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Report of the Secretary of War, communicating, in answer to a resolution of the Senate, the report of Lieutenant Whipple's expedition from San Diego to the Colorado

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REPORT

OF

THE SECRETARY OF WAR.

COMMUNICATING,

In answer to a resolution of the Senate, the report of Lieutenant Whipple's expedition from San Diego to the Colorado.

FEBRUARY 1, 1851.

Ordered to be printed.

WAR DEPARTMENT,

Washington, January 31, 1851.

SIR: In compliance with the resolution of the Senate of the 20th instant, I have the honor to transmit to you a copy of the report of the expedition from San Diego to the Colorado, by Lieutenant Whipple, of the corps of topographical engineers.

With great respect, your obedient servant,

C. M. CONRAD,
Secretary of War.

Hon. WM. R. KING,
President of the Senate.

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, January 31, 1851.

SIR: I have the honor to submit a copy of a report of an expedition from San Diego to the Colorado, by Lieutenant Whipple, corps topographical engineers, called for by a resolution of the Senate of the 20th instant.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

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

Extract from a journal of an expedition from San Diego, California, to the Rio Colorado, from September 11 to December 11, 1849, by A. W. Whipple, Lieutenant United States Topographical Engineers.

Having engaged Tomaso as guide and Indian interpreter, on the 11th day of September, 1849, we started from the mission of San Diego for the junction of the Rio Gila with the Colorado.

Tomaso is chief of the tribe of Indians called Llégeenos, or Diegeenos. Whether this was their original appellation, or they were so named by the Franciscans from San Diego, the principal mission among them, I could not learn. According to Tomaso, his tribe numbers about 8,800 persons, all speaking the same language, and occupying the territory from San Luis Rey to Agua Caliente. They possess no arms, and are very peaceable. Crimes, he says, are punished—theft and bigamy by whipping, and murder by death. They profess the greatest reverence for the church of Rome, and, glorying in a Christian name, look with disdain upon their Indian neighbors of the desert and the Rio Colorado, calling them miserable gentiles.

The mission of San Diego, about five miles from the town and ten from the plaza of San Diego, is a large pile of adobe buildings, now deserted and partly in ruins. There remains an old Latin library, and the chapel walls are yet covered with oil paintings, some of which possess considerable merit. In front there is a large vineyard, where not only delicious grapes, but olives, figs, and other fruits, are produced abundantly. In the days of their prosperity, for many miles around, the valleys and plains were covered with cattle and horses belonging to this mission; and the padres boasted that their yearly increase was greater than the Indians could possibly steal. But in California the sun of their glory is set forever. Near by stand the thatched huts of the Indians, formerly serfs or péons—now the sole occupants of the mission grounds. They are indolent and filthy, with more of the vices acquired from the whites than of the virtues supposed to belong to their race. Some of them live to a great age, and one old woman, said to be far advanced on her second century, looks like a shrivelled piece of parchment, and is visited as a curiosity. Many of these Indians, men, women, and children, assembled on the bank of the stream, apparently to witness the novelty of a military procession. But a pack of cards was produced; and, seating themselves upon the ground to a game of monté, they were so absorbed in the amusement as to seem unconscious of our departure.

Our route leads over steep hills, uncultivated and barren excepting a few fields of wild-oats. No trees; no water in sight from the time of leaving the mission until we again strike the valley of the river of San Diego, half a mile from Santa Monica, the rancheria of Don Miguel de Pederina, now occupied by his father-in-law, the prefect of San Diego, Don José Antonio Estedillo. The hill-tops are white with a coarse quartzose granite, but as we approached the rancho of Don Miguel the foliage of the trees that fringe the bank of the Rio San Diego formed an agreeable relief to the landscape. Here the river contains a little running water; but before reaching the mission it disappears from the surface, and at San Diego is two feet below the bed of shining micaceous sand. Maize, wheat, barley, vegetables, melons, grapes, and other fruits, are now produced upon this ranch in abundance. With irrigation the soil and cli-

mate are suitable for the cultivation of most of the productions of the globe. But the mansion-houses of such great estates in California are wretched dwellings, with mud walls and thatched roofs. The well-trodden earth forms the floor; and, although wealth abounds, with many luxuries, few of the conveniences and comforts of life seem known. From fifty to one hundred Indians are employed on this ranch in cultivating the soil, doing the menial household service, and attending to the flocks and herds. Their pay is a mere trifle, and Sundays are allowed to them for holiday amusements—attending mass, riding, gaming, drinking.

September 13.—From Santa Monica to Santa Maria, five and a half leagues, the steep hillsides showed scarcely the vestige of a road, and night overtook us midway. For the first league we follow a cañada, through which extends a row of live-oaks, with here and there a pool of water. We cross a range of barren hills and pass a ravine with magnificent oaks, a little grass, and indications of water. Another ridge brings us into a valley rendered beautiful by a liberal sprinkling of wide spreading oaks, and a long winding and gradual descent leads to a wooded glen, where the thick foliage of intertwining branches throws a shade over a spring of limpid water, and seems inclined to shield from mortal eyes a treasure sacred to the sylvan deity. But here the road was bad, and as we cut the trees to mend the way it seemed like sacrilege. Another league, with here and there a tree, brings us to Santa Maria. This is the rancho of the hospitable Don José Maria Martin Ortega. It lies in a fertile basin many miles in extent, and contains an excellent mineral spring. The mountains surrounding are covered with bleached masses of coarse granite, and the principal ranges have a general direction from northwest to southeast.

Rancho de Santa Maria, September 15, 1849.

	9 a. m.	12 m.	3 p. m.	6 p. m.
Barometer, Green's siphon -	28.713 in.	28.719 in.	28.681 in.	28.633 in.
Attached ther., F.,	81°	86°.5	83°.5	67°.5
Detached ther., F.,	82°	86°.5	84°	67°.5

Magnetic inclination, as determined by observations with Fox's magnetic dip circle, 58°.42.

Magnetic intensity, ———.

September 16.—The preceding night has been very cool, and the thermometer at sunrise stands at 50°.5 Fahrenheit.

Finding the spring-water warm, the thermometer was immersed, and immediately rose to 70°.5, twenty degrees higher than the temperature of the surrounding atmosphere. The water is highly impregnated with sulphur, but clear and delicious to the taste. Large bubbles of gas are constantly rolling to the surface of the spring from the moving sand below.

Pursing our journey, we were surprised to find pools of water standing in the road, although there had been no rain, probably, for months. The road crosses the basin, and for several leagues sweeps along pretty little valleys, with patches of grass and trees. This day brought to view the cottonwood, or alamo. It so much resembles the Lombardy poplar, as at

first to be mistaken for it. Found much feldspar, containing crystals of garnet and turmaline.

As we approach Santa Isabel, which is seven and a half leagues from Santa Maria, a change comes over the face of the country. Nature appears more smiling; the valleys teem with grass, and the oaks, though small, are creeping from the cañadas to the hill-sides.

Santa Isabel is a charming spot, surrounded by gentle hills, and watered by a rapid and never-failing mountain stream. It was a flourishing place during the prosperity of Catholic missions in California. There still remain the ruins of a church, and mud walls of other dilapidated houses. A collection of miserable straw huts serve as a home for about three hundred Indians, who, from having been the slaves of the priests, appear to have succeeded to the inheritance. They irrigate their fields and cultivate maize, wheat, and barley. Their vineyard is very flourishing; the most delicious grapes are in great abundance; peaches, figs, and apples are beginning to ripen; while we feast upon melons and pears. Many of these Indians are shrewd and evidently not wanting in natural capacity, but they are in that stage of civilization in which man seems most degraded. They have acquired a knowledge of and a taste for the vices of the oppressors of their race, but know nothing of the virtues which might serve as an antidote. Now that they are freed from bondage to the Franciscans, and from the equally exacting Spaniards, it remains for the United States to render that freedom a true blessing by establishing among them schools where they may be taught their duties as Christians and as men.

Their ideas upon religion are few and simple: there is a God in heaven; their tribe, and all who have been marked with the sign of the cross, are Christians, and when they die they will go to the happy regions; all others are gentiles and outcasts from heaven.

The geological formation here consists of quartzose granite, mica-schist, talcose-schist, with turmaline and hornblende: some indications of metal. Silver is said to exist in this vicinity; but where, the Indians pretend not to know.

Dr. Parry thinks he felt the shock of an earthquake this evening.

Santa Isabel, September 17, 1849.

	9 a. m.	12 m.	3 p. m.	6 p. m.
Green's syphon barometer, No. 222,	27.232 in.	27.256 in.	27.253 in.	27.189 in.
Attached ther., F.,	70°.5	84°.5	86°	71°.5
Detached ther., F.,	74°	81°	86°	71°

On the morning of September 18th we took an early start, and, as the short cut of sixteen miles to San Felipe is not passable for wagons, we proceeded in a northerly direction towards Warner's ranch. The valleys through which our route leads are really charming for California. The groves of oaks are filled with birds of song, and morning is made joyous with the music of the lark and blackbird.

Having traversed the long valley of Warner's ranch, eight miles from Santa Isabel, we struck the much travelled emigrant road, leading from the Colorado to El Pueblo de los Angeles. In a ravine of superb oaks we stopped to gather grapes, for here is an Indian village, a mountain-

stream, and a vineyard. Upon entering San Felipe, twenty-six miles from Santa Isabel, we found several parties of emigrants, some of them destitute of provisions. They tell us that upon the desert we shall find many in a condition bordering upon starvation. They also confirm the reports of the emigrants at San Diego, concerning the hostilities committed by the Indians at the mouth of the Rio Gila. One party pretended to have had a pitched battle with them, and showed an arrow with which one man had been wounded. The number of the Yumas at the mouth of the Gila was estimated at 5,000; and it was feared that they would utterly destroy the emigrant parties in their rear.

The village at this place contains probably fifty Indians, part of whom are Diegeenos, and acknowledge the authority of Tomaso; the rest belong to the tribe of the desert called Como-yéi, or Quemeya, speaking a different language, and totally ignorant of Spanish. To my surprise the women were neatly dressed in calico frocks; and, notwithstanding the streaks of tar with which they paint their faces, some were quite good looking. Their zandias were all "verde," and they had nothing else to sell. As at this place we take leave of the Llégeenos, it may be well to record such words of their language as have been gathered from Tomaso, their chief, and others of their tribe:

Diegeenos.	English.
Mo-qué-hut.....	Horse.
Ah hüt, or moolt.....	Mule.
Ay-cóotchet.....	Man.
Seen.....	Woman.
Nile.....	Father.
Tile.....	Mother.
Hámato.....	Body.
Estár.....	Head.
Wa.....	Face.
Hoo.....	Nose.
A-yon.....	Eye.
A-wuc.....	Eyes.
Ah.....	Mouth.
Sith'l.....	Hand.
A-sác'l.....	Fingers.
Cu wis.....	Arms.
E-with'l.....	Leg.
Toon.....	Knee.
Ha-meel-yáy.....	Foot.
Hil-e-tár.....	Hair.
El mám.....	Boy.
En-yát'l.....	To day.
Mát-in-yat'l.....	To-morrow.
Hoon.....	Night.
Han, or hánnà.....	Good.
A-wáh.....	House.
Tayheéth, or cucháo.....	Blanket.

Diegeenos.	English.
Apée-ël.....	Hat.
Hinc.....	One.
Ha wúc.....	Two
Há-móok.....	Three
Cha-póp.....	Four.
Seráp*.....	Five.
Coo quit'l-hue.....	Money.
Iris coquit'l-hue.....	He wants money.
Pootivuris coò-quit'l-hue.....	I.
N'yál.....	He.
Poo.....	Am.
Tawa.....	Here.
Pee.....	I am here.
N'ya-pee táwa.....	He was there.
Poo-ee pia a.....	Fruit.
Ach-a má cha.....	Water.
Ahá.....	Bread.
Me-yert'l.....	To eat.
As-a ó.....	To drink.
Ay-sáie.....	Ear.
Ha-má-t'l.....	I drink water.
N'ya-ahá-asáy.....	I eat meat.
N'ya coquayo asá-ho.....	Brandy.
Quarquc.....	To be drunk.
Asér-mérāye.....	I drink rum.
N'ya-quar-quac asèe.....	Nothing.
Omuc'l, or omah ó.....	Yes.
Ho.....	I have a horse.
N'ya-hut-n'yay pilyay.....	I had a horse yesterday.
N'ya-hut-pour-y'ayo.....	I shall have a horse to-morrow.
N'ya hut-meton-yat'l-ninia.....	

September 19.—Left San Felipe at 8 a. m. Trees and grass gave place to rocks and sand. About two and a half leagues from San Felipe we entered the dry bed of an arroyo, which traversed for nearly a league a narrow winding ravine, produced by a fault in the mountains. The width in some places was barely sufficient to admit the passage of our wagons, while the perpendicular height of the rock, on either side, was at least fifteen feet. The rock, at first coarse granite, with tumulé of pedregal, passed into an indurated shale, talcose or mica slate; veins of quartz were still numerous.

Encamped at El Puerto, three and a half leagues from San Felipe, where we found springs of water, a little grass, but no wood. Here were many emigrants, who gave the same dreary account of the desert as was

* According to Tomaso, the Diegeenos have but five numerals, although others of the tribe gave me, hesitatingly, ten, viz: hinc, hawoc, hamook, enáy-póp, shúckle skajo, sunhook, scrap, shook, chiphook, and yamat, apparently erroneously taken from the Yumas.

told us last night; much sand, and no grass. One of the men showed me a piece of lead ore, apparently containing silver, found at this place.

Left El Puerto at 8 a. m., September 20; crossed a steep hill and entered the basin of Vallecito. Here abounded cacti, maguey, fouquiera spinosa, and wild sage, but not a blade of grass. Wading the sand for a league, the hills close in to form a narrow valley, where we find grass and excellent springs of water impregnated with sulphur. Here we encamp. Near us are the ruins of adobe huts, indicating the decline of the Indians. There remain a few naked and miserable wretches, who have a garden of green melons, but nothing to eat except the roots of the wild maguey.

This day we first met with the mezquite bean, upon which the prosperity of our horses and mule and the success of our expedition are expected to depend. The accompanying sketch represents a branch of the mezquite screw-bean. These screw like pods grow in clusters of eight or ten upon the same stem. Both the screw and the pod mezquite contain much saccharine matter, and are very nutritious. They ripen at different seasons of the year and are very abundant, each tree producing many bushels.

Vallecito, September 20.

	12 h.	3 p. m.	6 p. m.
Barometer, Green's syphon -	28.511 in.	28.492 in	28.439 in.
Thermometer, attached -	99° .50	96° .5	96° .5
Thermometer, detached -	99°	99°	98°

Vallecito, September 21.

	6 a. m.	9 a. m.	12 m.	3 p. m.
Barometer, Green's syphon,	28.400 in.	28.461 in.	28.484	28.443
Thermometer, attached,	61° .5	96°	100° .5	99° .5
Thermometer, detached,	62°	101°	99°	99°

September 21.—The day was so warm that we were compelled to lie by at Vallecito until about 5½ p. m., when we pursued our route down the valley, which soon stretched out into a plain. The road followed a bed of sand, in which the feet of our horses sank below the fetlock at every step. Six miles from the springs of Vallecito, a semi spherical hill in the midst of the valley separated two roads: the right-hand one leading directly to Cariso creek; the left, by a circuit of half a mile, taking you by the way of a mineral spring of drinkable water. The scenery here, by moonlight, was beautiful. The hills in the back ground, with angles sharp and sides perpendicular, were singular, in the extreme. By the dim light it was hard to believe that they were not ruins of ancient works of art—one had been a temple to the gods, another a regularly bastioned fort. The fine large trees which mark the course of the run have furnished the name by which it is known—"Palmetto spring."

Vegetation in the valley remains unchanged; cacti, maguey, kreosote, (larrea Mexicana,) dwarf cedar, and the fouquiera spinosa, are abundant.

Many meteors were seen shooting from the zenith to the southwest. A cloud arose in the east, with frequent flashes of lightning; but the night passed without rain.

Arrived at Cariso creek, fifteen miles from Vallecito, eight from Palmetto spring, at midnight. Found the water of the creek quite brackish; mules and horses would scarcely taste it, thirsty as they were. Of food for them there was none; the emigrants had consumed every blade of grass and every stick of cane, so that our sorrowful animals are tied in groups to the wagons to ponder their fate upon the desert.

Saturday, September 22.—The sun was perhaps half an hour high when our hungry animals were again put in harness. At camp the creek appears 50 feet wide, and nearly a foot in depth; but a mile or two below, it is entirely lost in the thirsty sand. Our route was through the valley of the Carayal. Its banks are of clay, worn by the rain into fantastic shapes, and occasionally mountains appear beyond. The road is strown with emigrants wending their way to the "placers." No rocks were visible, save masses of pedregal, slaty in structure, and containing large ferruginous nodules. Two leagues from camp we passed a steep ridge seemingly formed of gypsum, clear as glass.

Noon.—We are now fairly upon the desert; sandy hills behind—a dreary, desolate plain before us, far as the eye can reach. An undulating surface of sand, with pebbles of jasper, is sprinkled with small green clumps of *larrea Mexicana*.

Thermometer 108° Fahrenheit in the shade.

3 p. m.—Twelve miles from Cariso creek stopped to dig for water, but in vain; thermometer 106° in the shade.

There appeared in the east a cloud, which soon assumed that peculiar appearance which often precedes a violent storm. A dark mass approached, a hurricane was upon us, and we were enveloped in a cloud of sand; the mules were driven from their path, the canvass covers were torn to shreds, and the wagons themselves in danger of being upset. For fifteen minutes we were blinded, when a torrent of rain quieted the dust. A shower of hail succeeded, and the men, throwing themselves upon the ground, hid their faces in the sand for protection. There was neither flash nor report of lightning for an hour. It came at length as night was closing in, to add sublimity to the scene. Pools and streams of water appeared in every direction, and spots upon the parched desert which two hours before seemed never to have been kissed even by a gentle dew, now afforded bucketsful of water for the thirsty mules.

It was dark when one of the party returned, saying that the road led into a lake, which he had been unable to find his way across. Our destination for the night was what the emigrants call "New lake," the nearest point at which we expected to find water. But now we had left the sandy soil of the upper desert, and were traversing a lower plateau whose clayey bed retained the copious shower like a cup. At this time our parties were greatly scattered—some far in advance, others far behind. With us were neither tents nor provisions; to encamp was hence impossible. Thinking that the extent of the inundation could not be great, we entered the water and pushed onward. For a mile, at least, we traversed this lake-like sheet of water, the mules wading to their knees at every step, and still the chains of lightning that seemed to encircle us showed, far as the eye could reach, nothing but water. Yes, there was one spot of land visible—Signal mountain, about five miles distant; and, after a brief consultation, we turned towards it. Wandering about at night in an unheard-of lake, not knowing in what gulf the next step might plunge

us, would have been sufficiently romantic without the storm which still raged unabated, the lightning which blinded, and the thunder which stunned us. At length the camp-fire of the advance party was discovered, and served as a beacon to lead us safely into port. The tired mules loudly expressed their gladness at reaching terra firma, and finding, twenty-five miles from Cariso creek, a resting-place at camp. There is no grass here; but a rank growth of what is called "careless weed" is very abundant. This affords little nutriment; the hungry animals, however, prefer weeds to nothing. At 11 p. m. the stars were shining brightly, and scarcely a cloud was to be seen. Lieutenant Coutts, commander of the escort, thinks that during the storm he felt an earthquake.

Morning, September 23, showed our encampments to be upon the banks of a beautiful little sheet of water, called by the emigrants "New lake." Kearny's route, Cook's and Graham's trails, must all have been north of this lake, or it would have been seen. The water is fresh; but in position it is not far from the Salt lake laid down upon Emory's map.

The prominent mountain lying about four miles S. 10° E. from camp, and apparently 2,000 feet in height, must serve as a beacon to travellers crossing from the Colorado, and may probably be found a convenient point from which to flash gunpowder for the determination of the difference of longitude between San Diego and the mouth of the Rio Gila. Hence it may be called "Signal mountain," and this lake so near its foot "Signal-lake." The accompanying hasty sketches give rough views of both lake and mountain. The former is about a quarter of a mile in length, and a hundred yards wide; depth not ascertained. Mud hens were the only navigators visible. The southern bank is high, and sprinkled with mezquite trees. Upon the north is marsh, with careless weed. At its eastern extremity the lake communicates with a little bayou, the course of which is distinctly marked towards the southeast with mezquite. This is a portion of the stream, which has been termed by the emigrants "New river."

Left Signal lake at 8 a. m., hoping to find grass at our next stopping place. There is a trail upon each bank of the bayou. Proceeding in a general ESE. course, we crossed the stream at a distance of five or six miles from the lake. At this point the banks were steep, the bed of the stream from ten to twenty feet in width, and ten feet below the surface of the surrounding plateau. The depth of the water was less than a foot, and there was no current, for in many spots above the channel was dry. A few miles beyond the bayou, we struck the border of a large grove of mezquite, where we found great quantities of beans. Here were first found shells of the fresh-water muscle. Hares and many partridges were seen. The deep channel of New river again appeared, with more water than before. Twelve miles from Signal lake we again struck an angle of the river where the banks were low and the stream nearly fifty yards wide. The water was sweet, apparently deep, and silvery fish, large as perch, were seen in it. The scene from this place is roughly represented in the accompanying sketch. As we approached our destination for the night, the sands of the desert gave place to green patches of grass.

At sunset we encamped about eighteen miles from Signal lake, at a point on this river called, par excellence, "New river," the oasis of the desert, where sweet water and excellent grass are abundant.

Monday, September 24.—Half an hour after sunrise, thermometer 72° , barometer 30.119 inches.

The grass here is good, and so abundant that we will be enabled to wait here for our remaining teams and recruit the weary animals. We are now in the midst of the desert, and at the recruiting place of all travellers. The white tents of the numerous emigrants gave the place quite the air of a village. The grass upon the plains is short, green, and tender. Upon the banks of the streams it grows tall and thick. Dr. Perry, the botanist, thinks the grass a new species, which he proposes to call "chondrosium desertorum." Although the river bears no marks of being new, as its name implies, the grass which grows in its vicinity has probably but lately made its appearance upon the desert. A change seems passing over this region: rain becomes more abundant; mezquite grows; careless weed springs up, soon to give place to more tender herbage.

New River, Jornada, September 25.

	6 a. m.	9 a. m.	12 m.	3 p. m.	6 p. m.
Barom., Green's syphon, 222	29.935 in.	30.014 in.	30.090 in.	29.908 in.	29.880 in.
Attached therm.	$68^{\circ}.5$	$94^{\circ}.5$	$100^{\circ}.5$	$104^{\circ}.5$	95°
Detached therm.	69°	98°	104°	108°	98°

Observed with Fox's dip circle for magnetic inclination and intensity.

September 26.—At sunrise, thermometer 75° , barometer 29.880 inches. This day made a reconnaissance in the vicinity of New river. Three and a half miles SSE. from camp crossed the bed of New river upon dry ground. Careless weed and grass very luxuriant. Upon the bank the mezquite grove was gay with the songs of small birds. South, towards the mountain range, patches of green grass, with here and there a kreosote plant, appeared. All else was hard clay, baked and cracked in the sun to appear like a pavement of wood. Everywhere, near the banks of this stream, the planorbis and other fresh water shells have been found in abundance; and here small volutes covered the ground, and in some places were heaped up in such quantities as to appear like snow. The heat was intense. An astonishing mirage often presented to view the appearance of water. As we approached there seemed to be a bank of trees reflected distinctly from the smooth surface below. The illusion faded away as we drew near, to reappear in the distance. Eight miles from camp the river impeded further progress, being fifty yards wide, and apparently deep. Mud hens were swimming on its surface; herons, with their long bills, were dipping for fish.

Dr. Parry went to the mountains to day, by taking a course nearly south-west. He crossed no stream except the one at camp. The foot of the hills was sprinkled with locust trees, but the mountains seemed destitute of vegetation.

September 27.—At sunrise thermometer 70° , barometer 29.814 in. At 5 p. m. recommenced our journey. Two miles from New river our route lay over a level plain, green with the characteristic grass and the larrea Mexicana. Grass, by degrees, gave way to drifting sand, and butes, covered with green shrubs, alone broke the monotony of the desert. Five miles from camp we crossed the dry bed of an ancient stream, with steep

banks, and a level sandy bed, ten feet below the surface of the desert, and one hundred and fifty feet wide. Mezquite lined its banks, while kreosote and wild sage sprinkled the valley.

Eight miles from New river we encamped at the "Lagoon," where we found water, but no grass or beans for the animals.

September 28.—Left the "Lagoon" at 4 a. m., and by the aid of Venus, whose light was so strong as to cast a decided shadow, we ascended a bank to the upper desert, leaving in the valley, upon our right, one and a half mile from camp, the "Second Wells." We moved on east over the desert, covered with pebbles of jasper or deep drifting sand, and without shells, with no green thing to relieve the eye save the *larrea Mexicana*, which covets solitude. Twenty miles brought us again upon the steep sand bank which long had bounded our horizon. We descended eighty to one hundred feet into the mezquite-covered cañada, or valley, extending from this point, about twenty miles in width, to the Rio Colorado. Upon this lower plain, where were found the same fresh-water shells as distinguished the region of New river, we pursued a northeast course, parallel to the bank which bounds the desert proper, for seven miles, to the "Three Wells." Here we encamped, twenty seven miles from the "Lagoon." The wells are dug ten feet deep, at the bottom of a small natural basin, which seems scooped from the plain.

At the camp of the "Three Wells," twelve miles west from the crossing of the Rio Colorado, September 28, 1849, at 8 hours 15 minutes p. m., there occurred an earthquake. The oscillatory motion was from east to west. It struck the tents, spilled water from a nearly full bucket, awoke those who were asleep, and frightened many of those who were awake. The rocking motion continued about two minutes.

September 29.—At 5½ a. m. left "Three Wells," and kept along the foot of the sand bank, a little north of east, for eight miles. Met many emigrants, with women and children, facing the desert with cheerful looks. Frank says that the happiest set of fellows he has seen upon the desert was that encamped at the "Wells" last night, with their wives and children.

At the fork of the road we were met by our old guide Tomaso, who had been despatched to warn the Indians of our approach. He was accompanied by Santiago, chief, and the principal man of the band of the Yumas, which occupies the village at the lower crossing of the Colorado. Santiago wore a blue great coat, and a fancy cotton handkerchief bound his head; his legs and feet were bare. Others were clad in the simple breech-cloth. All were mounted on spirited horses. The road up the bank, to the left, is the emigrant trail over the deep drifting sand of the desert. Taking the more circuitous route to the right, we were escorted by the Indians a short distance to their village in the cañada, luxuriant with maize and melons. We were at once surrounded by great numbers of Indian men and women, evincing friendliness, curiosity, and intelligence. The women are generally fat, and their dress consists of a fringe, made of strips of bark, bound around the hips and hanging loosely to the middle of the thighs. The men are large, muscular, and well-formed. Their countenances are pleasing, and seem lighted by intelligence. I doubt whether America can boast a finer race of Indians. Their warriors wear the white breech-cloth, and their hair, hanging in plaits to the middle of their backs, is adorned with eagle's feathers and the rattle of a rattle-

snake. They are exquisite horsemen, and carry their bow and lance with inimitable grace. A dozen of these warriors conducted us beyond their village three miles, through fields of maize and groves of alamo and willow, to the Rio Colorado, where we encamped, twelve miles below where the Rio Gila unites its "sea-green waters" with rightly-named Colorado.

Until October 1st we remained at the lower crossing of the Colorado, waiting for a road to be cut upon the right bank, five miles, to the emigrant crossing. Our Indian neighbors were very sociable, bringing us grass, beans, melons, and squashes, for which they received in return tobacco or money. Old Santiago, their chief, could not speak Spanish, and so our guide, Tomaso, was made interpreter. There were also here a few of the Comoyah Indians, from the desert, or San Felipe, and they could converse with us. Santiago and his people professed great friendship for Americans in general, and us in particular. They "had never stolen from the emigrants, nor maltreated them in any way;" but the Indians higher up, near the mouth of the Gila, they represented as being a desperate set of rascals. "They plundered the emigrants of what they could not steal. The day before, a German had been decoyed away from his party and murdered. They had even come to open hostilities with some parties of the emigrants and fought pitched battles; and as they numbered from five to ten thousand people, they were always victorious." These accounts seemed the more probable as they agreed with those given by the emigrants themselves. Santiago concluded by requesting us to remain with him; as we were, as he said, too few and too weak to cope with those at the mouth of the Gila.

The basis of our road along the bank of the Colorado was an Indian foot-path, which wound around every tree that time had thrown across its ancient track, doubling the true distance. Passing through a forest of cottonwood and willow, we came to the foot of "Pilot knob," and having crossed a spur which extends to the river, found ourselves upon the banks at the emigrant crossing. Here we encamped. "Pilot knob" is an isolated mountain, and rises above us to the height of about fifteen hundred feet. We ascend the highest peak to fire rockets, and watch for signals from the Sierra, beyond the desert.

Tuesday, October 2, 1849.—Left the foot of "Pilot knob" and travelled on through groves of mezquite, upon the bank of the Colorado. Not an Indian had we seen since leaving the village of Santiago; but Tomaso, with some alarm, pointed out fresh foot-prints in the path we followed. We emerged upon the river. The branching paths were soon after lost. A densely wooded ravine rendered it impossible to follow the immediate bank of the river. In search of the way I soon found myself separated from the escort and alone, following a well trodden path. Eager to reach my destination, I pushed on for an Indian guide. At length the winding path led me into a village of the Yumas. As I rode to the principal hut, without even an interpreter, I felt myself imprudent in thus throwing myself into the power of these sayages. They at once surrounded me. One with an emerald pendant from his nose held the bridle of my mule, some played with my pistols, others handled my sword. Seeming to put perfect confidence in their honesty, I nevertheless watched them narrowly while I endeavored to explain in Spanish the object of my visit. Him with the jewelled nose I found to be Anton, a petty chief or captain of

his village; he understood but little of Spanish. Soon there rode up, upon a spirited horse, an Indian whom I found to be a Comoya from San Felipe, called "Mal Anton," and with him I could converse. They having consented to guide me to the mouth of the Rio Gila, I shook off the curious men, women, and children that nearly buried my mule, and rode on. I passed through large patches of maize, melons, zandias, and squashes, leaving villages to the left and to the right. Lost in the maze of paths, and being unable to elicit a word from the grum-looking Indians I met, I turned for my guides. Soon they appeared, coming at full run, the chief in advance, armed with a musket; and Mal Anton followed upon his wild pony, gracefully swinging over his head the noose of his lariat. The chief led the way, while the other followed me through deep ravines and rude plantations. At length, having no fancy for sharing the fate of my namesake in Mexico, I ordered Mal Anton with his lariat in advance. "Tiene v. u. bon corazon?" he inquired as he passed. I assured him of protection as long as Americans were well treated by them. They led me two miles to the junction of the Rio Gila with the Colorado, where I found a hill excellent for an astronomical observatory. Eating a melon Anton had gathered for me, I returned and conducted the whole party hither, encamped, placed the transit in the meridian upon a temporary stand of stone, and observed the same night the passage of both limbs of the moon and several moon culminating stars.

Wednesday, October 3.—To-day came Pablo, grand chief of the Yumas, with his scarlet coat trimmed with gold lace, his epaulettes of silver wire, and, to crown all, green goggles. His legs and feet were bare, but he did not allow that to detract from the dignity of his manner. Tomaso ushered him in and acted as interpreter, translating my Spanish into Indian for him, and his Indian into Spanish for me. I explained to him that their territory now belonged to the United States; that the government took an interest in the welfare of those Indians who were honest and well-disposed; that we were inclined to live in amity with them, but were prepared to chastise those evilly inclined. He promised that his people should not steal from, or otherwise injure Americans, and I gave him those presents that I had prepared. Having taken a glass of aguardiente, his tongue was loosed, his dignity was overcome, and he no longer needed an interpreter; Pablo spoke Spanish better, by far, than I could.

October 4, 1849.—Many Indians in camp; all, as I ever expected to find them, most peaceably disposed. Bows and arrows pointed with jasper. Guns and pistols (mostly broken and discarded by emigrants) are constantly brought into camp. There is, however, perfect confidence among all parties.

Friday, October 5, 1849.—To-day the Indians of the Yuma tribe held a grand council, in honor of our arrival; and, as Pablo Coclum, the great chief in epaulettes and green goggles, had been chosen under the Mexican reign, they determined to show their adherence to the United States by deposing their old chief, and, in a republican manner, electing a new one. The successful candidate was our old friend Santjago, captain of the band of the Cuchans at the lower crossing. He seems a good old man, and worthy of his honors. Upon his election, he was escorted to my tent for the customary presents, and promised good faith towards all Americans.

Tomaso soon returned with three minor chiefs, or "capitanes de los

Cuchanes"—Anastasio, Anton, and Pasqual. The band of Anton lives eight or ten miles above us, and is famed for theft, robbery, and murder. Anton is one of their orators, and replied to me in a speech of half an hour's length. But Tomaso pretended that he did not understand the Cuchan language, and would not translate it.

October 7, 1849.—Took a walk into the villages, to see how the Indians live. They all knew me, and received me kindly enough into their family circle, composed of about a dozen men, women, and children, sitting or lying upon the ground, under the shade of a flat roof of branches of trees, supported by posts at the four corners. The women, dressed in girdles of bark, stripped into thongs, and partially braided, hanging in a fringe to the thighs, and ornamented with many strings of shells or glass beads, were making a mush of zandias, (watermelons,) or grinding grass seeds into flour. The men, with breech cloths, or perhaps a shirt cast off by the emigrants, were ornamented with rings in their noses and eagles' feathers in their hair. The children wore no covering except what nature gave them, but were decked with loads of beads upon their necks, and small strings of the same were inserted through their ears.

The laborious part of their toilet—that in which all their taste and skill are put in requisition—consists in painting. Warriors dye their faces jet black, with a stripe of red from the forehead down to the nose and across the chin. Women and young men usually paint with red, and ornament their chins with dots or stripes of blue or black. Around their eyes are circles of black. Their bodies are generally of a dark red, and polished with an oily substance, so as to resemble well-cleaned mahogany. The face and body are sometimes fancifully striped with black. Of their hair they are quite proud, and take great care in dressing and trimming it. It falls naturally from the crown of the head, and is neatly and squarely trimmed in front to reach the eyebrows; the rest is matted into plaits, and falls upon the back, reaching nearly to the ground.

Strings of broken shells, called "pook," are highly valued among them. They consist of circular pieces of sea-shell, with holes very nicely drilled in the centre. They are very ancient, and were formerly used as money. A string is now worth a horse. An Indian dandy is never dressed without them, and the number of strings worn indicates the wealth of the possessor. The figure of the young dandy, though large, is so faultless in its proportions, that, when I have seen him dressed in his clean white breech-cloth, with no other covering to his carefully-painted person, except the graceful plume upon his head, and the white bracelet of leather, with buckskin fringe and bright brass buttons, which serve as mirrors, upon his left arm, I could but applaud the scorn with which he looked upon European dress, and the resolute firmness with which he refused the proffered gift of pants.

The Yumas (or, as those near the mouth of the Gila call themselves, Cuchans) appear to be skilled in none of the arts. They have neither sheep, cattle, nor poultry. Horses and a few pet lap-dogs are the only domestic animals found at their ranchos. The men are warriors, and occasionally fish and hunt. The women not only attend to their household duties, but also cultivate fields of maize and melons, and collect grass seed, which they pound to flour for bread.

Returning to camp, I found the deposed chief, Pablo Coclum, and his

friend, Captain Anton, loaded with presents of melons, for which, in return, were expected tobacco and red flannels.

Learned from Pablo many words of the Yuma language. Rio Colorado is in their tongue, "Hah withl-cha cohut"—meaning, as in Spanish, red river. Rio Gila they call "Hah qua see ethl"—meaning salt river. The water is indeed brackish, and salt-water plants grow upon its banks.

October 12, 1849.—To-day large numbers of Yumas have started upon an expedition against the Maricopas. They are mounted on good horses, which they ride without a saddle, and manage with a halter. Their coal-black faces and striped bodies and legs give them a fierce aspect. Their hair is no longer suffered to hang loosely, but is bound with strips of scarlet woollen cloth, with long ends streaming behind. They are led by their famous war chief, "Caballo en Pelo," and, with bow in hand and quiver of arrows at their back, they look quite formidable.

Monday, October 15.—Arrived. Colonel Collyer, collector of the port of San Francisco, escorted by Captain Thorne, with thirty dragoons. Under their protection is also a party of emigrants, commanded by Mr. Audubon the younger, naturalist; and Lieutenant Browning, of the navy, Mr. Langdon Haven, and a son of Commodore Sloat, were with this party, which was suffering for the want of provisions.

October 16.—This evening has furnished a sad occurrence. Brevet Captain Thorne, son of Mr. Hermann Thorne, of New York, while superintending the transportation of his party across the Rio Colorado, just below the junction of the Rio Gila, was thrown into the river by the upsetting of his heavily-laden boat, and was drowned. The current of the river was so rapid that all exertions—even those of the Yuma Indians, the best swimmers in the world—were unavailing. Captain Thorne was succeeded in the command of the escort by Lieutenant Beckwith.

October 19.—Mr. Ingraham has just informed me that the wooden box in which is kept chronometer No. 719 cracked into pieces last night, while used in keeping time. This is another proof of the exceeding dryness of this climate, and I regret that I have no hygrometer to determine it. All the boxes in which the instruments were packed are being destroyed. The nicely-finished and well-seasoned cases made in England, many years since, for instruments of Troughton and Simms, have shrunk so as not to admit their original contents. A few nights since, while I was reading the micrometer of the zenith sector, the horn with which my reading lens was encased snapped, and flew from my fingers in three pieces. The peculiar state of the atmosphere was the only cause assignable for such an occurrence.

October 25.—Continued the survey at the junction of the two rivers. The Rio Gila, a short distance from its mouth, is so shallow that the Indians wade across it. The Colorado at the ferry, a short distance below the junction, is about twelve feet deep. The waters of the Colorado are almost opaque with clay, tinged with the red oxide of iron. But the water is sweet, and, when allowed to rest, becomes limpid. The waters of the Gila are colored with a sediment nearly black, and have a brackish taste, making appropriate the Yuma name for it, "Ha-qua-siél"—meaning "salt water." Both rivers are rapid, and their junction forms a distinctly-marked and nearly straight line, leading from the east bank of the Gila to the channel of the Colorado. They unite, and, singularly enough, contract to one-fifth the width of the Colorado above, in order to leap through

a narrow gorge which some convulsion of nature has torn through an isolated hill. Upon this hill, eighty feet perpendicular almost above the water, stands our observatory.

October 27.—Pasqual, one of the war chiefs, and Captain Anton, tell me that they are in daily expectation of an attack from the Maricopas. The Yumas deserve chastisement; for in their late expedition they surprised their enemies, and brought off captive two Indian boys, whom they afterwards sold as slaves to the Mexicans.

October 28.—Thronged, as usual, with Indian visitors. They say that the Maricopas came in sight of camp yesterday, but, seeing United States troops, dared not attack the Yumas.

October 30.—This morning, at about 4 o'clock, there was great alarm among the Cuchans, (Yumas,) who live upon the left bank of the Colorado. Our whole camp was aroused by their shouting and firing. By daylight they were swimming the river in crowds—men with their horses and women with their children—all crying out lustily, "Maricopa! Maricopa!" Every hill top was crowded with armed warriors, and others were riding hither and thither—why or wherefore, none seemed to know. At length Anton told me that many Maricopas had attacked them, and killed one Yuma. By 10 o'clock a. m. our camp was deserted by the Indians, and for the rest of the day not one has been seen. The soldiers think the whole story of Maricopas a ruse, and apprehend an attack to-night. Lieutenant Couatts has increased the number of sentinels for the night.

October 31.—Indians have been to-day sociable, as formerly—each chief bringing presents of excellent melons. Among them came for the first time the great war-chief, "Caballo en Pelo." I made him a small present, which secured his friendship.

November 2.—Among my early Indian visitors this morning is one whom the whole tribe call an hermaphrodite. She is gigantic in size, muscular and well-proportioned. Her breasts are not developed like those of a woman; but she dresses like one of the gentler sex, and, it is said, cohabits with a man. She is in disposition mild, and often hangs her head with a mental blush at the jokes of her companions.

From Pablo Cochuin, by birth a Comeyei, but formerly chief of the Yumas or Cuchans; from José Antonio, whose father was a Mexican, but born of a Yuma mother and always living with the tribe; from Poruaso, chief of the Diegeenos; from Antonio and Mal Antonio, intelligent Indians; from San Felipe, and from other Indians with whom I could converse, I have collected all information possible regarding the tribes of which they knew.

The term "Yuma" signifies "sons of the river," and is applied only to those born upon the banks of the Rio Colorado. The Yumas are divided into five lesser tribes or bands, viz:

1. *Cuchans*, numbering about five thousand persons, and living in villages upon both banks of the Rio Colorado, within about twenty miles from the mouth of the Rio Gila. They are a noble race, well formed, active, and intelligent.

2. *Mah-käh-os*. They are a great nation, and live upon the right bank higher up the Rio Colorado, seven days' journey from the mouth of the Rio Gila. Being very poor, they wear merely the breech-cloth; they are warriors, and well armed with bows, arrows, and lances.

3. *Hah wál cōes.* This great nation possesses the left (east) bank of the Colorado, eight days' journey above the junction with the Rio Gila. I have been shown to day by an Indian a very good blanket, black and white checked, said to have been made by the Hah-wal-coes.

4. The *Yam-pái ò* is the name of the tribe which occupies the left bank of the Colorado, six days' journey above the junction with the Rio Gila.

5. *Chim-woy os* designates those upon the right bank of the Colorado, opposite the *Yam-pái os*, and also six days' journey above the junction with the Rio Gila.

These four nations speak languages differing from the Cuchan; and Pablo says he can understand none of them except the *Ma há os*. They are notwithstanding firm friends and allies of the Cuchans, always assisting them when at war with their perpetual enemies, the Maricopas. In these wars, captives are made slaves, and are forever degraded. The mother will not own her son after such a misfortune has once befallen him.

At the mouth of the Colorado, about eighty miles below the junction of the Gila, is the tribe called "Co-co-páh." According to the previous definition, these also must be Yumas; but they are enemies of the Cuchans, and no intercourse exists between them. The Gila Indians call it but three days' journey to the country of the Co-co-páhs, and yet they seem to know them less and fear them more than any other Indians.

There are upon the desert west of the Colorado two tribes of Indians, called—one, *Cah-wée-os*; the other, *Co mo-yah* or *Co-mo-yéi*. The *Co-mo-yahs* occupy the banks of New river near the Salt lake, and the *Cah-wée-os* live farther north upon the headwaters of the same stream. Pablo himself is a *Co-mo yah*. He was born upon the banks of New river (*Hah-witl-high*) of the desert, emigrated hither twenty years ago, and when I arrived he was captain general of the Cuchan tribe. Several *Co-mo-yahs* are here, and they can generally be distinguished from the Cuchans by an oval contour of the face.

Pablo says that New river was formerly a running stream—rose north of the country of the *Cah-wée-os*, and flowed into the Colorado one day's journey below the lower crossing, at the village of Captain Santjago. But for some twenty or thirty years the water in it was merely in pools until the past season, when abundant rains restored its former dimensions, and again water flowed from the Salt lakes to the Colorado.

One month has now elapsed since my arrival at this place, and I have spent all my leisure moments in studying the character of the Indians. I have visited their ranchos; I have daily admitted them freely in my tent; upon the table are always many little things curious and valuable to them; and men, women, and children are permitted to examine and pass them from hand to hand without being watched, and never, to my knowledge, have I lost the value of a penny. With men shrewd as are the Cuchans, this might result from policy; but if thieving were tolerated among them, it seems strange that children should not be tempted, by the many curious things they handle, to recur to the habit.

Sunday, November 18.—The day exceedingly pleasant, like our Indian summer. Thermometer at 3 p. m., 82°.

For a long time I have endeavored to ascertain what were the superstitions of the Cuchans, what was their substitute for religion, what their

modes and object of worship. All the reply I could get from Tomaso and other Indians who glory in the name of Christians, was: "Ellos saben nada nada"—they know nothing at all. And when I made them interpret for me with the few Yumas, who knew no Spanish, the reply was still "nada." "The Yumas had no God; they worshipped nothing, and went nowhere after death." At length a woman appeared with a brass medal bearing the image of the Virgin Mary. When some one knelt to it with clasped hands, all looked on in silence and apparent awe, and afterwards expressed their approbation by saying, "ah-hote-kah"—good.

To-day chief Anastasio took up a French prayer book, and listened, evidently with reverence, at hearing it read. He then made a long dissertation in his own language, of which I understood little, except that, after death, the body of a Yuma is burnt, and his ashes ascends to heaven; that he himself had a good heart, and hence was worth any Christian.

Thursday, November 22.—The rising sun dispelled the clouds, and brought a charming day. At 12 m. the barometer, by a sudden fall of about a half inch, indicated the approach of one of our periodical storms, which soon swept over us. The wind, as is usual at such times, nearly precipitated our tents from the cliff into the river below. However, at sunset the wind moderated, the moon peeped from the clouds, and we obtained good lunar observations.

Friday, November 23.—Having been employed so steadily in observing at night, and computing all day, my health begins to suffer, and last night I was too nervous to sleep; hence the wail of the poor dog that nightly howls the requiem of his drowned master seemed more sad to me than ever. When Captain Thorne was lost in the Colorado, some weeks since, a Mexican boy shared the same fate. He left a faithful dog, which has declined the alluring invitations of emigrants and soldiers, preferring rather to lick the ground his master last trod than accept the daintiest fare from a stranger's hand.

Saturday, December 1, 1849.—Having determined, with all the accuracy which two months' time would admit, the latitude ($32^{\circ} 43' 31''.6$ north) and longitude ($114^{\circ} 33' 4''$ west of Greenwich) of the monument near the junction of the Rio Gila with the Colorado, and from thence measured $85^{\circ} 34' 16''.2$ west of south, the azimuth of the straight line of boundary leading to the Pacific ocean; and also having settled with the Mexican commission, which arrived yesterday, all questions relating to the boundary at this point from which any difficulty could be apprehended, we left the Mexican gentlemen in charge of our fixtures, and turned towards San Diego.

Of late my time has been so much occupied with professional pursuits that I have had less intercourse with the Indians than formerly, but my opinions of them are little changed from those previously expressed. I will merely add, that to this day, among the Yumas, I have never seen anger expressed by word or action, nor known of one of their women to be harshly treated; they are sprightly, full of life, of gaiety, and good humor.

The climate of the country near the junction of the Rio Gila with the Colorado will be best understood by a reference to the following records. They were kept by Dr. Parry, assistant, in a tent upon the hill at the junction, about 80 feet above the surface of the river Colorado.

Days and hours.	Height of barometer column.	Thermometer, Fahrenheit.		Remarks.
		Attached.	Detached.	
1849.	Inches.	Deg.	Deg.	
October 5.....9 a. m.	29.879	85.5	86	Day clear; mountains hazy; wind light from the west.
3 p. m.	29.804	92.5	94	
6 p. m.	29.791	82	83	Day clear; horizon hazy; light breeze from NW.
October 6.....10 a. m.	29.860	87.5	88.5	
12 m.	29.839	92	93	
3 p. m.	29.807	93.5	94	
6 p. m.	29.813	83.5	84	Day clear and sultry; varying breeze from east in morning; westerly at night; clouds cumuli at night.
October 7.....10 a. m.	29.847	88	89	
12 m.	29.853	94.5	96	
3 p. m.	29.823	97.5	98	
6 p. m.	29.814	87.5	88	Day cloudy at sunrise.
October 8.....sunrise..	29.817	74.5	75	
9 a. m.	29.877	87.5	88	
12 m.	29.877	86	87.5	Day clear.
3 p. m.	29.812	96.5	96.5	
October 9.....1 p. m.	29.813	92.5	93	
4 p. m.	29.801	91.5	92	
6½ p. m.	29.769	82	82.5	Day clear.
October 10.....9 a. m.	29.813	78	78.5	
6 p. m.	29.739	88.5	88	Day clear.
October 11.....9 a. m.	29.765	74.5	75	
12 m.	29.777	84.5	84	
3½ p. m.	29.820	87	88.5	Day clear.
6 p. m.	29.794	76.5	77	
October 12.....3 p. m.	29.840	84.5	84.5	
October 13.....9 a. m.	29.880	77	77	High wind from the NW., commencing at 10 a. m.; tents blown down; wind going down at sunset.
12 m.	29.851	81.5	82	
3 p. m.	29.798	85.5	84	
6 p. m.	29.740	76	76	High wind, similar to that of yesterday, more from the north; one tent blown down.
October 149 a. m.	29.893	77	76	
12 m.	29.744	81.5	82	
3 p. m.	29.734	82.5	81.5	
6 p. m.	29.744	77	77	Windy in the morning; still at night.
October 15....10½ a. m.	29.978	76	75.5	
6 p. m.	29.883	77	77.5	This day clear and calm.
October 16....10 a. m.	30.022	81	81	
October 17....9½ a. m.	29.932	77.5	77.5	This day clear and calm.
12 m.	29.931	88.5	88.5	
3 p. m.	29.869	96	98	
October 18....9 a. m.	29.852	77.5	77	Day clear; breeze from the north.
12 m.	29.874	89	89	
3 p. m.	29.862	95.5	95.5	Day clear; breeze from NE.
October 19....9 a. m.	30.062	74.5	74	
1 p. m.	30.072	84	83.5	
3½ p. m.	30.063	88	87.5	
6 p. m.	30.033	76	76	Day clear.
October 20....9 a. m.	30.158	77	76.5	
12 m.	30.105	84.5	86	
4½ p. m.	30.026	88.5	92	Day clear.
October 21... .9 a. m.	30.010	75.5	75.5	
12 m.	29.979	90	90	Day clear and calm, and hot.
3 p. m.	29.938	97.5	100	
October 22....7 a. m.	29.805	59	58	
9 a. m.	29.865	73	73	Day clear and calm, and hot.
12 m.	29.871	85	86	
3½ p. m.	29.870	98.5	102.5	
October 23....9 a. m.	29.950	76	77.5	
1 p. m.	29.979	92	93.5	Day clear.
3½ p. m.	29.973	96	96	

Days and hours.	Height of barometer column.	Thermometer, Fahrenheit.		Remarks.
		Attached.	Detached.	
1849.				
October 24....9 a. m.	Inches. 30.025	Deg. 75	Deg. 76	
12 m.	30.041	90	91	
3 p. m.	30.030	97	98	
October 25....9 a. m.	29.987	77	77	Clear.
12½ p. m.	29.967	88.5	89	
3 p. m.	29.912	93.5	94	
October 26....9 a. m.	29.825	78.5	79	Clear and calm till night; then arose a violent wind, which lasted until near morning.
1 p. m.	29.801	93.5	94	
4 p. m.	29.739	95	98.5	
October 27....9 a. m.	29.900	74.5	74.5	Breeze from NE.
12 m.	29.934	86.5	85.5	
3 p. m.	29.933	93.5	97	
October 28....9 a. m.	30.052	79.5	79	Day clear.
12 m.	30.061	89	88	
3 p. m.	30.035	96.5	97.5	
October 29....9 a. m.	30.052	73.5	73.5	Day clear and cloudy by turns; breezy; hazy clouds near horizon; passing clouds at night.
12 m.	30.059	87.5	87.5	
3 p. m.	30.029	90	90.5	
October 30....9 a. m.	29.992	70.5	70.5	Morning cloudy; sprinkling of rain in the afternoon—the first since our arrival.
12½ p. m.	29.994	81.5	81	
3½ p. m.	29.937	72	72	
October 31....9 a. m.	29.912	72	72	Morning cloudy; clearing up; wind from S.
12 m.	29.881	85.5	85.5	At night, cloudy, with sprinkling of rain; clouds in the NW. indicate that a storm has raged upon the desert to-day.
3 p. m.	29.833	84.5	83.5	Morning clear; horizon hazy. At noon, wind W., and clouds; towards night, a light shower coming from the W.; at 10½ p. m.; clear.
November 1...9 a. m.	29.869	75	75	Day clear.
12 m.	29.846	75.5	75.5	
3 p. m.	29.800	63.5	64	
November 2...9 a. m.	29.988	68.5	68	Day clear.
5½ p. m.	29.974	73	74.5	
November 3..10½ a. m.	29.997	76.5	77	Day clear. At evening, clouds, but clear through the night.
12 m.	29.974	82	82.5	
3 p. m.	29.922	83	83.5	
November 4...9 a. m.	29.866	71	71.5	Early morning cloudy, with rain; clearing up at 9 a. m.; wind from W.
12½ p. m.	29.830	74.5	74.5	
3½ p. m.	29.821	78	77.5	
6 p. m.	29.783	66	67	
November 5...12 m.	29.998	77.5	78	Clear and calm.
3 p. m.	30.007	88	90	
November 6...9 a. m.	30.150	68.5	68	Day clear.
12 m.	30.040	81.5	82	
3 p. m.	30.009	87	89.5	
6 p. m.	29.923	69	70	
November 7...9 a. m.	29.867	64.5	64.5	Day clear; light breeze from the N.; at night, cloudy.
3 p. m.	29.868	81.5	82.5	
6 p. m.	29.767	71	73.5	
November 8...9 a. m.	29.799	62	61.5	Cloudy, and a little rain before daylight; gusty wind from NW.
12 m.	29.809	70.5	70	
3 p. m.	29.810	72.5	73	
November 9...9 a. m.	29.937	63.5	63.5	Day clear.
4 p. m.	29.921	85	88	
November 10...9 a. m.	29.975	71	70.5	Day clear.
6 p. m.	73	75	
November 11.12 m.	29.942	79	79	Day clear; breeze from NE.; cloudy at night.
3 p. m.	29.924	83.5	84	
November 12.12 m.	29.953	76.5	76.5	Day calm and cloudy.
3½ p. m.	29.914	77	77.5	

Days and hours.	Height of barometer column.	Thermometer, Fahrenheit.		Remarks.
		Attached.	Detached.	
1849.				
November 13. .9 a. m.	29.620	73.5	73.5	Day cloudy; appearance of storm at the NW.; strong wind from SE. At noon, sprinkling of rain; at 3 p. m., heavy shower; night clear and calm.
12 m.	29.557	72.5	72.5	
4 p. m.	29.547	63	62.5	
November 14. .9 a. m.	29.789	64.5	64	Morning clear and calm; strong breeze at noon, and at 2 p. m. strong wind from W., with rain; night clear and calm.
1 p. m.	29.752	71	71	
4 p. m.	29.736	62.5	62.5	
November 15. Sunrise.	48.5	Dense white fog, for the first time, covers the low lands; clear; calm.
9 a. m.	30.014	61.5	61.5	
12 m.	30.016	67.5	67.5	
3 p. m.	30.010	75	75.5	Day clear; breezes from W.; night clear.
November 16. .9 a. m.	30.036	60.5	60.5	
12 m.	30.025	68.5	68.5	
4 p. m.	30.003	75	75.5	Day clear, and light breeze from W.; night clear.
November 17. .9 a. m.	29.962	77	77	
12 m.	29.965	75	75	
3 p. m.	29.935	80.5	81.5	Day clear and calm; night clear.
November 18. .9 a. m.	29.917	65.5	65.5	
12 m.	29.902	77.5	77.5	
3 p. m.	29.866	81	82	Day clear.
6 p. m.	69	
November 19. .9 a. m.	29.860	66	65	
12 m.	29.873	83.5	83.5	Heavy fog and dew at sunrise; at 9 a. m., clear; at 3 p. m., light breeze from W.
4 p. m.	29.839	84	86.5	
November 20. .9 a. m.	29.860	67.5	67	
1 p. m.	29.857	75	74.5	Light clouds at sunrise; at 3 p. m., heavy clouds at N. and NE.; night cloudy.
3 p. m.	29.845	80.5	80.5	
6 p. m.	29.829	64.5	66.5	
November 21. .9 a. m.	29.910	63	63	Morning clear; at 12 m., wind from W.; at 2 p. m., strong wind, with rain from W.; with slight intermission only, continuing all night.
12 m.	29.906	74	75	
3 p. m.	29.857	79.5	79.5	
6 p. m.	74.5	73.5	Wind still strong from W.; clear throughout the day.
November 22. .9 a. m.	29.723	69.5	69	
12 m.	29.638	75	75.5	
2 p. m.	29.508	73.5	73.5	Strong gusty wind from NW.
3 p. m.	29.471	62	60	
November 23. .9 a. m.	29.893	59	60	
12 m.	29.909	61.5	60.5	Clear; light breeze from W.
4 p. m.	29.922	64.5	64	
November 24. .9 a. m.	30.149	57	57	
12 m.	30.141	63	63.5	Preceding night cool and clear; frost in the low lands; day clear.
3 p. m.	30.110	70	71	
November 25. .9 a. m.	30.128	59	58.5	
4 p. m.	30.108	73	73	Cool breeze from N.
November 26. .9 a. m.	30.134	59.5	59.5	
1 p. m.	30.095	68.5	68.5	
4 p. m.	30.080	76	76.5	Clouds at sunrise; gusty wind from NW., with flying clouds, at 1 p. m.; a little rain during the night.
November 27. .9 a. m.	29.992	56	56	
12 m.	29.957	71.5	71.5	
3 p. m.	29.890	78.5	80	Morning calm and cloudy; at 3 p. m., breeze from NW.
November 28. .9 a. m.	29.682	57	55.5	
1 p. m.	29.671	66	66	
3 p. m.	29.682	63.5	63.5	Day clear and calm.
November 29. .9 a. m.	29.890	57	57	
12 m.	29.905	65	66.5	
3 p. m.	29.888	65.5	65.5	Day clear and calm.
November 30. .9 a. m.	29.967	55	55	
12 m.	29.899	71	70.5	
3 p. m.	29.979	75.5	75.5	
6 p. m.	29.958	63	64	

MEAN RESULTS.

FOR OCTOBER, 1849.

(Which may be considered as very nearly the mean result for the year.)

No. of observations.	Height of barometer column.	Attached thermometer.	Detached thermometer.	Remarks.
83	<i>Inches.</i> 29.924	○ 84.3	○ 84.8	From 1st to 31st October.

FOR NOVEMBER, 1849.

No. of observations.	Height of barometer column.	Attached thermometer.	Detached thermometer.	Remarks.
87	<i>Inches.</i> 29.895	○ 70.8	○ 70.8	From 1st to 30th November.

I will add a vocabulary of the Yuma (or rather Cuchan) language. Great pains have been taken to render it correct. We endeavored—and some of us succeeded to a certain extent—to converse with the Indians in their native tongue.

In the words of the vocabulary the sounds of the vowels are as follows, viz:

A, like ah.

E, as in *mé*; and *ě*, as in *met*; and *è*, like a in *fate*.

I, as in *pine*; and *ĩ*, as in *pin*.

O, as in *note*; and *õ*, as in *not*.

U, as in *flute*.

The syllable over which the accent is placed should be very strongly pronounced.

The language of the Yumas seems wanting in none of the sounds we have in English, and they pronounce with great ease and distinctness any English or Spanish word which they hear spoken.

Vocabulary of about two hundred and fifty words in Yuma and English.

Yuma (Cuchan.)	English.
É patch, or è-páh	Man.
Seen-yack	Woman.
O-shúrche, or o-so*	Wife.
Nà vère	Husband.
Her-mái*	Boy.
Mésér-hái*	Girl.
Hail pit	Infant.
Loth-mo-cúl	Father.
N'taie*	Mother.
Ho-maie*	Son.
M-cháie*	Daughter.
Soche*	Brother.
Am-yuck*	Sister.
Mél-è-páie*	Indian.
É couř such è rówo	Head.
Oom whelthe*	Head.
O con o*	Hair.
E étche	Hair.
E-dótche	Face.
Ee yù*	Face.
Eee-yu-calóque*	Forehead.
Smyth'l, or è sim ile	Ear.
E-dotche-ée	Eye.
Ee yu-sune-ya-o*	Eye.
E hotche, or ee hóo	Nose.
Ee-yu-qua-ófe*	Mouth.
A tuc-sáho, or ee-a-tuc-suche	Chin.
E pulche, or ee pailche	Tongue.

VOCABULARY—Continued.

Yuma (Cuchan.)	English.
Are-dóche	Teeth.
Ya-bo-měh	Beard.
N'yeth'l	Neck.
Ee seth'l, or è see'l	Arm.
Ee-wee	Shoulder.
Ee-sálche	Hand.
Ee-sálche serap	Fingers.
Ee-sálche calla-hotche	Finger nails.
Ee-mátche	Body.
Ta-wa coam*	Body.
Mee sith'l	Leg.
E-mětch-slip-a-slap yah	Foot.
E metch serap	Toes.
E mee cas saó*	Toes.
A-tan*	Back.
A-pee árpe*	Hat.
Ee éie*	Heart.
A-whut*	Blood.
He-paith láo*	Town; village.
Ee-pah-han	Rich man.
Co hóte*	Chief.
Con níee*	Warrior.
Hon-o-wai*	Parents.
N'yet'l*	Friend.
Máio habeé-é*	Compadre.
N'ye-valyay	House.
Een-ou wá*	House.
Een-ou-müt*	Hut.
Artim*	Bow.
O tées-a	Bow.
N'yee páh	Arrow.
N'yee pah-táh	Arrow of reed.
N'yee-pah-é sáh be	Arrow of wood.
A-ta-cárte*	Hatchet.
N'è-ma-ró*	Knife.
E-cal hor*	Canoe.
Ha-with'l, or ha-weèl	River.
Ha-weel-cha-whoot	Rio Colorado.
Ha-qua-si-eél	Rio Gila.
N'hum au-óche	Shoes.
A oóbe	Tobacco.
Am-mai	Sky; heaven.
N'yàtch	Sun.
Ha rup	Whiskey.
Huth'l-ya, or hull-yar	Moon.
Klup-wa-taie, or hutchar	Star.

VOCABULARY—Continued.

Yuma. (Cuchan.)	English.
No-ma-súp	Day.
N'ye-as-cup	Night.
N'yal-a so-arpe	Midnight.
Met n'yum	Light.
N'yat-col-see	Darkness.
Esta-no-sup	Morning.
N'yat-an-n' aee	Evening.
Pue n'a-pin	Noon.
Oo cher	Spring.
O-mo caahe-pué	Summer.
Ha-ti-ól	Autumn.
N'ya-pin	Winter.
Mét har	Wind.
Mét hár co-nò	Thunder.
N'ya-col-see	Lightning.
Way-mah-coutche	Breech-cloth.
Muh heé	Rain.
Ha-lúp	Snow.
N'awo-copé	Hail.
A à wo	Fire.
A-há	Water.
Sho-kine	Ice.
O-mut	Land.
A ha-t'hlow-o	Sea.
Ha sha-cut	Lake.
Ha-mut-ma-tarré	Valley.
Wee qua-taiè, or ha beé	Hill, or mountain.
Ha-mut-ma tarre-quel-marm	Island.
O-wee	Stone.
E-sith'l	Salt.
N'yer-ma-rò	Iron.
E-eesh	Tree.
E eé, or e-eetch	Wood.
Ee eetch-a-berr beerrch	Leaf.
Ta-sóu o	Meat.
Huts	Horse.
Hoo-wée	Dog.
A-hér-máh	Bird.
Es-páitch	Eagle.
Sor mēh	Eagle's feather.
Sah-with'l	Feathers.
A-cheé	Fish.
Ham-ark	White.
Quim ele, or n'yéelk	Black.
A-cha-whut	Red.
Ha-woo-surche	Blue.

VOCABULARY--Continued.

Yuma (Cuchan.)	English.
At-so-woo-surche.	Green (same as blue.)
A. quesque	Yellow.
O-teieque	Great.
O-noc-oqûe	Small.
A-hoté-kah, or a-hotk	Good.
Ha-lookk	Bad.
E-háne, or e-hán-ac	Handsome.
Ee-pah	Ugly.
Huts-ule	Cold.
Ep-eelk	Warm.
N'yát	I.
Mautz	Thou.
Ha-buitzk	He.
Co-bár-ro, or co-barque	No.
Ah-àh, or oh	Yes.
E-pailque	Much.
Queel-yóh	To-day.
Ten-igh	Yesterday.
Qual-a-yoque	To-morrow.
Sin, or así-éntie	One.
Ha-wick, or ha-vick	Two.
Ha-móok	Three.
Cha-póp	Four.
Se-rap	Five.
Hum-hook	Six.
Path-caye	Seven.
Chip-hook	Eight.
Hum-ha-mook	Nine.
Sah-hook	*Ten.
As-á-ò, or atch-a-mam	To eat.
A-sée, or ha-súc	To drink.
Co-no	To run.
A-heese, or chee-muc	To dance.
Et-sims	To wash.
N'yats hes-sailk	I wish.
Atch-ar-see-várch	To sing.
A-see-máh	To sleep.
A-ee-póve	To be sleepy.
Quer-quer, or atch-ak-qúerk	To speak.
O-ook	To see.
O-moo-han	To love.
Au-u-súc	To kill.
Au-nuc	To sit.
A-boúck	To stand.

* In counting above ten, they have no new terms; but combinations of the decade are used.

VOCABULARY.—Continued.

Yuma (Cuchan.)	English.
N'yeé moom, or at-co bér-quié	To go.
Que-di-que, (kerdeek,) or n'yue a yue	To come.
A-woo-noorch	To desire.
A-woo sèrche, or n'you-á-nùck	Very bad.
A-hote'k	Good.
A-ah-oche	A light.
N'yo pike	I have none.
Ho-wo-dówk	You have some.
Es mé-deék	Who knows.
E-páilque n'ya-mook	Very great.
Chi-mét-a-quis	Muskmelon.
Ché mēt-a-hán	Good melon.
Ché mēt-on yà	Watermelon, zandia.
Ché-mēt-toh	Watermelon, or zandias.
Nee-ca-chain	Cigar.
Ass-ee poo	To smoke.
Ac-corque	Far off.
A-hoték-a han àc	Very good.
Ha lúlk a-hán-ac	Very bad.
Chim-in-yeich	Scissors.
N'yeém-cot a bár-fah	River's bank.
Ha-bee-cohá	Emory's hill.
Ha-bee-co-a-chis	Pyramid hill.
Ha-bee-to-cúe	Capitol dome hill.
Ha-bee-co-là-là	Pilot knob.
Que-you-so-wiu-a	Pilot range.
At-co-bér-quié-n'ye	} I am going home.
Vál yay ye-moom	
Mel-ee-keèt-à	Chimney rock.
Manúrke	Paper.
Ac-coúrt	Shortly.
Ac-court-n'ya-moom	I go shortly.
Ah-ho-mah, or marrico tah	Beans (small, with black spots.)
Qui-yáy-vay-may-deek?	How do you do?
Mè-cham-pou-ee-ka	I am hungry.
Ee-yah (ee-yahts, plural)	Mezquite long bean.
E-esse	Mezquite screw bean.
Mè-tue-a-deek	I am going above.
Seen-yae-n'ye-hánac	The woman is handsome.
Ee-páh-n'ya-a-nùc	The man is ugly.
At-co-bér-quié-n'ye valyay-me-moom-ah-trole'k	} It is well that I am going home.
N'ya-háp	
N'ya-hap me-ye-moom	California.
Cobarrque	I am going to California.
	He is not here.

VOCABULARY—Continued.

Yuma (Cuchan.)	English.
Mas-tam-hóve - - - -	Devil.
Coo-coo-máh-at - - - -	God.
En-cáique - - - -	Give me.
O-oobe-én-cáique - - - -	Give me tobacco.
Su-cool - - - -	Beads.
Mez queeno - - - -	Stingy.
Marique (mareek) - - - -	White beans.
Tér-ditch - - - -	Maize.
N'yo-pike - - - -	I have none.
No-py-ám? - - - -	Have you none?
Hër-cóh - - - -	Mexicans.
Pain-gote-sáh - - - -	Americans.
Ae-o-taie - - - -	Grass seed.
Pook - - - -	Beads made of small pieces of sea shells with holes in centre and strung.
Que-dique (ker deek) - - - -	Come here.
N'ye-moom - - - -	I am going.

The words marked with an asterisk (*) were learned from Pablo; some of them were found to be of his native tongue—Comoyé—and probably nearly all are. Those not marked have been tested by a reference to the native Cuchans. The phrases given were in daily use among us, and were well understood to convey the meaning given.