

# THE COLORADO DESERT.

BY C. R. ORCUTT.

A vast triangular-depressed plain, below the level of the sea for a large portion of its surface, with an approximate area of twelve million acres (about one-half of which lies in Mexican territory), and comparatively destitute of verdure or of animal life, is the great basin known as the Colorado Desert.

This remarkable region lies between the peninsular range of mountains and the Colorado river of the west, extending from the San Geronimo pass, at the base of the San Bernardino mountains, on the north, to the shores of the Gulf of California, on the south, and forms one of the most extensive and important portions of the arid regions of the United States. On the north and northeast it is separated from the more elevated plains of the Mohave desert by a low range of denuded hills, extending from the San Bernardino mountains to near the junction of the Gila and Colorado rivers. Similar arid conditions exist on the eastern borders of the Colorado river, in Arizona, and south in Sonora, and along the Gulf shores.

From their rich chocolate-brown color, the inhospitable barrier between the Colorado and the Mohave deserts is frequently indicated on maps as the "Chocolate mountains." This range is better known to miners as the Chuckawalla (Lizard) mountains, a peculiarly appropriate name, from the great abundance and variety of lizards, but probably given from some fancied resemblance in the outline of these hills to this nimble animal.

The peninsula range of mountains, with a varying altitude of four thousand to eleven thousand feet, rise in precipitous abruptness from the western borders of the plains. The crest of this mountain range forms a sharp and well-defined line of demarcation between the arid region and the rich and fertile western slope. The summit is usually clothed with forests of oak and pine. The western slope is thickly overgrown with a varied vegetation, the valleys supplied in a greater or less degree with timber and water. Not so on the eastern declivity—the precipitous walls of rock, hundreds, often thousands of feet in height, present small inducements for plant growth, and the less precipitous banks are but slightly less devoid of botanical forms.

In the mighty chasms (or canyons), eroded by the still active, tremendous forces of nature, the botanist finds his richest harvest amid scenery that for beauty and grandeur would rival even the Yosemite. Surrounded by walls three thousand feet or more high, the queenly Washington palm (Washington filifera) may be found in groves, growing with tropical luxuriance beside quiet brooklets, rivalling in beauty and novelty the giant Sequoia groves of California.

Despite the large areas totally barren of vegetable life for the larger portion of the year, the absolute lack of rain through long periods, which may extend over three or more years of time, the Colorado desert possesses in seasons of precipitation a flora that in variety and beauty of forms surpasses that of the Atlantic states. In richness of color and coloring, the flora of California is probably unsurpassed, and the arid regions of the state are not one whit behind the more attractive western slopes. In springtime the stately lily of the desert (Hesperocallis undulata) wastes its sweetness on the desert air; every dry and thorny bush produces its quota of beauty, and a wealth of brilliant annuals spring into brief existence.

During June and July, 1858, the writer made his initial exploration in the Colorado desert, the main object being the examination of various prospects of gold, silver, lead and copper, which had been discovered in the Chuckawalla mountains, for a gentleman who was largely interested in their development. A brief report on this region, named the Pacific mining district, appeared in the tenth annual report of the California state mineralogist, 1859 ("The Colorado Desert," by Charles Russell Orcutt, pages 899-919).

Lyle says:—"Geology is the science which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature; it inquires into the causes of these changes, and the influence which they have exerted in modifying the surface and external structure of our planet."

In the decade commencing with 1850 the more depressed part of the Colorado desert seemed to have been known as the Cienega Grande, a better known perhaps as the Salton Sea, but more usually designated as the Dry Lake; in 1870 we are told by early emigrants of that period that the Colorado river was in the habit of annually overflowing its banks during the time of summer freshets, when the snows melted in the mountains whence the river has its source. This "annual overflow" (as often omitted as otherwise, it is said) formed a channel through the deep alluvial bottom lands of the great basin, to which the name New River was applied by the earlier pioneers who crossed the desert on the old overland route from Ft. Yuma to San Diego.

Along the course of New River, the Cocopa and other tribes of Indians planted and raised magnificent crops on the overflowed lands. Corn, melons, squashes, and other vegetables, and grain, reached the rankest growth attainable, and some of these early pioneers spoke with wonder of the fertility of the soil and the success attending these Indians in their agricultural labors. These fertile lands were formed of the sediment deposited by the waters of the Colorado river, and as the soil increased in depth the overflow decreased; with the increasing infrequency of these overflows, the

Indians were compelled to depart—the Cocopas retreating to the region of the Gulf, the Cahullias to the mountains around the northern base of the desert. In 1850 the desert Indian huts might yet be found among the mesquite groves of New river, and in 1852 I found the Indians producing from the unutilized soil crops of promise, after an overflow of some of the lands below the United States boundary.

"Approaching Carrizo creek, we saw for the first time in many days, strata of unchanged sedimentary rock. These consist of shales and clays of a light brown or pinkish color, forming hills of considerable magnitude at the base of the mountains. From their soft and yielding texture they have been eroded into a great variety of fantastic and imitative forms. This series of beds have been greatly disturbed, in many places exhibiting lines of fracture and displacement. Where they are cut through in the bed of Carrizo creek, they contain concretions and bands of dark brown ferruginous limestone, which include large numbers of fossils, ostraea and anomias. These have been described by Mr. Conrad, and are considered of Miocene age. In the debris of these shale beds I found fragments of the great oyster (Ostrea titan), characteristic of the Miocene beds of the California coast. A few miles north of this point, similar strata, probably of the same age, were noticed by Dr. Le Conte, but there they contain graptolite, an estuary shell, showing that the portion of the desert where they are now found was once covered by brackish water."—J. S. Newberry.

Dr. J. G. Cooper reports (in bulletin 4, California state mining bureau, pages 58 and 59) the discovery by H. W. Fairbanks, near Carrizo creek, of "fossil coral-islands, the coral forming extensive beds about the summits of short isolated ridges detached from the mountains of the western rim, and consisting at their bases of granitic or metamorphic rocks. The ridges appear to have been islands when the desert formed part of the Gulf of California, or of the Pacific ocean, and were at the right depth beneath the surface for coral growth on their summits for a long period. With the coral occurred several fossil shells of forms quite unlike those of the late tertiary of Carrizo creek beds, and apparently unlike those now inhabiting the Gulf of California."

Fragments of fossiliferous rock of the Carboniferous age have been found in the Carrizo creek region by various collectors, but none in place have yet been reported.

The Indians, according to Dr. Stephen Bowers, still preserve the memory of catching fish along the eastern base of the San Jacinto mountains, where the Cahullia Indians pointed out to him the artificial pools, or "stone fish traps," where their ancestors easily secured the fish on the receding of the tides of the ancient sea. This would seem to indicate that the change from an arm of the gulf is comparatively recent, and a study of the fossils seems to confirm this view. An old Indian in the Cuyamaca mountains pointed out to miners a few years ago points in the hills to the eastward where his great grandfather used to catch fish from the sea.

The cause of the separation of this region from the gulf can be readily understood in the present encroachment of the land that is forming from the sediment and debris of the Colorado river, where it empties into the gulf. With the formation of a barrier separating the basin from the gulf, the imprisoned waters were at once subjected to rapid evaporation.

The presence of fresh water shells in a semi-fossil condition, of a brackish water mollusk, and of marine shells of species now found living at San Diego, on the Pacific side, would seem to indicate that the great changes which have unquestionably taken place in this remarkable region were the result of natural phenomena of gradual, yet rapid, occurrence. After its isolation from the sea, with rapid evaporation, few years were requisite to transform this basin from an arm of the sea to a barren waste, the salt of the sea water forming the salt mines at Salton.

The Colorado river doubtless hurried past as it does today to the gulf, until breaking down the barrier it had itself erected. With alternate periods of evaporation and influx of fresh water, the great basin changed first to a brackish lagoon, and finally to a vast fresh water lake.

The water of the Colorado river at Yuma is known to carry at high water not less than ten per centum of solid matter. The deposit of this sediment in the great basin doubtless rapidly formed the deep and fertile lands which are now being harvested into service at Indio and Imperial, and being converted at the latter place, by the utilizing under control of the water from the Colorado river, into fields of agricultural promise.

Dr. Robert Edward Carter Stearns, in a paper read before the California academy of sciences, entitled "Remarks on fossil shells from the Colorado Desert" (published in the American Naturalist, 13:141-154, March, 1879), discussed the occurrence of fresh water shells found in a well at Walter's station at a depth of fifty feet. The surface of the desert where this well was sunk is 195.64 feet below sea level. Dr. Stearns remarks:

"I shall we indulge in a guess as to the depth of the water when these shells were alive? Shall we add the depth of the well to the elevation of bench marks, the ancient levels which form terrace lines in some places along the distant hills, once a part of the shores of an ancient lake, the walls of the basin which once inclosed and held a fresh-water sea? It may have been, however, that the lake was never so deep as the figures thus added would indicate, and that instead of a lake or a series of lakes, there existed only a lagoon or chain of lagoons, connected or disconnected, according to the voi-

ume of water, which probably varied one season as compared with another; a system of shallow reservoirs, receiving the catchment or surplus water in periods or seasons of unusual rainfall, sometimes, after a prolonged and widespread storm of great severity, uniting and forming an extensive expanse a few feet only in depth, as was seen in the valleys of California during the notable winter of 1861-62. The rate of depression may have been such as to continue to keep the lagoons supplied, \* \* \* and that only within a very recent period has this depressed portion of the Colorado basin become bare and dry. Are the phenomena which this vast and remarkable region exhibits \* \* \* the result of catastrophic action, sudden, violent, and widespread, or the result of gradual changes moving slowly through countless centuries?"

At Salton fresh water shells are found in countless myriads, with recent species of marine shells, on the surface of the plain, 250 feet below sea level. Portions of the Dry lake are 300 feet below sea level. These minute fresh water shells are drifted into windrows in places, where they may be scraped up by the quart.

Along the eastern base of the San Jacinto mountains, an old beach line is well defined, and can be easily traced for miles. The rocks are worn and rounded up to this line, sharp and jagged above. This line by actual measurement has been found to be even with the present level of the sea.

Major W. H. Emory, in report of the United States and Mexican boundary survey, gave the following table of distances:

San Felipe to Vallecito, 17.85 miles.  
Vallecito to Carrizo creek, 16.6 miles.  
Carrizo creek to Big Laguna, 25.31 miles.  
Big Laguna to New river, 5.83 miles.  
New river to Little Laguna, 4.5 miles.  
Little Laguna to Alamo Mocho, 18.44 miles.  
Alamo Mocho to Cook's well, 21.84 miles.  
Cook's well to Fort Yuma, 20 miles.

Dr. Charles Christopher Parry, botanist and geologist of the United States boundary commission, in reporting a reconnaissance made in 1849, wrote, concerning this region, as follows:

"On leaving the last rocky exposures to enter the open desert plain, we to some distance down the bed of Carrizo creek; along the edge of which are exposed the high bluffs of sand, marl and clay, exhibiting a fine sectional view of the tertiary formation on which the desert plateau is based. At the point where the road leaves the bed of the creek, to mount to the desert tableland, some 150 feet above, fossil marine shells of Ostrea were found, and gypsum makes its appearance in extensive beds. The upper layer of the tableland shows a variable thickness, composed of water-worn pebbles, derived from the adjoining mountains. Near the mountain base, this plateau has a height of about 500 feet above the level of the Colorado river. The surface extends in a gentle slope towards the Colorado, or eastward, about the distance of 25 miles, where it reaches its lowest depression at the lagoon or New river basin, which is in fact a part of the extended alluvial tract belonging to the Colorado river."

The New river region receives the drainage of a large scope of country, which is sometimes visited by heavy showers. "It retains this rain-water, and river overflows, for several months; when both these sources fail, it becomes a perfectly dry bed, or contracts into a quaggy saline marshes" (Parry). After a heavy rain, overflow there is a rank growth of grass and other vegetation, while considerable portions sustain a heavy growth of the mesquite. This affords fine grazing for stock, which cattle men have not been slow to appropriate.

Between the peninsula range and the Colorado river and the gulf lies a high mountain range, to the most northern and western point of which has been given the name of Signal mountain; this consists of a form of syenite, associated with recent lava. "Its surface is bare, and presents a forbidding outline of dark weathered rock, variously marked and furrowed by shows an irregular crest, gradually sloping towards the east." (Parry).

The Maricopas (of Arizona), the Cuchanos or Yumas, and the Cocopas are said to have originally formed one tribe. The Cocopa Indians reside within the limits of Mexico and the Yumas in United States territory. Major Heintzelman, in speaking of their agriculture, says: "It is simple; with an old axe, if they are so fortunate as to possess one, knives, and fire, a spot likely to overflow is cleared; after the waters subside, from the annual rise, small holes are dug at proper intervals, a few inches deep, with a sharpened stick, having first removed the surface for an inch or two, as it is apt to cake; the ground is tamped; if salt, rejected, and if not the seeds are planted. No further care is required but to remove the weeds, which grow most luxuriantly wherever the water has been. They cultivate watermelons, muskmelons, pumpkins, corn, and beans. The watermelons are small and indifferent, muskmelons large, and pumpkins good; these latter they cut and dry for winter use. Wheat is planted in the same manner, near the lagoons, in December or January, and ripens in May or June. It has a fine, plump grain and well-filled head. It is also grown grass-quickly for food; it is prepared by grinding the seed in wooden mortars made of mesquite, or in the ground. With water the meal is kneaded into a mass and then dried in the sun. The mesquite bean is prepared in the same manner, and will keep to the next season. The pod-mesquite begins to ripen the latter part of June; the screw-bean a little later. Both contain a great deal of saccharine matter; the latter is so full, it furnishes, by boiling, a palatable molasses; and from the former, by boiling and fermentation, a tolerably good drink may be made. The great dependence of the Indian for food, besides the product of his fields, is the mesquite bean. Mules form a favorite article of food, but horses are so highly prized, they seldom kill them, unless pressed by hunger, or required by their customs."

Much the same methods are followed by the Cocopas today, as observed by the writer. They also visit the canyons opening on the desert from the west, and gather the sweet and edible

palm fruits, there so abundant, and no doubt seek at times the pinyons or pine nuts in the forests at the summit of the peninsula range.

The townsite of Imperial is situated about 30 miles east of the old stage station on Carrizo creek, and here a new civilization, based on modern agricultural methods, is like to thrive where ravaged, the ground, in former times.

Dr. J. L. Le Conte gave an interesting account of some volcanic mud springs or solifataras, near the Southern Pacific railroad, on the Colorado desert in Silliman's Journal (2d ser. XIX, Ja. 1855). Arthur Schott mentions a severe earthquake which occurred November 29, 1852, and quotes from manuscripts by Major Heintzelman, as follows: "There exists, about 45 miles below Fort Yuma, in the desert between the western Cordilleras and the Colorado, a pond, considered as an old office, which had been closed for several years. The first shock of an earthquake, in 1852, caused a beautiful snowy jet more than 1,000 feet high into the air, where it spread high above the mountain, gradually disappearing as a white cloud. This phenomenon repeated itself several times in a diminishing scale. Three months later I visited the place; jets took place at irregular intervals, from 15 to 20 minutes. The effect was beautiful, as they rose mingled with the black mud of the pond. The temperature of the water in the principal pond was 118 degrees F., in the smaller one 135, and in one of the mud holes, from which gases escaped, 170. The air which escaped was full of sulphurated hydrogen, and in the crevices crystals of yellow sulphur were found. The ground near the office was covered with a white efflorescence, tinged with red and yellow. On the edge of a small pond crystals of sulphur ammonia, 1 to 5 inches long, were collected."

At the time of this earthquake low grounds near Yuma became full of cracks, many of which spouted out sulphurous water, mud, and sand. Dr. Parry records that the river formed new beds, leaving portions of its old bed so suddenly that thousands of fishes were left lying on the muddy bottom to infect in a few days the air along the river by their putrefaction, and that the frequency of earthquakes occurring here, forms also a point in the mythology and traditional tales of the aborigines.

A party of young people attended the ice cream social given in the Methodist church at Otay Saturday night.

Miss Mary Lentz spent some time, recently in Chula Vista, a guest in the home of Mr. and Mrs. Montgomery.

The Misses Richards, of San Diego, spent last Sunday with Mrs. H. S. Whitaker and her mother, Mrs. Wilkins.

Mrs. J. N. Woodard remains under the doctor's care, but is improving and no serious complications are now feared.

Mrs. S. W. Haines has been quite ill for several days, but will be relieved of her confinement to the house in a few days.

The Current Events club will hold its next regular meeting in the home of Mrs. Van Boskirk on next Thursday afternoon.

R. C. Allen, of Bonito, has purchased the yacht Sea Gull of P. S. Berger. He shows by his skill that he has often and well handled such craft before.

Henry Remant carried a party of twenty-five to Coronado in his yacht last Saturday, where they spent the day, sailing home in the early evening.

Miss Stockton, of San Diego, was the guest of Miss Woodard over night Wednesday night. A few friends were in for the evening and spent a musical hour.

H. S. Whitaker and William Wilkins have gone to the New River country to remain a short time attending to their property and other interests located there.

Miss Maggie Hammonds left Saturday morning for her home in Lawrence, Kan. She will be greatly missed as she was one of the popular young ladies of this locality.

The Mariners Rowing club of San Diego, accompanied by a few friends, came over to the club house on the bay front here, where they were entertained by Charles Gould Friday evening, returning home by the light of the moon.

Mrs. Hansberger and son left last week to join Mr. Hansburger in the eastern part of the county, where they will make a sojourn upon a homestead. Good wishes go with them for a pleasant home in the new location, but a welcome awaits their early return to Chula Vista.

Lincoln Clark and wife of San Diego have been visiting in the valley for a week past.

The election for school trustee will be had next Friday afternoon, polls open from 1 to 5.

F. E. Patterson and daughter, Ruth, of San Diego, were visitors in the valley, last Friday.

School closes a week from Friday.



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## A WEEK AT CHULA VISTA

### MANY GATHERINGS OF INTEREST.

THE YACHT CLUB IS A SOCIAL CENTER DURING THE WEEK.

Literary and Other Clubs Will Join in an Afternoon Meeting Today at the Congregational Church.

Chula Vista, June 6.—Although last Sunday was such an unusual day for this time of year in California, the Yacht club, as prearranged, sailed to Coronado, carrying with them a number of friends to hear the concert given in the Tent City. The bay was rough, but the wind was favorable, and the sail home in the afternoon was quickly over. Some innovations occurred but none of a serious nature.

LADIES AID MEETING. The Ladies' Aid met Wednesday afternoon in the home of Mrs. Henry Gulick, Sr. In two weeks the regular meeting will be at the church when a missionary programme will be given and tea will be served in the church parlors.

A NEW WAREHOUSE. E. S. Babcock has obtained from the Land and Town company concessions on Third avenue and Third street for the erection of a hay barn, which is to be 74,224 feet, for storing hay from the San Miguel mesa. The N. C. and O. Ry. Co. will lay another siding, at Third street, extending to the warehouse.


CLOSING EXERCISES. The public schools closed last week. Wednesday afternoon appropriate exercises were given in the primary and lower grades at the school house in their respective rooms. Graduating exercises were held in the Congregation-

## ABSOLUTE SECURITY.

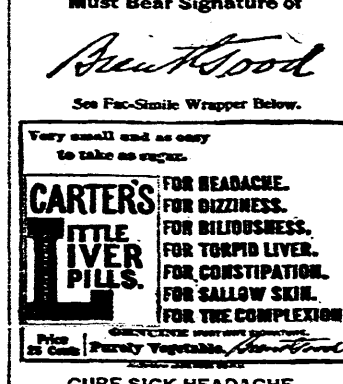
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