

The Open Court

A MONTHLY MAGAZINE

Devoted to the Science of Religion, the Religion of Science, and the
Extension of the Religious Parliament Idea

Editor: DR. PAUL CARUS.

Associates: { E. C. HEGELER.
MARY CARUS.

VOL. XX. (NO. 9.) SEPTEMBER, 1906. NO. 604

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OR

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BY

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1322-28 Wabash Ave., Chicago



WILLIAM SHAKESPEARE.

After an oil portrait now in the possession of the Shakespeare Memorial
at Stratford.

(With kind permission of the Shakespeare Memorial at Stratford.)

Frontispiece to The Open Court.

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THE NEW SALTON SEA.

VAST GEOLOGICAL AND ALLUVIAL CHANGES IN THE SOUTH-
WEST. TURNING ASIDE THE COLORADO RIVER
INTO THE ANCIENT SALTON SINK.

BY EDGAR L. LARKIN.

IMAGINE all these things: that once a very high and massive tower of stone, whose base rested on solid Archæan rocks beneath the primordial Palæozoic sea, lifted its top far above the waves. And that the tower stood from twenty to thirty miles east of a line drawn from Denver southward through Colorado Springs to Pueblo; that the Archæan strata were so thick and rigid that they did not bend upward and downward, so that the top of the tower during millions upon millions of years kept at the same mathematically exact distance from the center of the earth; that a powerful telescope provided with accurate levels, micrometers and graduated circles was set on a level base of stone on the top of the unique observatory; that a man, a skilled observer, lived on the tower during almost interminable ages and kept up lonely vigils, his eye at the instrument, ever making sweeps of his watery horizon, in hope of seeing some object; and that after watching so long and through so many eons that duration to him seemed to be infinite, he at last was rewarded by detecting an object just a few inches above the water in the distant west. Behold! it was land in what is now Central Utah. The tower was high enough to be in a tangent line drawn from its summit to the sea above what is now called the Wasatch range, south of Salt Lake. The telescopist at once measured its azimuth and height above the ocean horizon. His vigilance was increased and he never left the telescope. In a few thousand years, another slight elevation of land rose up out of the waves, and

the first was a few inches higher. Then new wastes began to appear by centuries. And after eons rolled away,—by years. Finally, all Colorado emerged from the Western sea. All of Utah was lifted up and to the southwest, Northern Arizona rose above the horizon. The tower, not being disturbed by this rising, was a place for accurate measurement of rates of elevation. These were exceeding slow. The mighty layers of Archæan rock were loaded with an inconceivable mass of superposed strata. The man saw the Rocky Mountains rise, and Pike's Peak lift its Majestic head above the ancient sea. And he saw the tops of Mounts Powell, La Plata, Harvard, Yale, Princeton, and Ouray, rise inch by inch, century after century. The observatory, the tower of stone having been set on the Archæan, weathered all later ages, until on this eventful and auspicious day when the first land in the west was seen, the day when this story opens—a late Jurassic day. When Colorado, Utah and Arizona were well up, the climate began to change. Rain and wind attacked the land and began the colossal work of beating down the peaks and transporting the debris, the products of the war,—to the sea. Nearly all of the abraded material went to the southwest. In 1900, I wandered in that wonderland of the earth—Central Colorado, and over the "Divide." A little stream here started toward the Gulf of Mexico, and there to the Gulf of California. A number of creeks united to form the headwaters of the Grand River, two thousand miles from their resting-place in the Californian gulf in far away Mexico. I saw waste places, denuded areas and facades and wondered where the washed-away debris might then be. The Grand River rising near Grand Lake in Colorado, flows into east-central Utah and unites with the Green to form the mighty Colorado, flowing through Arizona, through the magnificent canyon, and through desert wastes to Yuma and on southward to the head of the Gulf. All these streams form one of the great river systems of the earth. Their erosive and cutting power is enormous, and transporting of soil, silt and debris likewise.

For Palæozoic times were quiet; there being no high mountains, or elevated continents, to cause changes in climate and set up storm conditions, hence hurricanes, cyclones and raging winds did not obtain, nor rapidly driven rain. Gentle ripples came along Palæozoic beaches, left their tiny marks and these are now traced in stone in our museums. Then came the terrific Appalachian Revolution in the Atlantic States, which crumpled up the strata into mountains and closed the Carboniferous Age. Troubles beneath the waves then over Colorado, Utah and Arizona, came on

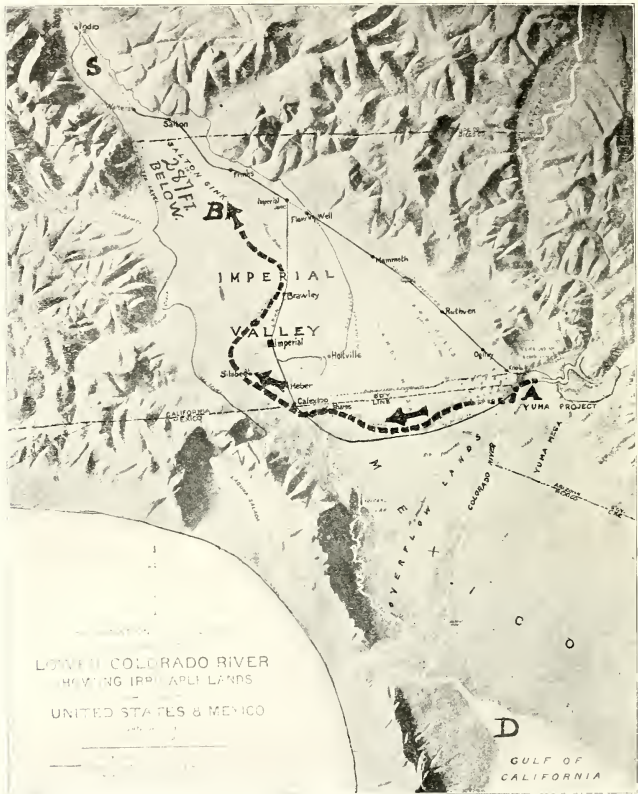
apace and lifted up the Rocky Mountains before the astonished eyes of our faithful watcher on the hypothetical tower. The circulation of winds then began and storms of rain. The age of carving, cutting, wearing, denudation and sculpture commenced and has been at work since, even until the present. And in no part of the world have these artists—wind and rain—wrought more exquisite work than in that vast area drained by the Colorado River. In later eons, frost, ice, snow, hail and more rapid winds came to the giant task of beating down the Rockies, the plateaus of Colorado and Utah, and hurrying the debris beneath the waves of the southern gulf. In Colorado, I gained something of the outlines of the plans and specifications of the primeval sculptors. Beneath the blue of the Colorado sky, I saw as it were, the blue-prints, the plans of the world's first architects. But in outline only.

WITHIN THE CANYON'S MAZE.

Later, I descended the mighty Canyon of the Colorado River in Arizona, and explored its intricate recesses, chambers and caves, hewn in the most obdurate Archæan rock, by swiftly running silt and sand-laden water. I saw the whole stupendous plan, the denudation of the uplands and erosion of the most wonderful canyon on earth. All the materials abraded from two great states had to pass through this canyon, ever grinding and cutting a wider and deeper way. Our man on the tower saw a Cretaceous deposit alone, 9000 feet deep. Its debris since then, has passed through the Canyon.

Those able to handle words as one would sticks and stones, have often climbed down into this canyon even to the edge of the torrental river; and have tried to describe what they saw, so that a distant reader might derive some idea of the gigantic scene, this rocky splendor, this wondrous vision; but words lost their power, and the pen its potency. There is no hope in words, therefore the canyon cannot be described. Artists with paints and pencil have made effort many times; but colors seem to pale and fade—the amazing scene cannot be fixed on canvas. When I entered the mighty chasm—this “abyss of erosion,” light from the sun, the sun of Arizona, was pouring into the terrific labyrinths in a grand supernal flood. Facades, towers, temples, cathedrals and palaces were all aglow. But, when I left, radiant beams came streaming in at a different angle, illuminating columns, pillars, turrets and domes not seen before. I entered a cave of gloom, and with a blade of steel, endeavored to scratch the Archæan strata. It was almost impossible, for the rock is more rigid than solid flint. The

canyon is 300 miles long; and from 3000 to 6200 feet deep, a total of 600 miles of giant walls. The entire abyss has been eroded by



RELIEF MAP OF THE SALTON SINK, THE IMPERIAL VALLEY IN CALIFORNIA, AND ITS EXTENSION INTO MEXICO. 4970

The water of the Colorado now leaves its bed at A and flows along the heavy dotted line to B, where it pours with great velocity into the sink. No water flows from A to D along the original bed. Indio at S in the northwest, is 22 feet below the level of the ocean. The bottom of the sink is 287 feet below the Pacific.

running water since the land was raised above the sea in the Jurassic age. The word eon kept ringing like a tuneful bell while I was

there; with no thought of millions, thousands or hundreds of years. In this awful maze, this labyrinth of duration, the word years has no effect on the mind. If, in the midst of this wilderness of primordial rock, some one had told me that within six years I would see the thousands of cubic miles of matter that once hurried through this gorge, and excavated from its depths, and that I would walk upon it, I would have been astonished. But I saw it all on June 4, and again on July 2, 1906. Fifteen thousand square miles of Permian, Jura-Triassic, Cretaceous, and later layers are absent



VIEW OF THE SALTON SEA BEFORE THE COLLAPSE OF A PORTION OF
THE SALT WORKS.

4966

Looking south; the track of the S. P. R. R. is close to the building at a depth of 50 feet. The second track is also submerged at a distance of several miles on this side of the warehouse.

from the uplands whose rainwaters flow through the Canyon. Their thickness was 10,000 feet. The matter all passed through the giant gorge, whose bottom is now 16,000 feet lower than the first layer carried away. Think of the word eons again.

THE WONDROUS IMPERIAL VALLEY.

On June 4, I ascended a tower in Calexico, California, and saw this same 15,000 square miles of geologic detritus and primeval product of denudation. The tower is 30 feet from the line of Mexico. As far as the eye could reach, to the east, west and south, there is spread out a vast expanse of soil made entirely of fine

silt that once passed through the great canyon. Not the Nile, nor Mississippi ever deposited richer soil. And in this sub-tropical climate, the Imperial Climate, vegetation, grains, grasses and fruits grow and mature with the most astonishing rapidity. The entire area is the garden, the hot-house of the United States. Upon stepping over the international line, one enters the Mexican town of Mexicali. It was then, on June 4, a thriving business town. Four-fifths of it, together with the bodies from the cemetery, are now in the bottom of the New Salton Sea, washed away by the diverted Colorado River. The hastily thrown up levee was cut away and



THE STATION AT MEXICALI, MEXICO, AND R. R. GRADING CAMP ON
JUNE 4.

4967

On July 5 the river was 45 feet below the building which stood on salt, and the building was in the Salton Sea. Track in bottom of the river.

every business house tumbled into the flood, 20 feet lower than the streets. From the tower, on June 4, I saw the river—a shallow stream, eleven miles wide, flowing to the west of the two towns, downward and northward into the wonderful Salton Sink, 287 feet below the ocean level. The eastern edge of the river was then almost to the top of the levee. Great was my surprise on July 2. The great expanse of water was then 45 feet deep in the earth, but only 400 wide. It was running through Mexicali with the speed of a mill-race, undermining buildings and the railroad. The soil, excessively fine silt and of great but unknown depth, melted away as though made of sugar. Trees, grain, gardens, grass, fences and

improvements of all kinds round-about Mexicali, and a few outside buildings in Calexico, plunged into the flood, and traveled with great speed to the depths of the Salton Sink, ruining railroad tracks and salt works.

THE WONDERFUL DEPRESSION.

In remote times the Gulf of California extended to the north-western side or end of the sunken area, just to include the site of Indio on the Southern Pacific Railway. But the head of the Gulf is now 140 miles from Indio. The Colorado once entered the Gulf through a mountain pass 85 miles east of Indio. It poured in silt, formed a barrier across the gulf, cut off an expanse of salt water and then moved to the site of Yuma, Arizona, 35 miles farther to the east, and entered the gulf about 12 miles above where Yuma now stands. The isolated expanse of saltwater evaporated and deposited a thick layer of salt. And then, within a few million years, the Southern Pacific Railroad came through the prehistoric Sink. Ties were placed on the salt-bed, rails were laid, and entire trains were loaded with pure salt and sent to Chicago and New York. The tracks are now 50 feet under the waves of a new sea, the salt is dissolved and warehouses destroyed. A new railroad was laid around the sea. It was soon submerged. Another was built farther to the north, and the sea is drawing nearer and nearer to the rails at this writing. The wide plain now having the present towns of Imperial and Calexico near its center,—since 1845,—has been called the Colorado Desert. Death awaited any living thing making the attempt to cross. I have several times passed the waste area on the cars, always saying “appalling desert.” It is now a luxuriant semitropical garden. Somebody planted seed where water could be had. So rapid was the growth that attention was attracted, great wealth was in sight.

TAPPING THE COLORADO RIVER.

Land and irrigation companies were formed. A vast network of canals, sluiceways, ditches, conduits and waterways was constructed throughout the rich “desert.” At last, every detail was completed in readiness to cut the west bank of the Colorado River, 8 miles below Yuma, and let in the precious water. The cut was made in the autumn of 1900. But rich silt deposited and choked this intake. Another stream was dug lower down. This became clogged with fine sediment. These cuts were made in California. Farmers were meanwhile settling in the valley far to the west, and

the cry for water increased. It was decided to go still lower and into Mexico and cut another intake. The hope was to secure a greater incline with increase of speed of water, so that silt would not deposit. And to get a supply of water at once, with the intention of putting in gates later. The river was low, and was not expected to rise before protection could be put in. But there came a disaster not thought possible. The Gila River suddenly poured a flood into the Colorado at Yuma and the new cut was soon filled with water. Silt, indeed, had no time to settle. Instead, the bottom and both sides, rapidly wore away. Alarm soon spread and at-



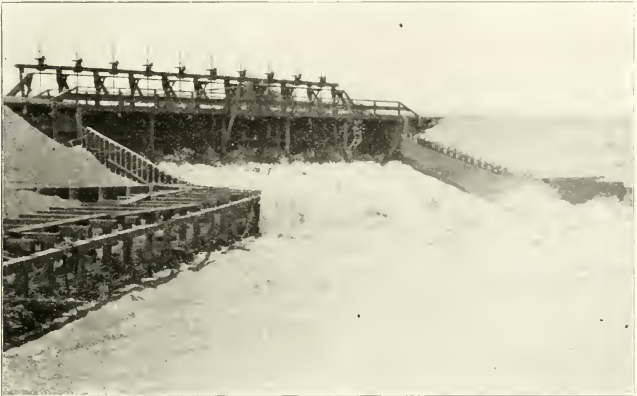
WESTWARD FROM CALEXICO IN THE FIRST STAGES OF THE FLOOD. 4968

River eleven miles wide, but on July 5 all this water was running through a cut 45 feet deep at C, close to the buildings in Calexico, to the left not shown. Mexicali to the left of D, is almost destroyed. At A is shown the top of Signal Mountain to the southwest in Mexico. B is a brick-kiln close to the Mexican lines due west of the two towns. From a photo by Rissinger, Calexico.

tempts were made to control the Colorado. Piles were driven and these were thatched with willows bound by cables, and covered by stones.

The first, second and third engineering attempts were made. But these were swept away as grass; for by this time, the regular floods of the Colorado came. A large island opposite the Mexican intake was washed through it and into the valley. The 50-foot canal soon widened to 100, to 500, to 1000, to 4000 feet, and the floods rushed through with impetuous speed. The entire system of canals was overflowed, Calexico and Mexicali were passed by

the rushing waters. The cut in the bank is 139 feet above sea level, Calexico is at ocean level and the sink 287 feet lower. The advance floods poured into the depression through an ancient river mouth with terrific speed. A mighty work appeared, cutting backward. The water backed up stream at times, with a rate of half a mile in each twenty-four hours. The roar was fearful. The falls receded, passed to the west of Imperial, Brawley and El Centro, and then drew near to Calexico. Levees were erected, Calexico was saved, but Mexicali vanished. The river on July 2 was backing up towards the Colorado cut and was two miles above Mexicali.



WASTE GATE AT SHARP'S HEADING.

4969

This is east of Mexicali, Mexico, and regulates the system of canals belonging to the California Development Company. From a photo by Rissinger, Calexico.

The Salton Sea is now 45 miles long and from 10 to 18 wide. On July 1, I went with a party of civil, hydraulic and railway engineers on the steamer Searchlight from Yuma down the river to the cut. The bed of the mighty Colorado below the cut was dry! No water flowed to the gulf, all went to the Salton Sink. The cut was 4000 feet wide. Trees were falling into the rapid current. I saw the vast plans as drawn up by the engineers. A great dam is to be thrown across the break. These plans are technical and can be explained only in an engineering magazine. The great scheme is in charge of Engineer H. T. Cory, Chief of the California Development Company. It is hoped that the arduous

work will be finished before January, 1907, and the floods controlled. If not, then the entire Salton Sink will be filled to the level of the primeval ocean, even to the ancient beach line. The Colorado in that event would never enter the gulf again, for its new bed is now lower than the old. Climatic changes would no doubt occur with the formation of a permanent new sea. If the dam is a success, then the fierce rays of the sun will again evaporate the water and the sea will vanish, leaving a deep layer of silt all over the layer of salt.

WONDERFUL ILLUMINATION OF THE ANCIENT SINK.

On my first visit, I secured an ordinary view of the Sink and its low down central sea. But on the second journey, it was my good fortune to behold a scene of splendor. The sun was just far enough north to escape a distant peak in the west and pour floods of slanting rays into the entire depression. I saw it all, for five minutes; every outline of the ancient ocean beach and the new sea. The region is simply wonderful. On July 1, I ascended a high place in Yuma and looked at the Sink with a glass from the east. I saw the giant rim of this cup in the earth. The geology of the entire region was revealed in all its scenic splendor.

LOWE OBSERVATORY, August, 1906.