REPORT

OF

EXPLORATIONS FOR A RAILWAY ROUTE,

NEAR THE THIRTY-FIFTH PARALLEL OF LATITUDE,

FROM

THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

BY LIEUT. A. W. WHIPPLE,

CORPS OF TOPOGRAPHICAL ENGINEERS.

base of the mountains, on gravel ridges and in dry ravines, are found cedar and mezquite, furnishing for the people sufficient fuel.

But the excellent coal, which is said to crop out in the Carnuel Pass and in the famous basin of Cibolleta, would, with railroad transportation, afford a large supply of this necessary commodity.

Hence, with the increase of population, the development of the precious metals, the manufacture of wine, and the produce of wool and other articles, will afford rich freights, east and west, in exchange for fabrics of every kind, and luxuries required from the older States.

Such seem a few of the considerations that will have an influence upon the prosperity of the Pacific railway.

CHAPTER IV.

General description of route traversed from Rio del Norte to port of San Pedro.—Remarks upon the Valley of Rio Colorado.

West of Rio del Norte, a ridge easily crossed brings us to Rio Puerco. A branch called Rio de San Jose, passing beds of coal, leads by a gradual ascent, near to the summit of Sierra Madre. Two passes here were examined—both practicable; one leading by the Camino del Obispo, the other by Ojo del Oso. The latter, by report of my principal assistant surveyor, A. H. Campbell, esq., who examined it, scarcely needs excavation to prepare the way for iron tracks. The Obispo Pass would probably require a maximum grade from eighty to ninety feet per mile, and a tunnel of perhaps three quarters of a mile, through soft limestone rock, at the summit. But nature has modeled the slope upon each side of the pass; and, beyond, the route glides quietly into the extensive, well watered, and beautiful valley leading to Zuñi. The route across the Sierra Madre passes extensive forests of excellent pine timber.

It is a singular fact that, throughout New Mexico, Pueblo Indians are universally conceded to be the most sober, honest, and industrious portion of the inhabitants of this Territory. My own observations would tend to confirm the fact. The Indians of Zuñi cultivate a portion of an extensive valley, in the midst of which their pueblo is built. Without irrigation, depending only upon occasional rains, they produce abundant crops of grain and vegetables. Even though they had furnished forage for Fort Defiance, their supply of maize seemed inexhaustible. These Indians are more shrewd and more enterprising than the lower class of Mexican population. They comprehend the advantage of trade which the opening of a railway through their country would afford, and are eager for its accomplishment. The Caciques met in council, and delegated three of their best men to show us the excellent route due west to Rio Colorado Chiquito, below the junction of Rio Puerco of the West. The service was accomplished to our

complete satisfaction. The route was excellent, nearly devoid of hills, with frequent springs and streams of water, and grama grass abundant.

Here is where the route through Campbell's Pass, at Ojo del Oso, unites with the main line. It possesses the advantage of a low summit and easy grades along the channels of the two streams it follows. But the waters of Rio Puerco of the West, being generally lost below the surface, fail to produce the fertility that distinguishes the Zuñi route.

The Colorado Chiquito is a stream smaller than the Gila, but similar in many respects. The banks are fringed with cotton-wood; the valley is wide, the soil rich, and the gravelly ridges are covered with fragments of pottery, among ruins of ancient Indian pueblos. Driftwood here is very abundant, indicating occasional freshets, and plenty of timber near the sources of the river. This stream we followed nearly west about sixty miles. Here the river turned northwest. Desiring to continue as we were, upon the parallel of 35°, a small reconnoitring party advanced to explore the low pass, where a spur of the Mogoyon mountains is broken by the volcanic peaks of San Francisco.

We had sent to Moqui, hoping to obtain Indian guides through this country also, but the messengers returned unsuccessful. They brought tidings that, by hundreds, the Moquis were dying by small-pox. Only three men could be found in health, and they were insufficient to throw the dead over the walls.

Without a guide, therefore, we moved onward about eighteen miles to a cañoned stream, with sides so precipitous and deep as to obstruct our march. Following north for a passage, fifteen miles brought us to its junction with the Colorado Chiquito. Again we explored westward, and with complete success. By an almost uniform grade, we ascended the wave-like swell of the Mogoyon spur, and, at the southern base of the San Francisco mountains, reached the headwaters of the San Francisco river. Here were vast forests of excellent timber, cedar, oak, and pine, covering the plains, and stretching southerly, over a region watered by San Francisco streams, to the furthest limits of vision. North of us rose the volcanic mountains, white with snow, and covered with new varieties of magnificent firs.

It was now between Christmas and New Year, and we were upon one of the most elevated parts of our whole route, seven thousand and two hundred feet above the level of the sea. The winter we knew to be unusually severe, as Mr. Leroux, for three previous winters, had seen these mountain peaks devoid of snow. Now, even at the base where we encamped, snow eight inches deep was lying upon the surface. But we were in a region where curled grama was everywhere abundant, and our mules fared well upon what they could glean from the rocky hill-sides. A thermometer immersed in Leroux's spring read 48°.4 Fahrenheit. This is undoubtedly the mean temperature of the place.

Continuing our explorations west-southwest without difficulty, we found a route leading to a stream marked by Captain Sitgreaves, upon his manuscript map, "Bill Williams fork," and represented as flowing into Rio Colorado forty-five miles below the Mojave villages. Following its course, we soon overlooked a vast region of charming country, which we called the "Black Forest." Notwithstanding the

depth of winter, and the snowy mountains not far behind us, here nature had put forth spring flowers and green herbage.

To our regret, the drainage of this region was to the southeast, and Bill Williams fork took the direction toward Rio San Francisco and the Gila. Disappointed, but not discouraged, we turned west, crossed streams, and, having made a circuit of one hundred and fifty miles, sent back messengers to bring up the train by a favorable route we had discovered. Our reconnaissance still continued in advance of the main body of the surveying party, communicating by signal-smokes or messengers the proper course for it to pursue.

Partridge creek we now followed until it entered an extensive basin, so abundant in curled grama that we called it "Chino valley." This appeared like a branch of that to which we had previously traced Bill Williams fork, and our hopes were again chilled by finding Partridge creek also turning east of south.

Thus far we had found no want of water, grass, and wood; no difficulty in the progress of our train of wagons, and scarcely an obstacle to the construction of a railway. But a continuous range of mountains seemed to deny our westward progress.

We ascended Chino valley northwest two days' march, finding no puerto for a passage through the mountain range, and no water among the ravines for our animals. The whole country to the northwest and north looked extremely unpromising; plains, barren and waterless, flanked upon the west by the still unbroken chain of mountains. In fact, it was the region over which Captain Sitgreaves passed two years before, finding no water for eighty miles, and crossing, beyond, two ranges of mountains whose steep declivities were practicable only for pack-mules.

We were now nearly five thousand feet above the level of the Rio Colorado, distant, in direct line, about one hundred and twenty-five miles. That would give an uniform grade, the whole distance, forty feet to the mile. It was therefore necessary to avoid ascents, and seek a route where a declivity might commence at the earliest moment.

Retracing our steps, we explored the same range south. Fifteen miles from Partridge creek we found flowing, through a dark grove of overhanging ash and hickory, a limpid stream, where ducks, turkeys, and deer were abundant. Five miles beyond Turkey creek we came upon Pueblo creek, so called on account of extensive ruins of houses and fortifications that lined its banks.

Thinking that this stream might change its southeast course and flow westward, we proceeded near to the base of Mount Hope. There ascending an elevated peak, the drainage of the country still appeared east of south, over the same great tract of fertile country we had previously seen from Bill Williams fork.

Thirty miles south, at the base of Black mountain, seemed a low summit. But there were surer indications of a break in the mountain chain where cut by a branch of Pueblo creek. So, returning thither, we ascended its finely-timbered banks nearly due west. In six miles we gained the summit of a pass where two streams found their sources within five hundred feet of each other; one flowing eastwardly into

Pueblo creek, the other westwardly along the course we sought. This cut through the sierra seemed formed by nature for a passage. Wide Indian trails and ruins of extensive fortifications, constructed centuries since upon the heights to defend it, showed that not only present tribes, but ancient races, had deemed this "Aztec Pass" of great importance. Upon the northern side the mountain slope was regular, and followed in a spur parallel to Pueblo creek, enabling the engineer to commence his ascent so as to pass the summit with a favorable grade. A deep cut, or perhaps a tunnel of two or three hundred yards, might be required through the narrow hill which forms the divide. Leaving "Aztec Pass" behind us, we gently descended fifteen or twenty miles along the rivulet, which flowed sometimes above and sometimes below the surface. Our stream now turning northwest toward Yampai creek, in that direction appeared a valley uninterrupted even to the horizon. The reconnoitring party again turned westward over a rolling prairie, and, somewhat to our surprise, in ten or twelve miles we found our course cut by the creek we had left. It now flowed west of south, with cañoned banks fifty feet high. The general surface of the country was gently rolling. Following our stream—which now we call Cañon creek—we found that the country became more rough, the cañon deeper cutting through, and a few miles below emerging from the eruptive barrier that once opposed the flow of its waters. Although no extraordinary difficulty may be apprehended in constructing a railway through the channel formed by the stream, it was no natural road for our wagons. Turning westward, we crossed the Aquarius range of mountains, and found a favorable passage, which our train followed through "Cactus Pass" to "White Cliff" creek. This was a fine mountain stream that fretted upon its rocky shores, shaded by cotton-wood and willows. It emptied into Big Sandy, the latter flowing south, and seldom showing water above the surface. Twelve miles below we again joined Cañon creek. The stream of transparent water, probably fifty feet wide and two feet deep, glides upon a pebbly bed, and nourishes upon its borders reeds and rushes of vivid green. Budding alamos line its banks, and mezquites cover the fertile valley. It is early in February, but the thermometer at midday stands 80° Fahrenheit, giving the climate of advanced spring. Following the creek for about thirty miles, to our regret it flowed nearly south, crossing three successive ranges of eruptive mountains, whose barriers were occasionally broken into cañons. There, having received an affluent from the last, it turned westward to the junction with the Rio Colorado.

This stream, indicated upon old Spanish and English charts, is designated Rio Santa Maria. Captain Sitgreaves, supposing when he saw its mouth that it was the same he had already named at its source in the mountains, calls it "Bill Williams fork." Already has been mentioned our disappointment that the little creek, which we left flowing east of south through the Black Forest, should be an affluent of the Rio San Francisco; and therefore, to avoid confusion of names, it seems proper to restore to the tributary of Rio Colorado the original appellation, Rio Santa Maria. It is an important stream, draining an extensive tract of country heretofore unknown. Alternate sections of its

sand. From the point where we quit Mojave creek to Cajon Pass, there is a plateau formed by a white conglomerate sandstone of diffuse stratification, and much upheaved by the Sierra Nevada. This sandstone is evidently tertiary and posterior to the eocene.

From Monté to Los Angeles, and at San Pedro, the road is constantly over modern alluvium, which probably conceals beds of the tertiary epoch.

In the Cajon Pass I found sienite, trap, and serpentine, exactly similar to those found between Rough and Ready, Grass valley, and Nevada City, and which contain the veins of auriferous quartz.

As specimens were given to me at Los Angeles, very rich in gold, coming from the Cajon Pass, it is more than probable that this point will, one day, be one of the richest places in California.

In an economical point of view, the eruptive rocks which form almost the whole country between Cactus Pass and Cajon Pass will furnish excellent materials for construction, for bridges, roads, and houses; there are also very beautiful marbles, red porphyry, and especially, I think, will be found there, mines rich in silver and gold.

Before concluding, I will say that the relative age of the Sierra Nevada is much less than that of the Rocky mountains, although the direction of the two chains is the same—that of the meridian. The coast range was raised at the end of the eocene epoch, whose beds it has upheaved and dislocated, as may be seen in the environs of Monterey; and the Sierra Nevada was raised later, at the end of the miocene, or pliocene; I have not been able to determine to which of these two this system of dislocation corresponds.

Accompanying this will be found a geological section of the country passed through, as correct as possible, for the short time I have left to make it.

I am, dear sir, your most obedient servant,

JULES MARCOU,
Geologist and Mining Engineer of the Southern Pacific R. R. Survey

A. W. WHIPPLE, *1st Lieut. Top. Eng., U. S. A.,*
In charge of exploration of route near 35th parallel.

CHAPTER VII.

Economical Zoology.—Game, and their means of subsistence: By C. B. R. Kennerly, M. D., Physician and Naturalist.

WASHINGTON, D. C., *July* 1, 1854.

SIR: I have the honor herewith to present a general account of the game animals of the country traversed by you in surveying a route for the railroad to the Pacific. I do not propose here to go into much detail, as the description of the individual species, with an account of their characteristic habits, is reserved for a subsequent report. For convenience of reference, I shall divide the line into several portions, and express, as briefly as possible, the peculiar features in the economical zoology of each.

From the Rio Grande to the Pueblo of Zuñi.—Although this district is hunted very closely by Indians and other persons traversing it, yet in some places we found game abundant. Before reaching the pueblo of Laguna, however, animals of the larger kind were rarely observed. Still, along the road, the large rabbit of this region (lepus callatis) was often seen springing and hurrying off towards some neighboring hills or clump of cedars, while the smaller species, (lepus artemesia,) less swift than its long-eared companion, but not less abundant, darted from its form in the grass and disappeared in its burrow; and along the Rio Rito, ducks and geese in large flocks supplied us with many delicious meals. But it was not until after leaving this village that we were enabled to enjoy the more noble sport of hunting the black-tailed deer (cervus macrotis) and bears, that we found upon approaching the Sierra Madre. This district has long been celebrated for its game, and the accounts that we had heard proved not to be exaggerated. Even in the small grassy valleys that we crossed were seen herds of the above-mentioned deer, while among the piñons on the hills were found the resting-places of the bear of several species.

Descending the western slope of the mountains, we again met with rabbits in great numbers. Besides these, we occasionally found the timid and graceful antelope; but being much hunted, they were here scarce and wild, and when seen were far off in small herds upon the plain. Along the valleys that stretch towards the pueblo of Zuñi, and which are generally hemmed in by rough and rugged hills, we found the grizzly bear (ursus ferox) abundant. When impelled by hunger they become very fierce, and, descending into the valleys frighten off the *pastores*, who, in their terror, abandon their flocks to these huge monsters.

A part of this country abounds in birds, whose glad notes cheer the traveller on his way. Among the lofty pines and thick cedars of the Sierra Madre we were enabled to collect many valuable specimens of new and otherwise interesting species.

From the Pueblo of Zuñi to the Little Colorado river.—Leaving the village, we continued our march for a short distance along the Zuñi creek, making, as we went, interesting collections of fishes, mostly new and undescribed species. Leaving the creek then to our left, we passed through a succession of cedar groves and grassy valleys, abounding in black-tailed deer and antelopes, (antilo capra Americana.) In this region we first saw signs of the panther, (felis concolor,) which, leaving the wooded hills, occasionally descended into the valleys to hunt the hare or chase the antelope. At night, while the cheerful camp-fires were blazing around, the coyoté, (canis latrans,) approaching near, would serenade us with his loud and varied notes, while afar off the large, gray wolf (canis gigas) would utter his dismal howl, mingled with the piercing cry of the panther. The latter animal would become silent at the approach of dawn, while the bolder coyoté, removing further from the camp, and seated upon some eminence, would continue his bark sometimes until after sunrise.

In many places birds were scarce, yet we were enabled to collect some very interesting specimens. The weather being cold, the reptiles had all disappeared.

From the Little Colorado river to Pueblo creek.—Passing down the Little Colorado, we sometimes saw ducks of the commoner kind, mallard and teal, flying swiftly over our heads, or calmly reposing on the bosom of the stream, and frequently encamped near the home of the beaver, (castor fiber,) where he had felled the groves of young cotton-wood trees, and trimmed off the limbs with such smoothness as to resemble the work of human hands. Now and then the Canada porcupine (hytrin Canadensis) was seen as a dark bunch resting upon the projecting limb of some leafless tree, or awkwardly crawling among the bushes.

Turning towards the snowy peaks of the San Francisco mountains, we bade adieu to the Little Colorado. Ascending the gravelly mesa, our train passed slowly, occasionally turning from a direct line to avoid a small hill or little cañon. As we gradually approached the mountain, the chilly blast, sweeping over its whitened crest, painted our cheeks, while it made us draw more closely around us our thick and heavy coats. The little valleys skirting its eastern base, supplying good grass, were now the homes of hundreds of antelopes, who were here sheltered by the neighboring hills from the piercing winds.

A little further on and we found in great numbers the beautiful tufted squirrel, (sciurus aberti,) and admired its gracefulness as it leaped from tree to tree, or passed swiftly over the frozen snow; while the stillness of the evening was sometimes broken by the heavy flaps of the wild turkey's wings as he ascended to his roost in some lofty pine. Spending the Christmas here, we enjoyed much the sport of this wild region; often ascending high into the mountain to track the big-horn, (ova mentara,) whose timidity causes him to dwell in the most inaccessible places.

A few short marches through the dark pine forest and deep snow brought us near Mount Sitgreaves, which lay like a huge monster wrapped in the unspotted mantle of winter, while from its base stretched beautiful valleys covered with grass and dotted by clumps of cedars. Ascending the mountain, we found it the deserted home of the grizzly bear, which, chilled by the drifting snow that had also buried his food, had passed towards the south in search of more comfortable quarters. The number of trails of this animal that we found here, all leading towards the south, is almost incredible. Indeed, before the falling of the snow, it seemed to have been the peculiar home of this animal. But now he was gone, leaving the tufted squirrel and wolf the sole proprietors of his former domain.

From this point our journey lay, for some days, along beautiful valleys, and often through thick and dark forests of cedars; and as we marched along we reaped a rich harvest of the smaller quadrupeds, such as pouched rats, mice, &c. Nor were we compelled to lay aside our rifles for want of larger game; for although we saw no antelopes, the black-tailed buck, accompanied by his graceful doe, frequently darted before us. Reaching soon a handsome valley, with its surface cut by a serpentine cañon, at some seasons probably containing a running stream, but now only watered by a succession of cool and clear pools, we found in great numbers Gambel's partridge, (callipepla Gambelii.) While encamped here this beautiful bird afforded us fine sport with our shot-guns, while frequently in the distance was heard the keen and sharp report of the rifle, or the hoarse bellow of the musket, from some party in search of deer. Along this cañon were many deserted wigwams, the Indians having probably retired to the south at the approach of winter.

But we had not bid a last adieu to the antelope, though we did not find it here among the hills and thick bushes. This species prefers the open valley, or wide and unbroken plain, where it can descry an approaching enemy in the distance. Descending into the Chino valley, we found this interesting animal very abundant. Large herds could be seen afar off moving away rapidly in alarm at the unusual sight of our train. Occasionally, impelled by curiosity, they would approach quite near, as if to see what creatures they were that had thus unceremoniously invaded the country of which they had remained the unmolested proprietors for so many generations.

After leaving the Chino valley, we entered again the cedar forests, where we found wild turkeys again very abundant, dwelling for the most part along the little brooks that we found in this region, and feeding upon the berries of the rough-barked and other species of cedar. It was pleasant, afar off here in the wilderness, to hear the familiar voice of the male as he gathered his flock to roost in some tall tree.

In the thick underbrush along these creeks the grizzly bear sometimes made his bed, and watched with careless air the ducks that floated on the stream. In this vicinity we caught some interesting fishes, and collected many handsome specimens of birds, the smaller species particularly being quite numerous.

From Pueblo creek to the Big Sandy.—Following up Pueblo creek nearly to its source in the mountains, we passed through Aztec Pass, with faces turned still towards the setting sun. This was a beautiful little stream, and we were sorry to leave it, as in this region one seldom sees such cool and limpid water.

Passing through the mountain, we again descended into a beautiful valley to hunt the black-tailed deer and chase the antelope, both of which animals we found quite abundant. Continuing our march, we crossed from time to time deep cañons with their pools of clear water, though containing no fishes, yet affording a sporting place for many ducks, which were at night frequently molested by the stealthy lynx (lynx rufus) that made its home in the neighboring rocks. The caves also among these rocks often afforded a shelter for the wild Indians of this region, who gather here the maguey plant and store it away for winter food. This plant we found very abundant, but the Indians do not depend upon it alone for subsistence, combining with it the smaller quadrupeds, as well as large game, which they are sometimes able to capture.

The distance from Pueblo creek to the Big Sandy is probably much less than the distance embraced between any other divisions that we