMahon had once been caught by a flood. He endeavored to escape to the uplands, in order to make his way to the railway. After three days of attempt he finally reached the summit of the immediate cañon, only to find another wall,



DRAWN BY THOMAS MORAN, FROM A PHOTOGRAPH. HALF-TONE PLATE ENGRAVED BY R. C. COLLINS.

#### IN TEMPLE CAÑON.

invisible from the river, which it was utterly impossible to surmount. Fortunately, the river had meanwhile subsided, and he escaped by resuming his boats.

There is a break in the continuity of the cañon near where the river crosses the 102d meridian. This interruption is only a short one, for the stream soon begins to descend again into a rock-bound trough. In this portion, and as far east as the mouth of Devil's River, some of the most beautiful and picturesque effects are found. The walls are no longer of orange color, but are of chalky limestone of purest white, which weathers into great curves rather than vertical ledges. In one cañon, for instance, the walls are

carved into the most remarkable perpendicular pillars, resembling columns of the Egyptian type, each of which is over one hundred feet in height. Unfortunately, the kodak films were exhausted, and the glass plates failed to receive the impression of this artistic scene. In other places the river has gradually undermined a channel far beneath a great ledge of overhanging limestone, the summit of which projected as smooth, slanting gables overhanging the stream, under which we sailed for hours.

Beautiful as were these cañons, and prolific as they were in game and in caves of wild honey, the hardships we had endured were telling upon the temper of the party,

and we no longer appreciated the noble surroundings. We longed only to escape from the walls, upon which we now began to look as a prison. Ten hours of hard rowing each day, every one of which was burdened with the additional labor of dragging the boats over dangerous rapids, constant wetting by wading and ducking, the baking due to a merciless sunshine, the restricted diet, made no better by Serafino's ignorance of hygienic cooking and Shorty's constant additions of bacon grease to every article, together with the ever-present apprehension of danger, had put us all in a condition of quarrelsome, nervous tension, which is a dangerous state in camp, no matter how friendly all may be, and it was with pleasure that we finally sighted a longed-for landmark indicating a point where we could abandon the river.

Opposite the village of Langtry, near the top of a vertical cliff some three hundred feet high, is a small bluff cavern. Poised on the edge of this inaccessible cavern is a huge pile of sticks skilfully entwined into what is perhaps the largest birds' nest in America. Since the trans-Pecos country was first known this nest has been a landmark, and until lately was inhabited by a pair of eagles which here annually brought forth their young. A few years since, however, a company of colored soldiers were stationed near this place, and, with the instinct which prompts men to shoot at every living thing, they killed the birds, which even the hardened frontiersmen had long protected.

We landed the contents of our boats upon a little beach opposite this nest. A messenger proceeded a mile and a half to the village of Langtry and secured a packhorse, which conveyed our belongings to the railway-station. It was gratifying to see once more even the crudest habitation of man. We were received by a famous old frontiersman, whose hospitable house is decorated with a peculiar sign reading:

Law West of the Pecos.

ROY BEAN,

Justice of the Peace and Notary Public.

San Antonio Lager Beer.

We had hardly reached the railway-track when we became aware of the fact that civilization's dangers are sometimes greater than those of nature. A locomotive whistle was heard in the distance, the first time that sound had greeted our ears for over a month. From the fact that this whistling continued fully five minutes we understood that it was a signal of distress, and that a train had become derailed somewhere on the wild and desert prairies. Soon a hand-car appeared. An appeal for medical assistance was made, and my party, with its small first-aid-to-the-injured outfit, was conveyed some five miles out into the desert, where a huge freight-train, pulled by two gigantic locomotives, and laden with rich goods for the Orient, had jumped the track and tumbled into a chaotic pile. All night long we attended to the injured and the dead, and it was three o'clock the next morning when we dragged our weary steps over the miles of cactus back to the village, threw ourselves upon the railway-platform, and for the first time within a month we slept away from the roar of the river and free from the oppressive fear of danger which had ever haunted us within its confining walls.

We had successfully navigated and mapped three hundred and fifty miles of a portion of one of America's greatest rivers which hitherto had been considered impassable; we had made a geologic section directly across the eastern sierra of the great American Cordilleras from the interior deserts to the coastal plain, procuring light upon some of our least-known country; we had escaped dangers which had overwhelmed those who had attempted the cañons before; and our little party dispersed contented with its success.

