

**THE BAD LANDS OF WHITE RIVER.**

To the southeast of the Black Hills in Dakota Territory, and stretching nearly to the great sand hills of Nebraska, lies a sterile region, the soil of which is broken up by projecting rocks, which give the whole district a remarkably uninviting appearance. So unsuited is it for habitation that the Indians, ages ago, gave it the name of the Bad Lands, which has belonged to it ever since. It is a work of immense difficulty to travel through this region, the ravines and valleys into which the rocks are worn being defiant obstacles in themselves and rendering it easy to lose one's way.

It is to Dr. F. V. Hayden, now United States Geologist, whose researches in the Upper Missouri country extended from 1853 to 1866, that we are indebted for our most definite scientific knowledge of this region.

The surrounding country is prairie, and the Bad Lands occupy a valley about 100 miles long by 30 broad, which seems to have sunk away from the surface of the earth. We publish herewith an engraving, for which we are indebted to the *Christian Weekly*, which well represents the general aspect of this valley, and the remarkable formations which characterize it. The rocks are fragments of what were once continuous strata, but which are now broken into tower-like columns; and it needs, as Dr. A. C. Peale remarks, but little exercise of the imagination to fancy oneself in the streets of an ancient city, whose inhabitants left behind them spires, buttresses, and shafts as monuments of their labor and genius.

M. De Girardin, a French traveler, gives the following account of a visit to the Bad Lands: "Accompanying one of the geologists, I ascended a hill and enjoyed one of the most wonderful of sights. At the extremity of an immense plain, rose-tinted by the reflection of the setting sun, there appeared to us an immense city in ruins—a city surrounded by walls and bastions, filled with palaces, gigantic domes, and monuments of most striking and fantastic architecture. At intervals, upon a soil white as snow, rose crumbling castles of a brick-red color, and pyramids with sharp summits, capped with shapeless masses, which seem to tremble in the wind. In the center of this chaos stood a gigantic spectre-like column. Descending into the valley, and passing between two columns of antediluvian architecture, we discover a vast amphitheatre, surrounded by crumbling and indented hills of a rich yellow color, and a confused mass of miniature mountains, of red and yellow clay, thrown without order on a soil so hard that the horses' feet make no impression upon it."

This desert, says Dr. Peale, is destitute of vegetation, and the scanty supply of water is strongly alkaline, coating the rocks with a white crust, where it evaporates. There are no signs of life, not a bird, nor even an insect. The geologist pursues his investigations surrounded by bleak and barren desolation. If he is there in midsummer, the scorching sun, pouring down in the hundred defiles that thread this pathless

waste, is reflected back to him from the white or colored walls, unmitigated by a breath of air, or the shelter of a solitary shrub.

This extraordinary region is a vast city of the dead; and its spires and towers are the monuments of most remarkable extinct races of animals, whose remains are strewn through the debris in the greatest confusion. Thick layers of rock are composed of petrified bones, sometimes perfectly preserved, and again reduced to powder. Vast numbers of turtles are found.

Some of the animals combined the peculiarities of the bear, hog, and cat. Others, 18 feet in length, had points of resemblance to the tapir, rhinoceros, hog, and horse, and still others represented a race that lived on both flesh and vegetables, and yet chewed the cud like our cloven-footed grazers. These curious animals became extinct before the mammoth and mastodon lived. When they roamed over the country, Europe and Asia were represented by islands, scattered over a wide expanse of ocean, and our Atlantic seacoast extended back to the mountains, and far up the Mississippi valley. The region between the Rocky Mountains and the Mississippi was covered with great lakes, whose waters were at first salt, but gradually became fresh. Between these lakes were areas of land covered with a vegetation tropical in its luxuriance and profusion. Through its forests roamed herds of singular animals. In the bitter struggle of life, many species and genera were blotted out, and their remains washed into the lakes, to be imbedded in the then forming rocks. One of our most eminent geologists thus beautifully gives the picture of tertiary times:

"Most of the continent exhibited an undulating surface, rounded hills, and broad valleys, covered with forests grander than any of the present day, or wide expanses of rich savannah, over which roamed countless herds of animals, many of gigantic size, of which our present fauna retain but a few dwarfed representatives. Noble rivers flowed through plains and valleys, and sealike lakes, broader and more numerous than those the continent now bears, diversified the scenery.

"Through unnumbered ages the seasons ran their ceaseless course, the sun rose and set, moons waxed and waned over this fair land, but no human eye was there to mark its beauty, nor human intellect to control and use its exuberant fertility. Flowers opened their many-colored petals on meadow and hillside, and filled the air with perfumes, but only for the delectation of the wandering bee. Fruits ripened in the sun, but there was no hand there to pluck, nor any speaking tongue to taste. Birds sang in the trees, but for no ears but their own. The surface of lake or river was whitened by no sail, nor furrowed by any prow but the breast of the water-fowl; and the far-reaching shores echoed no sound but the dash of the waves, and the lowing of the herds that slaked their thirst in the crystal waters."

Gradually the lakes became filled with sediment, and the barriers over which their outlets flowed were slowly broken down and they were drained. Great climatic changes ensued. Subsequently the country was elevated, and the process of erosion began. Rain channels cut deeper and deeper into the soft rocks, forming gorges which communicate in every direction, leaving monuments between giving the characteristic peculiarities of the Bad Lands.

Yielding to the forces of nature, and crowded to the southward, during the glacial period, by the mantle of ice that covered the country, the inhabitants of this region disappeared, until now the only living representative of them is the rhinoceros. Such changes are almost incomprehensible; but we should remember that the time in which they were effected is, to us, simply infinite.

Changes are going on at present, which will eventually result in the draining of our great lakes, as were those of the Bad Lands. "The cities that stand upon their banks will, ere that time, have grown colossal in size, then gray with age, then have fallen into decadence, and their sites be long forgotten; but in the sediments that are now accumulating in these lake basins will lie many a wreck and skeleton, tree trunk, and floated leaf. Near the city sites and old river mouths, these sediments will be full of relics that will illustrate and explain the mingled comedy and tragedy of human life. These relics, the geologist of the future will doubtless gather, and study and moralize over, as we do the records of the tertiary age. Doubtless he will be taught the same lesson we are, that human life is infinitely short, and human achievements utterly insignificant."

**The Steam Engine of the Future.**

A lecture was lately delivered in Greenock in celebration of the anniversary of James Watt and the centenary of the completion of the first practical steam engine. Mr. J. Scott Russell was the lecturer, and the theme of his lecture took the form of queries as to whether we had discharged our duty as trustees of that valuable gift to mankind, whether we have during one century got out of the steam engine all the good to humanity which it was capable of producing, and, finally, what was the work which James Watt had left us to do in the coming century. Mr. Russell, in answering these questions, was of opinion that, as trustees of the steam engine, we had worthily discharged our duty; and that the duty left by Watt was, in point of fact, the invention of a new steam engine which should occupy less space, consume less fuel, and perform the work of the world at one half the cost, and render all the elements of modern life cheap and abundant, instead of dear and scarce. But is such an engine possible? It is not impossible; and Mr. Russell's contribution to the solution of the subject gives hope, says the *Mining Journal*, that "the steam engine of the future" may become a great fact before the end of the present century.



VIEW IN THE BAD LANDS, WHITE RIVER, DAKOTA TERRITORY.