

and a little stunted acacia. The iodeodonda is a new plant, very offensive to the smell, and, when crushed, resembling kreosote. Its usual growth is the height of a man on horseback, and is the only bush which mules will not eat when excessively hungry; besides this were varieties of ephedra, erytherœa, helianthus petiolaris, and two well known and widely diffused grasses, the reed grass, and a short salty grass, uniola distichophylla.

October 6.—It was determined to follow the river still farther down before turning west. Great difficulty was experienced in getting teams to assist us. The Mexicans we had engaged, as if by universal agreement, refused to go farther, alleging fear of the Apaches; but the truth was they expected to extort money. In Armijo's day, when a thing was wanted for government, it was taken. Our treatment turned their heads, and, like liberated slaves, there was no limit to their expectations and exactions. We used every means to bring these people to reason, but finding them intractable, and that the progress of the army was arrested, the quartermaster, Major Swords, seized what wagons and animals were needed, and paid a liberal price for them. To our surprise they were perfectly enchanted at the whole business; first at being paid at all, but principally at being relieved from the responsibility of deciding for themselves what they would take for the chattels. A likely boy who had been engaged to go to California as arriero, was to-day claimed by his creditor or master. He owed the man sixty dollars, and was by the law of the country paying this debt by serving at two dollars per month, out of this he was to feed and clothe himself, his master being sutler. It was plain he could not pay his debt in his lifetime. When such debtors get old and unfit for labor, it is the custom to manumit them with great pomp and ceremony. This makes the beggars of the country. The poor debtors thus enthralled for life for a debt of sixty dollars are called peons, and constitute, as a class, the cheapest laborers in the world. The price of the labor for life of a man was, in the case we have stated, sixty dollars, without any expense of rearing and maintenance in infancy or old age, the wages covering only a sum barely sufficient for the most scanty supply of food and clothing.

I saw some objects perched on the hills to the west, which were at first mistaken for large cedars, but dwindled by distance to a shrub. Chaboneau (one of our guides) exclaimed "Indians! There are the Apaches." His more practised eye detected human figures in my shrubbery. They came in and held a council, swore eternal friendship, as usual, no doubt with the mental reservation to rob the first American or Mexican they should meet unprotected.

The women of this tribe rode à la Duchesse de Berri, and one of them had an infant, about two months old, swung in a wicker basket at her back. Their features were flat, and much more negro-like than those of our frontier Indians; a few Delawares in camp presented a strong contrast, in personal appearance and intelligence, with the smirking, deceitful looking Apache. Some of them had fire arms, but the greater part were armed with lance and bow. They were generally small legged, big bellied, and broad shouldered.

Came into camp late, and found Carson with an express from California, bearing intelligence that that country had surrendered without a blow, and that the American flag floated in every port.

October 7.—Camp 68.—Two Mexicans deserted from my party last night, frightened by the accounts of the hardships of the trip brought by Carson and his party. Yesterday's news caused some changes in our camp; one hundred dragoons, officered by Captain Moore and Lieutenants Hammond and Davidson, with General Kearny's personal staff, Major Swords, Captain Johnson, Captain Turner, adjutant general to the army of the west, Messrs. Carson and Robideaux, my own party, organized as before mentioned, and a few hunters of tried experience, formed the party for California. Major Sumner, with the dragoons, was ordered to retrace his steps. Many friends here parted that were never to meet again, some fell in California, some in New Mexico, and some at Cerro Gordo.

Arrived in camp late, after a most fatiguing day, watching and directing the road for my overloaded and badly horsed wagon. I sat up until very late, making astronomical observations.

About two miles below the camp of last night, we passed the last settlement, and in about four miles left the beaten road, which crosses the east side of the river, and thenceforth a new road was to be explored. The land passed over to-day, although unsettled, is incomparably the best in New Mexico; the valley is broader, the soil firmer, and the growth of timber, along the river, larger and more dense.

The ruins of one or two deserted modern towns, probably Valverde, and remains of ditching, for irrigation, were passed to-day. The frequent incursions of the Indians are said to cause the desertion of this part of the valley.

As we approached our camp, the lofty range of mountains sweeping to the northwest, around the head of the Gila, became unmasked, at the same moment that the Puerco range showed themselves on the eastern side of the river Del Norte, stretching boldly and far away to the south. This last ridge of mountains is to the east, and altogether distinct from that commencing at Zandia, and tapering off to the south close to the river.

I have heretofore revelled in the perfect stillness and quietude of the air and scenery of New Mexico; yesterday and to-day have been exceptions, for the wind has been very high from the south, and the dust overwhelming.

Computed to-day the height of the Secoro mountain to be 2,700 feet above the level of the plain. Several officers guessed at the height of the mountain, and the mean of all the guesses was 1,200 feet, and the distance of the peak only two and a half miles, while it was, in fact, upwards of four miles. He who attempts to reckon the height and distance of hills in this pure, dry atmosphere, after coming from ours, will always fall as much short of the mark.*

One or two large white cedars were seen to-day, and, in addition

* Attention is asked to my meteorological record in the Appendix. A wonderful difference between the thermometer and wet bulb will there be seen, showing the dryness of the atmosphere.

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to the usual plants, was that rare one *cevallia sinuata*, *gauva parviflora*, *œnothera sinuata*, and a species of wild liquorice, but with a root not sweet, like the European kind.

The latitude of this camp by 10 altitudes of polaris, $33^{\circ} 41' 19''$.
Longitude of this camp, 18 observations, east and west stars,
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October 8.—*Camp 69.*—The valley of the Del Norte, as we advance, loses what little capacity for agriculture it possessed. The river commences to gather its feeble force into the smallest compass to work its way around the western base of Fra Cristobal mountain. The Chihuahua road runs on the eastern side, and that part of it is the dreaded jornada of the traders, where they must go most seasons of the year ninety miles without water.

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Our road over hill and dale led us through a great variety of vegetation, all totally different from that of the United States. To-day's observations of the plants may be taken as a fair specimen of the southern part of New Mexico. First, there were cacti in endless variety and of gigantic size, our new and disagreeable friend, the *larrea Mexicana*, *Fremontia vermicularis*, *obione canescens*, *tessaria borealis*, *diotis lanata*, *franseria acanthocarpa*, several varieties of mezquite, and among the plants peculiar to the ground passed over, were several compositæ, a species of *malva convolvulus*, an unknown shrub found in the beds of all deserted rivers; larger grama, as food for horses, nearly equal to oats, and *dalea formosa*, a much branched shrub, three feet high, with beautiful purple flowers. The infinite variety of cacti could not be brought home for analysis, and this department of the Flora must be left to the enterprise of some traveller, with greater means of transportation than we possessed. A great many were sketched, but not with sufficient precision to classify them.

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The table lands, reaching to the base of the mountains to the west, are of sand and large, round pebbles, terminating in steep hills from a quarter to a half mile from the river, capped with seams of basalt. Some curious specimens of soft sand stone were seen to day, of all shapes and forms, from a batch of rolls to a boned turkey.

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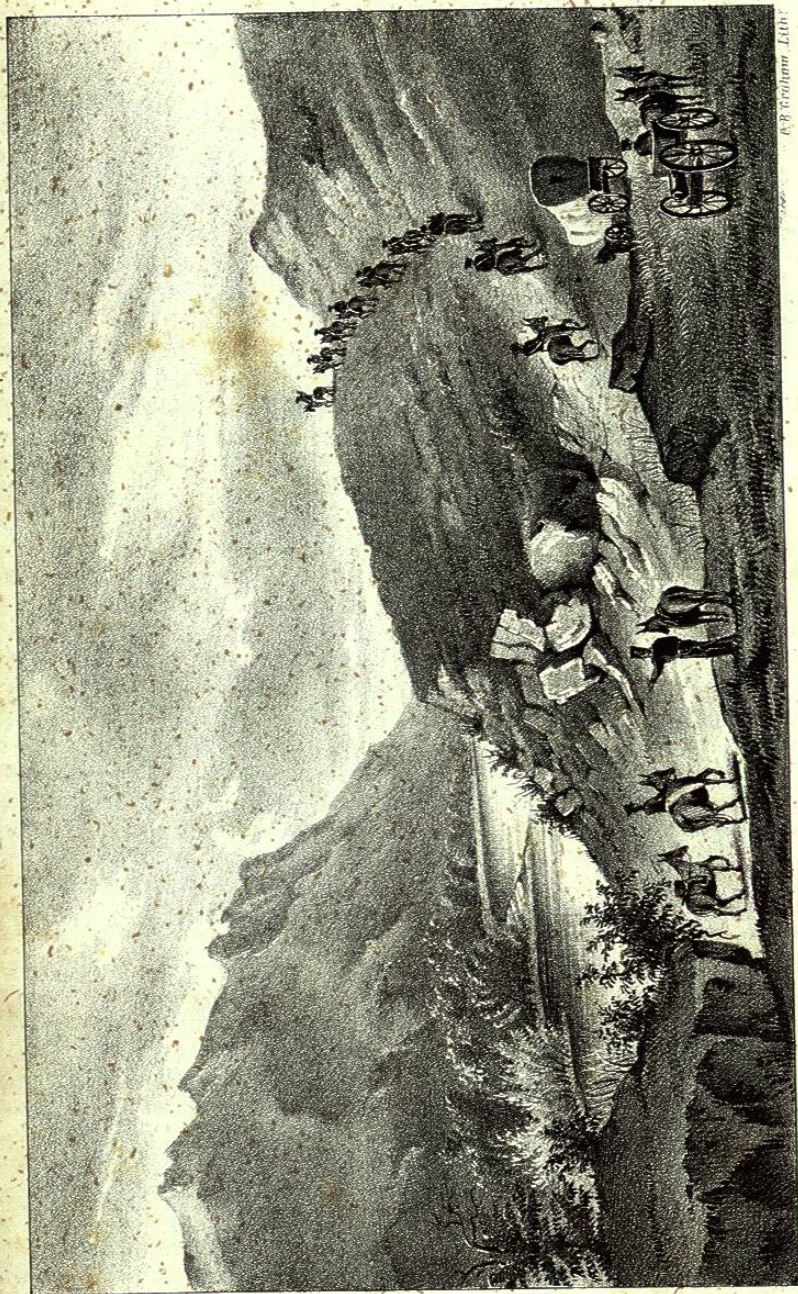
October 9.—The country becomes broken, and the valley narrows into a cañon which sweeps at the base of Fra Cristobal mountain, making it necessary to rise to the table lands on the west side, which we found traversed by deep arroyos, crowned on their summits by basalt, underlayed by sand stone.

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I shot two or three quails, (*ortix squamosa?*) differing from ours in their plumage, but entirely similar to them in their habits. We also killed a hawk resembling, in all respects, our sparrow-hawk, except in the plumage, which, like the quail, was that of the landscape, lead colored.

Game in New Mexico is almost extinct, if it ever existed to any extent. To-day we saw a few black tailed rabbits, and last night Stanly killed a common Virginia deer.

Three distinct ranges of mountains, on the west side of the river, are in view to-day, running apparently northwest, and nearly parallel to each other. The lesser range commences at Secoro; the



THE LAST DAY WITH THE WAGONS

next at Fra Cristobal mountain, and the last at a point farther west, yet to be determined. The ravines between are broad, and show the beds of dry streams, which would probably be found watered when near their sources. A butte was seen in the distance, close to the river, and surrounded by trees, which was at first taken for an adobe house, but the near approach showed it a conglomerate cemented by lime, which had been left standing when the surrounding earths were washed away. At its base I found some rare specimens of olivine set in lava. The road was unbroken, obstructed by bushes, and so bad that the wagons made only $11\frac{1}{2}$ miles, and the teams came into camp "blown" and staggering after their day's work. Expecting nothing better ahead, it was determined to leave the wagons and send back for pack-saddles. My own pack-saddles having been brought along, I had time to observe the rates of my chronometers and make other preparations necessary for so important a change in our mode of proceeding.

October 10th, 11th, and 12th were passed in camp waiting for the pack-saddles.

We are now 203 miles from Santa Fé, measured along the river; 16 circum-meridian altitudes of beta aquarii, and 17 altitudes of polaris give me for the latitude of the place $33^{\circ} 20' 02''$, and the longitude, by the chronometer, 7h. 08m. 57s. We must soon leave the river. A cross section of it at this point is 118 feet wide, with a mean depth of 14 inches, flowing over large round pebbles, making it, at this point, unsuitable for navigation with any kind of boats.

The height of our first camp on the Del Norte, one mile north of San Felipe, indicated by the barometer, was 5,000 feet, showing we had descended, from Santa Fé, 1,800 feet.

Here the height is 4,241 feet, showing an average fall in the Del Norte, from the camp near San Felipe to this place, of four feet and a half per mile. The greater part of the way the fall is uniform and unobstructed by rapids, and the river flows, for the most part, over a bed of sand, without any sensible increase or diminution in its volume of water. Sometimes its tranquil course is rippled by large angular fragments of basalt, trapp, lava, and amygdaloid, which everywhere strew the table lands of New Mexico.

Our present camp is in a valley 70 or 100 acres in extent, well grassed and wooded, and apparently untrodden by the foot of man; for here we saw, for the first time in New Mexico, any considerable "signs" of game in the tracks of the bear, the deer, and the beaver. We flushed several beavies of the blue quail, saw a flock of wild geese, summer duck, the avocet, and crows.

Above and below us is a cañon, and on the eastern side of the river the Fra Cristobal shoots up to a great height. We saw on its sides, reaching nearly to the top, large black objects which we could not distinguish with our indifferent glasses, but which must be either shrubbery or rocks.

For the last night or two it has been unusually cold, the thermometer ranging from 25° to 32° Fahrenheit, but during the day it mounts up to 75° and 80° .

October 13.—Moved one mile to get better grass. Just as we

had pitched our new camp Lieutenant Ingalls came up with a mail, and gave the pleasant information that the saddles were only about six hours behind.

October 14.—We parted with our wagons, which were sent back under charge of Lieutenant Ingalls, and, in doing so, every man seemed to be greatly relieved. With me it was far otherwise. My chronometers and barometer, which before rode so safely, were now in constant danger. The trip of a mule might destroy the whole. The chronometers, too, were of the largest size, unsuited to carry time on foot or horseback. All my endeavors, in the 24 hours allowed me in Washington to procure a pocket chronometer, had failed. I saw then, what I now feel, the superiority of pocket over large chronometers for expeditions on foot or horseback. The viameter for measuring distances, heretofore attached to the wheel of the instrument wagon, was now attached to the wheel of one of the small mountain howitzers.

The valley narrows into a cañon at Bush peak, and opens again a mile or so wide, where we encamped for the night. Growth of to-day much the same as yesterday.

Bush peak is, on its river face, a steep escarpment of basalt, and abreast of it, on the west side of the river, we saw many chips of metalliferous limestone. To-day, met a solitary Mexican mounted on a mule, driving before him a horse, with his back literally skinned with the saddle. He was beating the poor beast over the galled place. The Mexicans generally treat their horses and mules in a barbarous manner, riding and packing them when their backs are running with sores.

October 15.—After travelling three and a half miles, we turned off from the Del Norte and took final leave of it at a pretty little grove, where we found two Mexicans returning from a trading expedition to the Apaches. They were attending a poor worn out jennet, (that had been maltreated and overtaken,) in the hope that a few days' rest would enable it to take their lazy bodies to the settlements.

At this point, several intelligent guides were detached to look up a road further south, by which Captain Cook, who is to follow us with the Mormons, may turn the mountains with his wagons.*

After mounting to the table land, some 200 feet above the valley, it is very level, except where the table land is indented by the streams from the mountains, most of which are now dry. We passed two in succession, both deep and wide enough to contain all the water of the Mississippi, and presenting the appearance of the deserted beds of once large and turbulent rivers. The beds were paved with large round pebbles, mostly of the red feldspathic granite.

On the table land the winter grama (a more delicate grass than summer grama) was in great abundance, but now dry and sun burnt. The other growth noticed to-day consisted of malva, senecio longilobus, small mezquite, fraxinus, (ash,) different from any in the United States; castilleja and datura.

* The route followed by Colonel Cooke will be found traced on the map

Far off to the south, between the peaks of two high mountains, stretched the table land contiguous to the valley of the Del Norte. For the first time since leaving the Arkansas the mirage was seen, and gave the wide opening the appearance of a sheet of water disturbed by the wind. Two distant peaks looming up looked, for all the world, like a fore and aft schooner. As I was observing this my mule came to a halt at the edge of a steep precipice. Below were green trees and luxuriant foliage, the sure indication of water. The stream was clear, limpid, and cool, the first, but one, I had seen since crossing the Alleghanies, where water could be drunk without imbibing a due proportion of mud and sand. Its name, Paloma, (Pigeon creek.)

In the valley grows cotton wood, a new variety of evergreen oak, with leaves like the holly, a new variety of ash, and a new kind of black walnut, with fruit about half the size of ours. The oak was covered with round red balls, the size and color of apricots—the effects of disease or the sting of an insect.

Four miles further brought us to another creek of clear water, running sluggishly, and like the last the size of a man's waist. In its valley were many large trees, uprooted, presenting the appearance of new ground.

On the plains and in the dry valleys were many rare specimens of chalcidony. The only living thing seen was a small rattle-snake, the first since we left Vegas, of the size and mark of the small prairie snake, but of reddish hue, like that of the ground it inhabited.

Observed to-night for latitude and longitude; our height was (approximately) 4,810 feet above the sea.

October 16.—We commenced the approach to the Mimbres mountains over a beautiful rolling country, traversed by small streams of pure water, fringed with a stunted growth of walnut, live oak and ash. The soil in the valleys and to the hill tops of the best quality, covered with a luxuriant growth of grama, a species of entriana differing from the large grama. Nothing but rain is required to make this part of the country inhabitable. There were several new and beautiful varieties of cactus and the entamario (tessaica borealis) diotis lanata in great luxuriance; one a miniature tree, with the stalk six inches in diameter, a new species of dieteria like an aster, with fine purple flowers; aster hebecladus and three-leaved barberry (berberis trifoliolata.)

This must one day become a great grazing country, particularly for sheep. The pure dry air is eminently adapted to them, and they are said to be in all New Mexico very prolific, an ewe seldom failing to drop two lambs.

October 17.—We ascended from the stream, on which we were encamped, by a narrow valley for 2½ hours before reaching the summit between it and the Mimbres, which was so indistinct that I passed it several miles before discovering it. We descended in an arroyo towards the Rio Mimbres, very narrow, and full of shattered pitch stone; the sides and bank covered with a thick growth of stunted live oak. In full view, nearly the whole time of our de-

scent, was a mountain of peculiar symmetry, resembling the segment of a spheroid. I named it "the Dome". Our road led along its base to the north; another path leading to Janos, a frontier town in Sonora, passes down the Mimbres on the south side. The Mimbres was traversed only a mile; for that distance its valley was truly beautiful, about one mile wide of rich fertile soil, densely covered with cotton wood, walnut, ash, &c. It is a rapid, dashing stream, about fifteen feet wide and three deep, affording sufficient water to irrigate its beautiful valley. It is filled with trout. At this place we found numberless Indian lodges, which had the appearance of not having been occupied for some time. We turned westward and ascended all the way to our camp.

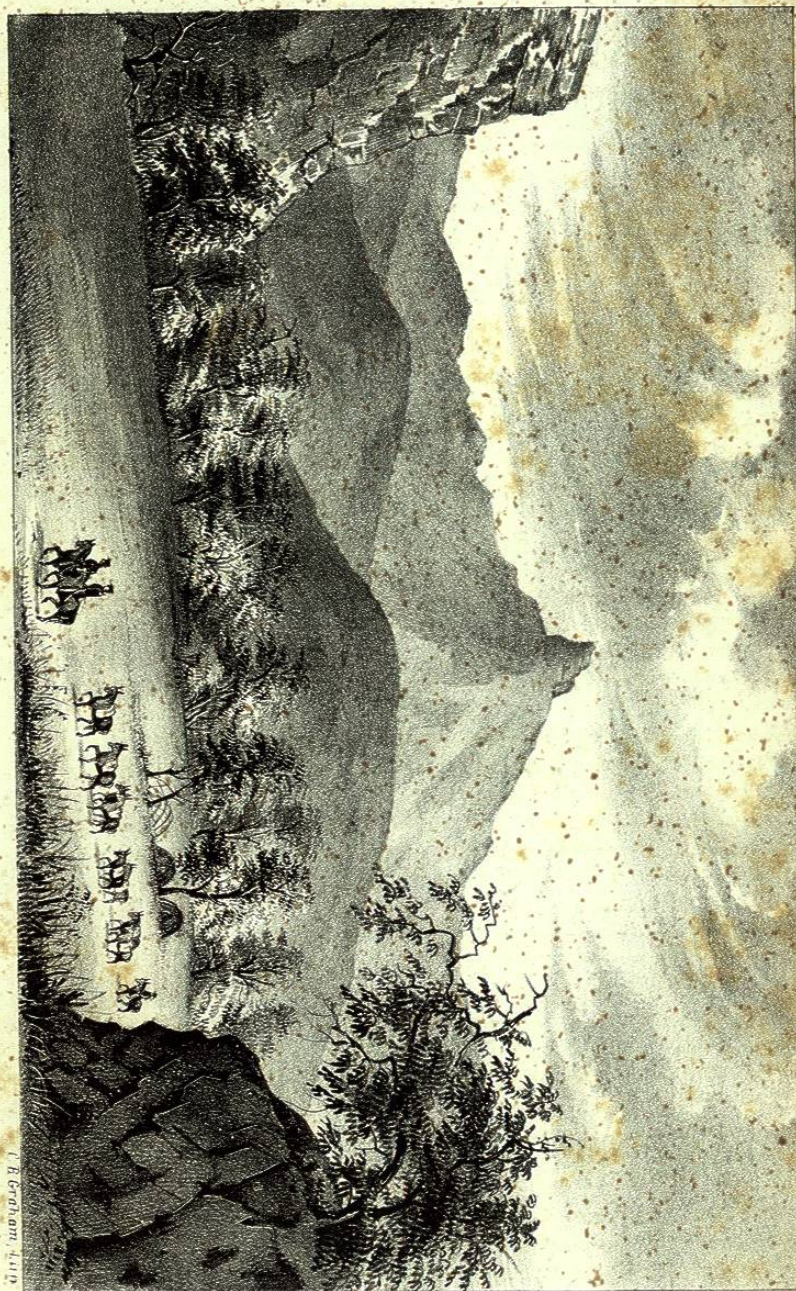
The mountains appeared to be formed chiefly of a reddish amygdaloid and a brown altered sandstone, with chaledonic coating. In places, immense piles of conglomerate protruded; disposed in regular strata, dipping to the south at an angle of 45° . There was also one pile of volcanic glass brittle, in strata about a half an inch thick, dipping 45° to the south. The character of the country and its growth to-day are very similar to those of yesterday; several new plants and shrubs, amongst which was the *cercocarpus parvifolius*, a curious rosaceous shrub, "with a spiral, feathery tail, projecting from each calyx when the plant is in seed." The spiral tailed or barbed seed-vessels fall when ripe, and, impelled by the wind, work into the ground by a gyratory motion. The cedar seen to-day was also very peculiar; in leaf resembling the common cedar of the States, but the body like the pine, except that its bark was much rougher. (For the rest of to-day's growth, see catalogue of plants for this date.)

At night, 12 circum-meridian altitudes of beta aquarii, and seven altitudes of Polaris, give for the latitude of the camp $42^\circ 11'$.

October 18.—A succession of hills and valleys covered with cedar, live oak and some long leafed pine. We passed at the foot of a formidable bluff of trapp, running northwest and southeast, which I named Ben Moore, after my personal friend, the gallant Captain Moore, of the 1st dragoons. In many places the path was strewn with huge fragments of this hard rock, making it difficult for the mules to get along. Turning the north end of Ben Moore bluff, we began to drop into the valley of what is supposed an arm of the Mimbres, where there are some deserted copper mines. They are said to be very rich, both in copper and gold, and the specimens obtained sustain this assertion. We learned that those who worked them made their fortunes; but the Apaches did not like their proximity, and one day turned out and destroyed the mining town, driving off the inhabitants. There are the remains of some twenty or thirty adobe houses, and ten or fifteen shafts sinking into the earth. The entire surface of the hill into which they are sunk is covered with iron pyrites and the red oxide of copper.

Many veins of native copper were found, but the principal ore is the sulphuret. One or two specimens of ammoniate of silver were also obtained.

Mr. McKnight, one of the earliest adventurers in New Mexico,



VALLEY OF THE MIMBRES

J. B. Graham, del.

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