33D CONGRESS, 1st Session. } [SENATE.] { EXECUTIVE.

REPORT OF AN EXPEDITION

DOWN THE

ZUNI AND COLORADO RIVERS,

BY

CAPTAIN L. SITGREAVES,

CORPS TOPOGRAPHICAL ENGINEERS.

ACCOMPANIED BY MAPS, SKETCHES, VIEWS, AND ILLUSTRATIONS.

WASHINGTON:
BEVERLEY TUCKER, SENATE PRINTER.
1854.

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REPORT

OF

THE SECRETARY OF WAR,

COMMUNICATING,

In compliance with a resolution of the Senate, the Report of an Expedition down the Zuñi and Colorado rivers, by Captain Sitgreaves.

FEBRUARY 15, 1853.—Referred to the Committee on Military Affairs.
MARCH 3, 1853.—Ordered to be printed ; and that 2,000 extra copies be printed, 200 of which for Captain Sitgreaves.
MAY 17, 1854.—Ordered that 3,000 additional copies be printed.

WAR DEPARTMENT,
Washington, Feb. 12, 1853.

SIR: In compliance with the Senate resolution of the 28th July last, I have the honor to transmit herewith the "Report of the Expedition down the Zuñi and the Colorado, under the command of Captain Sitgreaves, of the Corps of Topographical Engineers, and of the maps belonging thereto; also, the sketches and views and illustrations of Indian customs."

Very respectfully, your obedient servant,

C. M. CONRAD,
Secretary of War.

Hon. D. R. ATCHISON,
President of the Senate.

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BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, Feb. 7, 1853.

SIR: I have the honor to submit the Report of the Expedition down the Zuñi and the Colorado, under Captain Sitgreaves, of the Corps of Topographical Engineers, called for by a resolution of the Senate of July last.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Top. Engineers.

Hon. C. M. CONRAD,
Secretary of War.

WASHINGTON, *February* 7, 1853.

SIR: I have the honor to submit the accompanying map of the route explored by me from the pueblo of Zuñi, New Mexico, to Camp Yuma, on the Colorado of the West, under instructions from you, of which the following is an extract:

"The river Zuñi is represented on good authority to empty into the Colorado, and it has been partially explored by Lieutenant Simpson to the pueblo of Zuñi. You will therefore go to that place, which will be, in fact, the commencing point of your exploring labors. From the pueblo of Zuñi you will pursue the Zuñi to its junction with the Colorado, determining its course and character, particularly in reference to its navigable properties, and to the character of its adjacent land and productions. The junction of the Zuñi and Colorado will be accurately determined. You will then pursue the Colorado to its junction with the Gulf of California, taking those observations which will enable you accurately to delineate its course."

The party was organized at Santa Fé, and consisted of Lieutenant J. G. Parke, Topographical Engineers; S. W. Woodhouse, M. D., physician and naturalist; Mr. R. H. Kern, draughtsman; Mr. Antoine Leroux, guide; five Americans and ten Mexicans as packers and *arrieros*.

As many mules as could be procured in time, suitable for the purpose, were purchased; but these not being sufficient, the assistant quartermaster at Santa Fé furnished me, on my requisition, with forty additional ones, with pack-saddles, &c. A portion of the provisions for the party were obtained from the assistant commissary of subsistence at the same place

The commanding officer in New Mexico being about to

make an expedition against the Navajos, directed me to await his departure, so as to take advantage of the protection afforded by his command as far as our routes coincided, or until he could detach a proper escort for my party. The troops assembled at Santo Domingo, on the Rio Grande, and took up their march thence on the 1st August. On the 1st September we arrived at the pueblo of Zuñi, the point at which my exploration was to commence.

Colonel Sumner had detailed for the escort Brevet Major H. L. Kendrick, 2d Artillery, with thirty men of his company, but they were not detached until after they had accompanied him to Cañon Bonito, three days' journey farther into the Navajo country. I was thus compelled to wait at Zuñi until the 24th September, consuming in the mean time part of the limited supplies provided for the expedition. The mules likewise suffered from the delay, for there was scarcely any grazing in the immediate vicinity of the pueblo, and I did not deem it prudent to send them to a distance, as small parties of Navajos had been seen lurking in the neighborhood. The mules of Major Kendrick's command were still more unfit to undertake a difficult march, many of them having been taken out of wagons after a journey of several weeks' duration.

I can add very little to the information afforded by the map, almost the entire country traversed being barren, and without general interest. Observations with the sextant were made as often as occasion served; and the latitude and longitude of as many points determined as are necessary to establish the line of march with sufficient accuracy. Collections were made of such objects of natural history as could be transported with our limited facilities. Their description will be found in the reports hereto appended.

The expedition set out from Zuñi the 24th September. The incidents of the journey are detailed in the following extracts from my journal:

September 24, *Camp No.* 1.—Our first day's march was only six miles. It was made thus short to enable us to correct any defects that might be discovered in the arrangement of the packs.

The Zuñi is a mere rivulet, and not entitled to the name of river; in most parts of our country it would not be dignified with that of creek. The corn-fields of the Zuñi Indians extended at intervals for several miles down the stream, their crops and orchards being planted on the edge of the valley, or in

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the fertile gorges of the mountains. The only cultivation in the immediate vicinity of the pueblo consisted of small vegetable gardens, tended by the women and watered by hand, in which were grown chiefly onions, beans, and chile.* Their orchards produce good peaches, with which we were abundantly supplied during our stay at the village.

September 25, *Camp No.* 2.—A well-beaten trail, following the general direction of the stream, enabled us to avoid the inconvenience of travelling over ground rendered soft and miry by the recent rains. We encamped on the banks of the creek, near some abrupt rocks, from beneath which gushes out a fine spring. Fragments of pack-saddles and broken boxes gave evidence of a former encampment of white men, probably of the party of Lieutenant Thom, who escorted Mr. Collier to California in 1849.

September 26, *Camp No.* 3.—The valley is here shut in by abrupt walls of gray sandstone, occasionally mixed with basalt, having frequent springs running out from under them; but further down it expands to several miles in width, other valleys opening into it. The faces of the sandstone rocks, wherever they presented a smooth surface, were covered with Indian hieroglyphics or pictures carved or painted upon them.

The bed of the stream becoming dry, we crossed the point of a precipitous basaltic ridge, and, keeping on the slope of the hills bounding the valley to the north, encamped on a little channel, filed with muddy rain-water, in the middle of a miry plain. The soil on the hills was sandy, and in the plain of sand mixed with clay; in both cases yielding to the foot.

September 27, *Camp No.* 4.—Just after leaving camp a small party of Indians came in sight, who proved to be Coyoteros, (Apaches,) driving some asses to Zuñi for the purpose of trade. One among them was evidently a Mexican, captured probably in childhood, for he spoke but few words of Spanish.

The well-marked trail we had hitherto followed brought us at length to the Little Colorado, which it crosses, continuing on south to the Salt River, a tributary of the Gila.

At this point the Little Colorado is an insignificant stream, divided into several small channels, flowing through a narrow

* Since the establishment of the military post at Cañon Bonito, and the consequent pacification of the Navajos, the amount of cultivation has greatly increased. During the past season the Zuñi Indians had some ten thousand acres in corn, and the Moquis a still greater quantity.

valley destitute of timber, but covered with a thick growth of rank unnutritious grass. The hills bounding it on either side are of gradual slope, with here and there a rocky point of a conglomerate of gray sandstone and pebbles jutting out into the bottom.

September 28, *Camp No.* 5.—Proceeding down the valley, it widens out into a broad plain, which the recent profuse rains had made soft and muddy. To avoid this we turned off from the river, and made our way across the high land, but gained little by the exchange, for the soil was so light and thinly covered with grass that the mules sank to their fetlocks at every step. The ground was strewed with pebbles of agate, jasper, and chalcedony, and masses of what appeared to have been stumps of trees petrified into jasper, beautifully striped with bright shades of red, (the predominating color,) blue, white, and yellow. The rocks were gray sandstone, sometimes of a slaty structure.

September 30, *Camp No.* 7.—The river here runs through a deep and rocky cañon, which we skirted, and crossed below it to the south bank, finding the ground much broken by ravines, which were only visible when we came directly upon them. The surrounding scenery resembled that of the northwestern prairies, the country being bare of trees and the horizon unbroken, except in one direction, where a high conical peak, that had served us several days as a lankmark, varied the uniformity of its outline.

October 1, *Camp No.* 8.—The river, winding to the north, gave us a straight course across the high land, soft and sandy, as usual, and frequently intersected by deep ravines, until we again encountered it, flowing now between bluff sandy banks fringed with cotton-wood trees, and presenting at length the appearance of a river, but still with little water in its bed. I remarked cropping out of the side of a bluff a seam of fibrous gypsum three or four inches thick. In the course of the day's march the San Francisco mountains became visible to the west, and to the north several singular volcanic peaks.

October 2, *Camp No.* 9.—The river here receives a tributary known among trappers as Chevelon's Fork, from one of that name who died upon its banks from eating some poisonous root. Their confluence produces an intricate labyrinth of sloughs, in which we became involved, and were forced to encamp, not finding an outlet until late in the day. In several

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places veins of fibrous gypsum were seen, looking like the ice-crystals that burst open the ground in spring.

October 3, *Camp No.* 10.—Our course was here interrupted by a deep bayou thickly overgrown with rushes, and which, on attempting to turn it, was found to lead to a rocky ravine or cañon utterly impassable. We retraced our steps, therefore, and with much difficulty recrossed the river, which, making a bend to the north, winds through a broad plain resembling the bed of a great lagoon from which the water had just subsided, leaving it slimy and intersected with fissures and channels that often impeded our progress. Here and there only a bush of the wild sage dotted its surface, and the surrounding hills appeared equally destitute of vegetation.

October 5, *Camp No.* 12.—The country on the north bank presenting the same appearance of desolation as far as the eye could discern, we again crossed the river, and, passing on to higher ground, encamped on a bayou near the edge of the valley. The grass upon the hills was invariably better and more abundant than on the river bottom, but the absence of wood and water in such places generally obliged us to make our camps near the river. The mules, particularly those of Major Kendrick's command, already began to show signs of fatigue, and their backs to become galled by the saddles.

The army pack-saddle is of excellent materials and workmanship, but is defective in form. Its shape should approach more nearly to that of the riding-saddle, so as to provide against a change in the condition of the animal. A saddle may answer very well for a horse or mule in good condition, which will injure the back when the animal becomes lean or changes from a grain to an exclusive grass diet. Lieutenant Colonel Johnston informed me that he was in the habit of using with good results the common Texas tree, provided with the necessary rings and straps. A good pack-saddle is still a desideratum in the service.

October 7, *Camp No.* 13.—Many precipitous cañons were passed, enclosing within their walls of yellow sandstone clumps of small cotton-wood trees. Ridges of lava and a black dust, the detritus of the lava, covering the ground in many places, indicated our approach to a volcanic region. Near our camp, on the bank of the river, were the ruins of several stone houses, which the guide, Mr. Leroux, said resembled those of the Moqui Indians.

October 8, *Camp No.* 14.—About a mile below the last camp the river falls over a succession of horizontal ledges of sandstone, forming a beautiful cascade of one hundred to one hundred and twenty feet in vertical height, and continues on its course through a cañon of that depth, the general level of the banks remaining the same.

Having been informed by my guide and other experienced trappers that this cañon extends down the river to its junction with the Colorado, and the great cañon through which the latter flows, I regarded the attempt to follow the river to its mouth as too hazardous, considering the condition of the animals and the state of the supplies, and therefore, by the advice of the guide, turned off towards the mountains, with the purpose of striking the Colorado below the great cañon, and then exploring it upward as far as might be found practicable. Leaving the river then, we passed along the base of high table lands, the lava sand lying several inches deep upon the ground, filling up the hollows, and forming ridges across the plain; and, ascending the plateau, found it also covered with the lava detritus, and all the prominent points occupied by the ruins of stone houses of considerable size, and in some instances of three stories in height. They are evidently the remains of a large town, as they occurred at intervals for an extent of eight or nine miles, and the ground was thickly strewed with fragments of pottery in all directions. The fact that no vestige of water could be discovered in the vicinity sufficiently accounts for their present depopulation. The encroachment of the lava sand blown down from the adjacent mountains may have gradually filled up the springs and water-courses; it is certain, at any rate, that the heaviest rains would now be rapidly absorbed by it, and after a day or two leave no trace of water upon the surface.

The houses resemble in all respects (except that *adobes* do not appear to have been at all used in their construction) those of the existing pueblos of New Mexico; and the pottery, of a great variety of fabric and pattern, is similar to that now in use among them.

October 9, *Camp No.* 15.—Pursuing our way still further into the mountains, the ruins became of rarer occurrence, or else were concealed by the cedars with which the hills were covered. A small pool of water was discovered under an overhanging rock, out of which the men as they came up filled their canteens; and, as the water was not thereby sensibly

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diminished, it was supposed to have its source in some concealed reservoir, and that it would be possible in the course of the day to water all the animals. We should then, moreover, have been able to hold a more direct course, having diverged towards the mountains in the expectation of finding water. The camp was scarcely pitched, however, when it was reported that the spring was rapidly becoming exhausted, and Mr. Leroux was therefore sent, with the mules and half of the men, in search of water, the rest remaining in camp to protect the supplies. He did not return until late in the night, and reported that he had come upon a large encampment of Yampai or Tonto Indians, on the edge of a deep ravine, through which ran a stream, which he supposed to be the headwaters of the San Francisco, a tributary of Salt river. The women and children, engaged in gathering *piñones*, (pine-nuts,) fled at his approach; while the men held themselves aloof, and refused to parley with him or meet his friendly advances. He was compelled, therefore, to return as he went, not venturing to drive the mules into the ravine, and thus give the Indians an opportunity of attacking him at disadvantage. I regretted that he had suffered his men to take from the lodges sundry articles of value to the Indians. Among these were some admirably made baskets, of so close a texture as to hold water; a wicker-jar, coated with pine-tree gum; a large quantity of piñones and grass-seed; some bread, made of the mezquit bean; a cake of *mezcal*, (a preparation of the maguey;) and pieces of a substance that had all the appearance of chalk, but, as it did not effervesce with acids, was probably an exceedingly pure variety of kaolin.

October 10, *Camp No.* 15.—The mules, having now been two days without water, were, as the last resource, sent back to the river, taking with them some kegs and India-rubber water-bags with which I had fortunately provided myself. They returned in the evening, less three of their number lost by the way, but bringing back an abundant supply of water. In the course of the preceding night, by watching by the spring and dipping up the water by the spoonful as it trickled out, enough had been obtained to furnish each person with a cup of coffee.

October 11, *Camp No.* 16.—As we ascended the mountain the cedar gave place to the nut-bearing pine; and this, when near the summit, to a pine of larger growth, with long leaves.

Herds of antelope were seen in all directions, but they kept to the open country, and were shy and difficult to approach.

October 12, *Camp No.* 17.—The ascent of the mountain was continued, with the greatest anxiety as to the result of the day's journey, for the mules had drunk but once in more than four days, and the country showed no indications of water in any direction. There was much beauty in some of the glades and mountain glens we passed. The ground was covered with fresh grass, and well timbered with tall pines, mingled, after attaining a certain altitude, with aspens of a brilliant yellow.

Crossing the summit we descended gradually to the brow of a precipice overlooking a green vale of five or six miles in extent, but with no appearance of water, and commenced the descent, picking our way with difficulty among the loose rocks, in the belief that there we should be compelled to abandon most of our animals. When half-way down, a shot from one of the Mexicans on the flank inspired us with hope, for it was the signal fixed upon to notify the discovery of water; but still I observed nothing to warrant it; and it was not until we had reached the bottom of the cliff that I discerned a narrow thread of grass and weeds, greener and ranker than the surrounding growth, winding out from a little nook, and losing itself in the plain. It proved to be a spring of delicious water; and thus providentially terminated our fears and anxieties for the time.

October 13, *Camp No.* 17.—It was necessary to halt here for a day or two, to rest the mules and have them reshod. The feet of the sheep, too, had become sore and worn out; and at the suggestion of a Mexican, my *mayor domo*, the cracks in them were filled, by means of a hot iron, with resin and pine-tree gum, by which operation the animals appeared much relieved. Mr. Leroux reconnoitred the route ahead, and found water in several places ten or twelve miles distant. He again surprised a few lodges of Indians, who fled, leaving their effects behind them. This time he did not permit his men to pilfer, but, on the contrary, left at the lodges a small present of tobacco, handkerchiefs, and knives, for the purpose of conciliating the Indians, and inducing them to hold some intercourse with us, by which means we hoped to obtain useful information in regard to the route. The only provisions found in the lodges were piñones and the grass-seed before mentioned.

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The box chronometer had been carried in a pannier, carefully packed in wool, and placed on the steadiest mule of the *atajo*, which was always led by the halter; but it was nevertheless found to have stopped, from the roughness of the last day's journey. Independent observations were therefore made for the longitude, the pocket chronometer not having sufficient regularity to be depended on.

During the night we were alarmed by a stampede of the mules. Fortunately they ran into a gorge near the camp, from which there was but the one outlet, and we succeeded in quieting them. The cause of their fright was made apparent by the roaring of a panther, or other large animal, in uncomfortable proximity to the herd.

October 15, *Camp No.* 18.—Our route lay across plains of gentle slope. Mingled with the pines were a few small post-oaks; and in a green glade was found some white clover of a different variety from that common in the States. Flowers and birds were more numerous than upon the northern slopes of the mountain, but no fragments of pottery or other signs of habitation were seen. Our camp was upon the dry bed of a lagoon, a mile in extent, having some small pools of water hidden among the tall grass, from which our arrival put up a large flight of water-fowl, crows, and smaller birds. When approaching the mountains I had been struck with a singular incandescent appearance which some of the higher slopes presented when the sun was near the horizon. This I found to be caused by a bright, yellow-colored grass, having the extremities of the blades tipped with red by the action of the frost. It looked fresh, but the animals preferred the shorter kind, which grew upon the ridges and among the pines.

October 16, *Camp No.* 18.—We were detained at this camp by the illness of one of the party, a Mexican, from a blow on the head received some days previously. He died on the 25th, and was buried at the foot of a large pine tree, marked with a cross. The delay afforded our jaded animals the rest they so much needed, but also consumed a portion of the supplies of which we were afterwards in great want. The bacon had lost much in weight from the effect of the hot sun, and the issues at this place nearly exhausted the supply. About twenty sheep, in poor condition, remained, and formed our sole dependence, with the exception of some meat-biscuit, the excellence of which had not then been tested. It is an admirable preparation, and should form a large proportion of the supplies for all similar expeditions. Although antelope and black-tailed deer were abundant, and the fresh tracks of bears were occasionally seen, our hunters, some of them experienced and expert, had not been successful in supplying us with game. The daily variation of the temperature was remarkable, the average range in twenty-four hours being about 55° Fahrenheit, or from 10° to 65°. Near the summit of one of the adjacent hills were the traces of old excavations, made apparently in search of the precious metals, but the surrounding formation gave no indications of their existence. Similar remains were observed near Camp No. 16.

October 21, *Camp No.* 19.—Occasional patches of white clover were again met with, and the singular cedar first seen when crossing the Zuñi mountains. The trunk is large and low, with wide-spreading branches, and the bark, several inches thick, is corrugated like that of the oak. The camp overlooked a wild and picturesque cañon. Tall pines, oaks, and the low, spreading cedar were mingled so as to produce a park-like effect, heightened by glimpses through the vistas of the sheep and mules grazing on the rich grama grass that grew up among and concealed the sharp, black fragments of trap that covered the ground.

A Mexican who left camp on the 19th to hunt for game, had not returned when we set out; and as our frequent search for him had been unsuccessful, it was feared that he had fallen into the hands of the Yampais. At sunset, however, on driving the animals to water in the cañon, he was discovered sitting on a rock, picking a rib of venison. He had lost himself and become bewildered, wandering about for three days without water or food; for although he had killed a deer, he had not ventured to eat for fear of rendering his thirst insupportable, until he found himself at the spring near Camp 17, from which place he had been guided by the trail of the party until he overtook us.

October 23, *Camp No.* 21.—Keeping along the side of the mountain in the hope of meeting with water, we got into a succession of deep and steep ravines; but, finding them dry, bore more to the south, and descended into the bed of a small stream, called by trappers Bill Williams's Fork, in which were a few pools containing sufficient water for the supply of the party. As we descended the pines became of smaller

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growth, with here and there cedars, scrub-oaks, locusts, and the *Fallugia paradoxa*, described in Major Emory's report.

October 24, *Camp No.* 22.—Leaving behind us the mountains and the stream, whose course was too much to the southward, we struck out west across the plain. The ground was much broken by precipitous ravines, in one of which were seen masses of porphyry and quartz, the only exceptions to the usual trap we had met since reaching the mountains.

October 25, *Camp No.* 23.—In the course of the day we passed a few groves of the common cedar, the only tree to be seen. The grass, of good quality, was parched with the continued drought, and the soil, loose and dry as ashes, gave little hope of finding water.

October 26, *Camp No.* 24.—At daylight it was discovered that a dozen mules were missing. Their tracks showed that they had gone back upon our trail, and some men were despatched to recover them; while the rest of the party pursued their journey across a rocky ridge thickly overgrown with cedars, whose low branches, frequently sweeping off a pack, rendered the march slow and laborious. When we stopped to rest in the middle of the day the animals, overcome with thirst and fatigue, refused to graze, and huddled together under the shade of the trees. Before resuming the march, a gourd of water and some bread were left for the men who had been sent back in search of the missing mules; and, after a march of seven miles further, we encamped the third night without water.

October 27, *Camp No.* 25.—A few hours after setting out, fresh signs of Indians began to make their appearance, and increased as we advanced, in frequency and numbers, until we came upon a well-marked and newly-made trail, leading to the northward of our course, but into which we turned in the hope of its leading us to water. Having pursued it in silence a few miles, we surprised a party of ten or twelve of the most wretched looking Indians I have ever seen, naked, and apparently almost starved. They all fled, except an old man and a woman, whom we attempted to conciliate with some presents; but were not successful in allaying their fears, although the man finally undertook to direct us to water. The mules were therefore unpacked and sent off under his guidance. He conducted them to two small springs in a rocky gorge, some ten miles distant; but, in their eagerness

to drink, the ground was soon trampled into a mere mass of mud, so that very few were enabled to quench their thirst. The Indian watched his opportunity, when not observed, to slip from his mule and escape among the rocks; but as he had performed the only service we required of him, no attempt was made to retake him.

October 28, *Camp No.* 26.—As there was no other alternative, the camp was removed to the vicinity of the springs and the men set to work at clearing them out. By this means, and leading two or three at a time to water, in the course of this and the following day a small quantity was obtained for each animal, barely enough to keep them alive, but not enough to allay their thirst, as their refusal to eat and plaintive cries too clearly proved.

The continued absence of the men who had been sent back on the 26th upon the tracks of the missing mules created great fears for their safety, or lest they had returned to Zuñi; and their arrival there, it was apprehended, would give rise to unfavorable rumors in regard to the party. Our anxiety was relieved, however, by their reappearance in camp. They had succeeded in finding the mules and bringing them within a day's march of camp, when half the number had again made their escape. During their absence of four days the men had suffered much from hunger and thirst, having taken but one day's rations with them, and being without water, except a small gourd full that one of them had been provident enough to conceal before setting out. The bread and water we had left for them, though placed conspicuously in the middle of our trail, had not been discovered by them, and was probably carried off by the Indians.

A party sent out to reconnoitre brought back the gratifying intelligence that twelve miles in advance was a small stream of running water and an abundance of tolerable grass. A band of Yampais were found encamped upon it, from whom Mr. Leroux learned that the numerous trails we had observed for the last two or three days united and led to the country of the Mohaves, and that their camp was but one day's journey from the river.

October 30, *Camp No.* 27.—This rivulet, which I have called the Yampai, has its source in three small springs; it is repeatedly lost in the ground within a distance of half a mile; after which it disappears entirely. A few willow and cottonwood trees grow upon its banks, and green grass was here

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seen for the first time since leaving the San Francisco mountains. Here, too, we enjoyed the luxury of a bath and clean clothes—a luxury not fully appreciable by those who have not gone a week without water to wash even their faces and hands.

November 1, *Camp No.* 28.—In the morning one of the sentinels discovered an Indian lurking about the mules, and brought him into camp. He called himself a "*Cojnino*," was well clothed in shirt, leggins, and moccasins of buckskin, and his hair bound up behind into a queue, after the manner of the Pueblo Indians. A long hair-rope wound around his waist gave unmistakeable evidence of his designs upon our mules. After a short time several others made their appearance upon a neighboring hill, and were induced by signs to approach the camp; but, when within two hundred yards, the first one sprang up and darted from the midst of a dozen men who were standing around him, wielding an arrow drawn from his quiver to prevent their approach, and calling out loudly to his companions, who immediately turned and fled, discharging their arrows into the herd and killing three of the mules. The men were then ordered to fire upon them, which they did without any apparent effect, although traces of blood upon the rocks showed afterwards that one at least had been wounded.

November 2, *Camp No.* 29.—We kept down the valley of the Yampai some twelve miles, when, finding that its course was out of our most direct route, we diverged from it across a wide barren plain, and encamped without water, grass, or wood, the only fuel being the withered cacti with which the plain abounded.

A naked escarpment on the side of the creek showed a stratum of granite, containing a great deal of feldspar, underlying the trap, and a whitish feldspathic rock enclosing nodules of chalcedony. The rest of the country only exhibited the usual volcanic formation.

November 3, *Camp No* 30.—Directly in our front was a bold range of mountains, from the top of which we were sanguine of seeing the Colorado. We entered a rugged and difficult pass, between cliffs and pinnacles of gneiss, and attained the summit after a long and fatiguing ascent and the loss of several mules that gave out by the way, to be again disappointed in beholding, instead of the river, another extensive and desolate plain, and beyond it a similar formidable looking mountain range.

While halting to rest the mules and endeavor to bring up those that were left on the road, Mr. Leroux turned off to ascend a higher peak, affording a more extended view of the country ahead; and, passing by a cluster of rocks, received the discharge of a flight of arrows from a concealed party of Indians. Three of the arrows took effect, inflicting severe wounds in the head and wrist, which caused him much suffering and disabled him for the rest of the journey. The Indians were driven from rock to rock, but always contrived to keep out of rifle range; and, after the pursuit was abandoned as fruitless, they returned as near as their safety would permit, watching our movements and making gestures of rage and defiance. When the march was resumed they followed for a short distance, approaching near enough to discharge some arrows, without effect, at the rear of the party. They were similarly clad and appeared to be of the same tribe as those last seen; some of the men, indeed, thought they recognised the one who had been in our camp two days before.

November 4, *Camp No.* 31.—Many trees of the Spanish bayonet, scattered over the plain, varied the scene somewhat, but gave no relief to its aspect of barrenness; and another night passed, without grass or water, added to the sufferings of the nearly exhausted animals.

November 5, *Camp No.* 32.—The approach to the mountains, before alluded to, was by a gradual ascent, so that when we arrived at their base, there did not remain much to be overcome. The pass was nevertheless exceedingly rough, and bordered by overhanging crags, which it was deemed prudent to occupy before advancing with the *atajo*. We passed through, however, unmolested, and were at length cheered by the view of the Colorado, winding far below through a broad valley, its course for many miles being apparent from the large trees upon its banks. The smoke of numerous fires in the valley gave evidence of a large Indian population, and the sight brought a spontaneous cheer from the men, who believed that this was to be the end of their privations and of the labors and anxieties of the journey.

The barometer showed us to be about 3,200 feet above the river. The descent to it was rapid and continuous, the slope of the mountain reaching almost to its banks.

A small travelling party of miserable looking Indians was met ascending the mountain, one of whom, being too much frightened, or too heavily laden to escape, was interrogated by

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signs, but no information could be obtained from his real or affected stupidity.

At this point the river was two hundred and sixty-six yards wide, with six feet of water in the deepest part; the banks bluff and sandy, about twelve feet high, and the current rapid; but a dense growth of willows and weeds prevented me from measuring its velocity with any degree of accuracy. The presence of water seemed to afford the only relief from our former privations, for the soil—an almost impalpable sand—bore nothing but dry weeds and bushes, and the whole scene presented the most perfect picture of desolation I have ever beheld, as if some sirocco had passed over the land, withering and scorching everything to crispness.

From this point I had designed to explore the river upward to the great cañon, and determine accurately the mouth of the Rio Virgen, one of its largest tributaries; but the exhausted condition of the animals and scanty supply of provisions (the party having been already several days on reduced rations) compelled me reluctantly to forego my purpose.

The whole country traversed from the San Francisco mountains was barren and devoid of interest. It consists of a succession of mountain ranges and desert plains, the latter having an average height of about 5,000 feet above the level of the ocean. The larger growth, almost exclusively of cedar, was confined to the mountains; and the scanty vegetation of the plains, parched by a long drought, furnished few specimens for the botanist.

November 7, *Camp No.* 33.—A well-worn trail leads down the river, by the side of which in several places were found traced on the ground Indian hieroglyphics, which Mr. Leroux and a Mexican of the party, who had passed many years among the Comanches, interpreted into warnings to us to turn back, and threats against our penetrating further into the country. We had not gone far before Indians were seen in front in considerable numbers, who appeared to be assembling to dispute our advance. By the exchange of friendly signs three of them, mounted on fine horses, were induced to approach, whom a few presents sufficed to convince of our peaceful intentions; and they joined the party and accompanied its march. As we proceeded their number received accessions at every step, until it amounted to some two hundred men, women, and children, who followed on foot, running by the side of the mules, and talking and laughing with every appearance of friendship. In the evening the camp was crowded with them, bringing in for barter small quantities of pumpkins, beans, corn, and, in one or two instances, of wheat, which seem to be the staples of their food, for no animals, except a few horses, were seen among them; and the few sheep we had left were the objects of great admiration, especially to the women.

The appearance of the Mohaves is striking, from their unusual stature, the men averaging at least six feet in height; and their stalwart and athletic figures offered a convincing proof of the excellence of a vegetable diet. Almost all the men were naked, with the exception of the breech-cloth. The hair, cut square across the brows in front, hung in loose braids behind, reaching frequently as low as the waist; occasionally it was matted on the top of the head into a compact mass with mud, for the purpose of destroying the vermin that infest them. The only garment worn by the women was a long fringe of strips of willow bark wound around the waist, and falling as low as the knees. No covering to the feet was worn by either sex. Their arms are the bow and arrow, the spear, and the club. The arrow is formed of two pieces: that to which the barb is attached of hard wood, seven inches long, or one-fourth the entire length; and the other of a light reed that grows profusely along the banks of the river, feathered, as usual, at the extremity. The custom still prevails among them of carrying a firebrand in the hand in cold weather, which is mentioned in the account of Coronado's expedition in 1540, and induced those discoverers to give to the river the name of Rio del Tizon. Their lodges are rectangular, formed of upright posts imbedded in the ground, and rudely thatched on the top and three sides, a portion of the interior altitude being sometimes obtained by excavation. I saw none of so great a size as those described in the account just referred to.

November 8, *Camp No.* 34.—A large crowd of men, women, and children continued to follow us, many of them carrying beans and pumpkins, and all urgent for us to encamp among them, for the purpose, as they gave us to understand, of trading. I was myself anxious to obtain supplies from them; but their numbers and importunity had been so troublesome the day before, that it was resolved to exclude them from the camp, and to adopt some plan which should free us from a repetition of the annoyance. Before unpacking the mules, therefore, a chain of sentinels was placed around them, with instructions

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to prevent the entrance of the Indians, and places were designated on the outside where they might hold their market. This arrangement gave great dissatisfaction, and did not fully answer the purpose intended, for many eluded the vigilance of the sentinels, or took advantage of their negligence, and the camp was soon again filled with them. A large number were observed to have arms; and the fact that no chiefs had presented themselves, notwithstanding our frequent demands for them, was regarded as suspicious, and calling for all possible vigilance. The retreat was therefore sounded, and the Indians ejected from camp, which was accomplished with difficulty, and hardly without the use of violence. They left us with scowling faces, and some old women were vociferous with what we supposed to be their threats and denunciations.

November 9, *Camp No.* 35.—While preparing for our departure before daylight, Dr. Woodhouse, who was warming himself by the fire, received an arrow through the leg, fortunately without doing him much injury. Several others were thrown into the camp and among the mules, but the darkness caused them to fall harmless. The sentinels, however, were thrown further out, and we got under way without further annoyance, numbers following us with yells of defiance, but taking care to keep at a respectful distance.

Some days after (on the 16th) we came upon another large settlement of Indians, who represented themselves to be Yumas, and met us with assurances of friendship. One of them, who spoke Spanish tolerably well, informed us that we were eight days' journey from the Gila, and that there was a military post near its mouth, and described accurately the persons of the officers whom we knew to have been stationed there. They were without provisions, living upon the fruit of the mesquit and tornilla trees, and seemed to have recently located themselves upon the spot. I was convinced of the sincerity of their professions, and distributed some presents among their old men; but we did not relax our customary vigilance, excluding them from the camp, and keeping a few men constantly under arms. The utility of the precaution was soon made apparent, for about the middle of the following day, as the advance of the party were engaged in unpacking the mules to give them their accustomed noon rest, a band of fifty or sixty Indians, approaching under cover of a thicket, fell upon a soldier of the escort who had lagged in the rear, and, having disabled him with an arrow wound in the elbow, dispatched him

with their clubs, following it up by a general attack upon the party, in which they displayed much boldness, advancing within easy arrow range, and maintaining their ground against the fire of our rifles and musketoons for some fifteen minutes, when they were beaten off with loss, leaving four dead upon the ground, and carrying off several wounded. They possessed themselves of the musketoon of the soldier they had killed, but showed themselves unskilled in its use, firing it off several times at a distance of half a mile.

Our progress down the river, though heralded by signal fires as we advanced, was continued without further molestation. Numbers of the mules gave out daily for the want of food, until we were driven to the necessity of destroying all the spare saddles, blankets, tents, ammunition, books, and whatever was not absolutely essential to our safety. Our provisions, too, became exhausted; and the mules, the poorest of which were daily killed for the purpose, supplied our only food until the 30th November, when we arrived with a small remnant of them at Camp Yuma, near the mouth of the Gila, where rations were obtained for the subsistence of the party to San Diego, California.

Below the point at which we reached the Colorado irregular lines of rugged mountains enclose its valley, now receding to a distance of some twenty miles, now advancing towards each other, and at three places abutting against the river, hem it in between rocky promontories, leaving no room for a roadway at their base. The passage of these defiles were the most difficult portions of the journey, requiring long detours over naked cliffs of extreme acclivity, to cross which we were sometimes obliged to break stepping places in the rock for the mules, and to assist them in their ascent by means of ropes, and where a misstep or the jostling of a pack against an impending crag would occasionally precipitate one of them to the bottom of the adjacent precipice. The arable land bordering upon the river is greatly encroached upon by extensive flat spurs, hard, gravelly, and destitute of vegetation, which reach far out into the valley, leaving a comparatively small proportion of the space between the mountains susceptible of cultivation. Some large cotton-wood trees grow directly upon the river banks, but the growth of the rest of the valley is small consisting chiefly of mezquit, tornilla, willow, and a singular tree with a smooth, pale green bark, and leaves so diminutive as to require a close proximity to discern them.

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The shrubs are the arrow-wood, wild sage, *hediondilla*, or creosote plant, and grease weed, so called from the brilliancy of its flame while burning. Cacti are not numerous; the most remarkable is the *pitahaya*, or *Cereus giganteus*.

Only two kinds of grass were found, at rare intervals, and in small quantities; a tall, coarse variety, growing in large tufts, and a smaller kind, having a perceptible incrustation of salt upon the leaves.

The trap in some places along the river showed traces of carbonate of copper, and beneath the trap was seen a coarse, gray granite, and in one instance a stratum of clay slate.

Near camp 51 a large rock occupies the middle of the channel, and ledges extend from it across to both banks. In many other places the river is obstructed by shifting sand bars, rendering its navigation difficult, if not impossible, except during a high stage of the water. The water stains upon the rocks marked a height of twelve feet above the actual level, but the indications of overflow were partial, except near the mouth of the Gila, where a large surface appears to be subject to inundation.

Very respectfully, your obedient servant,

L. SITGREAVES,
Brevet Captain Topograpical Engineers.

Colonel J. J. ABERT,
Corps Topographical Engineers.

TABLES

OF

DISTANCES, GEOGRAPHICAL POSITIONS,

AND

METEOROLOGICAL OBSERVATIONS.

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