America Illustrated

AMERICA ILLUSTRATED

EDITED BY

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CONTENTS AND LIST OF ENGRAVINGS.

PREFACE.

AMERICA ILLUSTRATED is intended to make the people acquainted with the superb creations of Nature that distinguish this country above all others. With such an extraordinary richness of material we regret owing to our book being produced at a price intended to place it within the reach of the million, and that, our space being, therefore, somewhat circumscribed, our attention has necessarily been confined to the most prominent types of scenery. We have, however, endeavored in all cases to select, as the subject of our illustrations, those landscapes whose names have for years been familiar to our ears as household words, but of whose sublime beauty and magnificence the great mass of our population have had no adequate conception. Descriptions, without illustrations, are indeed "songs without words."

Within the last three years a wonderful portion of the earth's surface, of previously hidden and, indeed, almost unsuspected beauty, has been opened up by the persevering efforts of a body of explorers selected from among men of science and adventure. The Yellowstone Region, in the Rocky Mountains, is described by those who have visited it as superior to all the other wonders of the American continent; and it does, in reality, fulfill the most extravagant of the suppositions to which its concealed marvels gave rise. For more than sixty years, ever since the existence of a lake, which they held to be the source of the Yellowstone River, was established in 1806 by the celebrated explorers, Captains Clark and Lewis, these marvels were vaguely hinted at and surmised. But the mystery is a mystery no longer, and from the official records of the Government we have compiled an account of what the brave men saw who penetrated to the valley, on whose south side are the Wind River Mountains, a snow clad barrier which no white man had ever crossed (prior to the expedition of Captain Jones, in 1873, these solitudes were thought impassable); on whose eastern side is the Snowy Mountain Range and a grand cluster of volcanic peaks; on whose north side are the Gallatin Range and the vast parallel ridges through which the tributaries of the Missouri pass northward.

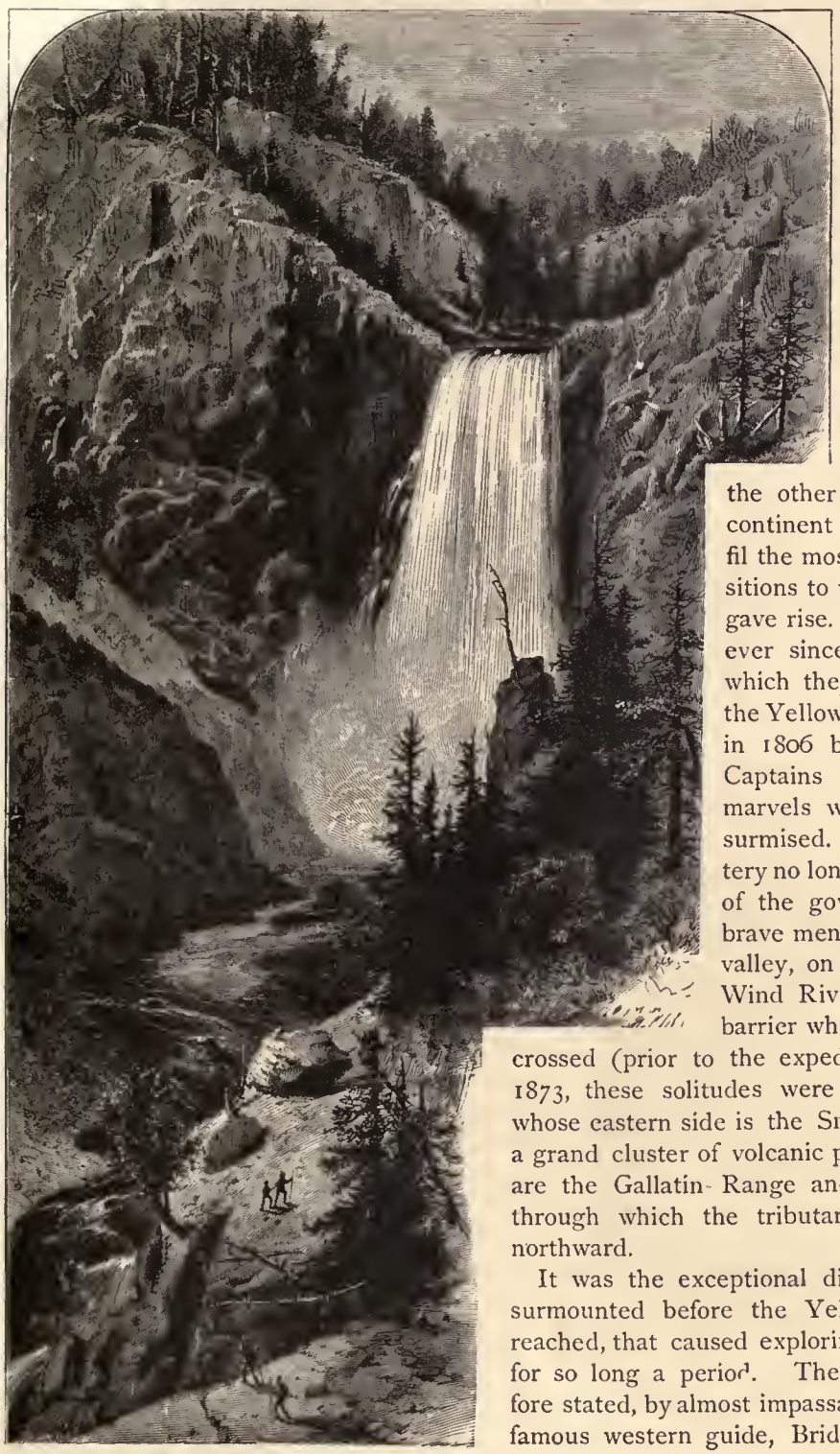
This is only one of thirty sections of our country which we have selected as the subject matter for description and for the profuse illustrations that illustrate the text. On this continent nature has been so fantastic in many of her works, and has scattered her beauties around with such lavish profusion, that, to the true lover of the picturesque, America presents charms unknown to other lands. The grandeur and vastness of our mountains, the large featured sublimity of the scenery of many of our rivers, so majestic in the fulness and evenness of their flow; the great extent of our wonderful underground caverns; the awfulness of the cañons to be found in our Western Territories, many of which have been but recently, and with great difficulty and danger, explored; the immensity of our lakes, beyond all comparison the largest in the world; all these present a field which surpasses any other in richness of picturesque, and show that Nature has wrought with a bolder hand in this land than in those which boast of an older civilization.

It is upon the faithful rendition of these features, and of the most sublime of these beauties that we rest the success of our enterprise. For over a year some of the most celebrated arists and wood engravers of the metropolis have been engaged in the preparation of the beautiful engravings that illustrate the text of the volume, and a glance at the result of their labors will show, even to those inexperienced in such matters, that the finest order of wood engraving approaches very closely the more ambitious efforts on steel.

The text has been printed from new type made expressly for this purpose, upon heavy toned and extra calendered paper, and the result is a volume which, in sumptuous appearance and intrinsic merit, will bear comparison with books which are sold in the book and fine art stores for TEN DOLLARS.

AMERICA ILLUSTRATED.

THE VALLEY OF THE YELLOWSTONE.



The Lower Falls.

WITHIN the last three years a wonderful portion of the earth's surface, of previously hidden and, indeed, almost unsuspected beauty, has been opened up, by the persevering efforts of a body of explorers, selected from among men of science and adventure. The Yellowstone Region in the Rocky Mountains is described by those who have visited it as superior to all the other wonders of the American continent; and it does, in reality, fulfil the most extravagant of the suppositions to which its concealed marvels gave rise. For more than sixty years, ever since the existence of a lake, which they held to be the source of the Yellowstone River, was established in 1806 by the celebrated explorers Captains Clarke and Lewis, these marvels were vaguely hinted at and surmised. But the mystery is a mystery no longer; and the official records of the government tell us what the brave men saw who penetrated to the valley, on whose south side are the Wind River Mountains, a snow-clad barrier which no white man had ever crossed (prior to the expedition of Captain Jones in 1873, these solitudes were thought impassable); on whose eastern side is the Snowy Mountain Range, and a grand cluster of volcanic peaks; on whose north side are the Gallatin Range and the vast parallel ridges through which the tributaries of the Missouri pass northward.

It was the exceptional difficulties which had to be surmounted before the Yellowstone Basin could be reached, that caused exploring expeditions to neglect it for so long a period. The Valley is walled in, as before stated, by almost impassable mountain ranges. The famous western guide, Bridger, declared that a direct

route from Lower Wyoming was an absolute impossibility, and that a crow could not fly over it, unless it took provisions along. The first exploring party under Professor Hayden (1870) were compelled to take an exceedingly circuitous route, and to consume much time in following it. They went north in Montana as far as Fort Ellis, and then approached the Park from the upper side, fully four hundred miles out of the direct road. This apparent impassability has been the germ from which grew the marvelous stories told by western hunters and guides, and has made it, in the eyes of the savages, an abode of evil spirits.

The expedition of Captain Jones, in the summer of 1873, demonstrated, however, that even guides are not infallible, and that Prof. Hayden had unnecessarily lengthened his journey. The Jones party broke camp at Fort Bridger, Wyoming, on June 12th, and proceeded in a north-easterly direction as far as the Valley of the Popo Agie. There the explorers changed their route, proceeding northwest to Two-Ocean Pass, and from thence north into the Yellowstone Basin. The most important fact developed by this expedition is that a railroad is practicable through the Wind River Valley across the foot-hills at the base of the Sierra Shoshone Mountains. The country at this point is well watered and timbered, and the soil is very rich—features which distinguish it strongly from the waste and barren regions that surround it.

The history of the discovery of this region is as follows: "In 1870, some of the officials and leading citizens of the territory of Montana organized the expedition known as the Hayden Expedition, which, accompanied by a small escort of cavalry, started from Fort Ellis, a frontier military post, beyond which civilization did not then extend, and in thirty days explored the cañons of the Yellowstone Valley, and the shores of Yellowstone Lake; then crossing the mountains to the headwaters of the Madison, they visited the geyser regions of Firehole River, and ascended that stream to its junction with the Madison, along whose valley they returned to civilization, confident that they had seen the greatest wonders on the continent, and convinced that there was not on the globe another region where, within the same limits, nature had crowded so much of grandeur and majesty with so much of novelty and wonder."

This does not seem to be an exaggerated estimate of the scenes which revealed themselves to this and a second expedition which set out in the following year, led by Colonel Barlow, the chief engineer, and under special orders from General Sheridan; and starting, as the former expedition had done, from Fort Ellis, ascended Gardiner's River, and found themselves in a region of hot springs, the deposits from which cover the hillsides with quaint samples of natural architecture, forming a fitting introduction to the grander marvels of the valley. The deposit is snowy white, and has the form of a frozen cascade. The springs now in active operation cover an area of one square mile, while three or four miles are occupied by the remains of springs which have ceased to flow. These springs had been overlooked by the former exploring party, so that they were actually first discovered in 1871, and they have already become the resort of many invalids, who speak highly of the virtues of the waters. They are at a height of six thousand feet above the sea; and south of them rises a domelike mountain two thousand feet higher, whose summit commands a view of fifty miles in every direction. From this summit the party descended into the Yellowstone Valley, by a path which combines every variety of beauty, boldness, fertility, grandeur, and gloom; and includes an elevated plateau thirty miles in extent, dotted with groves of pine and aspen, with numerous beautiful little lakes scattered throughout its extent, and many springs, which flow down the slopes, and are lost in the vast volume of the Yellowstone. In their passage over this plateau the party came to a terrific rift — a preparation for the incomparable awfulness of the Grand Cañon, which lay before them—a rift two thousand feet in depth, with the river rolling in its deeps, over volcanic boulders, in

The Lower Cañon.

some places; and in others, forming fathomless still pools. Small cascades tumble at different points from the rocky walls, and the river appears from the lofty summits a mere ribbon of foam in the immeasurable distance. "Standing on the brink of the chasm," writes one of the party, "the heavy roaring of the imprisoned river comes to the ear only in a sort of hollow, hungry growl, scarcely audible from the depths. Everything beneath has a weird and deceptive appearance. The water does not look like water, but like oil. Numerous fish-hawks are seen busily plying their vocation, sailing high above the waters, and yet a thousand feet below the spectator. In the clefts of the rocks, hundreds of feet down, bald eagles have their eyries, from which one can see them swooping still farther into the depths, to rob the ospreys of their hard-earned trout." A grand, gloomy, terrible place; peopled with fantastic ideas, full of shadows and turmoil. At the head of this cañon is the beautiful cataract which the explorers called the Tower Falls, which, though its sheer fall is four hundred feet, is so hidden away in the dim light of overshadowing rocks and woods, its very voice hushed to a low murmur, that men might pass within half a mile of it, and not dream of its existence.

The Grand Cañon.

But not until the Grand Cañon is reached are the wonder and the dread of the region to be realized. Two of the explorers accomplished a descent into its fearful abyss at a point where the chasm is one thousand one hundred and ninety feet deep. Their ascent was most perilous, but the spectacle revealed to them was worth the risk. On entering the ravine, they came to hot springs of sulphur, sulphate of copper, alum, steam-jets in endless variety, some of them of very peculiar form. One of them, that of sulphur, had built up a tall spire, standing out from the slope of the wall like an enormous horn, with hot water trickling down its sides. They descended the channel of the creek for three miles, and were now one thousand five hundred feet below the brink, and after four hours of hard toil, reached the bottom of the gulf, and the margin of the Yellowstone, where they found the water warm, and tasting of alum and sulphur. The river-margin is lined with all kinds of chemical springs, some depositing craters of calcareous rock, others muddy, black, blue, or reddish water. "The internal heat," says Lieutenant Doane, "renders the atmosphere oppressive, though a strong breeze drives through the cañon. A frying sound comes constantly to the ear, mingled with the rush of the current. We had come down the ravine at least four miles, and looking upward, the fearful wall appeared to reach the sky. It was 3 P.M. and stars could be distinctly seen, so much of the sunlight was cut off from entering the chasm. Tall pines on the extreme verge appeared the height of two or three feet. The total depth is probably three thousand feet. There are perhaps other cañons longer and deeper than this one, but surely none combining grandeur and immensity with such peculiarity of formation and profusion of volcanic or chemical phenomena." The geologist of the party, Dr. Hayden, thus reads the history of this tremendous chasm: "Ages ago, this whole region was the basin of an immense lake. Then it became a centre of volcanic activity; a vast quantity of lava was erupted, which, cooling under water, took the form of basalt; volumes of volcanic ash and rock fragments were thrown out of the craters from time to time, forming breccia as it sunk through the water and mingled with the deposits from silicious springs. Over this were spread the later deposits from the waters of the old lake. In time the country was slowly elevated, and the lake was drained away. The easily eroded breccia along the river channel was cut out deeper and deeper as the ages passed; while springs, and creeks, and the falling rain combined to carve the sides of the cañon into the fantastic forms they now present, by wearing away the softer rock, and leaving the hard basalt and the firmer hot spring deposits standing in massive columns and Gothic pinnacles. The basis material of the old hot spring deposits in silica, originally white as snow, are now stained by mineral waters with every shade of red and yellow—from scarlet to rose

color, from bright sulphur to the daintiest tint of cream. When the light falls on these blended tints, the Grand Cañon presents a more enchanting and bewildering variety of forms and colors than human artist ever conceived."

Awful as it is to look upwards from the depths of the Grand Cañon, it is infinitely more so to gaze downwards from its terrific verge. From the silent horror of the effort, the strong brave men of the exploring party shrank in agony, crawling backward from the edge in undisguised terror, and hardly able to realize their safety.

Crystal Falls.

The grandeur of the cañon is at once heightened and diversified by the magnitude and beauty of its Upper and Lower Falls; the latter are especially striking. The sheet of water falls sheer three hundred and fifty feet (with a like height of terr ble wall rising above it), in one unbroken symmetrical expanse, covered with white foam, while rainbows are formed in the spray from almost every point of view; and the steep rocks near, constantly wet with rising mist, are covered with bright green vegetation. The Upper and Lower Falls are only a quarter of a mile apart, the former turning over a precipice one hundred and fifty feet high. The scene at the Lower Falls is grandly beautiful. On either side the walls of the cañon rise to a height of nearly a thousand feet, while far below the turbid waters of the stream writhe and eddy along their winding course. Mountain pines cover the steep banks, while here and there the withered trunk of a dead tree extends its white form over the foaming waters. You can not approach within a hundred yards of the Falls without becoming thoroughly drenched by the continual shower of snowy spray. Far below the Cañon continues, seemingly a great fissure that was rent in the solid rock during some volcanic convulsion, leaving on either side the jagged walls of granite and basalt.

The three principal lakes in the Park are the Yellowstone, Mystic and Shadow. The shape of Yellowstone Lake is exceedingly irregular, and one is constantly surprised at coming suddenly upon broad bays and inlets that extend far into the land. Of this lovely sheet of water, which has, in elevation, but one rival, the South American lake Titicaca, the engineer-in-chief of the Hayden (1870) party, thus eloquently writes: "Secluded amid the loftiest peaks of the Rocky Mountains, possessing strange peculiarities of form and beauty, this watery solitude is one of the most attractive natural objects in the world. Its southern shore, indented with long narrow inlets, not unlike the frequent fiords of Iceland, bears testimony to the awful upheaval and tumultuous force of the elements which resulted in its creation. The long pine-crowned promontories, stretching into it from the base of the hills, lend new and charming features to an aquatic scene full of novelty and splendor. Islands of emerald hue dot its surface, and a margin of sparkling sand forms its jeweled setting. The winds, compressed in their passage through the mountain gorges, lash it into a sea as terrible as the fretted ocean, covering it with foam." But it lay before the explorers, when they saw it first, calm and unruffled, the most beautiful object which their toilsome journey had revealed. No fish save trout live in its waters, but they are thronged with waterfowl; great fleets of white swans and pelican sail

over its bosom, and crowd its islets. The great river flows away from it in a deep and easy channel, a quarter of a mile wide; its superficial area is three hundred square miles. The Lake gives the strongest geological evidence of having been, at some remote period, a great inland sea. It is fed by the mountain snows, and Prof. Hayden reports that his deepest soundings were at three hundred feet. The water is a shade between dark green and blue.

The descriptions given by Professor Hayden, Captain Jones, Langford, Stevens and others who have been connected with various exploring parties, glow with enthusiasm. They speak in the warmest language of the grandeur of this remarkable region. Springs are most abundant, and sometimes hundreds can be found within the compass of a few rods, and hot and cold springs are often seen within a few feet of each other. "The mountains are Gothic palaces, with twelve or fifteen feet terraces, thousands of times larger

Yellowstone Lake.

than any ever attempted by human hands; cathedrals, some with numerous minarets; enormous castles pitched on the higher hills, which are shaped perfectly like cones, and densely covered with forests of pine, giving their slopes a beautiful green color that contrasts strikingly with the brown tops; walled gateways from below curved up to the summit; pavilions surmounting the smaller hills and looking like delightful summer resorts; fortifications around the bases, arranged sometimes in series, one above the other; one gigantic and perfectly shaped pyramid, excelling vastly the famous ones of Egypt—all shaped out of dark-brown metamorphic sand and limestone."

That portion of the Valley of the Yellowstone which has been set aside for a National Park comprises about 3,500 square miles of territory near the head-waters of the river that gives the region its name. Our attempt at description may be briefly summarized: There are vast gloomy cañons through whose gorges rush the waters of numerous mountain streams; walls of basaltic rock and granite rising in wild grandeur to the height of many hundreds of feet; placid lakes whose waters present for miles on miles surfaces of glassy smoothness, in strange contrast with the chaotic scenes around them; wonderful springs that send up unceasingly volumes of gray mud, and geysers and glaciers that surpass those of Iceland. These form a panorama of physical marvels that will be interesting alike to the scientist and the tourist. What Mont Blanc and the Alps have been to the pleasure-seekers of the Old World, the Yellowstone Valley will be to those of the New. Its rugged magnificence will be a never-failing source of inspiration for painter and poet, and when civilization has built cities and marts of trade in the Western wilds that are now but thinly settled, and a thorough system of communication has been established between the Eastern sea-ports and all parts of our broad land toward the National Park, wanderers from all over the world will turn their faces hitherward to view Nature in her grandest shrine.

THE HUDSON RIVER AT WEST POINT.

SINCE the time when Hendrick Hudson first sailed up the broad stream that bears his name, it has been a river of romance. The graceful prose of Irving has bestowed fame upon the Headless Horseman and the sleepy good-for-naught Rip Van Winkle, and many poetic recollections cluster about the quiet waters and picturesque banks. The river flows through landscapes of varied beauty, and on either side, as far as the eye can reach, the dark outlines of the Kaatskills and Highlands loom up. The bosom of the stream is dotted with the white sails of yachts and pleasure-boats, and its silence is often broken by the steady paddle-stroke of the stately steamboats that ply between the towns and cities on its shores. Our artist has taken as his subject for illustration the most beautiful and historically the most interesting portion of the river—West Point in the Highlands.

The history of the spot on which the famous military academy stands is very romantic. Its natural strength made it a valuable site for a fortress, and the Continental Congress ordered the erection of Fort Putnam at a point 598 feet above the level of the river, commanding a view of the surrounding country for many miles. An approach from the Hudson was made well nigh impossible by an almost perpendicular wall of rock, while on the western and south-western side the steep hills formed a strong barrier. A small force could hold the position for a long time against an enemy much superior. Above the fort, on a higher plateau, Fort Clinton and the other fortifications were built, forming altogether one of the most formidable strongholds in the world.

That this important point came near being treacherously surrendered to the British in 1780, is a familiar fact to readers of American history. It was in command of Benedict Arnold, a man whose dissipation had plunged him deeply into debt, and who was ready to betray his trust for the double purpose of replenishing his purse and gratifying his private revenge. It is well known how nearly he succeeded, and how finally he failed. Major André, whom he was to meet to perfect the arrangements for the delivery of the fortress, was captured by three American soldiers, and the plot was discovered.

Washington was to have made a visit of inspection to Fort Putnam and the other redoubts on this side the river, only two or three hours before his discovery of the treason of Arnold, at that moment as he supposed in command at West Point. The commander-in-chief was expected to

VIEW OF THE HUDSON FROM THE VICINITY OF WEST-POINT.

arrive the evening before, and had he done so, Arnold would probably never have escaped. Having accidentally met the French minister, M. de Luceme, at Fishkill, however (eight miles above), he was induced to pass the night there for the purpose of some conference, and set off early in the morning on horseback, sending on a messenger to Mrs. Arnold that himself and suite would be with her to breakfast. Arriving opposite West Point, near a small redoubt called Fort Constitution, Washington turned his horse from the road. Lafayette, who was then in his suite, called out, "General, you are going in the wrong direction; you know Mrs. Arnold is waiting breakfast for us." "Ah," answered Washington, "I know you young men are all in love with Mrs. Arnold, and wish to get where she is as soon as possible. Go and take your breakfast with her, and tell her not to wait for me: I must ride down and examine the redoubts on this side the river." Two of the aides rode on, found breakfast waiting, and sat down at once with General Arnold and his family. While they were at table, a messenger came in with a letter for Arnold, which announced the capture of André, and the failure and betrayal, of course, of the whole conspiracy. Showing little or no emotion, though his life hung upon a thread, he merely said to one of his aides that his presence was required at West Point; and, leaving word for General Washington that he was called over the river, but would return immediately, he ordered a horse and sent for Mrs. Arnold to her chamber. He then informed her abruptly that they must part, possibly forever, and that his life depended on his reaching the enemy's lines without delay. Struck with horror at this intelligence, she swooned and fell senseless. In that state he left her, hurried down stairs, mounted a horse belonging to one of his aides that stood saddled at the door, and rode with all speed to the bank of the river. A boat with six men was in waiting; and, pretending that he was going with a flag of truce, he pulled down the stream, and arrived safe on board the Vulture sloop-of-war, lying some miles below. * * * André was carried to headquarters, and, after a military trial, was executed, notwithstanding the strenuous efforts of the British authorities to save him. Arnold served for a while in the enemy's army. At the close of the war he went to Europe, where he died in obscurity, shunned by those to whom he had so basely sold his honor.

The national military academy was established by Act of Congress in 1802. It is supported by the Government, and the cadets are under no expense for tuition or maintenance; but they are required to serve in the regular army for a term of years after graduation. The appointments are made by Congressmen, and the candidates for admission must be between the ages of sixteen and twenty-one. The course of study, which is full and thorough in all that relates to a military education, requires five years for completion. The academy buildings are erected on a plain nearly two hundred feet above the Hudson, and cover an area a mile in circuit. In addition, there is ample space for the practice of gunnery, and the necessary military evolutions. The impression that cadets studied at West Point as a stepping-stone to some other profession seems to have obtained credence abroad. How erroneous was this opinion may be seen from the remarks of a distinguished European critic who has recently enquired into the subject, and who says: "The point which above all others must strike an observer is the extremely stern military spirit which pervades the whole discipline and teaching. The course is not only longer than at European colleges maintained for similar objects, but is probably more strict and exacting than that of any on the other side of the Atlantic."

For many years West Point was considered a useless expense by the people, and newly elected Representatives were wont to make the system of educating what they called "military snobs," the subject of their maiden speeches in the House; but the war with Mexico, and especially the war of the Rebellion, gave ample testimony of its value. Gens. Scott, Grant, Sherman, Sheridan, Mitchell, and many other prominent Union generals graduated there, and the rebel leaders Lee, Pemberton, Stonewall Jackson, and Johnson, also received from the National Government the military knowledge that enabled them to conduct their armies so well.

THE NATURAL BRIDGE IN VIRGINIA.

BEFORE the division of Virginia during the late war, Rockbridge county was one of the central counties of the State. It received its name from the famous bridge that lies within its confines, with the exception of which remarkable natural curiosity, it contains no attractions for a tourist other than well-cultivated fields and a prosperous farming population.

THE NATURAL BRIDGE, VIRGINIA.

From the middle of the eighteenth century the Natural Bridge has divided, with Niagara Falls, the wonder and admiration of travelers from Europe who have come to view the sublime creations of Nature in the Western World. It spans Cedar Creek, a small stream nearly dry in summer which flows into the James River, and it is apparently a solid rock in the form of an arch. The distance from the water to the nether side of the arch is about two hundred feet, and from that point to the upper side, forty feet; thus making the height of the bridge two hundred and forty feet. The chasm crossed by it is ninety feet wide.

The physical causes that combined to form this stupendous structure have been the subject of much discussion among scientific men. The Marquis de Chastellux, a French gentleman of distinguished attainments, who visited the Bridge in 1781, thus describes it:

"It is at the foot of these rocks, on the edge of a little stream which flows under this immense arch, that we must judge of its astonishing structure. There we discover its immense spurs, its back-bendings, and those profiles which architecture might have given it. The arch is not complete; the eastern part of it not being so large as the western, because the mountain is more elevated on this than on the opposite side. It is very extraordinary that at the bottom of the stream there appear no considerable ruins, no trace of any violent laceration which could have destroyed the kernel of the rock and have left the upper part alone subsisting; for that is the only hypothesis that can account for such a prodigy. We can have no possible recourse either to a volcano or a deluge, no trace of a sudden conflagration or of a slow and tedious undermining by the water."

From the description of the Baron de Turpin, a distinguished French engineer, who made the Bridge an object of special study, and who has written much on the subject, we subjoin the following:

"The mass of rock and stone which loads this arch," says the baron, "is forty-nine feet solid on the key of the great centre, and thirty-seven on that of the small one; and, as we find about the same difference in taking the level of the hill, it may be supposed that the roof is on a level the whole length of the key. It is proper to observe that the live rock continues also the whole thickness of the arch, and that on the opposite side it is only twenty-five feet wide in its greatest breadth, and becomes gradually narrower. The whole arch seems to be formed of one and the same stone; for the joints which one remarks are the effect of lightning, which struck this part in 1779. The other head has not the smallest vein, and the intrados is so smooth that the martins, which fly around it in great numbers, cannot fasten on it. The abutments, which have a gentle slope, are entire, and, without being absolute planes, have all the polish which a current of water would give to unhewn stone in a certain time. The four rocks adjacent to the abutments seem to be perfectly homogeneous, and to have a very trifling slope. The two rocks on the right bank of the rivulet are two hundred feet high above the surface of the water, the intrados of the arch a hundred and fifty, and the two rocks on the left bank a hundred and eighty

"We see that these rocks, being of a calcareous nature, exclude every idea of a volcano, which, besides, cannot be reconciled with the form of the bridge and its adjacent parts. If it be supposed that this astonishing arch is the effect of a current of water, we must suppose, likewise, that this current has had the force to break down and carry to a great distance a mass of five thousand cubic fathoms, for there remains not the slightest trace of such an operation."

The Baron de Turpin's scientific attainments were of so high an order that his opinions are always entitled to attention and respect; but it will be observed that he agrees neither with the elaborate scientific opinions that have been advanced in favor of the theory that it is the effect of some natural convulsion, nor with the popular conclusion that it was caused by the action of water through long ages, wearing away the limestone of which it is formed. Yet the Baron had himself no better theory to advance. The Bridge has also been visited by other European savans, but none of them have been more successful in their attempts at the elucidation of this natural wonder.

The bridge first became generally known in consequence of the enthusiastic admiration expressed by President Jefferson, who proclaimed its beauties in extravagant terms, and attracted much attention to it. It had been previously visited, however, by several noted Frenchmen, who had written eloquent descriptions of its magnitude and grandeur.

Like most places of similar interest, the Natural Bridge has its traditions. Far up on its rugged face are cut the initials of General Washington, and above his are those of an adventurous youth who nearly lost his life through his foolhardy determination to place his name above all that had been cut there before. By far the finest view of the bridge is that from its base. Standing there and looking up at its rough uneven sides, one has an opportunity to estimate its real magnitude.

Cedar Creek flows along so quietly that even the suspicion that it was once a roaring torrent, with force sufficient to cut through the vast rock that now hangs over it, seems ridiculous. The distance makes the overhanging trees at the top look like diminutive bushes, while the shrubs that grow from the ledges and clefts are scarcely apparent, except in places where they grow thickly, and then they have the appearance of grass or moss on the face of the rock. The view from the top to the creek below is almost painful, and few can gaze down without becoming dizzy.

There is a tradition of an English officer who, in 1762, attempted to scale the Bridge. He had visited the place with a party of friends, and notwithstanding their repeated expostulations and warnings he persisted in the venture. He divested himself of his coat and hat, and then, gayly bidding his comrades meet him on the top of the bridge, he began the ascent. By the aid of the bushes and the clefts in the rocks he succeeded in climbing to a ledge one hundred and eighty feet from the base. Here his courage failed him, for the rock above was fatally regular for nearly fifteen feet, and there were no bushes whose roots were imbedded in the stone with sufficient strength to support his weight. Terrified at his danger he began to descend ; but he had proceeded only a few feet when he lost his hold through dizziness, and was dashed to the bottom, in full view of his horror-stricken friends.

Our illustration of the Bridge was taken in the spring of the year when the melting of the snow and the unusual rain-fall had given Cedar Creek a volume of water it does not at other times possess. As before stated, during the summer, or after a continuance of dry weather, the Creek is nearly dry.

TRENTON HIGH FALLS, NEW YORK.

THERE is no State in the Union that presents a greater variety of attractive scenery than New York. The Hudson, the Highlands, the Catskills and the Adirondacks are in the east and north-east ; Onondaga, Cayuga, Oneida, Mahopac, Chatauqua, Seneca, Owasco, and numerous smaller lakes extend through the central and northern sections ; Erie and Ontario lie on the Canada boundary, and that famous natural curiosity, Niagara Falls, is in the north-west. It is, perhaps, owing to this abundance of noteworthy scenery that the Trenton High Falls in Oneida county are so little known and so much neglected, although there are two large and growing cities in the same county, Rome and Utica, and a great railroad passes within a few miles of the place. These Falls are second in interest only to the Falls of Niagara. They were known to the Indians by the name of Cayoharie, and are formed by the descent of a considerable stream called West Canada Creek, through a ravine of singular formation. Like all mountain streams, the creek is often swollen to a swift and muddy torrent by high rains and spring snows, and runs during the early months of the year over a succession of rocky ledges, falling from one to another to the depth of forty or fifty feet, the whole forming a continuous chain of picturesque cascades. The appearance of the creek has changed somewhat since its first discovery. The constant action of the water has worn through the strata that enclose it, and has materially widened the bed of the stream. Of course, the best time to see the falls is in the spring of the year, but unfortunately at that period they are least accessible. The city of Rome is, however, only fourteen miles distant, and the tourist can choose a fine day to make his visit and be back in town in the evening. The great difficulty lies in traversing the roads. The melted snow runs down from the hills in numberless rivulets, and the mixture of mud and slush underfoot interferes with the pleasure of exploring even the most romantic scenery. Those who desire to thoroughly enjoy the beauties of this picturesque spot should make their head-quarters at the hotel—a very good one—to be found near the Falls.

Cascades of marvelous beauty are not a rarity in American scenery ; but it is believed that Trenton Gorge has not its counterpart on the continent, at least it has no rival in sublimity on this side of the Rocky Mountains. It is not a mere waterfall or series of waterfalls. It is a gigantic millrace running for three miles between walls of solid rock, Nature's masonry, twice as high as Trinity steeple, and in many places almost as perpendicular. Through this gorge run the waters of West Canada Creek : now corkscrewing their way through a rocky path, water hewn ; now precipitating themselves by a series of cascades into an amphitheatre whose rugged sides of rock are clothed in leafy green ; now flowing in a rapid stream over a bed as smooth, and composed of stones

as regular and rectangular as those of a city sidewalk; now pouring over a rocky dam so straight and formal that you instinctively look for a sawmill at its base; now leaping down a two-storied cascade in a series of falls whose wondrous variety of beauty is beyond the power of pen or pencil to describe; now darting over a bed of rough rocks which throw it into foam and eddies and waves that are like a miniature surf; now gathering all its volume into one concentrated column and plunging through a narrow gap, beating like a gigantic trip-hammer on the rocky bed beneath; finally to hurry swirled and twisted and writhed into innumerable forms through a narrow defile, to issue at last in a deep and to the eye an unfathomable pool of treacherous calm at the very edge and mouth of the stony chasm. The gorge is to-day almost exactly what it was when the Indians hunted in these forests and fished in these pools. There is here and there a chain fastened into the rocks to help those of unsteady head or careless feet along the narrowest pathways in the rock. Once we mount a wooden staircase to get around the High Falls. For the rest we might easily imagine ourselves in a desolate wild. Civilization has done its utmost to ruin Niagara. It has only rendered Trenton Gorge accessible.

Sherman Falls, one of the cascades forming Trenton Falls, furnishes an interesting instance of the action of water upon solid rock. Far back in distant ages, before even the Indians had discovered it, the water, hindered in its course by some obstacle, made here a detour and leaped across the chasm at right angles to its present course. It cut a large amphitheatre in the solid rock upon this side, along which the narrow pathway now runs, and leaping down struck the opposite bank with such prodigious force as to cut a great chasm in the rocks thirty-eight feet in depth, which remains to attest its power in times past. It has since cut a clearage in the edge of the precipice which before turned it from its straightforward course, and pours through this chasm in one huge pillar of amber water like a gigantic waterspout inverted. The thunder is heaviest here; the walls rise highest; the blow upon blow of the great water column are most ponderous; and here, right athwart the spray that rises in perpetual incense filling the amphitheatre, trembles and dances a rainbow, now in perfect span, now in evanescent fragments, the most fragile and the most exquisite thing in nature. How marvelously this rainbow, by its very contrast, intensifies the impression produced by the thunder of the irresistible waters, and the massive strength of the impenetrable rocks, can hardly be described. Like all great artists, learners in her school, Nature delights in just such strong contrasts.

At the point in the Falls where the greatest volume of water descends, the rocky walls on either side are much nearer each other than at other places, giving the fall at a distance the appearance of water rushing through a great flood-gate. The waters rush along with an impetuous and unnecessary haste that is thoroughly American—every drop is unmistakably native-born. The walls are almost perpendicular below the Falls, and in many places the sky is scarcely visible from the banks of the creek. There is a ladder built from the base of the great cataract to the plateau above it, and tourists can climb up and view the falls at the spot where the first descent begins. The spectacle here witnessed is more than compensation for the exertion. Near the shore the water forms in whirls and eddies, perpetually changing its hues in the strong sunlight, while further out the torrent rushes over its inclining bed to the edge of the precipice, taking with it every now and then a huge tree that has been torn from its roots far up in the mountains and carrying it like an arrow over the fall. The colors on the trees, the rising mist, the foam here, the amber there of the water, tints of rainbows that come and go upon the spray, and the song of the wild waters—complete a landscape that, for romance, has few equals.

The other places of interest are the Alhambra Fall, the head of the ravine through which the Kanata flows, Boru's Bridge Fall, and the singular formations in the rocky banks known as Rocky Heart and Jacob's Well. The descriptions given by visitors to this spot, and the fact that it is on the direct route from Buffalo and Niagara, are helping to make it better known and more popular.

Oneida county, in which the Falls are situated, is a prosperous and well-to-do section of the State. One of its chief industries is the cultivation of hops, and its fine grazing facilities give encouragement to the raising of cattle and horses. The Oneida Community owns a large section of land in the county, and visitors to the Falls may thus have an opportunity also of observing the ways of this peculiar social organization.

PANORAMA OF TRENTON FALLS.

SQUAM LAKE.

DANIEL Webster said long ago that New Hampshire was a good State to emigrate from, but this does not change the fact that it is a very popular place to summer in, its mountains and lakes having thousands of visitors every year. Squam Lake is in a north-westerly direction from Lake Winnipiseogee, between Carroll and Grafton counties, and has an area of about thirty square miles. Its shores are very picturesque, and, in many places, rocky and mountainous. Our illustration will, perhaps, call to some of our readers, the memory of happy moments spent among the Hampshire hills, far away from the bustle of city life.

A lake whose surroundings are wild and uncultivated is best seen in the autumn, and we quote from the work of an enthusiastic traveler a description of Squam Lake at that season of the year:

"The first severe frost had come, and the miraculous change had passed upon the leaves which is known only in America. The blood-red sugar maple, with a leaf brighter and more delicate than a Circassian lip, stood here and there in the forest like the sultan's standard in a host—the solitary and far-seen aristocrat of the wilderness; the birch, with its spirit-like and amber leaves, ghosts of the departed summer, turned out along the edges of the wood like a lining of the palest gold; the broad sycamore and the fan-like catalpa flaunted their saffron foliage in the sun, spotted with gold like the wings of a lady-bird; the kingly oak, with its summit shaken bare, still hid its majestic trunk in a drapery of sumptuous leaves, like a stricken monarch, gathering his robe of state about him to die royally in his purple; the tall poplar, with its minaret of silver leaves, stood blanched like a coward in the dying forest, burdening every breeze with its complainings; the hickory paled through its enduring green; the bright berries of the mountain ash, flushed with a more sanguine glory in the unobstructed sun; the gaudy tulip-tree, the sybarite of vegetation, stripped of its golden cups, still drank the intoxicating light of noonday in leaves than which the lip of an Indian shell was never more delicately tinted; the still deeper dyed vines of the lavish wilderness, perishing with the noble things whose summer they had shared."

This is only the forest—the background of the picture. In the foreground lies the lake, its waves glittering like sunlit steel, or changing into all the colors of the rainbow under the glow of the evening sun. Here and there are islands, varying much in size, some being no larger than a tea-table, while in appearance they are equally dissimilar, although all are covered by the most luxuriant vegetation.

To summer visitors Squam Lake has no ordinary attractions. The White Mountains are not far away, and Lake Winnipiseogee, called by the Indians "The Smile of God," is also a pleasant point for a day's jaunt. Boating, of course, is one of the first amusements. A morning sail on the beautiful lake is full of enjoyment. The distant mountains, with the ever-changeful forms of mist around their summits, the trees leaning over the banks of the lake, here and there a diminutive harbor, in which the water is so clear and transparent that the bottom, covered with white and yellow pebbles, can be seen—all these combine to form a varied panorama. A storm on the lake is, however, a matter of more importance than would be supposed from its size. The wind blows a perfect hurricane, and the fog and clouds are so dark, that it is difficult to see a clear course ahead. Its proximity to the sea gives it the full force of the winds from the ocean. These are drawbacks, experienced fortunately only in unfavorable weather.

THE WHITE MOUNTAINS.

THE White Mountain range consists of eleven peaks, viz.: Mounts Washington, Clay, Jefferson, Adams, Madison, Webster, Jackson, Clinton, Pleasant, Franklin, and Monroe. Of these Mount Washington is the highest, having an elevation of 6,293 feet. The Indian name for these mountains was "Agiocochook" which signifies "the place of the Spirit of the Great Forest," or, according to Judge Potter, "the place of the Storm Spirit." They derive their English name from the fact that for ten months of the year their peaks are white with snow. Owing to the large number of tourists who visit the White Mountains every summer, it has become profitable to cut new roads, and level and grade old ones, so that now the ascent of the mountains is attended only with

SQUAM LAKE, NEW HAMPSHIRE.

fatigue and, if perchance a shower should come on, a little discomfort. The principal point of interest to the visitor lies in the ascent of Mount Washington. There are several routes to the summit, but the most popular one is from the Glen.

A drive of eight miles from the village of Gorham along the Peabody River will take the visitor to the Glen House, which stands on a plateau about 830 feet above the Gorham valley. The Glen House is on the lowest ridge of the hill that rises opposite to Mount Washington, which, as its name indicates, stands head and shoulders above the other summits—having no peer. Madison and Monroe come next on the left, and then Jefferson, who appears higher than he is. In a line with Mount Washington on the other side are Adams, Clay, &c. Jefferson's head seems modeled after a European pattern. It runs up to a sharp point, and wants but accumulated masses of ice to be broken into Alpine angles.

The distance from the base of the mountain at the Glen to its summit is eight miles, and a carriage road runs to the very top of the mountain. This road was commenced in 1855 by a chartered corporation under the management of D. O. Macomber, and was finished as far as the Ledge, about four miles from its base, in 1856. The road was not completed until the summer of 1861. Its average grade is twelve feet in one hundred, and its steepest grade is sixteen and a half feet in a hundred. The bridle path ascends the mountain in a direct line, while the carriage road winds around the Ledge and up the side, making the distance nearly double. Between the base and the Ledge the road is cut mainly through the forest, and affords no views of mountain scenery, but after this portion of the journey has been passed it runs along the very edge of a deep ravine that divides Mount Washington from Mounts Clay and Jefferson, and the traveler for the rest of the way may enjoy the imposing scenery at its best.

The path rises over a series of receding plateaus, each of which seems to be the summit as one looks up from below, and it is on account of this feature that Mount Washington fails to show its real height until one is far enough away to obtain a full view of its whole outline.

From Eastman's work on the White Mountains we take an account of the tragic termination of three attempts to reach the summit before the present roads were built: "During the last part of the ascent one will see the pile of stones that marks the spot where Miss Bourne, of Kennebunk, Me., died near midnight, in September 1855, and where her uncle and cousin kept sad watch until dawn. They started in the afternoon, without a guide, to walk to the summit. Night and fog overtook them, and the young lady perished in the chill and darkness among the rocks, but a few rods from the house they were in search of. Quite near, also, is the shelving rock, beneath which the remains of an elderly gentleman from Wilmington, Del., were found in July, 1857. He had attempted to ascend the mountain alone, one afternoon in August of the year before, and must have been overtaken by storm, cold and darkness, when near the summit. His watch and some bank-bills in his vest pocket were found uninjured; though most of the body, and even part of the skeleton, were gone. A little further below, and at the left of the descending path, the ledge is visible where Dr. Benjamin Ball, of Boston, passed two nights in the snow and sleet of an October storm, alone and without food or covering. He was rescued when nature was about sinking. His feet were frozen and he could not speak. How his life was preserved in such exposure is a marvel. It is equally remarkable that, though his feet were severely frozen, they were saved."

Arriving at the top of the mountain the mind recoils within itself through the impotence of its efforts to grasp the infinite and illimitable ideas suggested by the vastness of the scene. The summit of Mount Washington is six thousand two hundred and ninety-three feet above the level of the sea, being the highest point in the United States east of the Mississippi, except some peaks among the Black Mountains in North Carolina, which overtop it by six or seven hundred feet. The summit is entirely bare of vegetation, a vast stone heap, rugged and wild, but too regularly shaped for picturesqueness or sublimity. There has recently been erected here a railroad depot. The view from the apex commands the full circle of the horizon, and Mount Washington appears as an island surrounded by a tumultuous ocean of blue hills. But the adjacent peaks, jagged and bare, divided by valleys of stupendous depth, are yet the most impressive features of the grand panorama.

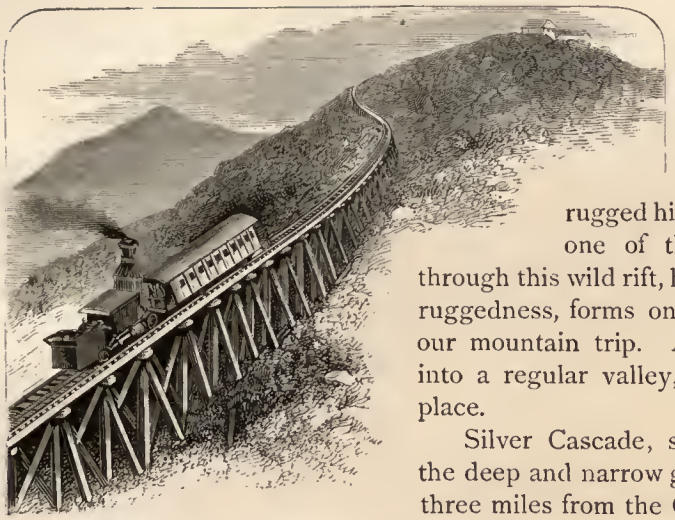
A horizon of nearly six hundred miles bounds the prospect. "In the immediate neighborhood, but far below, lie on one side Mounts Clinton, Pleasant, Monroe, and Franklin; on the other Jefferson, Adams, and Madison. On the east and west, openings are visible through which rivers, taking their rise in the mountains, wind their way along the valleys to the lowlands. Far in the distance,

SILVER CASCADE, CRAWFORD'S NOTCH.

chains of hills and mountains, distinct in outline and beautiful in form, arise on all sides, and these are still overtopped by those beyond whose blue summits mingle with the sky, and bound the glorious picture. Far to the south, the silvery waters of Lake Winnipiseogee set, as it were, in a framework of hills, encounter the eye and relieve and contrast the sombre majesty of the mountains. On the west the Green Mountains of Vermont, and on the east the mountains of Maine skirt the horizon and seem to support the sky." The summit of Mt. Washington consists of about an acre and a half of irregular rock, containing scarcely a smooth spot. There were formerly two hotels there — the Tip-Top House and the Summit House —but they have been consolidated.

Mount Washington and the White Hills.

Those who desire to see all the diversity of scenery which the White Mountains afford would do well to make, from this point, for Crawford's Notch; in that respect following the example of the writer, who, descending from the knob of Mount Washington, came presently upon a dark pond fed by the melting snows and overshadowed by bald and jagged crests of the mountain, presenting altogether one of the most striking pictures ever seen. No flower blooming on its bleak margin, no living thing rippling its icy bosom, it resembled a sullen, deep-set black eye staring eternally upward from its sunless hollow at the unapproachable glories of the heaven above. The path for several miles led around and over this line of savage crests, in many places steep and dangerous. In time one reaches the line of forest growth— at first appearing a mere thicket of stunted firs, and increasing in size with the descent. The character of the road also changed. The rugged pavements and steep stairways of loose and angular rocks



Mount Washington Railway.

had given place to deep-washed gullies. The Notch is a narrow and romantic gorge, walled in by precipitous rocks and mountains of imposing height. Its entrance resembles a gateway of Cyclopean masonry, affording scanty room for the rugged highway, and the passage of a brawling stream, one of the sources of the Saco River. The ride through this wild rift, halting and turning often to admire its savage ruggedness, forms one of the most agreeable reminiscences of our mountain trip. At the end of two miles the pass widens into a regular valley, and the scenery becomes more commonplace.

Silver Cascade, sometimes called the Second Flume, from the deep and narrow gorge through which the waters flow, is about three miles from the Glen. It is a water-chiseled chasm through which a bright stream toils with hoarse murmurings; while from far above on the mountain, where rocks and fir-trees crown the misty heights, the Silver Cascade comes skipping down like a white-robed undine, hasting to plunge herself in the gulf below. Part of its waters come from Mount Washington through Tuckerman's Ravine, and the descent is about eighty feet. It flows down a series of rough, rocky steps which widen toward the bottom.

The Glen Ellis Fall is near the road to North Conway and the Notch. Its descent is sixty feet. Other points of interest in the mountains are Tuckerman's Ravine; Willey Slide, named after the unfortunate Willey family, who were buried in a landslide on the night of October 25, 1826; the "Profile," and the Cascades.

It is impossible to close this short account of Mount Washington without briefly referring to the triumph which engineering skill has achieved in the construction of the Mount Washington Railway. During the summer season, steam-cars run daily over the track, which passes up the west side of the mountain to the summit. The construction of this railroad is due to the enthusiasm and inventive genius of Mr. Sylvester Marsh, of Littleton, New Hampshire. At first it was difficult to convince mechanicians of the feasibility of the scheme, and little encouragement was afforded by capitalists until an engine was actually running over a portion of the route. Finally, the necessary funds having been subscribed, the railroad was finished in 1869. It starts from a point 2,668 feet above the sea, and about 3,600 below the summit. The average grade is 1,300 feet, the maximum 1,980 feet, to the mile. There are nine curves on the line, varying from 497 to 945 feet radius. The track consists of three rails, the outer four feet seven and one-half inches apart, which sustain the principal weight of the rolling stock, and an inner *cog-rail*, four inches wide, into which the teeth of the driving-wheel of the engine play, and, as it revolves, the whole engine is made to move, resting on the outer rail. Practically, the operation is accomplished by one cog-wheel working into another. The atmospheric brakes reduce the possibility of accident to a minimum risk, and it is currently believed that the danger involved in traveling on this railroad is not greater than on an ordinary railroad.

The Depot and Summit House, Mount Washington.

In 1870–71 an expedition, consisting of C. H. Hitchcock, State Geologist of New Hampshire, J. H. Huntington, in charge of the Observatory upon the mountain, S. A. Nelson, Observer, A. F. Clough, and H. A. Kimball, Photographers, and Theodore Smith, Observer and Telegrapher for the Signal Service, passed the winter on the

top of the mountain, connected with the outside world only by a telegraph wire. Before this date only two of the various attempts made to reach the summit in winter had proved successful.

We have not space to dwell upon the various difficulties encountered in making the necessary preparations for wintering on the summit, many of which arose from the fact that the expedition was finally organized so late in the season, that before their arrangements were fully completed the trains had ceased to run. But, these matters having previously been attended to, an ascent was made on November 30, 1870. This ascent is so full of dramatic incident, that the reader will pardon us for reproducing it :

"The end of the first mile—carrying us up to within one half mile of the limit of wood-growth —found us in tolerable condition ; when a halt for breath and observations discovered to us an approaching storm lying on the Green Mountains of Vermont. It would undoubtedly strike us, but we still hoped we might press on and reach the summit first. The thought of being overtaken by a furious storm on the wintry, shelterless cliffs of Mount Washington, with the night about to enshroud us, was fearfully impressive, and prompted us to our best endeavors. With all the effort we could well muster, we had only advanced a half mile more, carrying us fairly above the wooded region to the foot of 'Jacob's Ladder,' when the storm struck us. There were suddenly wrapped around us dense clouds of frozen vapor, driven so furiously into our faces by the raging winds as to threaten suffocation. The cheering repose of the elements but a moment before had now given place to what might well be felt as the power and hoarse rage of a thousand furies ; and the shroud of darkness that was in a moment thrown over us was nearly equal to that of the moonless night. Compelled to redoubled efforts to keep our feet and make proper advance, we struggled with the tempest, though with such odds against us that we were repeatedly slipping and getting painful bruises. Mr. Kimball finding himself too much exhausted to continue this struggle on the track, we all halted in brief consultation. It was suggested that we return to Waumbek Station, an old building a half mile below us, and there try to keep ourselves from freezing by brisk exercise. Mr. Clough emphatically vetoed this as a most dangerous and impracticable proposition, saying that our only hope consisted in pushing upward with all our might.

"Here we became separated, three of our party left the railroad track, and Mr. Kimball left behind his luggage in order to continue the ascent. By thus leaving the track we escaped liability to falls and bruises, but found ourselves often getting buried to our waists in snow, and forced to exert our utmost strength to drag ourselves out and advance. We repeatedly called to Mr. Bracy, who had kept on the track, as we supposed, but could get no answer. The roar of the tempest overcame our utmost vocal efforts ; and the cloud of frozen vapor, that lashed us so furiously as it hugged us in its chilling embrace, was so dense that no object could be seen at a distance of ten paces.

"Against such remorseless blasts no human being could keep integrity of muscle and remain erect. We could only go on together a little way and then throw ourselves down for a few moments, to recover breath and strength. We had many times repeated this, when Mr. Kimball became so utterly exhausted as to make it impossible to take another step. He called to the others to leave him and save themselves if possible. The noble and emphatic '*Never*' uttered by the manly Clough, whose sturdy muscle was found ample to back his will, aroused him to another effort.

"The two stronger gentlemen, whose habits of life and superior physical powers gave hope of deliverance for themselves, were both immovable in the determination that our fate should be one, let that be what it must.

"The situation was one of most momentous peril, especially as to Mr. Kimball, whose exhaustion was now so extreme that he was wholly indifferent to the fate that seemed to impend ; only begging that he might be left to that sleep from whose embrace there was felt no power of resistance. Still there was forced a listless drag onward, mostly in the interests of his companions and in obedience to their potent wills. After this sort we struggled on, a few rods at a time, falling together, between each effort, to rest and gain new strength. At each halt Messrs.Clough and Cheney used their best endeavors by pounding and rubbing Mr. Kimball's feet and limbs, and in various other ways endeavored to promote circulation and prevent freezing.

"The last saving device was supplied by a cord which we chanced to have. At one end of this was made a noose, which was placed in Mr. Kimball's hand, while the other end was passed over the shoulder of Mr. Clough who tugged along in advance, while Mr. Cheney helped at his side. Most of the last mile was accomplished in this manner."

From the following description, a storm on Mount Washington in winter is no slight matter :

"*Sunday, February* 5. From one to two A. M. the wind was higher than during the early part of the night. Some of the gusts must have been above 100, possibly 110 miles an hour. The tempest roared and thundered. It had precisely the sound of the ocean waves breaking on a rocky shore. And the building too had the motion of a ship scudding before a gale. At three A. M., the temperature had fallen to —59°, and the barometer stood at 22.508, and attached thermometer 62°. Barometer was lowest yesterday at eight A. M., when it was 22.508, and attached thermometer 32°. Now, seven A. M., the thermometer indicates —25°, and the wind has fallen to 70. * * The valleys are full of stratus clouds; charged with frost as they are, occasionally sweeping over the summit, they completely cover one in a moment, hair, beard, and clothing; when the face is exposed it feels like the touch of a hot iron. To breathe this frosty air is very unpleasant. A full inhalation induces a severe coughing fit. Our butter-tubs stand in the outer-room; this morning we cut a piece of butter for breakfast, using a chisel and hammer!—it was like cutting into a stone.

"*Nine* A. M. Talked over the events of the past night at the breakfast table, recalling many laughable incidents, and agreeing that we rather enjoyed the night's experience than otherwise, that it was a sublime affair (having full confidence that the house would stand, the storm had no terrors for us); but all things considered, were unanimous in the opinion that once a fortnight was quite often enough for such grand displays of the storm-king's power. Of all the nights since this party came here the last exceeds every one."

LAKE GEORGE.

THE number, beauty, and variety of the lakes and lakelets is one of the most striking features of American scenery; and the Empire State holds within her boundaries a most Benjamin-like share of these pearls of nature. It is needless for her to boast of Cayuga, Pleasant, Piseco, Schroon, Paradox, Champlain, and numberless other delicious scenes, while with fair Horicon alone she may challenge all the earth. This bright gem—gem of purest water—is befittingly set in a surrounding of kindred beauties, shedding its effulgence upon the most attractive portion of the most picturesque State in the Union. It is as accessible in all directions as steamers, railways, and roads can make it. And what magnificent modes of access! The Canadian, dropping down Lake Champlain, nods to the Adirondacks on one hand, and to the Green Mountains on the other, as he hastens to pay a morning call; while the New Yorker glides swiftly through the enchanted fastnesses of the Hudson, and peeps into the gay saloons of Saratoga, as he runs up for a few days' pleasure-trip. And what cordial and hospitable greeting and entertainment they receive—moral and physical! What gracious smiles from the hostess, and what dinners and teas from the stewards of her hotels!

The Indian, true to that dominant emotion of his heart—a pure and reverent love of Nature—always fervently worshiped at this shrine, and baptized it humbly—in sympathy with its own character and sentiment—Horicon, or the Silvery Waters; he called it too Canideriout, or the Tail of the Lake, from its relative position to the proximate waters of Champlain. The French Catholics, equally obeying the specialties of their *morale*, christened it, in honor of their religious creed, Lake Sacrament; while the Anglo-Saxon, no less mindful of his highest and holiest love, made it do homage to his egotism, and named it after himself—Lake George! To this hour, well-a-day! the voices of poetry and of religion are drowned in the more clamorous cry of human pride and selfishness.

Who can say what deeds of heroism and horror, of love and hate, the shores and depths of Horicon may have witnessed in the forgotten ages of the past, when the red man alone was lord and master. What unwritten histories, rich and strange, may lie buried in its sealed waters. Certainly, since its story has found chroniclers, numberless events of classic and historic charm have clustered thick around it. The poet and the romancer have embalmed it in the quaint old rhyme and in winsome story. Brave armies lie under its sods, and its ripples now break over the graves of once gay and gallant fleets. Not a few of the most daring and important events of our Colonial wars, and of our Revolutionary struggle, endear these haunts to the national heart. And it is here that the thrilling scenes of Cooper's romantic novel "*The Last of the Mohicans*" are laid.

Lake George lies at the head of a valley of the St. Lawrence. Extending southward through Vermont and New York it has a length of thirty-five miles, and an average breadth of between two

and three miles. It is in some parts very narrow, being not more than a mile wide, while its maximum width is not more than four miles. It is noted for the singular transparency of its waters and the great number of islands it contains. It is in the bosom of high hills and surrounded by huge rocks and mountains, and is environed by forests which formerly were well-stocked with deer. The great number of visitors have, however, driven the game away.

The charm of many of the islands and localities embraced in the view from Caldwell, is pleasantly heightened by associations of historic incident. Diamond Isle was once (who, now watching its peaceful aspect, would ever think it!) a depot for military stores and war-clad bands. Long Point, hard by, in 1757 formed with the shore a harbor for the bateaux of Montcalm. Yonder too are still found the ruins of forts, and other adjuncts of the pride, pomp, and circumstance of glorious war. Fort William Henry, the most interesting of these relics, was built by the English during their colonial wars with the French, in 1755. The history of the construction of this fort contains so much that is of interest that we will be pardoned for making a brief recapitulation of it.

In 1745, when the French and Indian war was beginning to be pushed with vigor, Lake George became a medium for the water transportation of troops; but for a long time there was no fighting on its shores. In 1755, General William Johnson—a prominent character in the colonial history of New York—sent out a detachment of twelve hundred men under Colonel Williams to attack the French General Dieskau, who was stationed a few miles east of the lake with an army composed largely of Indians. The disciplined English soldiers were but little acquainted with the Indian method of warfare, and they soon found themselves in an ambuscade. Their commander was killed almost at the first fire, and after a short resistance, they retreated to the main body who were stationed on the lake-shore. The triumphant French general followed, but meanwhile General Johnson had thrown up a breastwork of logs, which enabled his men to fight to more advantage. After a sharp battle of five hours the French were compelled to retreat. General Johnson then erected Fort William Henry on this spot—a fort which became one of the strongholds of the English during the remainder of the war. It was built of logs, filled in with sand, and mounted nineteen cannon and four or five mortars. When Gen. Montcalm led his forces against it, it had a garrison of five hundred men. After a six days' resistance they were forced to surrender. They yielded on condition that they should be allowed to march out with all the honors of war; but when the fort was given up, Montcalm found it impossible to check the ferocity of his Indians, and the garrison was massacred in cold blood. On the spot where this tragedy occurred, there is to-day a large summer hotel; balls and merry-makings are frequent, and the air is often filled with music and laughter where once resounded the war-whoop of the Indian and the death-cries of his victims.

It is no slight task to determine in which direction here to seek the picturesque—whether in the bosom of the Lake, on the variedly indented shores, or on the overlooking mountain tops. Everywhere is abundant and perfect beauty. Our only regret is, as we offer our illustration of Lake George taken in the vicinity of Rogers' Slide—an illustration which for picturesque beauty is not often surpassed—that with our best seekings, we may still appear to the reader too much like the pedant in Hierocles, submitting a brick as a sample of the beauty of his house.

Rogers' Slide is a rocky height at one of the narrowest points of the lake. Its name grew out of an incident in the Indian war. A scout named Rogers, who had gained considerable renown for his daring and skill, was one day pursued by Indians, and fled to this spot. At the edge of the precipice he loosened his snow-shoes, and without changing their position, turned himself about in them and put them on again with the heels in front. He then ran to the southern brow of the rock, and descending through a gorge or ravine to the Lake sped away on the ice. The Indians reached the precipice and saw what seemed to be the tracks of two men who had apparently thrown themselves down the cliff in preference to being captured. On looking over the lake, however, they discovered Rogers fleeing across the ice, and at once their superstition suggested to them that a man who could have descended the cliff in safety must be under the protection of the Great Spirit, and should not, therefore, be harmed. From that time forward it was called "Rogers' Slide." It is with regret that we are obliged to detract from the romance of this little episode by stating that it was subsequently established that Rogers was a notorious braggart.

The attractions of Horicon will be more perfect when time shall effect the additional infusion of the picturesque, which will follow the enterprise, opulence, and taste of increasing population. Though now exhibiting all the elements of perfect beauty, she yet bides her time for complete development. She is now, to her sister waters of the Old World, as the untaught forest maiden is to the peerless

ROGER'S SLIDE, LAKE GEORGE.

queen of the boudoir and saloon. The refining and spiritualizing hand of art will soon enliven her quieter features, and soften her rougher characteristics. Ruined battlements and legendary shrines may never deck her bluffs and promontories in the mystic veil of romance, but happy cottages and smiling homes of health and content will climb her rude acclivities, and merry summer villas will peep gleefully out of the clustering shrubbery of her lovely isles, bringing to the heart more grateful thoughts and hopes than would the vaunted accessories of older spots, inasmuch as they will whisper of a yet higher civilization and of a nobler life.

THE MAMMOTH CAVE, KENTUCKY.

The Entrance.

SUBTERRANEAN chambers played an important part in the religious rites of the ancients, having been devoted to priestly ceremonies not only among the barbarous nations who then inhabited Northern Europe, and among various sects in India, but also among the classic Greeks. Often of unknown or unexplored depths, they were well calculated to support the superstitions upon which the religions of those days were founded.

In our day, caverns are interesting only for their natural features—their extent, location, and arrangement, and sometimes for the fantastic formations which they contain. Kentucky has more of these natural chambers than any other State in the Union. Many of them are but a few yards in depth, while others extend under the surface many hundreds of feet. During the late war, most of the nitre that was used was obtained from the caves of Kentucky, being found in abundance incrusted on their walls, from which it is easily detached with a pick.

Mammoth Cave is the largest yet discovered. It is in Edmonson county, near Green River, about 130 miles from Lexington in a south-westerly direction, on the road to Nashville, Tennessee. It is private property, and extends, it is supposed, ten miles underneath the earth, although owing to the numerous windings no accurate estimate can be made. It contains a great number of stalactites of large size and fantastic form, although neither so brilliant nor so beautiful as some which are

The Church.

found elsewhere. Two hundred and twenty-six avenues run through it, forty-seven domes adorn it, and there are twenty-three pits in it and many streams. The aggregate length of the various corridors is estimated at several hundred miles; but this is, probably, an exaggeration.

The scenery in the neighborhood of the cave presents no particular attractions. It lies amid ordinary woodland, its entrance being at the further end of a ravine known as Cave Hollow. The declivity leading to it is thirty or forty feet wide, and is formed of abrupt and broken steps. At the bottom rises an arch of rudely piled rocks, overgrown with a mass of tangled vegetation, through which there is a perpetual dropping of water. The cave itself is not, as might be imagined, one spacious hollow, but consists of a multitude of passages, none of which extend more than three miles in any one direction. About one hundred feet from the entrance the progress of the explorer is arrested by a door set in a rough stone wall, which crosses and completely blocks the entrance to the cave.

Passing through this door, you enter a narrow passage, on the left of which is a wall, built by miners to prevent the loose stones thrown up during their work from falling, and gradually descending a short distance along this passage, you arrive at the great vestibule of the cave. This is an oval-shaped hall, two hundred feet in length by one hundred and fifty feet in width, and fifty-five feet high, with a roof as flat and finished as if it were the work of skilled masons. Two passages open into it at its opposite extremities; that on the right being known as Audubon Avenue, while the other is the beginning of the main gallery of the cave. The roof of this great chamber consists of a single rock one hundred feet thick, in which the eye can detect no break or interruption. Leaving the Rotunda, and passing down Audubon Avenue, the visitor arrives at a narrow passage winding among loose rocks, which gradually slopes to a descent of seventy or eighty feet, and leads into a spacious oval gallery called the "Church." This apartment is sixty-three feet high, and about one hundred feet in diameter. Eight or ten feet above a peculiar formation, which is called the "Pulpit," is what is known as the "Organ Loft" and "Choir." Religious services have frequently been performed in this temple of nature.

Near the "Church" are the ruins of the old nitre works, and some thirty feet higher up is a large cave, connected with which there is a narrow gallery, crossing the main cavern, and losing itself in an opening on the right known as "Gothic Avenue." In this chamber there are to be seen a

THE DEAD SEA.

number of stalagmite pillars. The "Devil's Armchair" is a large stalagmite column, in the centre of which is a capacious and comfortable seat.

Returning from "Gothic Avenue" into the main cave the interest of the visitor increases at every step. At a small distance from the stairs by which he descends is an apartment called the "Ball-Room," owing to its singular adaptation for such assemblages. It contains an orchestra fifteen feet high, and equal to the accommodation of a hundred musicians, with a gallery extending back to the level of the high embankment near "Gothic Avenue," while the floor is level and smooth for several hundred feet. Further on is the "Giant's Coffin," a large rock on the right. At this point the incrustations on the wall begin; they are of the most fantastic and varied shapes. One hundred yards beyond the "Coffin" the cave makes a long curve. Here, by means of a Bengal light, a vast amphitheatre may be illuminated, and a scene of weird beauty exposed to view. Opposite to this point is "Sick-Room Cave," in which are a row of cabins for the use of invalids, it being supposed that the pure and temperate air of the cave, combined with good accommodations, might afford a cure for pulmonary consumption.

The Bottomless Pit.

Next in order is the "Star Chamber," which presents a most singular optical illusion. Looking up to the high ceiling the spectator seems to see the firmament itself, studded with stars; and far off, a comet, with a long, bright tail. In going into the "Solitary Chambers," the visitor must crawl upon his hands and knees for fifteen or twenty feet. The "Fairy Grotto" is distinguished for its great number of stalactites of various sizes. Lighted up by lamps this cave has the appearance of a grove of coral.

Returning from the Grotto, you re-enter the main cavern, and come next to the "Temple." This is an immense vault, covering an area of two acres, roofed by a solid dome of rock one hundred and twenty feet high. In the middle of this chamber there is a large mound of rocks rising on one side nearly to the top, and known as the mountain. This dome, however, is eclipsed by the "Mammoth Dome," which is four hundred feet high, and is considered one of the most sublime spectacles in the cave.

The "River Hall" is a chamber situated at the termination of "Relief Hall," through which the

visitor must pass on approaching the "Dead Sea" and the "Rivers." The "Bottomless Pit," which is situated hereabouts, is one of the most interesting portions of the cave. It is a deep, dark pool in the rocky floor whose depth is unknown. Attempts have been made to sound it, but probably owing to the lack of suitable apparatus, they have been unsuccessful. When the "Pit" is illuminated, its weird surroundings are strikingly brought out. The glare, driving back the shadows a short distance, the walls of rock, on which the flickering light battles with the darkness, and the mouth of the pit below so densely black as to apparently justify its name—all these are the constituents of a scene which strongly impresses the imagination.

On the left of the cave is a steep precipice, over which you can look down upon the black waters of the Dead Sea eighty feet below. At the foot of the slope flows the river "Styx," and in that stream and the "Echo River" are found the eyeless fish. Beyond the "Echo River" there is a walk of four miles to Cleveland Avenue, a passage three miles long, seventy feet wide, and ten or fifteen feet high, beyond whose termination no explorers have passed.

Guides are furnished at the cave, and the visitor dons a peculiar costume, that renders the walking and climbing more comfortable, than otherwise they might be. The Mammoth Cave is owned by Dr. John Crogan, who purchased it for ten thousand dollars.

MINOT'S LEDGE LIGHT-HOUSE, MASSACHUSETTS.

THE history of the light-house system in the United States is full of interest. The first act of Congress relating to it was passed on August 7, 1789, when provision was made that "all expenses which shall accrue from and after the 15th day of August, 1789, in the necessary support, maintenance, and repairs of all light-houses, beacons, buoys, and public piers, erected, placed, or sunk before the passing of this act, at the entrance of or within any bay, inlet, harbor, or port of the United States, for rendering the navigation thereof easy and safe, shall be defrayed out of the Treasury of the United States." For the sake of having a centralized authority, and to prevent any possible conflict of jurisdiction between the Federal and the State governments, the above act was re-enacted, March 26, 1790, conditionally that "none of the said expenses shall continue to be so defrayed by the United States after the expiration of one year from the day aforesaid, unless such light-houses, beacons, buoys, and public piers shall in the mean time be ceded to and vested in the United States by the State or States respectively in which the same lie, together with the lands and tenements thereunto belonging, and *together with the jurisdiction of the same.*" From and after this time, Congress has assumed the control of these beneficent aids of navigation.

Until 1852, our light-house system was the poorest in the world. It was under the charge of the Fifth Auditor, who had other duties to attend to, and was often ignorant of the first principles of light-house construction and maintenance. Complaints for this reason became so numerous that the Government organized a commission to go to Europe and inquire into the management of light-houses there. The result of this inquiry was the establishment of a Light-house Board, consisting of eight officers selected from the navy and the Engineering corps, to whom the entire control of all light-houses, light-ships, beacons and buoys was given. From the organization of this board the great improvement in our light-house system dates; it may now be said to be unsurpassed.

There are thirteen light-house districts on the Atlantic and Pacific coasts, and each district has its appropriate officers. The present law requires that a candidate for the position of Keeper of a light-house must be over eighteen years old, and able to read and write. No woman is allowed the management of a light, unless by special permission of the department. There are six orders of light in our system. One is designed to give warning of the approach of land, and the rest are to mark headlands, points in rivers, bays and lakes. There are white and red lights, fixed, revolving, and flash lights; there are also fixed white lights showing a flash at intervals, and, in some cases, two or three white lights to mark a headland. These differences are valuable in enabling approaching ships to distinguish between the various lights, and thus determine for a certainty as to what point they are approaching. Buoys, too, are set for the guidance of seamen.

MINOT'S LEDGE LIGHT-HOUSE, MASSACHUSETTS.

Minot's Ledge Light-house, the subject of our sketch, is situated on Minot's Ledge, a rock off the coast of Cohasset, about eight miles east of south-east of the Boston light, extremely dangerous to vessels sailing toward Boston from an easterly direction. A strong north-east wind would be almost certain to cast them upon the rocks, but for the warning light. The dangers of this point had attracted the attention of ship-owners and mariners many years ago, and in 1847 an appropriation was made by Congress to erect a light-house there. It was determined to build an iron pile structure sustaining at the top a keeper's dwelling, and above that an illuminating apparatus. The structure was to be in the shape of an octagon, each side at the base measuring nine-and-a-half feet, and the diameter of the circumscribing circle twenty-five feet. Iron piles ten inches in diameter, where they leave the rock, were to be inserted to a depth of five feet, at each of the angles of the octagon and at its centre. The light-house was finished according to this plan in the fall of 1849, but it stood only two years, being swept away with its keeper in the great storm of April, 1851. Money for rebuilding it was appropriated in the year following the disaster, and a new design was agreed upon by the light-house board, and approved by the Secretary of the Treasury in 1855. The base of the present structure is thirty feet in diameter. The stone-work is eighty-eight feet high, and for the lower forty is a solid piece of masonry. It has stood storms that were as severe as the one by which the former light-house was destroyed, and it is now believed to be impregnable. The cost of erecting it was a quarter of a million dollars.

From an article on the subject of light-houses recently contributed to a magazine by the well-known writer, Mr. Charles Nordhoff, we quote the following interesting facts: "The lenses used to enforce, concentrate, and direct the higher grades of lights cost various prices, up to eleven or twelve thousand dollars. The lamp of a first-order sea-coast light-house has four concentric wicks, the outer one being four inches in diameter. The oil is pumped up by clock-work or other machinery so as to feed these wicks constantly to their utmost, that they may give out as much light as possible. The Fresnel lens now comes in to save all the rays of light which have thus carefully been created, and to concentrate them and send them forth in that direction only in which they are required. Briefly described, the invention of Fresnel consists in surrounding the lamp by a series of prismatic rings of glass, each different from the others in its angles, but all cut mathematically to such angles that the rays which go above the proper plane and those which fall below shall be bent by refraction and reflection so as to become parallel with the lateral rays. Thus all the rays are saved and sent out in one sheet over the ocean. One of the most important duties of the keeper of a light is to see daily that the light and the lens are upon the exact and proper level. A deviation of only a fraction of an inch might throw the beam of light toward the sky or down toward the base of the light-tower, and thus make it useless to the mariner.

"There are at this time half a dozen electric lights in Europe, but their number is not increasing. They have proved extremely expensive in the maintenance, requiring the use of steam-engines for generating the electricity. It is said that this light, which is, no doubt, more powerful than any other in clear weather, does not penetrate fog so well as the oil light.

"Experience has shown our Light-house Board that the best light-keepers are old sailors and soldiers; and it is its desire, we have been told, that the maimed of those who served in the war for the Union should, where they are physically and mentally competent, receive these places. The petty though important place of light-keeper has too often been made a political prize, and thus the service, which requires permanence, has been injured. In England the light-keeper holds his office for life or good behavior. He begins at a less important light, on a low salary, and is promoted for skill and attention to his duties.

"Fog-signals, many of which are required at different points on the Atlantic and Pacific coasts, are of several kinds. Some are steam-whistles, the sound of which is made deeper or louder by being sent through a trumpet; but the most effective is probably the Siren. This ingenious machine consists of a long trumpet and a steam-boiler. The sound is produced by the rapid revolution past each other of two flat disks pierced with a great number of small holes; a jet of steam under high pressure is projected against the disks, which revolve past each other more than a thousand times a minute; as the rows of small holes in the two disks come opposite each other, the steam vehemently rushes through and makes the singular and piercing noise which a Siren gives out. One of these machines costs about $3,500 complete, with its trumpet, boiler, &c."

The present pay of light-house keepers varies according to the importance of the light and the responsibility put upon the keeper. The Congressional appropriation covers an average salary of

six hundred dollars per annum. The keeper of Minot's Ledge, on the Massachusetts coast, receives $1,000, while some keepers receive but $350.

The cost of light-houses varies as much as the salaries of the keepers. Some light-houses cost ten thousand dollars; Minot's Ledge light cost two hundred and fifty thousand, the building of this structure being attended with great difficulty. General Alexander, who superintended the construction of the present tower, was able to get but thirty hours of work done the first year, and one hundred and fifty-seven hours the second. No part of the rock was ever uncovered for more than a few minutes at a time.

On the Atlantic coast it is the aim of engineers to have the lights as high as is consistent with safety, while on the Pacific coast the high rocks and cliffs compel the erection of the light-houses almost too high for effective use. Point Lomo, at the entrance of San Diego bay, is nearly five hundred feet above the sea. As the Pacific coast is much more foggy than that of the Atlantic, the danger there is that the lights may be obscured by the fog. New light-houses are being constantly erected. At the last session of Congress an appropriation was made for the purpose of building forty new light-houses at points to be designated by the Light-house Board.

The history of light-houses dates from a very early period, as their obvious necessity might lead us to expect. Beacons to aid mariners were, from remote antiquity, common on the shores of the Mediterranean, the Archipelago, the Bosphorus, and the Red Sea, and the famous Pharos of Alexandria—whence the French and Italian name of light-house is derived—was accounted one of the seven wonders of the world. The dimensions of this building are not satisfactorily known. According to Josephus the light was visible about forty English miles.

NIAGARA FALLS.

NEARLY all visitors to Niagara experience a feeling of disappointment at first sight of it, and are inclined to pronounce the descriptions they have read of it exaggerated. Especially is this true when the first view is obtained from the bank of the river on the American side, for only from the Canadian shore, or from the foot-bridge that crosses the river, can the magnificence of the spectacle be properly appreciated. But from whatever point they may be observed, the grandeur of the Falls is more forcibly impressed upon the observer with every view he takes.

The Niagara river is thirty-three miles long, and is the outlet of Lake Erie. It forms part of the boundary between the United States and Canada, and is the channel by which the waters of the four great lakes flow into the Gulf of St. Lawrence. The rapids of the river are about a mile long, and begin sixteen miles from Lake Erie; their current is very narrow, and the water flows swiftly over the rocks, constantly growing in velocity and force, until it dashes over the precipice at Niagara. At this point the river attains a width of 4,750 feet, one-fourth of which is occupied by Goat Island. This island divides the cataract into two falls, the American and the Canadian. The latter is known as "Horseshoe Falls," from its peculiar shape, and has twice the breadth of the American Fall.

The Rapids are far from being the least interesting feature of Niagara. There is a violence and a power in their foaming career, which is seen in no other phenomenon of the same class. Standing on the bridge which connects Goat Island with the Main, and looking up towards Lake Erie, the leaping crests of the Rapids form the horizon, and it seems like a battle-charge of tempestuous waves, animated and infuriated, against the sky. No one who has not seen this spectacle of turbulent grandeur can conceive with what force the swift and overwhelming waters are flung upwards. The rocks, whose soaring points show above the surface, seem tormented with some supernatural agony, and fling off the wild and hurried waters, as if with the force of a giant's arm. Nearer the plunge of the Fall, the Rapids become still more agitated; and it is almost impossible for the spectator to rid himself of the idea, that they are conscious of the abyss to which they are hurrying, and struggle back in the very extremity of horror. This propensity to invest Niagara with a soul and human feelings is a common effect upon the minds of visitors, in every part of its wonderful phenomena. The torture of the Rapids, the clinging curves with which they embrace the small rocky islands that live amid the surge, the sudden calmness at the brow of the cataract, and the infernal writhe

and whiteness with which they re-appear, powerless from the depths of the abyss, all seem, to the excited imagination of the gazer, like the natural effects of impending ruin, desperate resolution, and fearful agony, on the minds and frames of mortals.

The waters sweep down the rapids with such velocity that as they shoot over the precipice they leap clear from the rocky wall, making a curve behind which the latter is distinctly visible. This space between the rock and the waters of the fall is much wider at the bottom, where they strike the river, for the stone there, being loose and shaky, has been hollowed out by their continuous action. On the Canadian side "The Cave of the Winds" has thus been formed behind the fall, and visitors, by passing over a rocky and dangerous path, can go beneath the Falls as far as Goat Island.

The Rapids above the Falls.

There are two ways of making this trip from the Canadian side; one is by steps which have been built down the face of the wall, and the other is from the tower. Both of these are private property, and their owners will furnish a guide and a suit of oil-cloth to those who wish to descend. The oil-cloth is absolutely necessary, for the spray is like heavy rain, and without such protection the visitor will become thoroughly drenched. The path that leads beneath the Falls is covered with ice far into summer, and is at all times both slippery and perilous.

The Horseshoe Fall has the appearance of an immense cylinder turning over and over. Some of the many bazaars for the sale of Indian goods and souvenirs have towers, and from these a fine view of the cataract may be obtained. Near the American side, Goat Island overhangs the precipice, and shows its rocky wall; and Prospect Point—a fine place to see the Falls at sunrise—hems in the river.

In the short period during which observations of the Falls have been made by men who are more than passing travelers—a period which extends back no further than to the close of the last century—considerable changes have been made in it by the fall of masses of rock. In 1818 large fragments became detached at the American fall, and the same thing took place at the Horseshoe Fall ten years later. Old residents of the neighborhood assert that the line of the Falls has in consequence receded fifty yards in forty years; but as no exact measurements had been taken, this is mere conjecture. In 1842, Prof. James Hall, then State Geologist of New York, caused a careful survey to be taken, and made provision for obtaining the rate of recession hereafter. His published report contained a fac-simile of a view of the Falls taken by Father Hennepin in 1678; in this and the accompanying description the cataract had a striking feature, which has since disappeared. This is a third fall from the Canadian side towards the east, across the main fall, caused by a projecting rock, which turned the parted current in this direction. To corroborate the truth of this description, Prof. Hall quotes that of Kalus, a Swedish naturalist, who visited the Falls in 1750, and published the results of his observations in the *Gentleman's Magazine* a year later. He speaks of a rock having fallen a few years previous to his visit, by which the three falls that had before existed were changed into two, and indicates in an accompanying sketch the spot where it formerly stood. This evidence is

sufficiently reliable to prove that changes have been and are taking place in these Falls which in time may completely change their appearance and character.

In the deep gorge below the Falls, the current, contracted into one-fourth its space, is borne in violent eddies and whirlpools along its inclined bed toward Lake Ontario. Notwithstanding the apparent danger, the river is here crossed by small boats, and a little steamer takes passengers nearly to the foot of the cataract.

On each side of the river below the Falls there rises an almost perpendicular wall, and the upper part of the stream can be reached only by means of stairways that have been constructed at various points along the banks below. Within two miles of the Falls is the railway suspension-bridge, built by Mr. Roebling in 1855. It is thrown across the gorge at a height of two hundred and fifty-eight feet above the water, and is supported on each bank by towers of solid rock, whose centres are eight hundred feet apart.

Twenty-eight feet below the railway track there is a carriage and foot-road for pedestrians and vehicles. Besides this, there are two other bridges near Niagara, the new suspension-bridge just below the Falls, and the bridge to Goat Island.

On the Rocks below the American Falls.

The descent beneath the American Fall should be made from Goat Island. Prof. Tyndall at his visit ventured, with his guide, as far under the Fall as it was possible to go. Connected with Goat Island by

GRAND VIEW OF THE HORSESHOE (CANADIAN) AND AMERICAN FALLS.

a foot-bridge is Lunar Island. A fine view of the Falls may be obtained from either, the Canada Falls being on one side, and the American on the other. There is a ferry which will take the visitor across the river for a quarter of a dollar, and as it ventures quite near the Falls, he can here obtain a good view of the immense volume of water which pours down into the gorge, a distance of one hundred and fifty feet. The gorge itself bears striking indications of having been cut by the water, and scientific investigation has established this to be the true theory.

The sound of the Fall varies greatly with the wind and the condition of the atmosphere. Ordinarily it can not be heard more than a quarter of a mile away, while on other occasions, its roar can be distinguished as far as Lake Ontario and across its waters to Toronto, forty-five miles distant. Many of the early visitors to the Falls have recorded that they heard the sound of the waters, twenty-five, thirty, and thirty-five miles away. Close by, it is like a monotonous rumbling not unlike that made by an immense saw-mill, but much deeper and fuller.

Below the Falls the Niagara river flows swiftly through its walled banks for three miles. It then turns towards the Canadian side, and rushing into a depression in the steep cliff, emerges from it almost at a right angle. This place is known as the whirlpool, and presents the appearance of having been hollowed out by a violent eddy. The river then flows on over an inclined bed until it reaches Lake Ontario. In its short passage of thirty-three miles there is a total fall of 334 feet.

It is a theory of some scientific men that at one time the drainage of the Lakes was through the various western rivers to the Gulf of Mexico. It is believed that this was changed by a great tidal wave, and that the Erie bank was broken down, and a channel excavated whose bed was lower than the surface of the lake ; and that the water rushing out became the Niagara river.

THE EAST RIVER SUSPENSION-BRIDGE.

NEVER was a more important engineering work undertaken, nor one which, notwithstanding its immense cost, is more likely to be prolific of rich results by the increased value given to real estate in all parts, and particularly the outskirts, of Brooklyn, than the construction of the bridge across the East River. Geographically the greater portion of the city of Brooklyn is nearer the business centre of New York than any part of the latter city above Fourteenth Street, and were it not for the isolation caused by the necessity of twice daily going through *le mauvais quart d'heure* consumed in crossing the East River in the crowded ferry-boats, there is no doubt but that the growth of "The City of Churches" would have been even more rapid and extraordinary than that which has actually taken place.

The act to incorporate the New York Bridge Co., for the purpose of building and maintaining a bridge across the East river between New York and Brooklyn, was passed by the Legislature of New York on the 1st of April, 1867, and shortly after this date the work on the structure began. The capital stock of the company was placed at five millions of dollars, to be divided up into shares of one hundred dollars each. By a clause in the charter the corporations of the cities of New York and Brooklyn are empowered to take possession of the bridge and its appurtenances at any time on payment to the bridge corporation of its cost and thirty-three and one-third per cent additional; but if advantage be taken of this proviso, the bridge is to be made free to travelers and vehicles. It was further enacted, that no pier should be constructed in the river beyond the pier lines laid down in the Act of authorization, and that the bridge should be built at an elevation of not less than one hundred and thirty feet above the river at high tide, thus leaving the navigation of the East river unobstructed. It begins at or near the junction of Main and Fulton Streets, in the city of Brooklyn, and will cross the river as directly as possible to some point at or below Chatham Square, not south of the junction of Nassau and Chatham Streets, in the city of New York. In addition to the private subscriptions toward the capital stock, New York city is to pay five hundred thousand dollars in each of the years 1874 and 1875, and the city of Brooklyn the sum of one million dollars during the same time.

The work of construction was carried on under the supervision of the late John A. Roebling, the well-known engineer and architect of the Cincinnati Suspension-Bridge, up to the time of his decease.

This onerous position was then transferred to his son, Mr. W. A. Roebling, and at this writing is still held by him. The plans and specifications adopted at the inception of the enterprise anticipated many of the leading features which have since contributed to the success of the great bridge at St. Louis. To cross a river 1,600 feet in width with a single span had, up to this time, been thought beyond the limits of engineering skill. But the difficulties in this case were much enhanced by the fact that the towers to support the immense structure necessary for this purpose had to be constructed under circumstances that rendered the usual modes of sinking piers impracticable. It was, therefore, determined to employ the method of working by compressed air. Caissons were made having the horizontal dimensions of the two piers, that on the New York side being 102 feet by 172. Each caisson was, in effect, a wooden box turned bottom upward, the interior space being nine feet high. The roof of the New York caisson (bottom of the box) was twenty-two feet thick, of solid timber bolted together, supported by frames running from side to side. These frames, together with the edges of the box, and the upward pressure of the condensed air within the caisson, were to sustain the vast superincumbent weight. The area of the structure was about 17,500 square feet.

The caissons having been built on ways, were launched after the manner of a ship, and towed to the points where the piers were to be located. Courses of granite blocks were then laid upon the top of the caisson, by which it was sunk to the bed of the river. Air was then forced into the chambers from the shore until the water in the interior space was entirely displaced, the engines working night and day to maintain the pressure. The workmen obtained access to the chamber by means of two shafts extending above the surface of the water. At the bottom of each shaft were two air-locks, simply ante-chambers constructed of iron, into which the men entered from the shafts, and, closing an air-tight door behind them, admitted the compressed air from the caisson by means of a cock. When the pressure in the last ante-chamber was equal to that in the caisson, a communicating door was opened, and the men passed into the chamber below. In going out this process was reversed, the compressed air in the lock being allowed to blow off through a cock into the open shaft. Great care has to be taken in regulating the compression of the air, as work in the caisson is attended with considerable danger. Two men have already died, and a score or more have been prostrated, owing to its injurious effects.

To secure proper foundations for the two great towers was the principal engineering problem to be overcome, and now that these have been built and the towers erected on them, the bridge scheme may be said to stand on a firm footing and its construction almost regarded as an accomplished fact. The caisson on the Brooklyn side of the river was sunk into its place during the year 1871. Up to 1872 the borings for foundations on the New York side had been confined to a small area covered by an old pier, owing to the fact that the adjacent ferry slips could not be immediately vacated. These were evacuated by the lessees at so late a date, that experiments could only be made with four bore-holes before the caisson was ready to be sunk.

The bore-holes developed the fact that there was an extreme difference of twelve feet in the level of the bed rock, the hole of the least depth touching hard-pan at a depth of eighty feet below high water, and the deepest at ninety-two feet. The strata consisted in the main of a black mud deposit of twelve feet, followed by a layer of coarse sand of six feet in depth, which overlaid a gravel bed of the same thickness. Beneath the gravel was a very heavy deposit of quicksand of a depth varying from fifteen to twenty feet, and abounding with boulders in its lower portion. The quicksand extended usually to within a few feet of the rock, and, in some instances, to the rock itself. But the immediate rock surface was covered with a compact layer of material through which it was impossible to drive a six-inch pipe without shattering it. To drive the pipe only one inch required thirty blows of a five hundred pound hammer, falling from a height of twenty feet. When the sinking of the caisson commenced, it was not determined by the engineers whether to go to rock or to remain above it. Further investigation into the character of the river bed convinced them that no single plan of operation would be adequate to remove all the material that would have to be displaced. The immediate river bed consisted of logs and loose dock stones followed by a sticky black clay. These materials could be most conveniently displaced by dredging. The river sand, and the firm gravel underneath it, could be more easily removed through pipes, either by means of pumps or by the air-pressure direct. The coarser gravel would go to water shafts, while the fine quicksand could be blown out through the pipes, until the preponderance of the boulders and small rounded stones compelled a return to the water shafts. It was at first determined to use the dredge for this latter

SUSPENSION BRIDGE CONNECTING NEW YORK WITH BROOKLYN.

purpose, but it was found by experience that the dredge had not sufficient capacity to remove stones imbedded in quicksand. After much tedious investigation a satisfactory foundation was reached in May, 1872.

The probable cost of the bridge has been estimated at $13,045,065.00. From this amount, however, a large sum must be deducted for land which will lie under the bridge when completed, and be capable of utilization. It is expected that the leases of these properties will reimburse the Bridge Company $1,644,350.00.

The original plans have been considerably modified and altered. Since the first estimates were made, it has been found necessary to increase the width from eighty to eighty-five feet. Two out of the three sidewalks that were contemplated have been given up, and two additional horse-car tracks substituted. This change involved an increase of seven per cent in the cost of the entire bridge, including superstructures, tower foundations and anchorages. The United States Government directed there should be an additional elevation of five feet, an order which necessitated a change in the trusses and some of the masonry.

When the cities of New York and Brooklyn take charge of the management of the bridge, the Board of Directors will consist of twenty members. Each city is to have the nomination of eight members, the right of appointment being vested in the Mayor and Comptroller, and the last-named gentlemen are to hold similar positions by virtue of their office.

There is a strong inclination on the part of New York to throw off the burden it has assumed in this matter. It has been freely argued that the bridge will work to the detriment of the metropolis by drawing off a large share of its population; but the city is legally bound to fulfil its agreement, and although it may succeed in delaying the opening of the bridge, it will ultimately be compelled to pay its grant. When completed the bridge will be the largest of its kind in the world. Work on it is rapidly progressing; but although the act of incorporation demanded it should be opened for travel during 1870, it will not be finished for three or four years to come. The tower on the Brooklyn side has been carried to a height of one hundred and sixty-two feet, and the tower on the New York shore is also attaining lofty proportions. The Brooklyn tower, at the springing line of the arches, will be two hundred feet high, and the New York tower will require an elevation of one hundred and twenty feet to bring it to the level of the roadways.

Our picture of the bridge is taken from the Brooklyn side. The building near it is the office of the Fulton Ferry Co., whose Brooklyn terminus adjoins the office of the New York Bridge Co.

DOWN THE MISSISSIPPI RIVER.

THE history of the Mississippi is in some respects sufficiently interesting. The expedition of De Soto, by whom it was discovered, was one of the most unfortunate of the many that were set on foot to search for riches in the wilds of the New World; and the subsequent struggle for the right to navigate the river fills an attractive page in the history of America. Although De Soto was the first white man who gazed upon the Mississippi, the credit of exploring it belongs to Marquette, a Catholic priest, and to Joliet, the Canadian trader. These men descended the Wisconsin river to the Mississippi, and paddled down the latter in light canvas a distance of eleven hundred miles. By virtue of their discoveries France claimed possession of the whole of the Mississippi Valley, and that region was subsequently called Louisiana, after the king who then reigned. It remained a French province until 1762, when it was ceded to Spain, and continued the property of that power until the year 1800, when it was ceded back to France.

During the time that Louisiana was under the dominion of Spain, frequent disputes arose between the United States and the Spanish authorities respecting the right to navigate the Mississippi, which at that time was our western boundary. On two occasions these disputes very nearly provoked a war, while at another time the trouble had taken such a form that the State of Kentucky, having obtained a promise of recognition from Spain and of permission to use the Mississippi for commercial purposes, was on the point of seceding from the Union and of declaring itself a separate sovereignty. After France had regained possession of Louisiana, the United States Government instructed Mr.

Livingstone, then our minister at Paris, to begin negotiations for the purchase of New Orleans. Napoleon was at that time First Consul of France, and it was one of his favorite projects to colonize Louisiana, and thus counterbalance the influence of the English colonies in the East; but before his plans had matured, a war arose between England and France. Mr. Livingstone, whose previous negotiations had proved futile, saw his opportunity and again pressed his offer for the purchase of New Orleans, calling attention to a proposition in the London papers, to send 50,000 men to take that fort. Napoleon, fearing that such a step might be taken, sold our Government all the territory between New Orleans and Oregon for $15,000,000. The cession was made in April, 1803.

Only two generations have passed away since that time, and what a marvelous change has come over the ceded territory. From Minnesota to the Gulf the bank of the great river is covered with cities, factories and plantations, and the wilderness that once extended from its western bank to the Pacific coast, is built up into powerful and flourishing communities.

The Mississippi takes its rise in Minnesota, 3,160 miles from the Gulf of Mexico, and 1,680 feet above the level of the ocean, lat. 47° N., long. 95° 54′ W. A little pool fed by the neighboring hills discharges a little rivulet, scarcely a span in breadth, and meandering over sand and pebbles, and blending with it here and there a kindred rivulet, it ripples on, forming a number of basins, until it subsides at last into Itaska Lake. Issuing from the lake it first flows northward through several small lakes, and then in various directions, forming Cass Lake, Lake Winnipeg, and a number of other bodies of water. Finally, directing its course southward, it begins to show promise of becoming the mighty river that, at its maturity, commands the admiration of mankind.

Large steamboats ascend the river from New Orleans to St. Paul, and indeed as far as Fort Snelling, just below the Falls of St. Anthony, and the river is navigable to small steamers for nearly two hundred miles above the Falls. The country beyond the Great Falls, of surpassing beauty and fertility, has within the last twenty years been added to civilization by the great tide of German immigration, which has steadily flowed in that direction; and there is no doubt but that this country, with its natural advantages and the industry of its population, possesses all the elements of a wealthy and powerful commonwealth. In 1848, on the site of the present city of St. Paul, there stood a few log huts; and across the river the Indian roamed in his wildness and freedom on his own soil. With the development of the country of which it is the capital, has arisen the city of St. Paul, having a population of over twenty thousand, with handsome public buildings, stores and factories. Above St. Paul are the magnificent Falls of St. Anthony. Here may be seen the sublime spectacle

The Falls of St. Anthony.

Down the Mississippi.

of the whole volume of the waters of the Mississippi rushing and foaming along a bed of huge rocks, and falling at one part of the cataract, nearly twenty feet perpendicularly. The tumultuous rapids above and below the Falls, the piles of rock, the swift current and the spray, produce a *coup d'œil*, at once beautiful and imposing. The river is here about six hundred yards in width, and in its descent is divided by Cataract Island. A dam having been constructed from this point to the eastern shore, almost the whole volume of water now rushes through the western channel. On the east side of the cataract is the city of St. Anthony, which, started in 1849, has steadily increased in prosperity, and is now connected, by a suspension bridge, with the city of Minneapolis on the western side.

The Mississippi and its affluents are noted the world over for their steamboats. These are sometimes three hundred feet long, and have three decks. The lower one is for freight, the middle for freight and passengers, and the third (called the "Hurricane deck") contains the wheel-house and the sleeping accommodations of the cabin employees. The grand cabin is on the second deck, and extends over the whole of the boat, with the exception of a small space at the bows. It is gorgeously furnished, and is finished in white and gold. The passengers on board are good evidence of the cosmopolitan nature of our population. Immigrants from every country in Europe throng the deck, and in the cabin are seen a strange commingling of the various types of our social life.

Embarking on board of one of these boats at St. Paul to descend the river, we steam away until we reach Lake Pepin. Everybody knows that Lake Pepin is caused by an expansion of the Mississippi River, which gives it for a distance of twenty-five miles all the appearance of a lake. Its breadth here averages three miles. There are no islands in Lake Pepin, but all along its shores are high bluffs of picturesque forms, crowned with shrubbery. High above all the rest looms the bare front of the "Maiden's Rock," grand in nature, and interesting in its romantic associations. It has a sad story to tell to each passer-by; and as each passer-by always repeats it, we will not be an exception.

Winona, a beautiful girl of Wapasha's tribe, loved a young hunter, and promised to become his bride. Her parents, like too many in Christian lands, were ambitious, and promised her to a distinguished young warrior, who had smote manfully the hostile Chippewas. The maiden refused the hand of the brave, and clung to the fortunes of the hunter, who had been driven to the wilderness by menaces of death. The indignant father declared his determination to wed her to the warrior that very day. The family were encamped upon Lake Pepin, in the shadow of the great rock. Starting like a frightened fawn at the cruel announcement, she swiftly climbed to the summit of the cliff, and there, with bitter words, reproached her friends for their cruelty to the hunter and her own heart. She then commenced singing her dirge. The relenting parents, seeing the peril of their child, besought her to come down, and take her hunter-lover for a husband. But the maiden too well knew the treachery that was hidden in their promises, and when her dirge was ended, she leaped from the lofty pinnacle, and fell among the rocks and shrubbery at its base, a martyr to true affection.

A notable feature of the Mississippi and of its tributaries is the raft. Rafts are masses of floating timber which find a ready sale at the numerous saw-mills in the vicinity of New Orleans. The flat-boat (sometimes called "broadhorn") is built of plank, and is sometimes a hundred feet long, and thirty broad. It is rectangular, and sometimes roofed over, and is used to carry the produce of the farmers to the large cities along the river banks. Occasionally a lumberman takes his family with him on board his raft, and it is to be hoped that these civilizing influences will, in the course of time, as in the case of the boatmen on the Erie Canal, do something toward ameliorating the manners of these rude pioneers.

Among other points of interest, mention must be made of Trempileau Island, a rocky height which rises to an altitude of five hundred and sixty feet. The romantic beauty and picturesqueness of this island amply justifies the poetic name bestowed upon it by the French, who called it "*Mont qui trempe à l'eau*" (Mountain which dips in the water). Below this point is the busy city of La Crosse. Here the Valley of the Mississippi increases in width and the hills are lost in the distance. In this part of the river are a great number of small islands which add greatly to the romantic beauty of the scene. Along the shore on each side are scattered towns more or less interested in the transportation of cereals; but this business is, each succeeding year, becoming in a greater degree monopolized by Dubuque. After a junction with the Wisconsin river we approach Dubuque, the largest commercial city of Iowa. Pursuing our course we at last arrive at the famous Rock

The Raft.

The Bridge across the Mississippi at St. Louis.

Island, three miles long, and having an area of a thousand acres. Upon this island government has erected arsenals and formidable fortifications. On the east side of the river in Illinois is the city of Rock Island, on the west side, in Iowa, the city of Davenport. The rapids which here extend for a distance of fifteen miles, interfere greatly with navigation, and make it very difficult to ascend the river with heavily-laden freight-boats. Steam-boat men complain bitterly of the railroad draw-bridges which connect the Illinois and Iowa shores with Rock Island, and it must in fairness be conceded, bearing in mind the natural obstacles that they have to overcome at this point, that this additional impediment presses rather hardly on them.

Between Rock Island and St. Louis there is little of interest. But what a spectacle is unfolded to our view as we approach the city which is pre-eminently the "Queen of the Mississippi." "The town seems as old as London. The smoke from the Illinois coal has tinged the walls a venerable brown, and the grouping of buildings is as picturesque and varied as that of a continental city. From the water side, on ridge after ridge, rise acres of solidly built houses, vast manufactories, magazines of commerce, long avenues bordered with splendid residences; a labyrinth of railways bewilders the

eye; and the clang of machinery and the whirl of a myriad wagon-wheels rise to the ear. The levee is thronged with busy and uncouth laborers; dozens of white steamers are shrieking their notes of arrival and departure; the ferries are choked with traffic; a gigantic and grotesque scramble for the almost limitless West beyond is spread out before the vision."

The first habitations on the site of the present city were erected in 1764, by Laclede Liguest, who, the previous year, had started from the French colony of New Orleans to explore the turbid waters of the Missouri. It does not appear that his expedition was very successful, for he speedily returned from the confluence of the two rivers to St. Louis, the new outpost named after Louis XV., the reigning king of France. Subsequently the whole of the vast territory known as Louisiana was ceded by France to Spain. Notwithstanding the heart-burnings which the occupation of a French city by Spanish soldiers caused, a fusion soon took place, and both parties agreed in heartily hating the English. After many vicissitudes the whole settlement, being a part of what was then known as Louisiana, was, in 1804, annexed to the United States. "Since the late war," says a recent writer, "the town has leaped into a new life, it has doubled its population, its manufactures and its ambition, until it stands so fully abreast of its wonderful neighbor, Chicago, that the traditional acerbity of the reciprocal criticism for which both cities have so long been famous is latterly much enhanced. The city, which now stretches twelve miles along the ridges, branching from the watershed between the Missouri, the Maramec and the Mississippi rivers, flanked by rolling prairies richly studded with groves and vineyards; which has many railroad lines pointed to its central depots, and a mile and a half of steamboats at its levee, a thousand miles from the sea; whose population has increased from 8,000, in 1835, to 450,000, in 1873; which has a banking capital of nineteen millions; which receives hundreds of thousands of tons of iron ore monthly, has bridged the Father of Waters, and talks of controlling the cotton trade of Arkansas and Texas,—is but little like the St. Louis of the days when Col. Stoddard had his headquarters in a rude cottage, and the United States, in his person, had just adopted the infant city."

The bridge, of which we furnish an illustration, will have a vast influence on the fortunes of the city. Work was begun on it in January, 1868. The stonework was finished last December, and the superstructure completed in May, 1874. The caisson-work is said to be a marvel of engineering skill, and laid even deeper than that of the Brooklyn Bridge. The eastern abutment rests on a solid foundation 110.6 feet below the surface. The masonry measures 103,000 cubic yards—39,000 yards more than the famous structure over Menai Straits, in North Wales, England. The centre span is 520 feet clear of the piers, and the bridge proper is 1,627 feet long. It accommodates two double railway tracks, foot-walks, street-railway tracks, and a track for ordinary vehicles. The entire cost of the structure was about $11,000,000. It was opened on the 4th of July, 1874, with appropriate ceremonies, amid a grand display of fireworks and oratory.

The river is the principal highway to all the cities along its banks, and whenever it is closed owing to low water or ice, there is an immediate and severe depression in business. All varieties of boats are seen on the Mississippi. The fine large steamboats, the strong flat-bottomed packets, the cruisers to the Upper Mississippi, and the Missouri barges laden with iron, lead, coal and copper, the huge grain transports, and rafts of every size. When the ice-gorge comes, the boatmen on the Upper Mississippi suffer severely. Property to the value of hundreds of thousands of dollars is often lost at this time.

The velocity of the current increases below St. Louis, the river having, above the city, received the vast volume of the Missouri, but the scenery is attended with a degree of sameness that leaves little room for description. Probably at no portion of the three thousand miles of its course is the Mississippi more uninteresting than in the vicinity of Cairo, where the waters of the Ohio River join it. Not by any means a desirable place of abode is Cairo, and the severe description given of it in Dickens' American Notes is not unmerited.

"At length we arrived at a spot so much more desolate than any we had yet beheld, that the forlornest places we had passed were, in comparison with it, full of interest. At the junction of the two rivers, on ground so flat and low and marshy that at certain seasons of the year it is inundated to the house-tops, lies a breeding-place of fever, ague, and death. A dismal swamp, on which the half-built houses rot away; cleared here and there for the space of a few yards; and teeming, then, with rank unwholesome vegetation, in whose baleful shade the wretched wanderers who are tempted hither, droop, and die, and lay their bones; the hateful Mississippi circling and eddying before it, and turning off upon its southern course, a slimy monster hideous to behold. * * * *

"WOODING UP."

"The decline of day here was very gorgeous; tingeing the firmament deeply with red and gold, up to the very keystone of the arch above us. As the sun went down behind the bank, the slightest blades of grass upon it seemed to become as distinctly visible as the arteries in the skeleton of a leaf, and when, as it slowly sank, the red and golden bars upon the water grew dimmer, and dimmer yet, as if they were sinking too; and all the glowing colors of departing day paled, inch by inch, before the sombre night; the scene became a thousand times more lonesome and more dreary than before, and all its influences darkened with the sky."

Mr. Dickens here, by indulging in generalization, like so many other travelers from time immemorial, did great injustice to the Mississippi. Before its confluence with the Missouri River, its waters are of remarkable purity; after the junction they contain about three-tenths of sedimentary matter. We hardly need say, too, that the towns of the more northern part of the river are as bright, and as clean and healthy, as any to be found on the surface of our broad land.

Memphis, the most important port on the Mississippi between St. Louis and New Orleans, presents a remarkably fine appearance from the river. An esplanade, having a width of several hundred feet and bordered with blocks of large warehouses, extends along the bluff in front of the town. It

The Levee.

has doubled in population in ten years, and now has forty-five thousand inhabitants. Vicksburg, celebrated for its historic siege, Natchez, and Baton Rouge, the capital of Louisiana, are the other principal river towns.

To those who have very magnificent conceptions of the Mississippi, founded on mere arithmetical computations of leagues, or vague geographical data, it may be astonishing, but it is nevertheless true, the Mississippi is artificial for many hundreds of miles. Nature has, of course, poured out the waters, but man has made the banks. By a vast system of raised embankments, called levees, the river is constrained to abstain from overflowing the swamps, now drained, and green with wealth-producing crops. During the spring floods the surface of the river is several feet higher than the land on each side, and the steamer moves on a level with the upper stories, or even the roofs of the houses, reminding one of such scenery as could be witnessed in the old days of treckshuyt in Holland. The river varies in width from 600 to 1,200 yards, but then it is one hundred and eighty feet deep, and for hundreds of miles it has not less than one hundred feet of water. Thus deeply has it scooped into the rich clay and marl in its course: but as it flows out to join the sea, it throws down the vast precipitates which render the bars so shifting and difficult, and bring the mighty river to

such a poor exit. Great masses of earth, amounting to thousands of acres in the course of a year, cave in annually and slide into the stream, uprooting great numbers of forest-trees, which float out with the waters, and become the most dangerous obstructions to navigation. They accumulate on sand-bars and in the short bends of the river, and are soon covered by deposits of earth, forming new islands or high swampy land. Others will firmly fasten themselves in the channel and become the perilous "snag" or the formidable "sawyer." A few miles above the wharfs and large levees of New Orleans, the country really appears to be a sea of light green, with shores of forest in the distance, about two miles away from the bank. Near the banks are houses of wood, with porticoes, pillars, verandahs, and sun-shades, generally painted white and green. There is a great uniformity of style, but the idea aimed at seems to be that of the old French chateau, with the addition of a colonnade around the ground story. The levee is as hard and dry as the bank of the canal.

The spring floods, raising the river from fifty to seventy feet—at low water the stream is comparatively narrow, and on either side the banks are high and sandy—bring anxious days to the inhabitants. Sometimes the current, wearing away the levee, overflows the country to the extent of thirty miles. The destruction of property caused by these "*crevasses*" is very great. During

Removing Snags by Dredging.

the spring of 1874, a considerable portion of the State of Louisiana was under water, owing to one of these crevasses, and thousands of persons were rendered homeless. The destruction of crops and farming utensils made a famine so imminent, that the people were compelled to appeal for assistance to Congress and the country at large. This last break is to be traced to the present corrupt government of the State, which, instead of using for its legitimate purpose the money appropriated for the repair of the levees, wasted or stole it.*

The city of New Orleans extends from the Mississippi river to the shores of Lake Pontchartrain; but part of this area, being covered by cypress swamps, remains to be filled up. The canals which run from the city to the lake, are very picturesque; those known as Old and New Basin are both navigable, and large steamers pass through them to the lake, and schooners laden with produce and

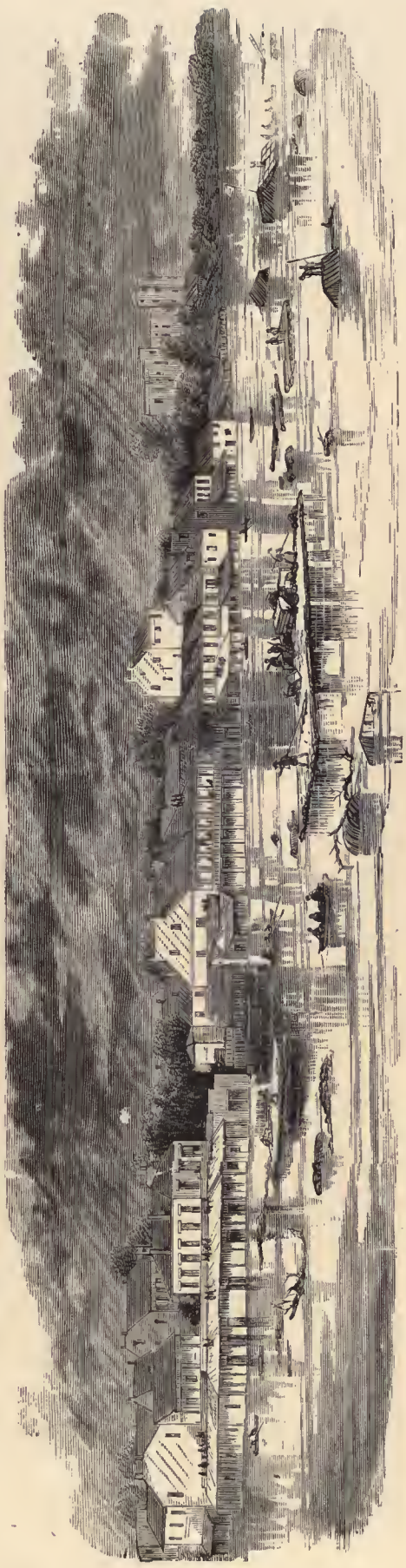
* A recent writer in *Appleton's Journal* argues against the policy of reclaiming lands by closing up the bayous. He contends that the annual overflow of the Mississippi might be prevented by opening the mouths of the bayous, and allowing the surplus waters of the Mississippi to find their way to the lakes, or the Gulf, through them. It is at the bends of the river, where the water strikes the levees with the greatest force, that the bayous take their departure. If, therefore, say those who hold these views, there is a way of limiting the strength of the current during the floods, by letting the water flow off by these channels, and thus materially reducing its volume, the mouths of the bayous should be opened and levees built along their banks.

lumber are towed in and out by mules. The danger of overflow from the Mississippi and the wet, marshy nature of the soil, make good drainage a necessity to the health of the population. Notwithstanding the severe blow which the war gave the commercial interests of the city, it is still one of the first ports of the country. When some of the many plans which have been suggested to make her the outlet for the grain product of the Northwest come to be executed, the increase to her business prosperity will be immense. A capacious barge system is at present in operation on the rivers, and an all-rail communication with the two great cities of the Northwest will, probably, be established at an early day. The Illinois Central Railroad, by building a line from Jackson, Tenn., to the Ohio river opposite Cairo, will bring the commercial interests of New Orleans in close relation with those of Chicago, and make the journey between the two cities a trip of only thirty six hours.

The city has two distinct parts—the American quarter, and the French. The former is much superior in the width of its avenues and the beauty of its architecture. Among its notable buildings are the St. Charles Hotel, the Academy of Music, the St. Charles Theatre, the Masonic Hall, the Exposition Hall, and the City Hall. The last-named structure is of granite and white marble, built in the Ionic style, with a fine portico and massive granite pillars. There are one hundred and sixteen churches in the city, representing all shades of religious belief; but the Roman Catholic Church, owing to the French population, is in the majority.

The cotton trade gives New Orleans much of its picturesque vivacity, and contributes largely to its support. It receives most of the cotton crop of Louisiana and Northern Mississippi, of Northern Alabama, Arkansas, and Florida. Between January and May, which is the busy season of the year, the labor is almost unceasing at the Cotton Exchange and in all the prominent warehouses. Some attention, also, has been given to the manufacture of cotton, and two factories have already been established which are clearing a profit of from eighteen to twenty-five per cent. One of them is located at Beauregard, the other at the penitentiary.

One of the greatest evils, from which New Orleans suffers, is the enormity of its taxes. Its city debt is estimated at twenty-three millions of dollars, and it is responsible for nearly three-fifths of the State debt of $42,000,000. The consequence of this condition of things, arising from the notoriously corrupt government which has been in power for the last few years, is that the price of real estate has declined fifty per cent. Notwithstanding these adverse influences, the census of 1870 gave New Orleans a population of one hundred and ninety-one thousand, an increase of nearly fifty per cent over that of 1860. That the city should make any progress at all, in view of these drawbacks, speaks volumes for its natural advantages, and proves it possessed of



Scene at Baton Rouge during the Floods of 1874.

elements which, if properly appreciated, and in more propitious days, will raise it to the highest commercial importance and prosperity.

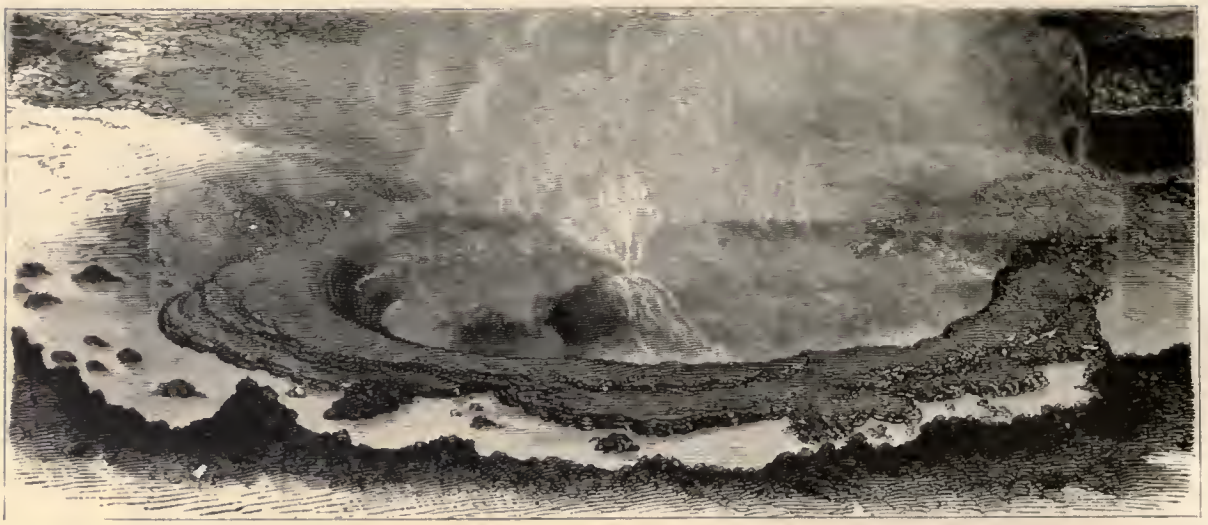
It is a well-known peculiarity of the Mississippi, that, as it approaches its mouth, it grows narrower. After passing New Orleans the depth of the river diminishes, and at a distance of one hundred miles from the city the stream is lost in the low, marshy lands. Here the current is divided into three channels, which flow through the half-formed soil, and out into the Gulf. Unfortunately for the purposes of navigation the depth in these passes is never great, and varies under the influence of wind and weather.

HOT SPRINGS AND GEYSERS OF THE YELLOWSTONE.

The Hot Springs near Gardiner's River.

NEAR the lower end of the third cañon, Gardiner's River, a mountain torrent, effects a junction with the Yellowstone, and it is up the valley through which this stream flows, a distance of four miles from the point where the two rivers meet, that the famous hot springs are located. It is hardly possible to find words to express the desolation which here exists. Along the valley are strewn boulders of volcanic rock; and stagnant lakes, from fifty to one hundred feet in diameter, owing their existence to volcanic action in long gone ages, are scattered here and there. It is necessary to make a divergence of about two miles from the bed of the river, across a most barren and elevated country, to reach the first hot spring. This is six feet wide, and has a depth of two feet, with a temperature ranging from 126° to 132° Fahr. Still ascending, but returning toward the river-bed, we reach four other springs, circular in their form, and varying in diameter from six to ten feet. It is in this vicinity that we find the extraordinary deposits formed by the springs in distant ages, the snowy whiteness of which at once suggested the name of White Mountain Hot Spring, from the remarkable resemblance these deposits bear to a frozen cascade. The deposits cover an area of four square miles, but the springs in active operation are to be found within an area of one square mile. The oxide of iron in the water gives the streams that flow down the White Mountain the most beautiful tints of red, the most exquisite shades of yellow, and the most brilliant green. Falling down the declivity from one basin to the other, and gradually cooling in its descent, the water becomes at a distance of five hundred yards from the first spring as cool and clear as spring water. There are hundreds of these reservoirs, and the party of Dr.

GREAT FALLS OF THE YELLOWSTONE RIVER.



Boiling Sulphur Springs.

Hayden bathed in a great number of them, each individual being able to choose the degree of heat agreeable to him.

The margins of the basins are beautifully scalloped, and formations of exquisite beauty are encrusted on them. The wonderful variety of these deposits excited the admiration of the party. The report of Dr. Hayden says, in treating finally of this neighborhood: "But it is to the wonderful variety of exquisitely delicate colors that this picture owes the main part of its attractiveness. The little orifices from which the hot water issues are beautifully enameled with the porcelain-like lining, and around the edges a layer of sulphur is precipitated. As the water flows along the valley, it lays down in its course a pavement more beautiful and elaborate in its adornment, than art has ever yet conceived. The sulphur and the iron, with the green microscopic vegetation, tint the whole with an illumination of which no decoration-painter has ever dreamed. From the sides of the oblong mound, which is here from thirty to fifty feet high, the water has oozed out at different points, forming small groups of the semicircular, step-like basins.

"Again, if we look at the principal group of springs from the high mound above the middle terrace, we can see the same variety of brilliant coloring. The wonderful transparency of the water surpasses anything of the kind I have ever seen in any other portion of the world. The sky, with the smallest cloud that flits across it, is reflected in its clear depths, and the ultramarine colors, more vivid than the sea, are greatly heightened by the constant gentle vibrations. One can look down into the clear depths and see, with perfect distinctness, the minutest ornament on the inner sides of the basins; and the exquisite beauty of the coloring and the variety of forms baffle any attempt to portray them, either with pen or pencil. And then, too, around the borders of these springs, especially those of rather low temperature, and on the sides and bottoms of the numerous little channels of the streams that flow from these springs, there is a striking variety of the most vivid colors. I can only compare them to our most brilliant aniline dyes—various shades of red, from the brightest scarlet to a bright rose tint; also yellow, from deep-bright sulphur, through all the shades, to light cream-color. There are also various shades of green, from the peculiar vegetation. These springs are also filled with minute vegetable forms, which under the microscope prove to be diatoms, among which Dr. Billings discovers *Palmella* and *Oscillara*. There are also in the little streams that flow from the boiling springs great quantities of a fibrous, silky substance, apparently vegetable, which vibrates at the slightest movement of the water, and has the appearance of the finest quality of cashmere wool. When the waters are still these silken masses become incrusted with lime, the delicate vegetable threads disappear, and a fibrous, spongy mass remains, like delicate snow-white coral."

On the way from Mount Washburn to the Upper Falls the party of Mr. Langford came across six or eight boiling springs of great size, which emitted large quantities of sulphurous vapor. "It looked like nothing earthly we had ever seen, and the pungent fumes which filled the atmosphere were not unaccompanied by a disagreeable sense of possible suffocation. Entering the basin cautiously, we found the entire surface of the earth covered with the incrusted sinter thrown from the

springs. Jets of hot vapor were expelled through a hundred natural orifices with which it was pierced, and through every fracture made by passing over it. The springs themselves were as diabolical in appearance as the witches' caldron in Macbeth, and needed but the presence of Hecate and her weird band to realize that horrible creation of poetic fancy. They were all in a state of violent ebullition, throwing their liquid contents to the height of three or four feet. The largest had a basin twenty by forty feet in diameter. Its greenish-yellow water was covered with bubbles, which were constantly rising, bursting, and emitting sulphurous gas from various parts of its surface. The central spring seethed and bubbled like a boiling caldron. Fearful volumes of vapor were constantly escaping it. Near it was another, not so large, but more infernal in appearance. Its contents, of the consistency of paint, were in constant, noisy ebullition. A stick thrust into it, on being withdrawn, was coated with lead-colored slime a quarter of an inch in thickness. Nothing flows from this spring. Seemingly, it is boiling down. A fourth spring, which exhibited the same physical features, was partly covered by an overhanging ledge of rock. We tried to fathom it, but the bottom was beyond the reach of the longest pole we could find. Rocks cast into it increase the agitation of its waters. There were several other springs in the group, smaller in size, but presenting the same characteristics.

"The approach to them was unsafe, the incrustation surrounding them bending in many places beneath our weight,—and from the fractures thus created would ooze a sulphury slime of the consistency of mucilage. It was with great difficulty that we obtained specimens from the natural apertures with which the crust is filled,—a feat which was accomplished by one only of our party, who extended himself at full length upon that portion of the incrustation which yielded the least, but which was not sufficiently strong to bear his weight while in an upright position, and at imminent risk of sinking into the infernal mixture, rolled over and over to the edge of the opening, and with the crest slowly bending and sinking beneath him, hurriedly secured the coveted prize."

Between the Upper and the Lower Falls and Yellowstone Lake, which is the central gem of that wonderful collection of long-hidden treasures, lies a marvelous region, filled with boiling springs and craters, with two hills, three hundred feet high, formed wholly of the sinter thrown from the adjacent springs; and at the base of one of them is a cavern whose mouth is seven feet in diameter, from whence a dense jet of sulphurous vapor explodes with a regular report like a high-pressure engine. A few yards off is a boiling spring, seventy feet long by forty wide, the water of which is in unceasing agitation; and in another direction is a boiling alum spring, surrounded with beautiful crystals. No wonder that the first beholders of these things called the various points by names of infernal significance. There are now no true geysers in this group, but in ancient times there were very powerful ones. The steam-vents on the side, and at the foot of these hills, represent the dying stages of this once most active group.

But the real geyser region is just over the margin of the Yellowstone Basin, on the Firehole River. The valley in which these wonderful phenomena are located is about twelve miles in length,

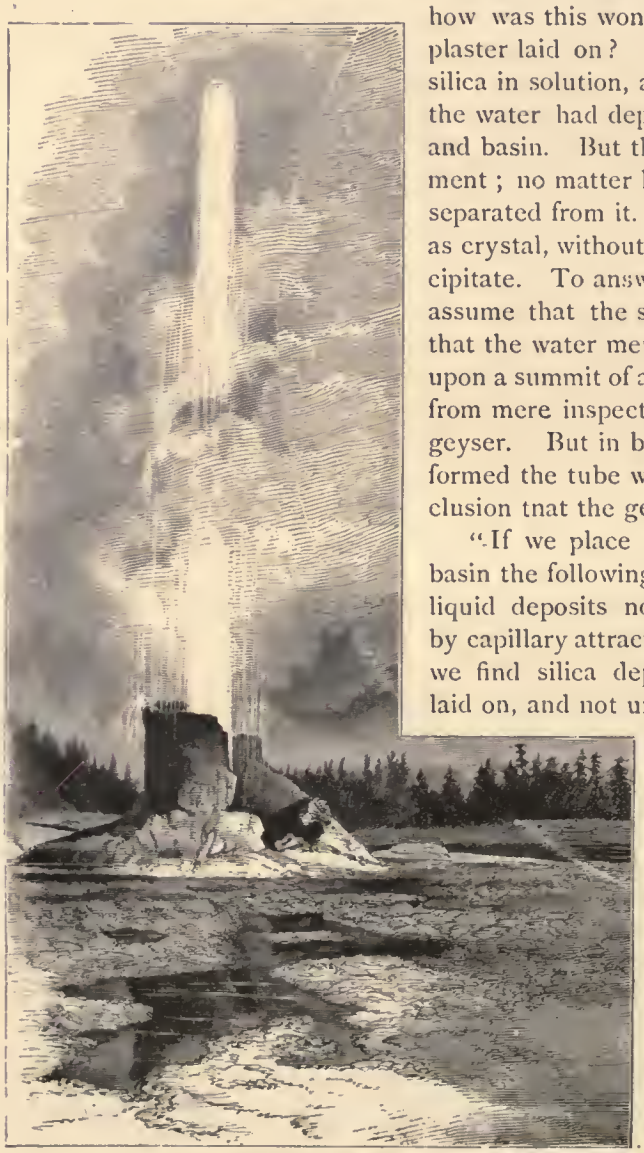
Hot Spring Cone.

with an average width of three miles. It is said that there are more of these natural wonders in this small area than can be found in the rest of the world.

The Firehole River flows from Madison Lake, one of the most beautiful of the many lovely sheets of water in the mountains, and the volume of its waters is increased by the constant accession of mountain torrents, until just before reaching the geyser-basin, it falls over two cliffs, one twenty, and the other fifty feet in height. "These pretty falls, if located in an Eastern stream, would be celebrated in history and song; here amid objects so grand as to stagger belief, they were passed without a halt."

Everybody knows that a geyser is an eruption of water from the earth to a considerable height in the air; but the power to which we owe these extraordinary manifestations of nature, its means of action and the causes of its intermittent action, are not so generally understood. For a lucid explanation of these phenomena we cannot do better than refer to the disquisition of the learned scientist, Prof. Tyndall, on this subject. The particular geyser whose mechanism and development he investigated, is the Great Geyser of Iceland; but the principle of the geysers of the Firehole Basin, and of those that have recently been discovered in the celebrated Lake District of New Zealand, and of all similar springs, is the same.

"It consists of a tube seventy-four feet deep and ten feet in diameter. The tube is surmounted by a basin which measures from north to south fifty-two feet across, and from east to west sixty feet. The interior of the tube and basin is coated with a beautiful smooth silicious plaster, so hard as to resist the blows of a hammer; and the first question is, how was this wonderful tube constructed—how was this perfect plaster laid on? Chemical analysis shows that the water holds silica in solution, and the conjecture might therefore arise that the water had deposited the silica against the sides of the tube and basin. But this is not the case: the water deposits no sediment; no matter how long it may be kept, no solid substance is separated from it. It may be bottled up and preserved for years as crystal, without showing the slightest tendency to form a precipitate. To answer the question in this way would moreover assume that the shaft was formed by some foreign agency, and that the water merely lined it. The geyser basin, however, rests upon a summit of a mound about forty feet high, and it is evident from mere inspection that the mound has been deposited by the geyser. But in building up this mound the spring must have formed the tube which perforates the mound, and hence the conclusion tnat the geyser is the architect of its own tube.



Giant Geyser.

"If we place a quantity of geyser water in an evaporating basin the following takes place: in the centre of the basin the liquid deposits nothing, but at the sides where it is drawn up by capillary attraction, and thus subjected to speedy evaporation, we find silica deposited. Round the edge a ring of silica is laid on, and not until the evaporation has continued a considerable time do we find the slightest turbidity in the middle of the water. This experiment is the microscopic representative of what occurs in Iceland. Imagine the case of a simple thermal silicious spring, whose waters trickle down a gentle inclosure; the water thus exposed evaporates speedily, and silica is deposited. This deposit gradually elevates the side over which the water passes until finally the latter has to take another course. The same takes place here, the ground is elevated as before, and the spring has to move forward. Thus it is compelled to travel round and round, discharging its silica, and deep-

ening the shaft in which it dwells, until finally, in the course of ages, the simple spring has produced this wonderful apparatus which has so long puzzled and astonished both the traveler and the philosopher."

The boiling springs, all in active eruption, with craters from three to forty feet high, are scattered along both banks of the Firehole River; and as the expedition hurried along, anxious to reach the settlements of Madison Valley, they came in sight of an immense volume of clear, sparkling water, projected into the air to the height of one hundred and twenty-five feet. "Geysers, geysers!" they shouted in concert; and so they were, this one standing as a sentinel at the mouth of the marvel-filled valley. It spouted at regular intervals nine times during the explorers' stay, the columns of boiling water being thrown from ninety to one hundred and twenty-five feet at each discharge, which lasted from fifteen to twenty minutes. By a succession of impulses, it seemed to hold the column up steadily in the air for the regular space, the great mass falling directly back into the basin, and flowing over the edges and down the sides in large streams. When the action ceases, the water recedes beyond sight, and nothing is heard but the occasional escape of steam until another exhibition occurs. The description of one of the geysers, of which there are hundreds, suffices for all, as to general features, but the difference in their dimensions is considerable, and the mounds and projecting rims are of various, though always extraordinary beauty. "The great beauty of the prismatic colors," writes Dr. Hayden, "depends much on the sunlight; about the middle of the day,

Castle Geyser and Fire Basin.

when the bright rays descend nearly vertically, and a slight breeze just makes a ripple on the surface, the colors exceed comparison; when the surface is calm there is one vast chaos of colors, dancing, as it were, like the colors of a kaleidoscope. As seen through this marvelous play of colors, the decorations on the sides of the basin are lighted up with a wild, weird beauty, which wafts one at once into the land of enchantment; all the brilliant feats of fairies and genii in the Arabian Nights' Entertainments are forgotten in the actual presence of such marvelous beauty; life becomes a privilege and a blessing after one has seen and thoroughly felt its cunning skill."

Of one, which they called the Castle Geyser, Dr. Hayden writes: "It is the most imposing formation in the valley, and receives its name from its resemblance to the ruins of an old fortress. The deposited silica has crystallized in immense globular masses, like cauliflowers, or spongiform corals, apparently formed about a nucleus at right angles to the centre. The mound is forty, and the chimney twenty feet high, and the lower portion rises in steps formed of thin laminæ of silica, an inch or two thick. The base of the crater is three hundred and twenty-five feet in circumference, and the turret is one hundred and twenty-five. At the base of the turret lies a large petrified pine-log, covered with a brilliant incrustation several inches thick."

The Grand Geyser is the finest object of the kind yet discovered in the world; and the variety of these wonderful things is astonishing. Their number is not less than fifteen hundred, but scarcely any two are alike. The explorers' suspicion that many quiet-looking springs were slumbering geysers, was justified by a magnificent surprise. Their camp was roused in the early morning by a fear-

The Grotto.

ful hissing sound, and the rush of falling water; and, on looking out, they saw a small crater, three feet in height, with an opening twenty-six inches in diameter, which had hardly excited any notice, playing a perpendicular jet to the height of two hundred and nineteen feet, amid great clouds of steam, and causing the ground to tremble as the heavy body of water fell with tremendous splashes upon the shelly strata below. Huge masses of rock were torn from their places, and borne away into the river-channel. It played steadily for ten minutes.

The "Giant Geyser," writes Lieutenant Doane, "played several times while we were in the valley, on one occasion throwing constantly for over three hours a stream of water seven feet in diameter, from ninety to two hundred feet perpendicularly, while it doubled the size of the Firehole River."

Near the Giant is the Grotto, so named from its curious formation. This geyser plays a volume of water six feet in diameter to a height of sixty feet. The excitement and pleasure of exploring such scenes as those presented by the Upper and Lower Geyser Basins of the Firehole River cannot be exaggerated in imagination. Every moment brought some fresh wonder to light, every hour chronicled a surprise, frequently mingled with awe. The mighty ranges of mountains, the tremendous ravines, the awful evidences of the rule of the Fire King (his power slumbering now, indeed,

but still asserted in the geysers and the mud volcanoes, and the impress of this terrible pa sage, in the dead ages, on the face of nature everywhere around); the beautiful rivers, the far-spreading forests, with their noble denizens—elk, buffalo, and deer; the pine-crowned promontories, and the fair table-lands, which unite to form the exquisite picture of this remote region, six thousand feet above the sea-level, and dating from the Pliocene age, is but the setting of the gem which sparkles on the summit of it all—the peerless Yellowstone Lake, the "Crown of the Continent." Of this lovely sheet of water we gave a full description, with an illustration, in a preceding part of this volume.

THE EAST RIVER.

THE East River is really a part of Long Island Sound, whose water it unites with the Atlantic Ocean through New York Bay. Until quite recently it was along its banks that the maritime business of New York was concentrated. With the constant increase in the commerce of the city the occupation of the wharves on the North River became necessary, but a large proportion of the ocean traffic and the bulk of the coasting trade are still conducted on the Eastern side. Leaving "The Battery" on the left, and sailing up the river, an interesting panorama is spread before the eye. As far as one can follow the windings of the river it is instinct with life and action. Vessels of all kinds, flying the flags of all nations, form a spectacle which is really bewildering. On the wharves are piled up great quantities of merchandise for export or for transport to the interior, and hundreds of men and vehicles move busily about.

Conspicuous are the great packet-ships which sail between New York and European ports. These lie generally at the wharves of ancient New York, below Wall Street, which was at one time the boundary line of the city, whence it derived its name. Further up the river numerous ferry-boats may be seen plying between New York and Brooklyn. At the present time there are nearly a dozen ferries to Brooklyn and vicinage, all well supplied with good and fast steamboats that have an average burden of four hundred tons. So great is the travel over these vessels that at certain hours of the day they carry nearly a thousand passengers each on a single trip, besides horses and vehicles.

We have, in a preceding part of this work, described the Brooklyn Bridge, the most conspicuous object on the river. At the foot of Tenth Street is the great Dry Dock, which is said to be the largest of its kind in the world. Ten years of labor and eighty thousand tons of stone were devoted to its construction, and so perfect is its mode of operation, and so great are its power and capacity, that the largest vessel may be lifted out of water and secured for repairs in less than five hours.

The ferry to Blackwell's Island is at the foot of Sixty-first Street, which is a narrow strip of land about a mile long, and is the most southerly of the group of islands that have so long been the sites of various important charitable and reform institutions belonging to New York. Blackwell's Island contains the Workhouse, the Lunatic Asylum, and the Almshouse. Drunkenness and petty offences of all kinds are the principal qualifications for a residence in the first-named institution. It is the newest of the buildings, but certainly the busiest. Previous to its erection, the class of prisoners that now fill it were distributed among the District Prisons, the Penitentiary, the Tombs, and the Almshouse. The northern wing contains the female wards, and the southern wing the male. There are three stories to the main edifice, and the cross-buildings at the end of each wing have four stories and a loft. In these end-buildings are the work-rooms, the reception-rooms, and the officers'-rooms. The main building contains the apartments of the warden and physicians, the kitchen, the laundries, and the church auditory. The structure is of blue stone. There are also several out-houses, in which are the shops, the stable, and the boat-house for the Warden's and the Resident Physician's crew. The work-house was originally intended to be a kind of House of Industry, and during the first two years of its existence its occupants were paid for their labor; this was, however, soon abolished, and it became a penal institution. The majority of the prisoners on the Island are sent there for drunkenness, vagrancy, and assault, and come mostly from the slums of New York.

In the Lunatic Asylum the patients are mainly from the poorer classes, and are principally women. Mania afflicts more than four-fifths of them, the disease of the remaining fifth being dementia, general paralysis or idiocy. Mania includes the violent forms of mental disease as well as

GOVERNMENT BUILDINGS ON WARD'S ISLAND.

confirmed delusions. The building has no rooms stronger than the usual sleeping apartments of a hotel, and the only attempt at security is in the cast-iron sashes of the windows ; and these may be easily broken. The building is well-adapted for the more harmless forms of insanity, but is too insecure for cases where there are dangerous propensities ; while to convicts who feign mental derangement in the hope of escape, the greatest facilities to that end are afforded.

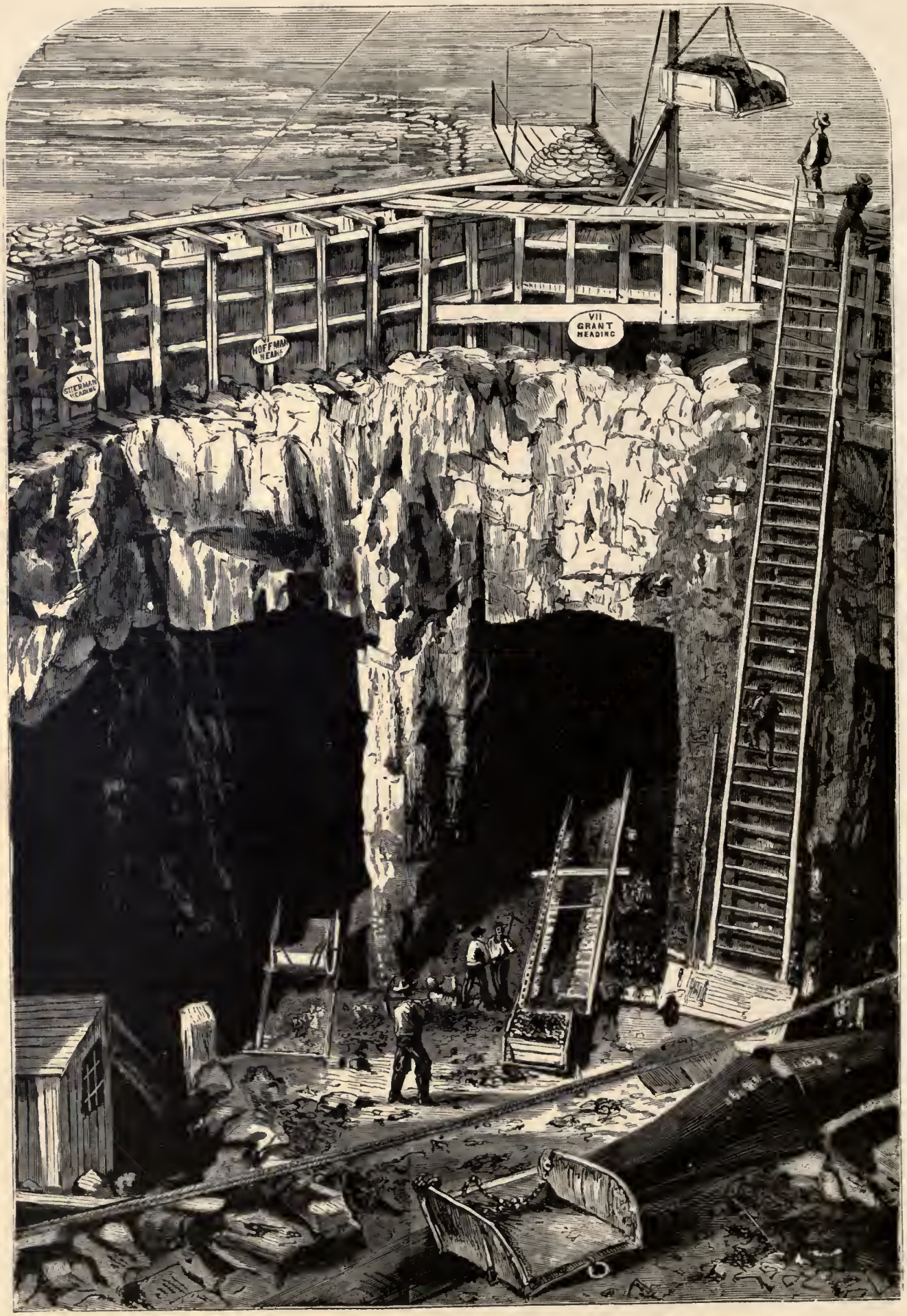
No description of the East River would be complete without giving some account of the endeavors that have for some years been made for the removal of the dangerous rocks at the point known as Hell Gate, situated just above Blackwell's Island. Ever since the first settlement of New York, the existence of these rocks has been a thorn in the side of those interested in maritime pursuits, and has absolutely precluded the use of the shorter route by the Sound to large sea-going vessels. Although the direct saving in distance is but fifty miles, practically, allowance being made for the time usually lost by vessels of large burden beating about at Sandy Hook, waiting for high water to cross the bar, their removal would shorten the time consumed on a transatlantic voyage at least one day.

At Hell Gate a number of islands of rocks lie in the middle of the stream, which is here unusually strong and violent. This disturbance of the waters is caused by the difference of elevation between the two tidal waves whose waters here come together—one entering from the Sound, the other by way of Sandy Hook. These two waves meet and battle for victory within a space of less than four thousand feet. The eddies and miniature whirlpools which prevail at this point are the consequence of this tidal disturbance.

The following eloquent description by Irving gives some idea of the violence of the current owing to its forcible compression between shouldering rocks and promontories : " Being at the best of times a very violent and impetuous current, it takes these impediments in mighty dudgeon ; boiling in whirlpools ; brawling and fretting in ripples ; raging and roaring in rapids and breakers ; and, in short, indulging in all kinds of wrong-headed paroxysms. At such times, woe to any unlucky vessel that ventures within its clutches. This termagant humor, however, prevails only at certain times of tide. At low water, for instance, it is as pacific a stream as you would wish to see. But as the tide rises it begins to fret ; at half-tide it roars with might and main, like a bull bellowing for more drink ; but when the tide is full, it relapses into quiet, and for a time sleeps as soundly as an alderman after dinner. In fact, it may be compared to a quarrelsome toper, who is a peaceable fellow enough when he has no liquor at all, or when he has a skinful, but who, when half-seas over, plays the very devil." The difficulty of making a safe passage of this point was so great that before any attempt was made to improve the channel, a thousand vessels a year were either lost or seriously damaged by running against the rocks. " To steer a vessel through these intricate passages, through which the water runs with such speed, breaks noisily even in the calmest times upon the rocky shores and islands, and whirls in a thousand dizzying eddies, requires," says the Government surveyor, " a cool head and a steady hand, even with the superior help of steam. But in a sailing-vessel the greatest skill and self-possession, without a commanding wind, prove insufficient to guard against certain danger."

Operations against Hell Gate were not begun before 1851. The first engineer who undertook the gigantic task of clearing the rocks was a M. Maillefert, a Frenchman. This gentleman had been successful in removing the obstruction in the harbor of Nassau and elsewhere. It was found, however, that his plan of operation, which consisted of exploding charges of gunpowder against the rock, was only partially successful in removing masses of projecting rock, and was totally inadequate to displace reefs of solid bed-rock. In brief, M. Maillefert's plan was only effective when used against small bodies of isolated rock. Nevertheless a considerable improvement in the channel resulted from his labors.

The civil war caused a suspension of all operations against Hell Gate ; but in 1866 General Newton was assigned by the War Department to make a report as to the best means of removing the obstructions. He recommended the direction of all energies toward the main channel. Advertisements containing specifications of the work to be accomplished were issued, but so little was its nature understood that bids were received varying in amount from $38,000 to $500,000. The contract was awarded to the lowest bidder. This gentleman, Mr. Sidney F. Shelbourne, who proposed to work by drilling and exploding the rocks, did little more than make various experiments and demonstrate, at the cost to himself of twenty thousand dollars, the impossibility of certain modes of operation, before the time specified in his contract expired, and the contract was withdrawn.



OPENING OF THE SHAFT BENEATH HELL GATE.

Some idea of the nature of the difficulties to be overcome can be formed from the report of Gen. Newton, dated December 19, 1868: "The removal of rocks in Hell Gate is attended with peculiar difficulty. The current is extremely rapid, so that divers could not be sent down, in most places, to regulate and set the drills, except at slack water. This fact requires that the drill should act independently of manual assistance, and therefore peculiar and ingenious devices are required. But the more formidable evil is the chance, unavoidable in the long run, of being collided with, from the number of vessels, daily increasing, which frequent this narrow pass." This latter consideration finally convinced Gen. Newton, that the only way to proceed was to sink a shaft from the shore, and to blow up the roof and its supporting columns by one grand explosion, and afterwards to remove the *débris* by grappling, or as might be otherwise determined. This plan was adopted with complete success, and the final result depends only upon the action of Congress in making the requisite appropriations.

Nitro-glycerine has been largely used in removing isolated rocks; but as a description of the various processes used in this great undertaking would absorb much more space than we have at command, we are obliged to content ourselves with giving a brief and incomplete sketch of this interesting work.

THE YOSEMITE VALLEY.

WORDS fail utterly to give any idea of this extraordinary valley. To paint its wonderful formation would tax the imagery of a Voltaire. In its wildest and most fanciful explorations into the realms of dreamland that fantastic imagination fell utterly below the conception of the physical marvels that here abound. In one of his *Romans* Voltaire did, indeed, foreshadow the existence of a cañon on a scale then unknown to mankind. His hero, being, by an adverse combination of circumstances, encompassed by danger on every side, and not knowing whither to sojourn, embarked in a canoe and left his course to the guidance of the broad river's current. The river-banks, arid in one place and in another covered with flowers, by-and-by closed toward each other, and rose perpendicularly toward Heaven, so that it was dark as night on the surface of the water. Still carried onward by the current, which now raged and roared against the rocks and swept by them with awful swiftness, he was finally, after passing through inconceivable perils, wrecked in El Dorado,—the phantom kingdom of the gold-loving Spaniards. Here his description panders to the avarice of civilized man, and fails utterly to cope with, or to give even a glimpse of, Nature's sublime creations. Imagination could not conceive of such stupendous mountains of solid stone as those which rise perpendicularly from the Valley of the Yosemite to the height of five thousand feet—of a cataract having a clear fall of sixteen hundred, and a total fall of over two thousand six hundred feet—or of a magical lake which reproduces the surrounding panorama on its bosom with such distinctness that *the reflection* can be copied by an art requiring such sharpness of outline as photography.

The gorge in the Sierra Nevadas, known as the Valley of the Yosemite, is about fifty miles from the town of Coulterville, Mariposa county, California. It is from eight to ten miles long, about two miles wide, and is enclosed by walls of solid granite, varying in precipitous height from two to five thousand feet. They are not uniform in appearance, in some places being rounded or dome-like at the top, while in others they run up into sharp peaks, or assume fantastic forms like the ruins of gigantic castles. At the eastern end, the valley terminates in three cañons, through each of which passes a branch of the Merced river (a stream that rises near by and runs through the valley). On account of the great depression of the valley, the streams from the surrounding mountains find their way into it, and form marvelous cataracts as they dash down its perpendicular sides. In the spring, when the snow on the mountain sides melts, these streams are almost innumerable; and even during the dry season there is an abundant supply of water in the valley, keeping its vegetation fresh and green, in marked contrast with the barrenness of the surrounding country.

It is singular, remembering for what a length of time California has been occupied by the Spaniards, that the existence of this valley should have remained so long unknown. It was discovered in 1851 by an expedition organized by the miners to punish a party of depredatory Indians, who used the valley as a place of safe retreat. Unhappily for them, the pursuit being conducted with

energy and boldness, their trail showed the way into their fastness, and, a battle ensuing, they were nearly exterminated. But it was not until 1856, that travel commenced to flow hitherward. Notwithstanding the fact that the State of California, to which the Valley belongs, refuses to grant a lease for a longer term than ten years, a number of hotels, capable of containing from three hundred to three hundred and fifty guests, have sprung up. Mr. Nordhoff in his recent work on this subject strongly advocates the grant of the Valley to a corporation, to be organized with a large capital, for a term of years. In this manner the much-to-be-desired improvements could be effected, and all acts of vandalism prevented. Already bridges have been erected across the Merced River, and exorbitant tolls are exacted. As the tide of travel in the direction of this wonderful and unique locality increases, so will the vexations, restraints, and annoying charges, which are so universal at all places of great resort, be multiplied.

To give even a brief account of the various interesting sights, would be manifestly impossible in an article of this description. We therefore subjoin a table of the principal physical phenomena. For purposes of comparison let the reader remember that the Palisades of the Hudson River are but six hundred feet in height, and that the Falls of Niagara have a descent of only one hundred and sixty-three feet.

MOUNTAINS.

Indian Name.	Signification.	American Name.	Height.
Tu-tock-a-mu-la	Great Chief of the Valley	El Capitan	3,300 feet
Poo-see-nah Chuk-ka	Large Acorn Cache	Cathedral Rocks	2,660 feet
		The Cathedral Spires	1,800 feet
Pom-pom-pasus	Mountains Playing Leap-Frog	Three Brothers	3,830 feet
Hep-se-tuck-a-nah	Gone in	Union Rocks	3,500 feet
Loya	Signal Station	Sentinel Rock	3,043 feet
Loya	Signal Station	Sentinel Dome	4,500 feet
Ummo	Lost Arrow		3,000 feet
Patillima		Glacier Rock	3,200 feet
To-coy-æ	Shade to Indian Baby Basket	Royal Arches	1,800 feet
Hunto	The Watching Eye	Washington Column	1,875 feet
		North Dome	3,568 feet
Tis-sa-ack	Goddess of the Valley	South Dome	4,737 feet
Wayan	Pine Mountain	Mount Watkins	3,900 feet
	Cloud's Rest		6,034 feet
	Cap of Liberty		4,000 feet
	Mount Star King		5,600 feet

WATERFALLS.

		Cataract	900 feet
Po-ho-no	Night Wind	Bridal Veil	630 feet
Yo-Semite	Large Grizzly Bear	Yosemite	2,634 feet
	First Fall		1,600 feet
	Second Fall		600 feet
	Third Fall		434 feet
Py-wy-ack	Sparkling Water	Vernal	350 feet
Yo-wy-ye		Nevada	700 feet
Illilouette	The Beautiful	South Fork	600 feet
Yo-coy-æ	Shade to Indian Baby Basket	Royal Arch Falls	1,000 feet
Loya		Sentinel Falls	3,000 feet

One of the principal objects of interest, and one of the loveliest waterfalls in the world, is Bridal Veil Fall, formed by a stream which enters the Valley from the south. It falls from a height of 630 feet in a clear symmetrical arch of indescribable beauty; but, in summer, the creek of which it is a part is no larger than a common mill-stream. The foot of the waterfall is very difficult of access, owing to the almost impenetrable jungle which surrounds it. To reach it, it is necessary to scale huge masses of granite piled up in irregular order. During a certain part of the dry season, however, these difficulties may be avoided, the water being then so low that visitors can walk up the bed of the stream.

About a mile above the Bridal Veil Fall is the principal section of the northern wall called El Capitan. This stupendous mass of granite rises from the valley to a height of 3,300 feet. Although the precipices on each side are ragged and dingy, El Capitan is as bright and smooth as though it had been recently polished. It is nearly two miles broad. In a niche half way up its side

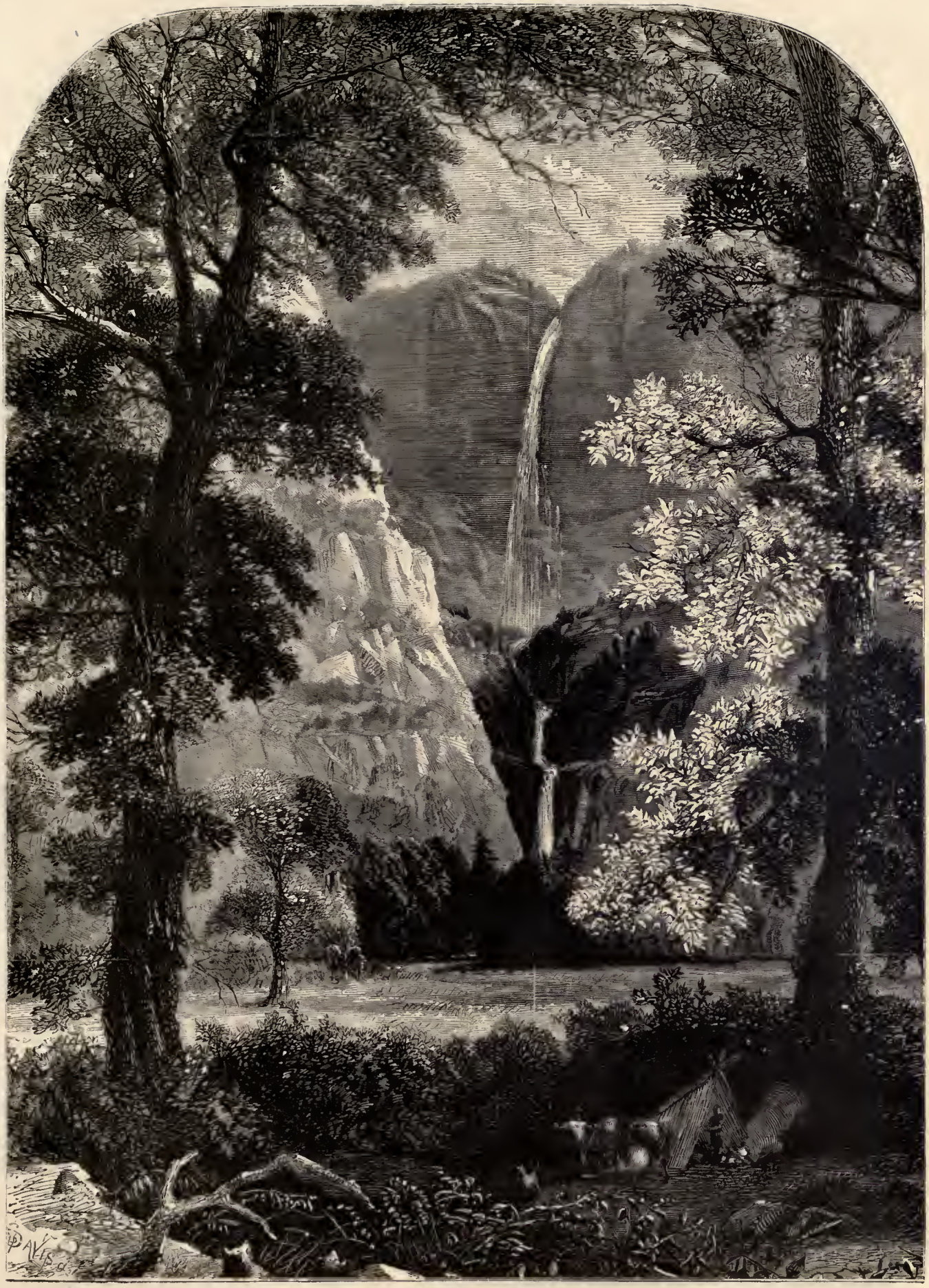
THE VALLEY OF THE YOSEMITE.

there grows a solitary pine-tree. Although there are no indications of any soil near it, nor any visible means by which soil could have been deposited in such a place, the tree seems hardy and thriving. A short distance up the Valley are the Cathedral Rocks. These consist of two columns or spires about 2,660 feet high, which have a gable-shaped rock between them. The cluster has a strong resemblance to the façade of a cathedral, and from this fact is their name derived. We next come to the Sentinel, a remarkable projection in the southern wall, nearly perpendicular, and terminating in sharp peaks far above the general line of the wall, and 4,500 feet above the bed of the valley. Nearly opposite are three peaks known as the Three Brothers, leaning over towards the Valley. The highest of the group is 3,830 feet above the river.

On the northern side of the Valley, and at a little distance from the Three Brothers, is the great Yosemite Fall, formed by a stream of the same name. The river reaches the valley in three leaps, the wall at this point forming three courses, and leaving a shelf or plateau at the bottom of each to receive the falling water. The upper course is the highest, affording the stream an unobstructed fall of 1,600 feet. It then rushes along until it takes a second leap of 234 feet, and after that another of 400 feet. The height from the top of the fall to the level of the valley is 2,634 feet. The upper fall is considered the highest in the world. Unlike the other cataracts in the valley the hot season does not so diminish the volume of the Yosemite Fall but that at all times of the year a well-defined sheet of water pours over it to the bottom. When the Valley was first explored, it was asserted that a greater cataract than Niagara had been discovered. The two are so widely different in character, however, that no comparison can be made between them. The falls of the Yosemite owe their attraction to the immense height from which the waters descend, and the grand scenery which surrounds them; while Niagara is famous for its immense volume. We quote from the description of a distinguished European writer the following comparison between the scenery here afforded, and some of the most sublime parts of Switzerland: "When we come to the 'Yosemite Falls' proper, we behold an object which has no parallel anywhere in the Alps. The upper part is the highest waterfall in the world, as yet discovered, being sixteen hundred feet in height. It reminds me of nothing in the Alps but the avalanches seen falling at intervals down the precipices of the Jungfrau. It is, indeed, a perpetual avalanche of water comminuted as finely as snow, and spreading, as it descends, into a transparent veil, like the train of the great comet of 1858. As you look at it from the valley beneath, a thousand feet below, it is not unlike a snowy comet, perpetually climbing, not the heavens, but the glorious cliffs which tower up three thousand feet into the zenith above, not unlike a firmament of rock."

Below the Falls are two of the most striking views in the whole valley, formed by two huge mountains of bare granite, called the North and South Domes. In an easterly direction from them, and towards the base of the Northern wall there is a valley which branches off from the main one, and is drained by the North Fork of the Merced. A short walk through it brings the tourist to Mirror Lake, a sheet of water about a mile in circumference, and remarkably transparent. The surrounding trees and rocks are reflected in its bosom with such faithfulness that the shadows are almost as distinct and clearly defined as the objects themselves. Standing on its shore, and looking to the south, a full view of the South Dome may be obtained. It is a mountain of rock that rivals El Capitan in grandeur. From a base covered with debris of soil and rock, it rises in the air 4,737 feet. It is much higher than the Captain, and although it does not present such a large area of perpendicular surface, its sides are almost perfectly straight nearly half the distance down from the summit. The mountain is sometimes called the Semi-Dome, a large portion of the side next to the Valley appearing to have been broken away at some remote period. Efforts have been made to scale it, but they have been futile, and it is to-day generally believed that it is impossible to do so.

Turning back from the Lake, and entering the cañon through which the main branch of the Merced river flows, the same variety of scenery presents itself. Vast masses of rock loom up from the banks of the river on both sides, and huge boulders are scattered around. About two miles up the valley there rises a perpendicular wall which prevents any further progress. Over its top the river falls a distance of nearly 400 feet, forming the Vernal Fall, which by many is considered the most beautiful cataract in the Valley, although some tourists claim that distinction for the Bridal Veil. Against the wall over which the cataract descends, there are placed several flights of dilapidated ladder-stairs, up which the visitor may ascend to the top, if he be sufficiently venturesome. On the plateau above, and close to the brink of the precipice, there is a natural parapet of rock, breast-high, over which one can lean with perfect safety, and trace the course of the foaming water,



THE YOSEMITE FALLS.

until it strikes the rocks below. In the afternoon, when the sun shines, there may be seen at this fall that beautiful spectacle — a circular rainbow. It is like the simple rainbow, having the same colors, only that it is a complete circle, which dissolves and constantly forms and reforms far below.

A mile further up the Merced Valley we come to Nevada Fall. This is, in one sense, the largest in the valley, since it presents the greatest body of water falling the greatest distance. It is 700 feet high, and during those seasons of the year, when the river is swollen and deep, it shoots clear of the rock, and so descends to the bottom; but during the dry season it strikes the rock a short distance below the top, and spreads out into a broad sheet of foam.

The following comparison is made by a gentleman to whom we have before made reference:

"To return again to the comparison of the sister valleys—the Yosemite and the Lauterbrunnen. The third peculiar feature of the Swiss valley is the parallel precipices on each side, rising perpendicularly from one thousand to fifteen hundred feet.

Mirror Lake and Mount Watkins.

El Capitan from Merced River.

They are, indeed, sublime, and where the cliff projects, in a rounded form, like the bastions of some huge castle, you might imagine that you beheld one of the strongholds of the fabled Titans of old. But what are they, compared with such a giant as El Capitan, lifting up his square, granite forehead, three thousand three hundred feet above the grassy plain at his feet, a rounded, curving cliff, as smooth, as symmetrical to the eye, and absolutely as vertical, for the upper fifteen hundred feet, as any Corinthian pillar on earth! What shall we say, when, standing in the middle of a valley more than a mile wide, you know that if these granite walls should fall toward each other, they would smite their foreheads together hundreds of feet above the valley! What magnificent domes are those, scarcely a mile apart—the one three thousand eight hundred feet, and the other four thousand five hundred and ninety-three feet in height! When you stand in the valley of Lauterbrunnen, and look at the snowy summit of Jungfrau, or "Virgin," you behold an object eleven thousand feet above you;

but your map will tell you that it is five miles distant, and, by a little calculation, you will find that you raise your eyes at an angle of only twenty-three degrees. So at Chamounix, you look up at the snowy dome of Mont Blanc, rising twelve thousand three hundred and thirty feet above you; but you must remember that it is six and one-half miles distant from you, and the angle at which you view it is only twenty degrees, while the very sharpest angle at which you can view it is twenty-five degrees. But at Yosemite you need but climb a few rods up the rocks at the base of that granite wall, and, leaning up against it, you may look up—if your nerves are steady enough to withstand the impression that the cliffs are falling over upon you—and see the summits above you, at an angle of nearly ninety degrees; in other words, you will behold a mountain top three thousand feet above you *in the zenith.*"

The Yosemite Valley is about a mile wide. The soil is diversified; in some places it is rich, while in others light and stony. Two or three attempts at farming have proven that grain and potatoes will grow well there. Timber is abundant, and consists of pine, cedar, fir, and oak, but nowhere is the forest dense. In tracts that are somewhat marshy, the grass grows long and green, and cattle and horses are occasionally driven there to pasture from the surrounding country.

The descent into the Valley is about three miles in length, and is very steep, although in no part impracticable to the California horse. But whatever the difficulties which attend the visit, the tourist will find the grandeur of the scenery full compensation for all his pains.

Big Tree.

DUCK-SHOOTING ON SARATOGA LAKE.

SARATOGA SPRINGS AND SARATOGA LAKE.

THERE is not a word in our language more suggestive of gayety, of frivolity, of a total banishment of care, than Saratoga. The virtues of its Springs have given it a long-established pre-eminence even among famous watering-places. Not only is it a rendezvous for those butterflies of fashion whose unremitting devotion to the sacred duties of society during the long winter season has told upon their delicate frames, but chiefs of bureaus from Washington, merchant princes from New York, "speculative" statesmen from the South, invalids from Europe vainly seeking that health so little valued until lost, English tourists bent on "doing" America, literary men representing the journals of the great centres on the alert for the latest rumor or the last scandal, governors of States looking (according to a recent foreign critic*) not at all like governors, fortunate miners from the Territories, lovers hoping that the freedom of the place will give them that opportunity which the routine of city life does not afford—all these, from all parts of this continent and every country in Europe, here meet on one common ground; with aims and aspirations widely differing, perhaps, but all nominally bent on seeking that dim unreality, pleasure—so much sought after, but so rarely found.

Saratoga owes its celebrity to the medicinal qualities of its waters. This spot is said to have been visited by invalids as early as 1773; but Congress Spring, whose waters are now in the greatest request, was not discovered until 1792, though it had for a long time been known to, and esteemed by, the Indians, who, many years before the Revolutionary War, frequented the High Rock Spring. The springs number about twenty-three or four, and are spread over a tract twelve miles across. After the Congress Waters, which are bottled and shipped to all parts of the world, the springs most in favor and use at Saratoga are the Empire, the Hathorn, the Columbian, the High Rock, the Red, the Pavilion, and Putnam's. The Excelsior, Minnehaha, Star and Saratoga Springs are also popular. The Empire Spring, the most northerly one in the village, has grown greatly in repute of late years. The Hathorn Spring, which is situated not far from the Empire, is also esteemed for the curious character of the rock from which it issues, and whence it derives its name. This singular rock has been formed by the accumulated deposits of the mineral substances (magnesia, lime, and iron) held in solution by the carbonic acid gas of the springs. The circumference of the rock at the surface of the ground is twenty-four feet and four inches, its height three feet, with an aperture nearly one foot in diameter. The Seltzer Spring is newly opened. All of these waters have been found very beneficial in cases of affection of the liver and chronic diseases of the bowels.

The scenery surrounding the village possesses few, if any extraordinary attractions, excepting Saratoga Lake, of whose beauties we have endeavored to give a faithful word and crayon picture in these pages. The village itself consists chiefly of a single street lined with spacious hotels, boarding-houses, and the private residences of the stationary population. The first hut was erected in 1773, by Dereck Scowton, and the first frame-house in 1784, by General Schuyler. The streets are gratefully shaded by fine trees, and most of the hotels have spacious grounds tastefully laid out. The Alpha and Omega of the daily Saratoga programme are to drink, to eat, and to criticise your neighbors. A recent writer thus describes it: "After water drinking and breakfasting, Madame Saratoga sits in silence on the piazza until it becomes too hot, when she retires to dress for dinner. After dinner she drives out or takes forty winks. Then she redresses and sits silently on the same piazza listening to music. About dusk all the leading hotels wake to life. The Grand Union goes to the Congress, the Congress goes to the United States, the United States to the Grand Union, and so on, till the full round is made, and till the fair inmates of every one of the hotels have reviewed the dresses of all their rivals in all the others. Sometimes Saratoga is supposed to dance in the evening, but she never does in reality. The hall rooms are thrown open and illuminated, the orchestras are playing the Madame Angot quadrille and the Blue Danube waltz, but no one dances, except a few boarding-house inmates who smuggle themselves into the hotels."

Saratoga Lake is nine miles long, and three miles broad, and is about three miles from Saratoga Springs, and about eight miles west of the Hudson River, which receives its outlet waters under

* Probably this fastidious gentleman is a descendant of that well-to-do countryman who went to London with no other object than to see the king, George III., and who, on returning to his native village, astonished his neighbors by declaring that the king *was only a man.*

A Feeder to the Lake.

the name of Fish Creek. The same stream, before its entrance into the lake, is called by the sesquipedalian title of Rayaderosseras River. With its pretty maiden name it loses its beauty, and flows forth from its union with the lake, in a dull and murky stream, and so drops sluggishly into the Hudson. The dimensions of Saratoga Lake dwindle into insignificance when viewed by the side of the great lakes of New York; but its natural beauties are so many and varied that every year thousands of pleasure-seekers flock to its shores and glide over its tranquil surface in search of game and fish, which abound in great plenty and variety. In the fall of the year duck-shooting is one of the favorite pastimes of the sportsman, and lovers of the piscatory art may be seen trolling for pickerel, or still-fishing for perch, bass, and other kinds of fish, and always with success. It is in the autumn that the beauties of Saratoga Lake can be best appreciated; during those "melancholy days the saddest of the year" the fairy-like tints of the rich and mellowed foliage on its picturesquely indented banks give it a peculiar, if somewhat sombre, charm. Until recently but slight efforts have been made to improve the natural beauties of the lake. The farms in the vicinity have been in the possession of the families who now own them ever since the first settlement of the country. A more delightful spot for the erection of country residences could not well be found. A stroll among its shores presents to view hills on which charming villas might cluster, each with its own spacious ground and splendid water view; hollows half shadow, half sunshine, in which a group of rustic cottages might be gathered. Mr. Frank Leslie, the well-known publisher, owns an estate on the borders of the lake, on which he has

Perch-Fishing on the Lake.

erected a fine residence, and there are rumors that other wealthy New Yorkers will soon follow his example. The indications are that Saratoga Lake will be better known in the future than the past.

An old Indian superstition connected with this lake, undoubtedly had its origin in its unusual loneliness and tranquillity. The Mohawks rested in the belief that its stillness was sacred to the Great Spirit, and that, if a human voice uttered a sound upon its waters, the canoe of the unhappy offender would sink to rise no more. An anecdote is related of an Englishwoman, in the early days of the first settlers, who, desiring to cross this lake with a party of Indians, was warned by them before setting out, of the awfulness of the spell. The day was still and dreamy, and the light canoe passed over the glossy water as silently as a feather. When in about the middle of the lake, the woman, wishing to shatter the blind superstition of the red-skins, uttered a loud cry. Instantly the

Fishing from a Sail-boat.

countenances of the Indians became clouded, and after a moment's pause, and in gloomy silence, they drove the light craft like a shadow over the smooth surface. After reaching the shore in safety, and landing the canoe, the woman rallied the Mohawk on his credulity. "The Great Spirit is merciful," replied the chief scornfully; "He knows that a white woman cannot hold her tongue."

THE PROPOSED CENTENNIAL EXHIBITION AT PHILADELPHIA.

THE three chief cities of the Atlantic States—New York, Boston, and Baltimore—differ to a marked degree from each other in respect to their architecture, the manner in which they are laid out, the characteristics of their populations, and their mode of living. New York is eminently cosmopolitan. It is built in its lower and ancient wards as though its founders were cramped for room, and found it necessary to make the streets as narrow as possible, without rendering them no-thoroughfares; although in its upper part it is sufficiently commodious and regular. Its population is varied and constantly changing, all nationalities being represented, and the city has the bustling,

busy air that always marks a great sea-port. Boston is laid out with an absolutely woful want of regularity. It is, compared with New York, a quiet city, with a well-known leaning toward art and literature; and it has a conscious air of being exclusive, dignified, and select, which the press and the people of the city have alike carefully endeavored to preserve. Philadelphia, on the other hand, is laid out evenly and regularly. Its industries are so different from those of New York or the metropolis of New England, that they have naturally affected the character of the people, who are domestic and home-loving, and do not build their houses to gain the admiration of passers-by, but with a view to comfort and durability. They have also plenty of room for the extension of the city's area, and have thus taken to the erection of great numbers of small houses for the accommodation of the poorer classes—a style of building that has no parallel in any of our other large cities. When we consider the miseries that attend life in the tenement-houses of New York during the summer months, this is an advantage that cannot be over-estimated. There are very few tenement-houses in Philadelphia. Each household has its own dwelling, which, although small, is at least comfortable. "In other cities," says a writer on this subject, "the question has been to give the working classes clean and comfortable apartments. In Philadelphia it has been how to give them pleasant and attractive homes. It is impossible to place too high a value on the effect of this home influence on the morals and manners of a great city, not to mention the amount of suffering it prevents, and the happiness it confers on families. The quiet atmosphere that seems to rest on its homes, pervades all the active life in the city. The hurrying, jostling crowds that block the lower end of Broadway, are not seen. Men move as if they had time to do all that was necessary. You are not carried away by the restless, feverish existence that makes New York boil like a cauldron. In the latter city, men seem all to be only getting ready to live, as if they had no time to enjoy existence until they had reached a certain goal, towards which they were driving under a full head of steam." In Philadelphia, the inhabitants seem to have modeled their lives on a fixed plan, and move on evenly and quietly to the end. A Philadelphian, it is said, lives nearly twice as long in one year as a New Yorker.

The approaching Centennial celebration of the Declaration of Independence, of which Philadelphia is to be the scene, is designed to be mainly an exposition of the best products of the various States and Territories. An interesting part of the display to American eyes will be that embracing relics of the Revolution. In this respect Philadelphia will have one of the richest contributions to make. Of great interest, too, will its old public buildings be. In Faneuil Hall, the first and boldest utterances were heard in favor of the freedom of the colonies; but Independence Hall gave birth to the Magna Charta of American history. This old structure of old-fashioned red brick still stands as it did nearly a hundred years ago; and visitors will be enabled to look upon the rooms that first heard the well-known words of the Declaration of Independence.

The city of Philadelphia is probably, in territory, one of the largest in the world. Although lying between two rivers, the Delaware and the Schuylkill, it is not bounded by them, and has almost unlimited room for expansion. Although with a much smaller population than New York, it already covers a much greater area, embracing within its limits one hundred and twenty-six square miles. It has also a park—Fairmount Park—lying on the banks of the Schuylkill with the Wissahickon flowing through it. It is one of the largest in the country, and is full of interesting points and picturesque scenes. Much of the natural wildness of the original grounds has been preserved, and presents a fine contrast to the more cultivated parts. There are lovely drives and walks, and the carriage road along the banks of the Wissahickon is as picturesque and beautiful as any artist can wish for.

Philadelphia has also fine modern buildings. Among these may be mentioned the New Masonic Temple, the Girard College, the Union League Building, and the Ledger Building. The wealth and prosperity of the city are owing almost entirely to its factories, which turn out annually wares to the average value of about two hundred and seventy-five millions of dollars. Its iron foundries alone produce more than a third of this amount. The Schuylkill River divides the city into two sections; that lying on the western bank is known as West Philadelphia. It is on much higher ground than the old city, and is built up in finer style.

PHILADELPHIA FROM FAIRMOUNT PARK, THE PROPOSED SITE OF THE INTERNATIONAL EXHIBITION.

THE REGION OF THE JUNIATA.

Peace and Plenty.

THROUGH the wildest region of Pennsylvania flows as lovely a river as there is in the country. Rising in the Alleghany mountains, the Juniata winds its devious way eastward through a hundred and fifty miles of mountain scenery to the Susquehanna, into which it empties. Thirty years ago travelers crossing the mountains to the Ohio River were accustomed to make the journey driving slowly in huge wagons along the banks of this river; to-day the same route is still taken, but it is on the Pennsylvania railroad; and a canal and telegraph line bear the railway track company. With this exception in the manner of transportation, the spirit of progress has made no material change in the Juniata valley. The inhabitants are mainly stolid old Pennsylvania farmers, who entertain contempt for anything new, and to this day prefer the good old-fashioned way of traveling to the "whizz and spit railroads." For the most part of German descent, they lead a life remarkable for its industry, simplicity, and thrift, and most of them are wealthy.

At its junction with the Susquehanna, the banks of the Juniata command beautiful prospects, whichever way the eye turns. Northward can be traced the placid course of the former river, with its green islands and long low sand-bars. Southward, fertile pastures and staid old farm-houses rise in view, while here and there groups of lazy cattle are feeding on the green grass; and westward its own blue waters flow with their treasures of surrounding scenery.

Newport is a little town ten miles up the river. In its neighborhood are fine mountain views and pretty wooded walks along the banks of the canal, and numerous romantic brooks and charming forest nooks and glens. In the vicinity of Millerstown, Mifflintown, and Lewistown—thriving villages situated a little farther up the river—numerous picturesque rivulets and some more pretentious streams come flowing into the valleys. In most of them trout may be captured in abundance, and in the forests an occasional deer may be seen. At Lewistown there is a stream, that is even exceptionably remarkable for the beauty of its surroundings. The path along its banks is shaded by overhanging trees, and leads past little cascades and several charming old mills and cottages, and occasionally an old log-dwelling, with the remains of a capacious fire-place, calling to memory the hardy pioneers who first entered the wilderness of Pennsylvania in dangerous times long ago. And if the tourist be of a romantic nature, he may gather from the old inhabitants rich pages of Indian history and legendary lore.

Westward from Lewistown is the village of Huntingdon, near the upper waters of the river. Here the character of the country begins to undergo a change. The hills wear a more imposing look, and encroach more and more upon the area of the valley. At Petersburg, the railway which for most of the distance keeps very close to the bank of the river, branches off towards a tributary called the Little Juniata. The tourist may take any of the three routes—the river, the canal, or the railway—and in any event may be assured of sufficient variety and entertainment, though the two former give the best opportunities for studying the character of the country.

SCENE ON A CREEK EMPTYING INTO THE LITTLE JUNIATA.

Going up the river one passes Alexandria, which has the honor of being the social centre of the valley. Beyond Alexandria is a little place called Water Street. Here the canal joins the river, forming what the boatmen call slackwater. This is one of the most picturesque spots in the valley. The hills are of commanding height, and the river road for a few miles lies in their shadow. The mountain sides are in many places marked by the debris of occasional land slides—a feature which is characteristic of much of the Juniata scenery.

From Water Street we go on twenty or thirty miles to Hollidaysburg, at the base of the Alleghanies. Here boats and cars were once transported over the mountains through Blair's Summit Gap by a portage railroad—a work of some magnitude whose construction required much enterprise and skilful engineering. It is forty miles long, and ascends to an elevation of two thousand five hundred and seventy feet. There are ten inclined planes on the route, varying in height from $4\frac{1}{8}$ to $5\frac{3}{4}$ degrees, to which the cars were raised by stationary steam-engines ; a tunnel eight hundred and seventy feet long, through the Staple Bend Mountain of the Conemaugh ; and four viaducts—one of which, over the Horse-shoe Bend, is a semicircular arch of eighty feet span. The cost of this road was over two million dollars before the war and the days of paper currency. The necessity for much of this apparatus has since been obviated by the construction of a tunnel.

At this point the journey westward terminates, and returning to Water Street, a pleasant walk of three miles will take one across the country to the railway at Spruce Creek. Although a new town, this is the most prosperous in the Juniata region. A morning's ramble into the neighboring country will disclose as fresh and varied a scenery as anybody can desire. In one place is a broad, dew-sprinkled lawn, in another a dense thicket, and again a little waterfall, while the sterner features of the landscape remind one of the Catskills.

The central or mountain region of Pennsylvania is nearly two hundred miles in length. On one side of this section of country are the meadow lands of the Atlantic slope, and on the other is the fertile basin of the Ohio. The rich soil of the two latter makes them the grain-producing sections of the State, while the central and mountainous territory furnishes vast stores of anthracite coal and ores of various kinds. It is through the latter region that the Juniata flows. Its surface is marked also by numerous parallel ridges of mountains of the Appalachian chain—among which, nearest to the Eastern section, are the South Mountain, Blue Ridge, and the Kittatinny. Through the latter the Delaware passes at the celebrated Water Gap, and the Lehigh river at Wind Gap. These

The Little Juniata—Tyrone in the Distance.

mountain ranges have an average height of a little over a thousand feet, and although they have no element of grandeur, they contain many gems of water and valley scenery. It is in the forty or fifty miles of hill and valley which lie between the Kittatinny and the Susquehanna that the great Pennsylvanian coal-beds lie.

NIAGARA FALLS: PAST AND FUTURE.

A PHILOSOPHICAL DISQUISITION BY PROFESSOR TYNDALL.

WE have now to consider the genesis and proximate destiny of the Falls of Niagara. We may open our way to this subject by a few preliminary remarks upon erosion. Time and intensity are the main factors of geologic change, and they are in a certain sense convertible. A feeble force acting through long periods, and an intense force acting through short ones, may produce approximately the same results. To Dr. Hooker I have been indebted for some samples of stones, the first examples of which were picked up by Mr. Hackworth on the shores of Lyell's Bay, near Wellington, in New Zealand. They have been described by Mr. Travers in the Transactions of the New Zealand Institute. Unacquainted with their origin, you would certainly ascribe their forms to human workmanship. They resemble flint knives and spear-heads, being apparently chiseled off into faces with as much attention to symmetry as if a tool guided by human intelligence had passed over them. But no human instrument has been brought to bear upon these stones. They have been wrought into their present shape by the wind-blown sand of Lyell's Bay. Two winds are dominant here, and they in succession urged the sand against opposite sides of the stone; every little particle of sand chipped away its infinitesimal bit of stone, and in the end sculptured these singular forms.*

The Sphinx of Egypt is nearly covered up by the sand of the desert. The neck of the Sphinx is partly cut across, not, as I am assured by Mr. Huxley, by ordinary weathering, but by the eroding action of the fine sand blown against it. In these cases nature furnishes us with hints which may be taken advantage of in art; and this action of sand has been recently turned to extraordinary account in the United States. When in Boston, I was taken by Mr. Josiah Quincy to see the action of the *sand-blast*. A kind of hopper containing fine silicious sand was connected with a reservoir of compressed air, the pressure being variable at pleasure. The hopper ended in a long slit, from which the sand was blown. A plate of glass was placed beneath this slit, and caused to pass slowly under it; it came out perfectly depolished, with a bright opalescent glimmer, such as could only be produced by the most careful grinding. Every little particle of sand urged against the glass, having all its energy concentrated on the point of impact, formed there a little pit, the depolished surface consisting of innumerable hollows of this description. But this was not all. By protecting certain portions of the surface and exposing others, figures and tracery of any required form could be etched upon the glass. The figures of open iron-work could be thus copied; while wire-gauze placed over the glass produced a reticulated pattern. But it required no such resisting substance as iron to shelter the glass. The patterns of the finest lace could be thus reproduced; the delicate filaments of the lace itself offering a sufficient protection.

All these effects have been obtained with a simple model of the sand-blast devised for me by my assistant. A fraction of a minute suffices to etch upon glass a rich and beautiful lace pattern. Any yielding substance may be employed to protect the glass. By immediately diffusing the shock of

* "The stones, which have a strong resemblance to works of human art, occur in great abundance, and of various sizes, from half an inch to several inches in length. A large number were exhibited showing the various forms, which are those of wedges, knives, arrow-heads, &c., and all with sharp cutting edges.

"Mr. Travers explained that, notwithstanding their artificial appearance, these stones were formed by the cutting action of the wind-driven sand as it passed to and fro over an exposed boulder bank. He gave a minute account of the manner in which the varieties of form are produced, and referred to the effect which the erosive action thus indicated would have on railway and other works executed on sandy tracts.

"Dr. Hector stated that although, as a group, the specimens on the table could not well be mistaken for artificial productions, still the forms are so peculiar, and the edges, in a few of them, so perfect, that if they were discovered associated with human works, there is no doubt that they would have been referred to the so-called 'stone-period.'"—*Extracted from the Minutes of the Wellington Philosophical Society, Feb.* 9, 1869.

the particle, such substances practically destroy the local erosive power. The hand can bear without inconvenience a sand-shower which would pulverize glass. Etchings executed on glass with suitable kinds of ink are accurately worked out by the sand-blast. In fact, within certain limits, the harder the surface, the greater is the concentration of the shock, and the more effectual is the erosion. It is not necessary that the sand should be the harder substance of the two; corundum, for example, is much harder than quartz; still, quartz-sand can not only depolish, but actually blow a hole through a plate of corundum. Nay, glass may be depolished by the impact of fine shot; the grains in this case bruising the glass before they have time to flatten and turn their energy into heat.

And here, in passing, we may tie together one or two apparently unrelated facts. Supposing you turn on, at the lower part of a house, a cock which is fed by a pipe from a cistern at the top of the house, a column of water, from the cistern downwards, is set in motion. By turning off the cock, this motion is stopped; and when the turning off is very sudden, the pipe, if not strong, may be burst by the internal impact of the water. By distributing the turning of the cock over half a second of time, the shock and danger of rupture may be entirely avoided. We have here an example of the concentration of energy in *time*. The sand-blast illustrates the concentration of energy in *space*. The action of flint and steel is an illustration of the same principle. The heat required to generate the spark is intense, and the mechanical action being moderate, must, to produce fire, be in the highest degree concentrated. This concentration is secured by the collision of hard substances. Calc-spar will not supply the place of flint, nor lead the place of steel in the production of fire by collision. With the softer substances, the *total* heat produced may be greater than with the hard ones; but to produce the spark, the heat must be intensely *localized*.

But we can go far beyond the mere depolishing of glass; indeed, I have already said that quartz sand can wear a hole through corundum. This leads me to express my acknowledgments to Gen. Tilghman, who is the inventor of the sand-blast. To his spontaneous kindness I am indebted for some beautiful illustrations of his process. In one thick plate of glass a figure has been worked out to a depth of three-eighths of an inch. A second plate seven-eighths of an inch thick is entirely perforated. Through a circular plate of marble, nearly half an inch thick, open work of the most intricate and elaborate description has been executed. It would probably take many days to perform this work by any ordinary process; with the sand-blast it was accomplished in an hour. So much for the strength of the blast; its delicacy is illustrated by a beautiful example of line engraving, etched on glass by means of the blast.

This power of erosion, so strikingly displayed when sand is urged by air, renders us better able to conceive its action when urged by water. The erosive power of a river is vastly augmented by the solid matter carried along with it. Sand or pebbles caught in a river vortex can wear away the hardest rock; "pot-holes" and deep cylindrical shafts being thus produced. An extraordinary instance of this kind of erosion is to be seen in the Val Tournanche, above the village of this name. The gorge at Handeck has been thus cut out. Such waterfalls were once frequent in the valleys of Switzerland; for hardly any valley is without one or more transverse barriers of resisting material, over which the river flowing through the valley once fell as a cataract. Near Pontresina in the Engadin, there is such a case, the hard gneiss being now worn away to form a gorge through which the river from the Morteratsch glacier rushes. The barrier of the Kirchet above Meyringen is also a case in point. Behind it was a lake, derived from the glacier of the Aar, and over the barrier the lake poured its excess of water. Here the rock being limestone was in great part dissolved, but added to this we had the action of the solid particles carried along by the water, each of which, as it struck the rock, chipped it away like the particles of the sand-blast. Thus by solution and mechanical erosion the great chasm of the Fensteraar-Schlucht was formed. It is demonstrable that the water which flows at the bottoms of such deep fissures once flowed at the level of what is now their edges, and tumbled down the lower faces of the barriers. Almost every valley in Switzerland furnishes examples of this kind; the untenable hypothesis of earthquakes, once so readily resorted to in accounting for these gorges, being now for the most part abandoned. To produce the Cañons of Western America no other cause is needed than the integration of effects individually infinitesimal.

And now we come to Niagara. Soon after Europeans had taken possession of the country, the conviction appears to have arisen that the deep channel of the river Niagara below the falls had been excavated by the cataract. In Mr. Bakewell's "Introduction to Geology," the prevalence of this belief has been referred to; it is expressed thus by Prof. Joseph Henry in the Transactions of

A NIGHT VIEW OF NIAGARA IN OLDEN TIME.

the Albany Institute: "In viewing the position of the falls and the features of the country round, it is impossible not to be impressed with the idea that this great natural raceway has been formed by the continued action of the irresistible Niagara, and that the falls, beginning at Lewiston, have, in the course of ages, worn back the rocky strata to their present site." The same view is advocated by Sir Charles Lyell, by Mr. Hall, by M. Agassiz, by Prof. Ramsay, indeed by almost all of those who have inspected the place.

A connected image of the origin and progress of the cataract is easily obtained. Walking northward from the village of Niagara Falls by the side of the river, we have to our left the deep and comparatively narrow gorge through which the Niagara flows. The bounding cliffs of this gorge are from 300 to 350 feet high. We reach the whirlpool, trend to the northeast, and after a little time gradually resume our northward course. Finally, at about seven miles from the present Falls, we come to the edge of a declivity which informs us that we have been hitherto walking on table-land. Some hundreds of feet below us is a comparatively level plain, which stretches to Lake Ontario. The declivity marks the end of the precipitous gorge of the Niagara. Here the river escapes from its steep mural boundaries, and in a widened bed pursues its way to the lake which finally receives its waters.

The fact that in historic times, even within the memory of man, the fall has sensibly receded, prompts the question, how far has this recession gone? At what point did the ledge which thus continually creeps backwards begin its retrograde course? To minds disciplined in such researches the answer has been and will be, at the precipitous declivity which crossed the Niagara from Lewiston on the American to Queenston on the Canadian side. Over this transverse barrier the united affluents of all the upper lakes once poured their waters, and here the work of erosion began. The dam, moreover, was demonstrably of sufficient height to cause the river above it to submerge Goat Island; and this would perfectly account for the finding by Mr. Hall, Sir Charles Lyell, and others, in the sand and gravel of the island, the same fluviatile shells as are now found in the Niagara river higher up. It would also account for those deposits along the sides of the river, the discovery of which enabled Lyell, Hall, and Ramsay to reduce to demonstration the popular belief that the Niagara once flowed through a shallow valley.

The physics of the problem of excavation, which I made clear to my mind before quitting Niagara, are revealed by a close inspection of the present Horse-shóe Fall. Here we see evidently that the greatest weight of water bends over the very apex of the Horse-shoe. In a passage in his excellent chapter on Niagara Falls, Mr. Hall alludes to this fact. Here we have the most copious and the most violent whirling of the shattered liquid; here the most powerful eddies recoil against the shale. From this portion of the fall, indeed, the spray sometimes rises without solution of continuity to the region of clouds, becoming gradually more attenuated, and passing finally through the condition of true cloud into invisible vapor, which is sometimes reprecipitated higher up. All the phenomena point distinctly to the centre of the river as the place of greatest mechanical energy, and from the centre the vigor of the Fall gradually dies away towards the sides. The horse-shoe form, with the concavity facing downwards, is an obvious and necessary consequence of this action. Right along the middle of the river the apex of the curve pushes its way backwards, cutting along the centre a deep and comparatively narrow groove, and draining the sides as it passes them. Hence the remarkable discrepancy between the widths of the Niagara above and below the Horse-shoe. All along its course, from Lewiston Heights to ts present position, the form of the Fall was probably that of a horse-shoe; for this is merely the expression of the greater depth, and consequently greater excavating power, of the centre of the river. The gorge, moreover, varies in width as the depth of the centre of the ancient river varied, being narrowest where that depth was greatest.

The vast comparative erosive energy of the Horse-shoe Fall comes strikingly into view when it and the American Fall are compared together. The American branch of the upper river is cut at a right angle by the gorge of the Niagara. Here the Horse-shoe Fall was the real excavator. It cut the rock and formed the precipice over which the American Fall tumbles. But since its formation, the erosive action of the American Fall has been almost nil, while the Horse-shoe has cut its way for five hundred yards across the end of Goat Island, and is now doubling back to excavate a channel parallel to the length of the island. This point, I have just learned, has not escaped the acute observation of Prof. Ramsay.* The river bends; the Horse-shoe immediately accommodates itself to

* His words are:—"Where the body of water is small in the American Fall, the edge has only receded a few yards

the bending, and will follow implicitly the direction of the deepest water in the upper stream. The flexibility of the gorge, if I may use the term, is determined by the flexibility of the river channel above it. Were the Niagara above the Fall sinuous, the gorge would obediently follow its sinuosities. Once suggested, no doubt geographers will be able to point out many examples of this action. The Zambesi is thought to present a great difficulty to the erosion theory, because of the sinuosity of the chasm below the Victoria Falls. But assuming the basalt to be of tolerably uniform texture, had the river been examined before the formation of this sinuous channel, the present zigzag course of the gorge below the Fall could, I am persuaded, have been predicted, while the sounding of the present river would enable us to predict the course to be pursued by the erosion in the future.

But not only has the Niagara river cut the gorge; it has carried away the chips of its own workshop. The shale being probably crumbled is easily carried away. But at the base of the fall we find the huge boulders already described, and by some means or other these are removed down the river. The ice which fills the gorge in winter, and which grapples with the boulders, has been regarded as the transporting agent. Probably it is so to some extent. But erosion acts without ceasing on the abutting points of the boulders, thus withdrawing their support and urging them gradually down the river. Solution also does its portion of the work. That solid matter is carried down is proved by the difference of depth between the Niagara river and Lake Ontario, where the river enters it. The depth falls from seventy-two feet to twenty feet, in consequence of the deposition of solid matter caused by the diminished motion of the river.*

In conclusion, we may say a word regarding the proximate future of Niagara. At the rate of excavation assigned to it by Sir Charles Lyell, namely, a foot a year, five thousand years or so will carry the Horse-shoe Fall far higher than Goat Island. As the gorge recedes it will drain, as it has hitherto done, the banks right and left of it, thus leaving a nearly level terrace between Goat Island and the edge of the gorge. Higher up it will totally drain the American branch of the river; the channel of which in due time will become cultivable land. The American Fall will then be transformed into a dry precipice, forming a simple continuation of the cliffy boundary of the Niagara. At the place occupied by the fall at this moment we shall have the gorge enclosing a right angle, a second whirlpool being the consequence of this. To those who visit Niagara a few millenniums hence I leave the verification of this prediction. All that can be said is, that if the causes now in action continue to act, it will prove itself literally true.

SABBATH-DAY POINT, LAKE GEORGE.

ON the western shore of Lake George there is a promontory that is famous in the history of the French and Indian warfare, and in the annals of the Indians themselves. It was here that in July, 1756, Lieutenant Corbierie, with a force of fifty Canadians and three hundred Ottawas, lay in ambush. A day and a night they remained on the watch in their bark canoes waiting for the approach of a body of English troops. At break of day they espied their adversaries, numbering some three hundred, drawing nigh in twenty-two barges, in which they had embarked from Fort William Henry the night before. The engagement was entered into with vigor and resolution on both sides, but the French and Indians soon discovered that they could gain no advantage unless they boarded the English boats. The many massacres which had been perpetrated by the savage allies of the French had made them a terror to the English soldiers, and when the latter saw them approach to close quarters, they became panic-stricken, and pulled towards the bank as fast as possible. Some of them even leaped into the water thinking to escape by swimming ashore; but it was all in vain. The clumsy boats could not outspeed the canoes, and the English were soon overtaken. In the first part of the conflict all that were captured were massacred without mercy, but at length the Indians began to take prisoners. The number of captives amounted to one hundred and fifty-seven,

(where most eroded) during the time that the Canadian Fall has receded from the north corner of Goat Island to the innermost curve of the Horse-shoe Fall."—*Quarterly Journal of Geological Society, May*, 1859.

* Near the mouth of the gorge at Queenston, the depth, according to the Admiralty Chart, is 180 feet; well within the gorge it is 132 feet.

SABBATH-DAY POINT, LAKE GEORGE

one hundred and thirty-one having been killed—twelve only escaping. On the French side, there was no loss at all, and of the Indians one only was slightly wounded.

At night, the Indians having imbibed large quantities of ardent spirits, became blood-thirsty, and roasted and ate several of their prisoners. A French officer named Roubard, whose tent was placed in the middle of the encampment of the Ottawas, says that the first object which met his eyes on arriving there, was a large fire. Near it were wooden spits fixed in the earth to which was fastened the body of an Englishman. The skin was stripped off, and more than one-half of the flesh was gone, and a few moments later he saw the savages eat of the remaining flesh with avidity. Close at hand they had meantime tied ten of the prisoners as spectators of the scene.

Two years later Sabbath-Day Point witnessed the encampment of the greatest expedition ever sent against the French and Canadians. The army comprised 6,350 regulars and 9,000 provincials. The fleet consisted of nine hundred bateaux, one hundred and thirty-five whale-boats, numerous rafts for the transportation of the artillery, and two towers highly decorated, each with two mounted cannon. They landed at Sabbath-Day Point on a Sunday—from which incident the place derived its present name. Montcalm was in command at Ticonderoga, and on the day of the landing sent Capt. De Trepezec, with a detachment of three hundred men to prevent the disembarcation, if possible. The attempt was unsuccessful, however, and only fifty or sixty of the French escaped; De Trepezec being himself mortally wounded. The English loss was only twenty-two, but it included Lord Howe, an officer who was much beloved.

The following day a battalion of Americans advanced to a post within two miles of Fort Ticonderoga, and the remainder of the army followed them the same night. In the morning it was determined to attempt to carry the fort by storm. The French had fortified it in every way possible, and had, in addition, felled oak-trees for nearly a hundred yards in front of the lines, their branches sharpened and pointing outward. At one o'clock the order was given to attack, and the provincials marched up to the works, received the fire, and then turned aside to make way for the regulars. The troops moved on through the swamps and underbrush, and strove to force the impenetrable barricade. A few Highlanders reached the breast-works, but were instantly slain by the enemy's bayonets. All day long the assault was maintained, but in the evening the English were compelled to abandon the field, leaving their dead and disabled behind them. The number of killed and wounded was 1,942. The following day the army re-embarked and returned to Fort William Henry, and the great Abercrombie expedition was at an end.

THE ERIE CANAL.

THE project of digging a canal that would extend to Lake Erie, had been agitated without substantial success at various times previous to 1815. During the latter part of that year, at a public meeting a committee was selected to memorialize the Legislature on the subject. This duty was performed by their chairman, De Witt Clinton, who prepared what is known as the New York Memorial, in which the practicability and advantages of the projected canal were set forth so clearly and forcibly that the opposition to the scheme fell into a minority. Petitions were presented, signed by thousands of citizens throughout the State, praying for an appropriation for the work, and, finally, the Legislature made an appropriation. A Canal Fund was established, special taxes were levied, and the work was commenced.

On the 4th of July, 1817, the first spadeful of earth was removed from the surveyed route amid the acclamations of a large concourse of persons, who, says one of the chronicles of the day, "exulted in the past, enjoyed the present, and anticipated the future." From that time the work progressed rapidly, although it still met with considerable opposition. Governor Clinton was its most devoted friend, and eloquently expatiated on the advantages which agriculture, manufactures, and commerce would derive from it. Indeed, so persistent were his efforts in its behalf, that the canal is still known by the *alias* of "Clinton's Ditch."

The western and last section was completed in 1825, eight years after the beginning of the work, and the success of the undertaking was announced by the firing of cannon all along the route. And

in truth it was a success of which its projectors had reason to be proud. They had constructed an artificial stream three hundred and sixty-three miles long, forty feet wide on the surface, twenty-eight feet at the bottom, and four feet deep, containing eighty-three locks, built of massive stone, of which the chambers are ninety by fifteen feet, and capable of containing boats of more than a hundred tons burden. The difficulties that had been overcome on the eastern section of the canal in the neighborhood of Little Falls, were the most formidable of all. In speaking of this section the Canal Commissioners, after pointing proudly to the fact that American skill had done in eighty days what a foreign engineer had estimated would require several years, say: "None but those who had examined the line previous to the commencement of the work—who had seen the rude and undulating surface which is traversed—the rocks which were to be blasted—the swamps and quicksands which were to be made impervious to water—and, in short, the huge masses of rough materials which with uncommon labor were reduced to symmetry and form, can duly appreciate the efforts which it has required to surmount these serious difficulties." And, in conclusion, they say that "had this portion of the work been begun originally, while their information respecting the construction of canals was only theoretical, the attempt would have defeated, or at least postponed for a century, the accomplishment of the great work of internal improvement."

Grain-Boat on the Erie Canal.

The difficulties that met the engineers at Lockport—the canal-boats here enter successively five locks, built of solid masonry, which lift the heavy boat, with its two hundred tons of cargo, seventy-five feet in a few minutes—were also of no ordinary kind. They had to cut through three miles of stone, and build the immense locks, which gave the town its name, in the face of numerous and serious obstacles. But they persevered notwithstanding all discouragements; and, at last, the work was completed. Then came a season of rejoicing that has not been equalled in the history of the State. The Governor, in the company of prominent officials, and with many distinguished citizens, traversed the canal, starting from Buffalo, the party being conveyed in a fleet of canal-boats, drawn by gayly-caparisoned horses. Along their whole route they received one continual ovation, at every town the municipal authorities being on hand to welcome them and to exchange congratulations. The newspapers of the day teemed with accounts of the ceremonies. The festivities lasted ten days, and were participated in by nearly the whole population of the State. The wildest and most extravagant prophecies were made respecting the vast wealth the canal would attract to New York city. The whole of the West would send their grain products over its waters. Other States would follow the example of New York, and would build tributaries to the great Erie canal. Governor Clinton poured some of the water of Lake Erie into the Atlantic Ocean to commemorate the communication which had been established between them, and the Common Council of the city of New York published a huge memorial of the ceremonies attending the final celebration.

That to-day with long freight-trains rolling daily over the track of the New York Central Railway, almost side by side with the canal, it should still be a very important aid to freight transporta-

tion, shows that the enthusiasts of fifty years ago were not altogether wrong as to its importance. When the Spring thaw sets in, and navigation suspended during the Winter is resumed, thousands and thousands of men obtain employment in various capacities on the many boats; and there is reason to believe that the freight business of the Canal may yet increase immensely. It has been estimated that the total amount of freight transported from the cereal-producing States of the West to the Atlantic sea-board approximates ten millions of tons annually. Of this the Erie Canal carries alone three millions of tons, notwithstanding the fact that the Canal is only open for six months, and that its great rivals, the New York Central Railroad, the Pennsylvania Railroad, and the Baltimore and Ohio Railroad, are in operation the year round. Exclusive of its branches the Erie Canal, from Buffalo to Albany, is 320 miles long, and about 28,000 men and boys are employed in various capacities in operating the boats during the season, and the number of horses and mules used for towing is about 16,000. In the busy season nearly a hundred and fifty boats reach tide-water through the Erie Canal daily, each boat containing more cargo, according to an eminent engineer, than the average railroad train, or more in the aggregate than twenty miles of railroad trains could carry. Yet it has well been said that while the plodding canal-boat attracts no attention, the railroad train creates a sensation in every village through which it passes. Standing in the roadway or sweet meadow land, attention never rests upon the boat that is gliding through the narrow inland waterway; the extent of the system is rarely dreamed of, so methodical and unobtrusive is it; but should a delay occur at one of the locks, in twenty-four hours hundreds of boats would accumulate, with as much grain on board as would feed a nation for at least one day.

A recent writer in *Harper's Magazine* gives a vivid description of the habits of those engaged in this traffic: "There is a vivid charm about all migratory people, and in vagabond adventure and vagabond life we find the breadth and color which elevate the commonplace into the romantic. The changing scenes and multifarious experiences stimulate the memory, quicken the eye, and loosen the tongue. Among those whose vagabondage is a necessity, and valuable commercially, are the canal-boat men. In their vessels they have their homes, their wives, and their children. While they are moving toward the sea-board or to the West, babies are born to them, children are schooled, and young men and women are married. A few own homes on shore, and do not allow their wives to accompany them, but most of them have been brought up in a cabin less spacious than a tent. They are cleanly and moral; the common schools have had no uses for them; but in wandering from hamlet to hamlet and city to city, they have acquired singularly varied knowledge, and habits at once creditable to themselves and interesting to the observer."

Of the life on board the boats and the scenes to be viewed from them, he further remarks: "From the windows of some cabins floods of hospitable light poured, revealing domestic groups at supper, reading and sewing; with the voices of men and women mingled the soft, swelling tones of a parlor organ, and the less musical clicking of several sewing-machines. Contentment and tranquillity rested upon these water-homes, a gentle spirit pervaded them, and though they were ever moving, the bonds within seemed permanent and strong. There was no riotous conduct, little loud talking, scarcely anything stirring but the water rippling about the stern. The inexpressibly delicate outlines of the river banks, and the unclouded, infinite vault above, spread their influence over the good and bad, the rough and gentle, of the cortege alike. Mothers were hushing their children to sleep on some decks, and to complete the picture there loomed in evening light a young boatman bending over the side of his own craft to clasp the hand of his sweetheart on another. Shrewd with strangers, among themselves these people are simple and generous. Our captain's two daughters were his idols, and of his plans to give them pleasure there was no end. The tough old gentleman was little addicted to profitless day-dreaming, but in speaking of his girls his vision expanded and elevated him to the region of the idealist. At sunset on our second evening out, as the sky was lost in seas of golden light, he stood, drawn to his fullest height, on the roof of the cabin, with his head uncovered, and, while his profile was stamped in clear relief on the glowing expanse, he tenderly spoke to his wife and us, seated below, of the bright future he intended his eldest daughter should have. Unconsciously his attitude and words expressed the glory of paternal affection, and the wisdom and far-looking thoughts which spring from it."

"The purest democracy exists among boatmen; obedience is necessarily exacted, but otherwise employees have little reverence in the treatment of their superiors. They eat at the same table, and are waited on by the captain's wife. While the captain was dozing on deck one of his men would coolly take his pipe out of his mouth, and use it himself. His stories were openly winked

BLUFF ON THE ERIE CANAL, NEAR LITTLE FALLS.

at, and his manner of calking his own deck loudly depreciated in his presence. All was borne with toleration, and retorted to with somewhat uncouth wit but with good-will. Profanity, by-the-bye, is the commonest sin of the boatmen, and they blaspheme in cold blood, without the enthusiasm or scientific precision of the sailor, and without the idiomatic richness of the Californian."

"Before nightfall we had more glimpses of perfect rural scenery: level miles of velvet-like turf, in superb condition, bounded by hills of the gentlest contours; fields of strong young grain curling and singing at the touch of the evening breeze; neat homes hedged in with greenery; and paths winding toward lovely villages in the hazy distance. The landscape is too calm to be distinctively American: it is not rugged, and the colors have little body. Wells of light seem hidden in the foliage, and stream out at every crevice; it is surely the land of an olden country.

"Night on the canal has the enchantment and mystery of the night upon the ocean. Cool breezes sweep over us, and if the horizon is interrupted at all, it is by the graceful lines of some hill that holds the resplendent tints of the declining sun, and lends nobility to the prospect. As the stars gleam out, myriads of fire-flies imitate them on either bank, and flash across the calm surface of the stream. Each boat carries a brilliant lantern in the bow, which disperses a circle of yellow light on the watery track ahead. The tow-lines dip occasionally with a musical thrill into the water, and in advance you may hear the steady thud of the horses' hoofs on the ground, or the low cry of the driver as he urges them forward. At the stern the helmsman is singing in a plaintive measure, until a lock engages him. His voice is then deepened. 'Lock be-l-o-o-w!' he calls to his mate; 'Ste-a-dy, ste-a-a-dy!' to the driver. There is a momentary clatter of feet upon the deck: we rise smoothly to the new level; the lock lights fade; quiet again, and we are traveling with the softness of a dream toward the amber morning."

The passage of the Canal near Little Falls, of which we give an illustration, under the lofty bluff which springs at this place from the edge of the Mohawk, is one of the most beautiful of the many beautiful features disclosed to the voyager on this great outlet of the West. No traveler sees a greater variety of fine objects within the same distance than the follower of the Canal from Schenectady to Buffalo.

For a long time the introduction of steam on the Canal has been a problem over which many minds have cogitated. The agitation for cheap transportation which has of late convulsed the West, taken in connection with the bids that other Atlantic cities are making to become the entrepot for the shipment of its productions, has directed much attention to this subject. The difficulty has never been merely in the use of steam, for propelling boats, but in the necessity for competing with horse-power in point of economy, and for preventing the waves from washing the banks of the Canal. The State offered a large reward for the invention of a steam-engine that would meet these two obstacles, and in a competitive trial during the Fall of 1873, Mr. Wm. Baxter was awarded the first prize. The official record of the trial trip marks the speed of the Baxter boat at $3\frac{8}{100}$ miles per hour with a consumption of $14\frac{88}{100}$ pounds of coal per mile, while carrying a load of more than 200 tons in addition to her machinery and fuel. It was estimated by the Commissioners of Award that the adoption of the Baxter boat on the Canal would result in an annual saving of $4,000,000, since freight can be carried at twice the speed for one-half the cost of horse-boats. This is considered a solution of the problem of steam canal-boats, and vastly enhances the importance of the Canal as a part of our system of internal improvements.

The cities of Buffalo, Rochester, Syracuse, Utica, Rome, Schenectady, and Albany, are on the Erie Canal, and almost entirely by its means is the transportation of heavy freight and grain between these cities and the smaller towns on the line accomplished. One of these long, low and narrow canal-boats will contain from one to two hundred tons of freight; they are built mainly with a view to strength, and owe their peculiar shape to the small width of the canal. Syracuse is one of the principal towns on the Erie Canal. For many years it has been largely engaged in the manufacture of salt, and the Canal has greatly helped the commercial prosperity of the city in furnishing a cheap medium for the transportation of its staple. The salt-works at Syracuse are comparatively extensive, and the shipments from them are very large. Buffalo, which is now a large city, was not much more than a village at the opening of the Canal in 1825. Rochester, Utica, and Syracuse were insignificant country places, while a host of the minor towns that now lie on its banks were not in existence. It may, in truth, be safely said that to the Erie Canal New York owes much of the wealth and prosperity which she to-day enjoys.

IN THE ADIRONDACKS.

THE Adirondack wilderness has of late become a favorite resort, owing to its proximity to settled communities and its many attractions to the sportsman and tourist. The Adirondack region or North Woods, as it is often called, lies between Lakes George and Champlain on the east, and the St. Lawrence river on the north and west. Its area is about equal to that of the State of Connecticut. It reaches northward to the boundaries of Canada, and southward to Booneville. The southern part, known as "Brown's Tract," is the least interesting. It lacks the wild landscapes, the numerous lakes, and the lofty mountains of the northern countries, and is tame in comparison. The real wilderness, above the Raquette river, is as primitive and natural as can be imagined. The forests are immense and imposing in their solitude. The axe of the lumberman has made no inroads upon them, and therefore, the vestiges of deserted lumber camps do not, as in the Maine forests, interfere with the picturesqueness of the landscape. The air is clear and bracing, and at all times free from malaria. An artist who has traveled all over Switzerland, and through the Rhine and Rhone regions, says that he has nowhere found scenery which, judged from a purely artistic point of view, combines so many beauties with so much grandeur. It is estimated that a thousand lakelets, many yet unvisited, are walled in by these vast forests of pine and hemlock. The Rev. W. H. H. Murray, to whose enthusiastic descriptions the Adirondacks owe much of their recently acquired celebrity, counted, from the summit of a mountain, forty-four with the naked eye.

This region has been called the "Sportsman's Paradise," from the fact that most of the sporting can be done from a boat, the whole country being intersected by a chain, or to speak more correctly, by a system of lakes. It is not necessary to undergo long and tiresome tramps through undergrowth and brambles, over swamps and morasses, with drooping branches to flap in your face, carry off your hat, or otherwise try your patience: but you glide along the quiet waters of the lakes, or paddle along the windings of the rivers, overhung by the outlying pines, and fringed with water-lilies that mingle their fragrance with the clear mountain air. You save your strength and your temper —and these are very important considerations to amateur sporting-men, whose chief aim is health, recreation, and amusement.

A guide is indispensable on a trip into the wilderness, and much of the tourist's pleasure depends upon the man he chooses. So many people now make annual excursions to the Adirondacks that, in the height of the season, a good guide is difficult to obtain. To those who wish to camp out, the necessary provisions are salt, coffee, sugar, condensed milk, &c.; enough venison and trout can be obtained in the wilderness to satisfy all wants. The favorite season for these excursions is midsummer. The snow has then melted from the mountains, and the climate is dry and delightful, the thermometer ranging between seventy and eighty degrees: the water is not very high, and the portages are in good condition.

Game of the larger kind is plenty. The woods are so unfrequented that the deer have not yet been driven away, but they are no longer to be seen in droves. Trout are plenty everywhere, and at times the water seems almost alive with them. It is also said that amid impenetrable jungles in the most secluded districts more dangerous inhabitants are still established in their hidden lairs: but the only evidence of the panther having frequented these mountains must be looked for in the stories with which the guides beguile away the hours spent around the camp-fire. Black bears and wolves are still numerous in certain districts, but they appear to have concluded a permanent truce with visitors, and are rarely seen on the banks of the lakes, even during the depth of winter, and their chief object seems to be to escape observation and molestation.

The extraordinary number of mountains (it is said that not less than two hundred distinct peaks can be counted) are the true glory of this region. To quote the imagery of an accomplished writer to whose work we are indebted for much information, "they are so compacted that their bases sometimes touch. So wildly disjointed and irregular is the system of mountains, it stands as though an ocean tossed by tempest had been suddenly congealed, and these strange heights had in ages following become clothed and in their right mind." Many of the passes between these mountains have been only partially explored, but if the present yearly accession to the ranks of the tourists who visit this region continues, the spirit of inquiry and adventure thereby necessarily engendered will doubtless cause some of these passes to become as famous as certain portions of Switzerland.

IN THE WILDS.

From the graphic description of his trip on the lakes given by S. I. Prime in his admirable book, *Under the Trees*, we subjoin the following. Mr. Prime started from Paul Smith's Hotel, passed through Spitfire Lake, and then, after traversing a narrow passage, reached St. Regis Lake, the upper. "This is nearly on the summit of the lake region, 1,500 or 2,000 feet above the sea, its waters flowing off to the north, and the lakes into which we are soon to come discharging themselves eastward, and then northeasterly into Lake Champlain. A sense of exquisite beauty filled me as the skiff glided gracefully into the midst of this lovely sheet of water. The sun was now well up in the blue, cloudless sky. Many isles lay around on the bosom of the lake. They and the shores were covered with dense pine and spruce trees. The water was like a polished mirror of steel. The islands were reflected. So was the heaven above me. Sometimes over the forest shores the distant ranges of mountains told me there was a world beyond and out of the limits of the bowl in which I was floating. But the lake seemed as a little sea of glass, clear as crystal, brilliant in the sun, skirted with living green, evergreen, and the feeling of the place was that of perfect isolation from 'the world and the rest of mankind.' During all the tour of these and three or four lakes yet to be mentioned, I did not see a boat or the face of a man, or anything to intimate that one had ever entered this charming desert before. No voice, no gun, no bark of a dog in the all-surrounding forest disturbed the deep serenity of the scene. Now and then the scream of a loon, fearfully like that of a human cry, would pierce the ear and increase the stillness as it ceased. But for my guide, who happily was stupid and said nothing, I was the only man there. It was a natural paradise, and I was as solitary as Adam before Eve appeared. Charles V. said of the cathedral of Burgos, such was its beauty, it should be put under a glass case and kept for show. It was almost painful to me that the loveliness of this scene is lost to the world. Why is such a waste of glory here? The sun shines on nothing more charming to behold. Here it lies, and the summer dies away into winter; and then the spring clothes it with resurrection beauty again. Perhaps the angels see it. But why was so much glory spilled where so few mortals, out of millions, ever see it?

"We touched the southern shore of the lake and stood in the margin of a dense forest, apparently impenetrable, certainly gloomy, damp, and cold. Out of the thicket emerged an old man, in many-colored and patched raiment, with long and matted beard and hair, who was not far above his companions of the woods, and this queer old fellow had with him a horse and a sled. Without words, for his business was understood by the guide, who knew where to meet him, the little boat was pulled out of the water and hoisted upon the sled, and we three trudged behind it as the beast drew it along over the damp, swampy way that had been made for this purpose. This is called a 'carry.' The old ferryman proved to be a character, a Frenchman, whose first name was Moses.

"At the door of the cabin of Moses the Trapper we embarked on Big Clear Pond, a round lake, with no islands in it, and four miles in diameter. The wind had now risen, and as the little skiff danced about merrily, my dull guide sought to entertain me with narrow escapes he had made on former excursions, when he had ladies for passengers, who had been frightened greatly on this very lake, which has a fine sweep for the wind, and easily makes a great swell."

Of the Upper Saranac Mr. Prime says: "This is the queen of the lakes. It is nine miles long, with irregular shores, wooded points putting out and making lovely nooks and bays, with frequent isles floating, as it were, on the surface. Some of these islands have traditions hanging around them, and one of them will be pointed out for years to come as the scene of a tragical event that happened upon it this very season. At the close of a very fine day last spring, a man and his wife had rowed out to the island, and were sitting near the shore enjoying the sunset. A gentleman out on the lake with his guide and boat espied something white on the island, and the guide insisted that it was a loon. The gentleman was not satisfied, but the guide took his rifle and fired, killing the woman on the spot.

"A map of this wilderness country will show a hundred and more lakes to the west of the one we are now passing through, and weeks as easily as days might be spent in going from one to another; but the journey would become tedious perhaps from sameness. Sweets cloy. This chain of lakes is 'linked sweetness long drawn out.' It is a system of lakes, rather than a chain. Raquette Lake is the largest of them all, with a shore of ninety miles, and it is 1,800 feet above the sea, and the Blue Mountain rises east of it 4,000 feet high, with a lake of the same name at its foot, esteemed the Pearl of the Wilderness. Raquette River enters Long Lake, sixteen miles long, and coming out of it, is navigable for thirty miles, and then enters Tupper's Lake, more celebrated for its picturesque beauty than any of the many around it. When the river leaves this lake again, it rolls its

UPPER AUSABLE LAKE.

augmented volume out of the wilderness into the fertile fields of St. Lawrence County. Thus the whole length and breadth of this strange country may be traversed by boats so light as to be easily carried on the shoulders of a man."

It is apparently a labor of love to describe this region, and this is what the Rev. Murray has to say of it: "If you go in by way of the Saranacs, do not camp down there, as some do, but pass over Indian Carry through the Spectacle Lake and Ramshorn Creek (sometimes called Stony Creek), into the Raquette river. Then turn up or down, as you please. If you desire to see some of the finest scenery imaginable, pass up the Raquette to Long Lake, and when some two miles up the lake turn your face to the north, and you will behold what is worth the entire journey to see. Then go on and do not camp, until you do so on the southern or western shore of Raquette Lake. Here you will find good sporting and scenery unsurpassed. Build here your central camp, and as soon as you are established go over to what is called the Wood's Place, and from the knoll on which the house stands, you will see one of the finest water-views in the world. Then visit Terrace Lodge, on an island to the front and left. From thence paddle to Beaver Bay, and you will find a point in it from which you can arouse a whole family of sleeping echoes along the western ridge and the woods opposite. Then go to Constable Point, and quench your thirst in the coolest, sweetest spring of pure water, from which you ever drank. Go next to the southern part of the lake, so hidden behind the islands that no one would suspect what a lovely sheet of water lay beyond, with its two beautiful reaches of softly shining sand, one as white as silver, the other as yellow as gold; and in the waters which lave the golden, you will find the best bathing in the whole wilderness. Do not leave this region until you have made an excursion to that Lake George in miniature, Blue Mountain Lake, and fill your mind with an impression which will remain in memory as one of the sweet and never-to-be-forgotten recollections of life. When you have retraced your progress up, and reached the mouth of Ramshorn Creek, keep on down the Raquette until you have swung round to Big Tupper Lake, and stood on the sloping edge over which the outlet of Round Lake and Little Tupper pours its full tide in thunder and foam; and if it be not too late in the season, and you know how to use the rod, you will raise, amid the froth and eddies of the falls, some of the largest and brightest-looking trout that ever gladdened a sportsman's eye. Then, if you are robust and full of pluck, force your way over the four-mile carry between the falls and Round Lake, and, hurrying on through its sluggish waters, do not pause until you enter the narrow secluded stretch of Little Tupper. As you pass out, visit the St. Regis waters, by the way of Big Wolf and Rollin's Pond and Long Pine, and so circle down to Martin's."

This would make a trip that would take in all the beauties of the Adirondacks.

The feat known as "running the rapids" is one that has long been practiced by the boatmen of Canada and the northern part of the United States. Rapids are so numerous in the smaller of the North American streams that if boatmen were compelled to make a circuit of each of them, a voyage would be decidedly laborious; but they use, light canoes and cedar shells, many not drawing over two inches of water, which are peculiarly adapted to the purpose, and with these they "run the rapids." The rapids of the Raquette river in the Adirondacks are three miles in length, and so turbulent that, until recently, even the experienced guides would not go over them. It is a stretch of madly-rushing water, save where, at the foot of some perpendicular fall, there is a "gool" studded with bubbles, and flecked with patches of froth. The river is full of boulders, among which the water glides smooth and deep, or it dashes with foaming violence against them. At various places the river with great swiftness shoots down steep declivities, and at others pours over perpendicular falls. But these waters were safely run by Mr. Murray, who strapped his rifle, rod, and baggage to the bottom and sides of his boat, and prepared everything so that, in case of catastrophe, he could swim ashore, and let his baggage follow him.

Nearly every one, no matter how little of a sportsman he may be, knows that deer traverse the native forest through what are called "runs." These natural pathways, hardly perceptible to unsophisticated city people, are well known to all the hunters and guides, and always lead to water, to which the instinct of the deer causes it to fly whenever alarmed. This propensity is a fatal mistake where deer-shooting is pursued in the methodical manner which prevails in the Adirondacks:

"The brave, hardy, eager gentlemen from New York and other cities are now prepared to go out the next morning to renew the chase. They go two or three times a week, and as the hunt is attended with great expense, exposure, and fatigue, and many are to share in it, it is just that each should have a fair chance to bag the game and glory of the day. The shore of the lake is laid off

DEER ON LAKE ST. REGIS, AT NIGHT.

into sections, and each section has its point of observation. These points are a considerable distance asunder, and lots are drawn by which the station of each one going to join the hunt is determined. This allotment is made overnight, that when early morning comes, each brave deer-slayer repairs to his post, and with all the patience he may possess awaits the issue. With him, in a light boat, is the guide, who rows and knows the spot to which his man is assigned. The boat soon reaches the point, and nothing is to be done but to wait, in it or on the shore, as the wary and anxious sportsman pleases. Thus the lake is environed with the watchful picket guardsmen.

"In the mean time a real huntsman—a paid and experienced man of the woods—enters the forest, with a leash of hounds, some six or eight, attached to his belt. Well in, he lets off a dog, trained to the service and eager to have a run, who begins at once to run in a circle, widening constantly as he seeks to get upon the trail of a deer. The hunter goes on and lets off another dog, and then another, until he has started his whole pack, who, running in circles, scour the whole forest, and seldom fail to scare up a buck. The moment the dog strikes the scent he begins to bark, and the glad sound meets the distant ears of the waiting watchers on the lake. The deer, alarmed, instinctively takes to the water, as the only way to break the trail and deprive the dog of his scent, by which he is keeping up the chase. The noble animal rushes through the forest into the lake to swim across. He is the prize of the boat nearest to which he takes the water. The guide rows in pursuit of him, and being able to row far more rapidly than the poor beast can swim, has no difficulty in overtaking him. When he has come so near that the merest bungler with a gun, who could not hit a barn door across the road, can now put the muzzle of the gun into the ear of the animal, if he please, the gallant Nimrod blazes away with his new rifle, lodges the bullet in the brain of the beast, and the work is done. If the deer, however, will not keep still long enough to be shot in this way, the guide takes him by the tail and holds him while the accomplished sportsman shoots him in the head. It sometimes occurs that even then, with the buck thus held by the tail at one end and the rifle in the hands of an excited shooter at another, the ball goes all abroad and the game is not hurt. Then the guide, with an oar or with his own stalwart arms, manages to get the animal's head under water, and so drowns him. But in the best of the business, it requires the same amount of science, skill, valor, and endurance to kill a deer, that it would to go out to the barn and kill the cow. Give the cow the run of the yard, and it would be more of a feat to bring her down with a rifle than to slay a deer in the Adirondacks."

The annoyance from insects is considerable, but even this has been greatly exaggerated. The "black fly," a small dark-colored fly about the size of a red ant, is plentiful during the earlier months of the summer, but disappears in July. Its bite, though annoying, is not poisonous, and abundant protection may be found against it. Mosquitoes and gnats are also numerous in some localities, but if care is taken in the selection of the camps, they will not be very troublesome. A headland or a point over the lake, where the wind is felt, or an island, is the best ground for camping, so far as insects are concerned; but under any circumstances it is a trifling drawback to the healthfulness and enjoyment of life in the woods. The climate is here so genial and constant, and the air is so clear and balmy that even people in the most delicate health may "camp out" without risk. The atmosphere is odorous with pine and cedar and balsam, and free from all impurities. Nevertheless, the most intelligent opinion is that these solitudes are not good places for those unfortunates to visit who are afflicted with consumption: but as a place to recuperate from the insidious diseases that arise from a too intense application to sedentary pursuits, this district is generally conceded to be without a rival. Those of good physical strength, but worn down with brain work, recruit with a rapidity which can only be described as being little short of marvelous. Scarcely any physical exertion is required on the trip. Walking is unnecessary during the hunting, fishing, and sight-seeing, all that being done from the boats; and the visitor is reduced to pedestrianism only when going and coming across the "carries," which, in the parts most frequented, are generally short, and with few exceptions, afford good walking ground. There are some parts, it is true, where no ease-loving tourist dare venture—places where the portages are mere swamps, and the boat and traps must be dragged or carried, while the hardy adventurer is waist-deep in mud and water. But guides have no particular love for such localities, and, unless otherwise expressly directed, will keep at a respectful distance from them.

THE WONDERS OF THE COLORADO RIVER.

FORMED in the southwestern part of Utah by the union of the Green River with the Grand, the Colorado rolls southward through a part of Arizona, into the Gulf of California. There are few streams in the world which are so extraordinary in their formation, and so singular in their history and reputation, or which are characterized by natural scenery at once so peculiar and so sublime.

Although the river, measured from the source of the Green, is nearly two thousand miles long, and is the largest American tributary of the Pacific, two causes render it to a great extent unnavigable, and will undoubtedly keep it so forever. The first is its excessive decrease in volume during the dry season; the other is the formation of its bed, by which a thousand impassable barriers are presented to the navigator. The stream is marked in many places for long distances by a succession of rapids of extraordinary violence and forbidding hazards, and these alternate in endless variety with cataracts, whirlpools, and powerful eddies. At one point, the stream has cut its way by the wear of ages through a jutting angle of solid rock, and is sucked with irresistible force through its new channel; at another, it rushes along a declivity as steep as a house-top with the speed of a locomotive. In some places the river is impassable even to the smallest boats; as for craft of a greater size, it is altogether useless to think of making any headway with that. Below these obstructions there is to the mouth of the river an unimpeded distance of over six hundred miles, and this during certain seasons can be traversed by steam; but when the water has fallen, large vessels can get no further than thirty-five miles from the outlet.

But what is most remarkable about the Colorado and its tributaries, is the extraordinary character of its rocky banks—its cañons. These impart to it the unparalleled scenery for which it is famous, and make it a stream like which there is no other. These cañons are over five hundred miles long, the Grand Cañon being alone over two hundred.

The cañon is a frequent physical feature of the Pacific and southwestern regions of the United States. It is simply a deep ravine or gulch—an extended fissure in the earth—and is peculiar only in respect to great magnitude and imposing aspect. Cañons of enormous depth are found in the vicinity of the Rocky Mountains, and some of the greatest are within view of the cars of the Overland railroad. But there are certainly none more marvelous, in all respects more profoundly impressive, than of the Colorado.

In these mountain passes the river takes its course between perpendicular banks of solid rock that rise to a stupendous height. We seem to be in the very heart of the earth. On the black waters flowing between their mighty walls there is profoundest gloom. An unearthly chill, an inexplicable dread, seizes upon the adventurous travelers floating on those dark tides. Perhaps the silence of the grave is about them, or perhaps to their ears is borne from the mysterious unknown ahead, shut out from their view by the cliffs that hem them in, the roar of an untried cataract or a tumultuous rapid. As high as they can lift their eyes only the perpendicular face of rock, seamed by many varied geological strata; and straight overhead like a blue ribbon suspended far, far above them, a narrow strip of sky.

From the giddy height above, the spectacle has not less of awful sublimity. Looking down upon the stream below, it is like a band of silver barely a foot wide laid along the bottom of the profound chasm; or if at night, with the moon's rays falling between the rocky walls, the whole abyss may be aglow, and a vein of golden splendor seam the earth.

One of the most impressive of these cañons is represented in our illustration. Our two minor illustrations give views of Moqui, one of the stone cities of Arizona, inhabited by the Pueblos or Moquis Indians. This tribe is by some supposed to be descended from the Aztecs, or from their predecessors the Toltecs; but whatever their origin, their stone towns are certainly unique, and like their religious and social customs and their national or, rather, tribal character, are of much interest. These towns are built upon commanding eminences overlooking the Colorado River, and can be approached only through narrow defiles in the rocks on which they stand. The houses are of mud and stone, two and three stories high. They are entered by ladders reaching to the second story, and when these temporary stairways are drawn up, as they are made to be, each dwelling becomes in truth a castle, and a strong one at that, as was conclusively shown during

the Mexican war, it being then found that they were proof against field-artillery. It is supposed that their former inhabitants were a quiet, industrious, agricultural people, who built these curious dwelling-places for protection against wandering tribes of savages. Traces of their existence are found not only along the Colorado, but all over that region, in pottery, fallen houses of stone and adobe, and curious hieroglyphics.

Many of the stone cities are without populations, like many of the stone houses. They are fallen and deserted relics of a once numerous people—perhaps of a civilization. Of the seven inhabited towns the average population is about three hundred each. Each town has its own chief, and is entirely independent of the others; but the people are all well-acquainted with each other, associate, and have the same religious faith and social customs. They are peaceable and hospitable, though not free from some habits which are natural to the savage the world over. Their religious belief is very remarkable, considering their location. Every morning they mount the roofs of their houses, and turning eastward, render homage to the rising sun. At the same time a number of men, girdled with strings of bells, start off toward the East, and run a mile or so at full speed, while their bells fill the air with a wild jingling; then they return, the people on the house-tops come down, and the uproar ceases. The reason for this curious usage is a tradition which is extant among them, that on some future day Montezuma will come to them from the sun, and restore their ancient glory. They, therefore, send out an escort every day to receive him, should he happen to make his appearance. Not less singular is their belief that the time of their restoration depends upon the condition of their habitations; and the sooner the latter have fallen into utter natural decay, the sooner will the former arrive. Thus it comes to be a part of their religion to let everything go to rack and ruin. They are even said to have refused aid from the United States Government.

One curious legend that is said to be extant among them is related in this wise: "In times long past a woman of superior beauty resided among the neighboring mountains. All the men admired and paid court to her. She received the tributes of their devotion, grain, skins, etc., but gave no favors in return. Her virtue and her determination to remain secluded were equally firm. There came a drought which threatened famine. In their distress the people applied to her, and she gave them corn from her stock, and the supply seemed to be endless. Her goodness was unbounded. One day, as she was lying asleep, a drop of rain fell upon her, and produced conception. A son was the issue, who became the founder of the race that built these cities of stone." In Oribay, one of the seven towns, an old woman is still said to be living that has the blood of this marvelous being in her veins, and like her progenitor, was once possessed of wonderful beauty. She receives general reverence.

The town of Moqui which is represented in our illustrations, is situated on a cliff that is at least fifteen hundred feet high. The top of the cliff is wedge-shaped, half a mile long, and at its widest part perhaps two hundred yards across. On the same rock are two others of the stone cities. Water is obtained from reservoirs that have been hollowed out in the surface of the rock; but these are sometimes exhausted, and it then becomes necessary to go to the foot of the cliff.

These strange Indian cities are certainly of sufficient interest to be mentioned even in connection with the wonderful Colorado. So different are the Moquis in their customs, character, desires, and belief from the other Indian tribes of that vicinity, that a totally different origin is almost necessarily inferred. It is true that their descent from the Aztecs or the Toltecs is not fully established, but it is certain that in their habitations, in their modes of life, and in their traditions there is much to make such a hypothesis probable. And here they live on the bluffs overlooking the Colorado, in their decaying cities, a dying people, and the nearer they come to their extinction, the nearer believing the advent of their redeemer to be, and their restoration to national power and glory.

The Moquis cities were visited in 1871 by Mr. E. O. Beaman, a member of the expedition that explored the Colorado in that year. The experiences of this expedition are full of vivid interest. For a long time the Colorado, as well as the Green River which helps to form it, had been the subject of the most marvelous stories. In the sixteenth century a Mexican exploring party reported the discovery of a river with banks so steep they could not be scaled or descended, and nine miles high. About one hundred years ago a Spanish priest, who had visited the Colorado, writes that the banks were so high that "a rock which, when lying in the river and seen from the cliff, appeared no larger than a man's hand, was found to be, at the water's level, as large as the cathedral at Seville." Hunters and miners occasionally contributed to swell still more these exaggerated reports by ac-

counts of their own hair-breadth escapes and severe sufferings when lost amid the rocky fastnesses that enclose these streams. In 1867, James White and Henry Strole, two gold-seekers, finding themselves in a country beset by hostile Indians, constructed a raft, and descended the Colorado from a point on the Grand, about thirty miles above its junction with the Green, preferring to encounter the unknown perils of that voyage rather than the known danger of discovery by the redskins. They had been only four days under way when Strole was drowned. White then continued

Distant View of Moqui, with Sheep-pens in the Foreground.

the voyage, and succeeded in reaching Callville, but only after ten days of the greatest hardship and deprivation. His experiences form a thrilling narrative.

In 1869 a Government expedition was fitted out under command of Major J. W. Powell for the exploration of the Cañons of the Colorado. They reached Callville after many striking adventures; but not satisfied with the results of their labors, a second expedition was fitted out—also under command of Major Powell—with the purpose of exploring not only the river, but the whole valley of the Colorado. Beginning at the point where the Union Pacific Railroad crosses the Green River, they

have already explored a distance of one thousand miles to the end of the Grand Cañon; but the expedition is not yet at an end. To complete their surveys it is supposed will require until the latter part of 1875.

The expedition was organized at Green River City, Wyoming Territory, in May, 1871, the party consisting of various scientific men and artists; among them the Mr. Beaman before-mentioned, who was a photographer from New York. The boats were three in number, properly provided with water-tight compartments and with other equipments stowed away in rubber sacks, the outfit being calculated to be sufficient for a year and a half. They descended the Green River to the Colorado, and then the latter stream, traversing a distance of six hundred miles, in which there was not less than four hundred rapids, by the 22d day of the succeeding October, at which time they went into winter-quarters. They had prepared themselves for encountering the greatest perils and hardships, nor were they much mistaken in their anticipations.

On the 2d of June, writes Mr. Beaman, they ran four very difficult rapids in going one mile, and were then forced to land and bail out the boats which were nearly full of water.

"After making everything secure again"—we quote from Mr. Beaman's journal—"we started out, and soon came to a very sudden bend in the river. The water, having worn a passage far under the rocks, sucked everything into it like a whirlpool. In passing the corner the Nellie Powell (one of the boats) was drawn under by this mighty current force, and capsized. The crew narrowly escaped drowning, but managed to reach the shore without great damage. * * *

"The Emma Dean also struck the wall, and carried away a rowlock; but the Cañonita rounded the turn successfully. * * * One mile further on we passed four fearful rapids, through which the boats plunged at a terrific rate, each nearly filling with water. The walls of rock are closing in as if to immure us in a monster tomb, and a certain terror fastens on a man's vitals as the grim shadows deepen, while yet life itself appears not to fascinate as does that unknown water-track beckoning us on.

"Camped at 11 A.M. for dinner, amid the most awful solitude we could imagine, the walls of the cañon rising on either side to the height of two thousand feet. Pulled out again at 1 P.M.; found the river very rough. Ran one mile, shipping large quantities of water. * * * The current of the river is very swift here, running upward of twenty miles an hour."

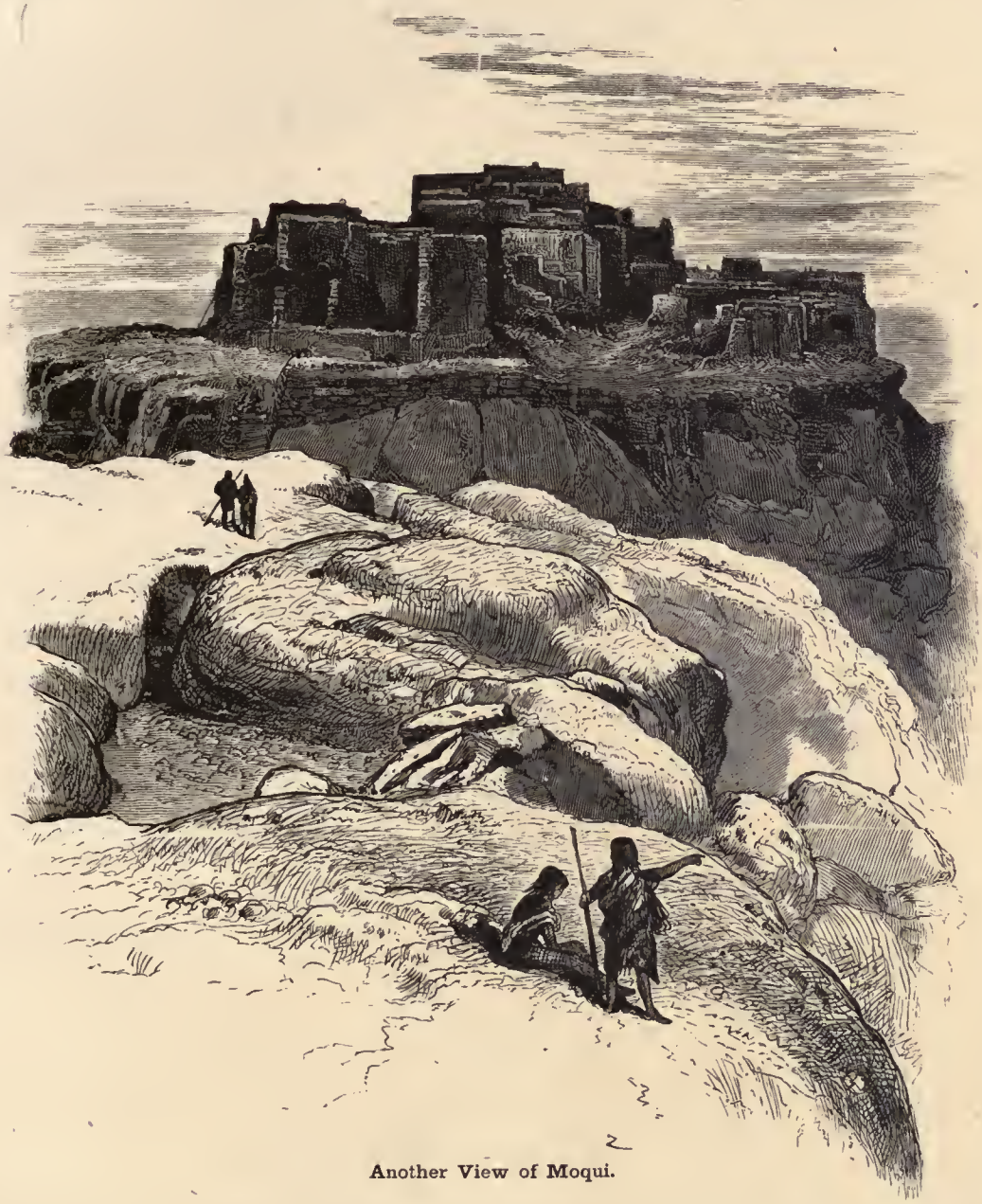
June 5th he writes: "The day has been full of excitement, not unaccompanied by danger, for we have run twenty fearful rapids in coming six miles. Imagination cannot create an enjoyment so full of nervous dread and daring as the dash through these rapids at the rate of thirty miles an hour.

"Arrived at Ashley Falls at 3 P.M. Here it was thought best that a 'genuine portage' should be made. The boats were accordingly unloaded, and two of them lifted over the cliff, a height of fifty feet, carried about a hundred yards, and then lowered into the river again at the foot of the falls. The Cañonita we decided to let go 'by the run,' which she did in fine style, coming out like a duck from the combing wave."

Later in the same month two of the party left the boats to take a measurement of certain carboniferous cliffs that attracted their attention. Having reached the summit of a rocky height on the river's edge, and wishing to descend on a side opposite to that by which they had come, they looked for some spot at which they might find a grade sufficiently easy. They proceeded for two miles, the sides of the cliff for all that distance being perpendicular for the first two hundred feet downward. As they proceeded, they rose higher and higher, until at last they were on the highest part of the cañon-walls, two thousand five hundred feet above the level of the river. Here they found a dangerous pass which they tried to descend, but after traversing the slope for fifteen hundred feet, they found the descent suddenly changed to a perpendicular for the next thousand feet. They were by this time suffering the pangs of thirst; it was also growing late, and they had no time to lose, if they would not be overtaken by night amid these pitiless rocks. They finally contrived to reach the river, but it was then nearly sunset, and they had accomplished nothing. There was nothing left but to return to camp by the easiest and shortest way. The route by which they had come was much too wearisome and difficult, and so they looked about for some other. They found one that seemed promising, but after a most painful and hazardous ascent of eighteen hundred feet, they found their further progress prevented by a blank wall two hundred feet high. They had no choice but to return to the river the way they had come. Here they endeavored to follow the course of the river back to camp, "through thorny underbrush and rose-briers, over cragged rocks, through mud, and often waist-deep in the water, with bleeding hands and exhausted frames." At ten o'clock even

this toilsome march was brought to a stop by a jutting cliff that cut off all further progress. Fortunately it was a bright moonlight night, and presently finding a dry cedar stump, they floated out into the stream with it, hoping to reach camp in that way.

"For a short distance they floated admirably; but, just as they were beginning to congratulate each other upon the success of the undertaking, a roar like that of a rapid fell upon their ears. They knew there was no rapid at that point, having passed it a few days before; hence what new danger menaced them? Their anxiety, however, was soon too well justified. A salient angle in the wall



Another View of Moqui.

jutted sharply into the current, causing a whirlpool which they were too near to avoid. Clem was not a good swimmer; and, as they neared the pool, Mr. Steward became aware that, while the cedar-stub might carry one person through, two trusting to it must be lost; so, when warned by the increasing suction that the time had come, he loosed his hold on the frail support, and trusted to God and his own muscle. The whirling waters seized him, and carried him—how far under he knew not; but, struggling against the terrible force, he struck for the surface. Several times he came so near as to see a faint line of light, and as many times was drawn under again."

Finally, as he was on the point of succumbing, he found himself beyond the reach of the whirling waves, and striking out feebly, reached the surface in quiet water. A little below he saw his

companion, the cedar-stub having carried him safely through. He reached this frail support with much difficulty, and the two soon afterward arrived safely in camp. But they had cañon experience enough for one day.

Of all the cañons on the Green and the Colorado, the Grand Cañon is in every respect the largest. It is over two hundred miles long, and varies in depth from four thousand to seven thousand feet. The stream is here from fifty to five hundred feet wide, and the descent is in some places as much as two hundred feet to the mile. Below the Grand is the Black Cañon, which is twenty-five miles long, with banks from one thousand to fifteen hundred feet high. Horseshoe Cañon is on the Green River, and is so named from its resemblance to a horseshoe. The walls are of red and yellow sandstone, perpendicular, and two thousand feet high. At this place there is a dangerous rapid, immense boulders cleaving the stream. The current flows at the rate of twenty miles an hour, and the waves dash wildly six and eight feet high. Red Cañon is below the Horseshoe, and is so named from the brilliant color of its walls. Lower down still is Swallow Cañon, in which, for a distance of two miles, the walls are lined on both sides of the river with myriads of swallows' nests.

Among the most sublime of the cañons on the Green River is the Cañon of Lodore, named from Southey's poem, "How do the Waters come down at Lodore?" "This cañon," writes Mr. Beaman, "is very narrow at its entrance, being only about one hundred and fifty yards wide. The walls, almost perpendicular, rise to the height of two thousand feet, and, like the Red Cañon, are composed of brilliant red sandstone, mottled and rainbow-hued. Occasionally a green cedar or mountain pine is seen clinging to its sides, adding a picturesque beauty to the place. As we descended the river, which at this point falls one hundred feet to the mile, the walls rose higher and higher, until at the head of Disaster Falls, fifteen miles further down, they attained an altitude of three thousand feet. Thus shut in by vertical walls, there was no alternative—had we wished it—but to go on. Accordingly on the approach of night we hauled our boats close into the shelving rocks, and prepared to fortify by rest for the running of the most noted and dangerous rapids on the morrow. It was here that, in 1869, Major Powell lost a boat, and nearly her crew. In 1850, a party of six trappers, having accumulated a large quantity of furs at Brown's Hole, constructed a raft of three 'degouts' tied together, on which they intended floating down to the Gulf of California. Brave, reckless, and probably not realizing the appalling dangers before them, they sailed down the first few rapids in fine style. When the head of Disaster Falls was reached, instead of landing and reconnoitring, as the roar of the cataract should have advised them to do, they dashed heedlessly along, and were carried over the falls. The raft was, of course, totally wrecked, and four of the men were drowned. The survivors, one of whom was Jim Bridger, the celebrated trapper and companion of Kit Carson, managed to clamber on to the rocks, and there, inclosed in a living tomb, they spent several weeks, subsisting upon berries, lizards, and snakes, exhausting themselves in efforts to find a way out of the cañon; and, finally, after three months' wandering, came into an immigrant's camp, in a famished and almost idiotic condition."

Mr. Beaman thus describes a sunrise in the Cañon of Lodore: "It was after the gray of the morning had passed away, and yet before the gates of Aurora had fully opened, that I awoke. The shaggy sides of the cañon were yet shadowy and dark, and a light, fleecy cloud of vapor, white as the driven snow, covered the bosom of the river, suspended, yet motionless as the canopy of space into which it was soon to ascend. I thought of 'the veil—the silver veil,' with which the prophet of Khorassan is said to have covered his features, to hide his dazzling brow from the sight of mortals. Soon the brightening and blushing skies denoted the glorious coming of the sun, and his swift beams began to tinge the peaks of the loftier mountains with golden color, that deepened as the day-god neared the horizon. As the light increased, the vapor in the gulch grew opalescent, and seemed in motion, soft and tenderly agitated as if by the breath of an infant; then its western edge slowly lifted, and, gradually disclosing the surface of the dark, clear waters, drifted lightly and away until lost in the distant gloom of the eastern hills. A mist, nearly as penetrating as rain, than became apparent and palpable for a brief space, when it broke into billowy masses, and slowly wreathed and curled its way up the cañon-walls, lingering in the glens and grottoes far up the mountains, as if reluctant to leave a scene of such witching charm. Now the tops of the mountains began to flame up with volcanic luridness, and in an instant the great radiator rose clearly from its fiery bath, flooding every thing with sudden brilliancy and distinctness, and transforming the river at our feet into a stream of molten silver."

Four miles below Disaster Falls are the Triplet Falls. They are three in number and distant

GRAND CAÑON.

from each other about a hundred yards. The walls of the cañon are here over three thousand feet high, and the scene is extremely impressive and beautiful. Further down we find Dennis' Cliff, so named after a member of the Powell expedition of 1869, who is supposed to have been killed at this place by Indians. The cliff is nearly four thousand feet high, and at its top ruins have been discovered supposed to be those of a Spanish or Indian people. Echo Park is at the junction of the Green and Bear rivers. "When a gun is discharged at this place," writes Mr. Beaman, "total silence follows the report for a moment; then, with startling suddenness, the echo is heard seemingly at a great distance—say five miles to the south, whence it comes back in separate and distinct reverberations, as if leaping from glen to glen. Louder and quicker grows the sound until apparently directly opposite, when a full volume of sound is returned; then once more the echo is heard, like the snapping of a cap, far to the eastward."

Split Mountain Cañon received its name from Major Powell on account of its remarkable physical features, the river at this point cutting into a mountain some 2,500 feet high, and in places reaching an altitude of 3,500 feet. From the summit there is a fine view of the whole length of the cañon extending far into the valley of the Mintah. Near the mouth of this cañon are many curious hieroglyphic carvings, representing the elk, deer, buffalo, bear, and various birds, accompanied by other characters evidently illustrative, supposed to be the work of the ancient Aztecs. The Cañon of Desolation is noticeable for a dreary waste of sand and rocks as far as the eye can reach. It is followed by Cole's Cañon, the two being together one hundred miles long, and containing one hundred and twenty rapids, of which forty are impassable to even the smallest boats.

But if one wished to enumerate all the scenes on the Colorado from the source of the Green to the outlet of Black Cañon, it would require far more space than is now at our command. The points of interest referred to in this sketch are but a small proportion of those that really deserve description, while of many hardly any description can be adequate, much less one that is necessarily brief and meagre. To reproduce the beauty and sublimity of many of these scenes is beyond the power of any pen.

LUMBERING ON THE SUSQUEHANNA.

THE Susquehanna River, the pride of Pennsylvania, is formed by the union of its North—sometimes called East—Branch with its West Branch at Northumberland, sixty miles above Harrisburg. Traversing the entire State from north to south, it intersects the rich mining and coal districts for which this section of country is remarkable, and along its banks are well-cultivated fields and prosperous towns. Its picturesque beauty, celebrated in many a poem, is largely due to the numerous islands which so frequently divide the stream, and to the rocky rapids that, at low water, obstruct its navigation. The river is skirted from Harrisburg to Sunbury by the Northern Central Railway, which then follows the bank of the Western Branch as far as Williamsport. Some of the most beautiful of the many lovely views that have made the Erie Railway celebrated above all other routes of travel, are to be obtained while traversing the fifty miles intervening between Cascade Bridge, the point near the border line of New York and Pennsylvania where the track strikes the North Branch of the Susquehanna, and Barton, where it takes its final leave of the river's sinuosities.

Had we space, we could without difficulty fill pages with descriptions of the numerous important and interesting towns that lie contiguous to the river. Only four generations have passed away since the reclamation of the lands from the Indians, and yet the landscape, on each side of the river and in every direction, presents to view a scene of peace and of well-cultivated husbandry that more than any other section of this country reminds the traveler of the garden landscapes of England. All the great railroads of the State approach or intersect its waters at one place or another, and serve to transport to distant parts—the South, the West, the Metropolis and the Eastern centres—the minerals that are here exhumed from mother earth. All this would form food for many articles, but we are obliged to jealously guard our limited space to the delineation of the picturesque side of American life.

MAKING UP RAFTS ON THE SUSQUEHANNA RIVER. A SCENE ON THE LINE OF THE ERIE RAILROAD.

Lumbering furnishes many of the inhabitants that live adjacent to the Susquehanna and its numerous tributaries with an occupation, and as a trade it is not destitute of the chances of adventure. If the lumberman be of a philosophic turn of mind, in what speculative reveries may he not indulge, as he adroitly steers his unwieldy flotilla. The plank he treads may support the burly frame of some great English advocate of the rights of the people, or be used in the construction of a desk from which a Bismarck may issue his dictum to the European world.

The preparations for the trip down the river, though laborious, are often conducted like a frolic. The felling of the trees in mid-winter, the cutting of shingles, and the drawing out on the snow, are employments preferred by the young men to the tamer but less arduous work of the farm-yard; and in the temporary and uncomfortable shanties, deep in the woods, subsisting often on nothing but pork and whisky, they find metal more attractive than village or fire-side.

The small streams emptying into the Susquehanna are innumerable; and eight or ten miles back from the river the arks are built, and the materials of the rafts collected, ready to launch with the first thaw. When the floods come in March, the noise of voices and hammering coming out from the woods above, warn the inhabitants of the villages on the river banks of the approach of an ark; and at the rate of eight or ten miles an hour, the rude structure shoots by the quiet hamlets floating high on the water, manned with a singing and saucy crew, who dodge the branches of the trees, and work their steering-paddles with an adroitness and nonchalance which sufficiently show the character of the class. The numerous sudden bends which the river takes, and from which it derived its name (Crooked River), often puts the steermanship to the test; and when the leaves are off the trees, it is a curious sight to see the bulky monsters, shining with new boards, whirling around in the swift eddies, and, when caught by the current again, gliding off among the trees, like a singing and swearing phantom of an unfinished barn.

It is a fact not generally known that when a river is rising, the middle is the highest, and *vice versâ* when falling—sufficiently proved by the experience of the raftsmen, who, if they start before the flow is at its top, cannot keep their crafts from the shore. A pent-house, barely sufficient for a man to stretch himself below, is raised on the deck, with a fire-place of earth and loose stone; and with what provision they can afford, and plenty of whisky, they shove out into the stream. Thenceforward it is *vogue la galère!* They have nothing to do all day but abandon themselves to the current, sing and dance, and take the turn at the steering-oars; and when the sun sets, they look out for an eddy, and pull in to the shore. The stopping-places are not very numerous, and are well known to all who follow the trade; and as the river swarms with rafts, the getting to land and making sure of a fastening, is a scene always of great competition. When all is settled for the night, however, and the fires are lit on the long range of the flotilla, the raftsmen get together over their whisky and provender, and tell the thousand stories of their escapes and accidents; and with the repetition of this, night after night, the whole rafting population along the five hundred miles of the Susquehanna become partially acquainted, and form a sympathetic corps.

THE HUDSON RIVER.

THERE is no river that is so intimately associated with our history and literature as the North or Hudson. Many of the most important events of the eight years of Revolution transpired in its vicinity. Irving and Paulding found rich subjects for their pens in its traditions and legendary lore, and a host of the minor poets have sung in enthusiastic rhyme of its placid bosom and beautiful banks.

Independently of all this, however, the river has charms that one need not be versed in history to enjoy, beauties so pre-eminent that they touched the hearts of the practical Dutch navigators, and caused Hendrick Hudson's secretary to write of it as a "fair river flowing through a goodly country." The hazy outlines of the hills limned against the blue sky, the prosperous fields stretching away from the banks as far as eye can reach, the bold promontories that rise up from the water as if to contest the right of passage, and the sudden bends where the river seems almost shut in by the tree-covered hills,—all these combine to form a grand natural panorama; and while admiring a scene

so beautiful that it seems as if all the combinations of Nature could not produce one more lovely, we glide by another in which the blue outlines of the hills seem softer, the rich verdure greener, and the gleam of the crystal current more silvery. The western water-courses do not compare with it: with their strong, muddy currents, and monotonous banks and outlines, they are, indeed, equally serviceable for navigation, but they utterly lack the graceful flow and air of peace and quiet that distinguish the placid Hudson.

At New York the river possesses the advantage of sudden contrast. It is but a short journey from the crowded docks of the North River, as the Hudson as it flows by the city is called, to scenes of rural life. Almost before we are aware of it, we have passed the wharves in which lie the great ocean steamers, and have left the crowded ferry-boats and ugly flatboats, with their escorts the noisy tugs, far behind; but hardly is the uproar and bustle of the city lost in the distance, than before the passengers of the magnificent steamers that ply the Hudson lie the pastoral beauties of the American Rhine. Intermixed with superb villas, the creations of modern wealth, which peep from amid the foliage on Washington Heights, one sees here and there a squarely-built mansion that in its pristine glory belonged to one of the early settlers; and the yachts and sail-boats, frequently containing fair occupants, lend an additional charm to a *dolce far niente* scene like which there is no other on this continent.

The Hudson River Railroad skirts the river on the eastern side, and frequently as the river-boats steam quickly onward on the breast of the incoming tide, one is tempted to believe that the boat can hold its own against its competitor. But the iron-horse rolls forward with a loud reverberation on the river's edge, and gradually gains until a station stops its victorious progress. The delay thus occasioned enables the steamboat to recover its lost ground for a time; but it is again overtaken and, from the same cause, again gets ahead. At last, however, either the steamer has to make a landing, or a greater distance intervenes between the stations, and the train slowly and gradually disappears in the distance.

A point that already approaches historic interest is Font Hill, a mile and a half below Yonkers, built by the late Edwin Forrest. Although a thorough American, the great tragedian had a decided fondness for the luxuries of life, and especially admired structures that implied the long possession of wealth. On returning from an English trip, he began the erection of Font Hill. It was built of blue granite, after the plan of an English castle, and has six towers, from which an extensive view of the Hudson may be obtained. In 1838 he took possession, and continued to reside in it until his next visit to England in 1844. The jealousy between Macready and Forrest had by this time culminated in an open quarrel, that became national at least so far as the dramatic world was concerned. Coming home with a heart full of bitterness, and fearing the accusation that he was aping the English nobility, Forrest sold his "castle" to the Roman Catholic Sisters of Charity of the Convent of Mount St. Vincent, who erected other buildings and use the whole of them as a school.

A little above Font Hill is Yonkers, a large and thriving village, about seventeen miles above the metropolis, where many wealthy New Yorkers have located since the increase of railway communication. The country round about is hilly and picturesque. Broad carriage-roads lead from it in nearly all directions, and there are facilities for every variety of sport—boating, fishing, or shooting. The celebrated Philipse Manor Hall is located at Yonkers, and is still kept in good order. It was originally built in 1682, and an addition was made to it in 1745. The building was constructed after a liberal plan. The apartments are all wainscoated, and the ceilings lofty, while the principal chamber is frescoed with figures. In this house was born Mary Philipse, whose beauty and prospective wealth captivated Washington when he was a young man. The future Commander-in-Chief lingered in her presence as long as etiquette and his duties would allow, but his exceeding diffidence prevented him from making known to her his passion, and she became engaged to a fellow-officer, named Morris. When the Revolution broke out, Morris refused to side

The Palisades.

Stony Point.

with the colonists. In the fall of 1776, Washington occupied the house so intimately connected with the romance of his youth as his military headquarters.

Four miles above Yonkers, at Hastings, are the most picturesque portions of the "Palisades." The Palisades extend along the western shore of the Hudson from Haverstraw almost to Hoboken, and are about thirty-five miles in length. They are portions of a ridge-rock of trap-rocks, and derive their name from the kind of fortification which they resemble. "Between Piedmont and Hoboken, these rocks present, for a considerable distance, an uninterrupted, rude, columnar front, from three to five hundred feet in height. They form a mural escarpment, columnar in appearance, yet not actually so in form. They have a steep slope of *débris*, which has been crumbling from the ridge above during long centuries, through the action of frost and the elements. This ridge is narrow, being, in some places, not more than three-quarters of a mile in width. It is really an enormous, projecting dyke-trap. On the top and among the *débris*, in many places, is a thin growth of trees." From the river the aspect of the Palisades is not very inviting. They have a grim, and somewhat forbidding appearance, but now and then one can catch, through occasional breaks in the ridge, glimpses of the beautiful country behind. The highest point of the Palisades is nearly opposite Sing Sing, and rises 666 feet above tide-water. The Hollanders called it by the startling name of Verdrietigh-Hoeck, which being translated, means "Vexatious Point." It obtained its name from the fact that at this place they were apt to meet with adverse winds, that crossed each other, and made the management of their lumbering vessels very difficult.

Dobbs' Ferry, five miles above Yonkers, was an important point during the Revolution. Several of the prominent movements in the Hudson River campaign took place there. Upon a high bank near the railway station, the Americans built fortifications at the beginning of the conflict, and held the place until their defeat by Lord Cornwallis, in October, 1776. Haverstraw, the place where Arnold and Andre met, is but a short distance from this place.

Sunnyside, the former residence of Washington Irving, is further up the river, about three miles below Tarrytown. Around this place, of which Irving wrote so gracefully, must ever cling the pleasantest of memories. It is reached from the main road by a winding carriage-way that passes through green meadows and shady woodlands, and along the border of a little vale, through which runs a sparkling streamlet that ripples down toward the Hudson until it empties into a little bay a few yards from Sunnyside. Irving's house was a quaint, old-fashioned cottage, half overrun with ivy, while from the eastern window the river could be seen for a long distance. From a description of the place by Mr. Lossing we extract the following:

"I visited Sunnyside and strolled along the brook at the mouth of the glen, where it comes down in cascades before entering the once beautiful little bay, now cut off from free union with the river by the railway. The channel was full of crystal water. The delicate foliage was casting delicate shadows where, at this time, there is half twilight under the umbrageous branches, and the trees are full of warblers. It is a charming spot, and is consecrated by many memories of Irving and his friends, who frequented this romantic little dell when the sun was at its meridian. After a while, I climbed its banks, crossed the lane, and wandered along a shaded path to a hollow in the hills filled with water. This pond, which Mr. Irving called the 'Mediterranean Sea,' was made by damming the stream, and thus a pretty cascade at its outlet was formed. It is in the shape of a 'palm-leaf' that comes from the loom. On one side a wooded hill stretches down to it abruptly, leaving only space enough for a path, and on others it washes the feet of gently grassy slopes. This is one of the many charming pictures to be found at Sunnyside."

Mr. Irving died in November, 1859, and was buried in the family burying ground at Tarrytown. His funeral was one of the largest ever known, and was attended by all the literary men of the day, and many other distinguished persons.

Near Tarrytown is the famous "Sleepy Hollow." A stream of water runs through it, which was called by the Indians Pocantecs, signifying a run between two hills. There is an old Dutch church and churchyard at its opening, built in 1690, of brick and stone—the brick being brought over from Holland for the purpose—which would delight an antiquarian. The expenses of its erection were defrayed by Frederic Phillips. Over its diminutive spire there is a vane in which is cut the monogram of its founder, and in the tower hangs the old bell, bearing the inscription in Latin: "If God be for us, who can be against us?"

Sing Sing is a prosperous village containing about five thousand inhabitants. It is built upon a slope of hills about one hundred and eighty feet above the Hudson, and overlooks Tappan Bay—a widening of the river which the early Dutch settlers called a sea. In the upper portion of Sing Sing there is a ravine yet retaining much of the wild and picturesque scenery that must have characterized this section of country before the advent of civilization. Over it flows the Croton river which supplies the city of New York with water. Its channel is of massive masonry lying upon an elliptical arch of hewn granite of eighty-five feet span, its keystone being more than seventy feet from the waters of the brook under it. The Croton Aqueduct was a most important improvement, the water of the city having been exceedingly impure and unhealthy. There was, notwithstanding, when the project was first agitated, considerable opposition to passing the appropriation necessary for its construction. Work was begun on the aqueduct in May, 1837, and progressed rapidly. At the head of the aqueduct a dam was constructed for the purpose of forming a fountain reservoir. "In the early part of 1841 a flood produced by a protracted rain-storm and melting snows, swept away the dam and carried with it, riverward, a quantity of earth and gravel, sufficient to half fill the beautiful Croton Bay. The dam was immediately rebuilt, at a greater altitude, and a lake was produced, almost six miles in length, capable of containing about 500,000,000 gallons of water. It is 166 feet above mean tide-water at New York, and pours into the aqueduct from 40,000,000 to 50,000,000

Entrance to the Highlands near Newburgh.

gallons every twenty-four hours. The Croton Aqueduct runs parallel with the Hudson, at the mean distance of half a mile from it throughout its entire length. Its course is marked by culverts and arches of solid masonry, and its line may be observed at a distance by white stone towers, about fifteen feet in height, placed at intervals of a mile. These are ventilators of the aqueduct; some of them are quite ornamental, while others are simple, round towers, and every third one has a square base, with a door by which a person may enter the aqueduct." This great work was finished in 1842, in the autumn of that year. The cost of its erection was about $12,000,000.

Poughkeepsie.

The State Prison is also situated, as is well known, at Sing Sing. It is in the southern part on a group of small hills known as Mount Pleasant. The prison is divided into male and female departments, and both were built by convicts. The modern prison system has been adopted here, and the prisoners are compelled to work at various trades instead of being placed in solitary confinement.

Some distance above Sing Sing is Stony Point, a mass of granite rocks, with occasional patches of ever-green trees and hardy shrubbery. The barrenness of Stony Point makes it unavailable for agricultural purposes, and the landscape here is almost the same as when the Continentals and British were marching and countermarching over its rocky surface. It is in the form of a peninsula. A light-house, a keeper's lodge, and a fog-bell stand upon the spot formerly occupied by the old fort.

To describe in detail the numerous points of interest along the Hudson would not only be wearisome, but would require much more space than can be devoted to it here. The entrance to the Highlands, Peekskill, Anthony's Nose, the Storm King, Constitution Island, West Point, and many other places, are remarkable alike for their extraordinary natural beauty and for their intimate association with our early history.

At the mouth of Wappingi's Creek, there is a promontory covered with gravel, from which a fine view of the Highlands and the town of Newburgh may be obtained. Newburgh is the oldest settlement in Orange county, and many historical associations are clustered around it. The first settlement was made by Palatines, who began to erect buildings on the site of the present town in 1709. After the lapse of a few years, the inhabitants became discontented with the spot, divided up, and

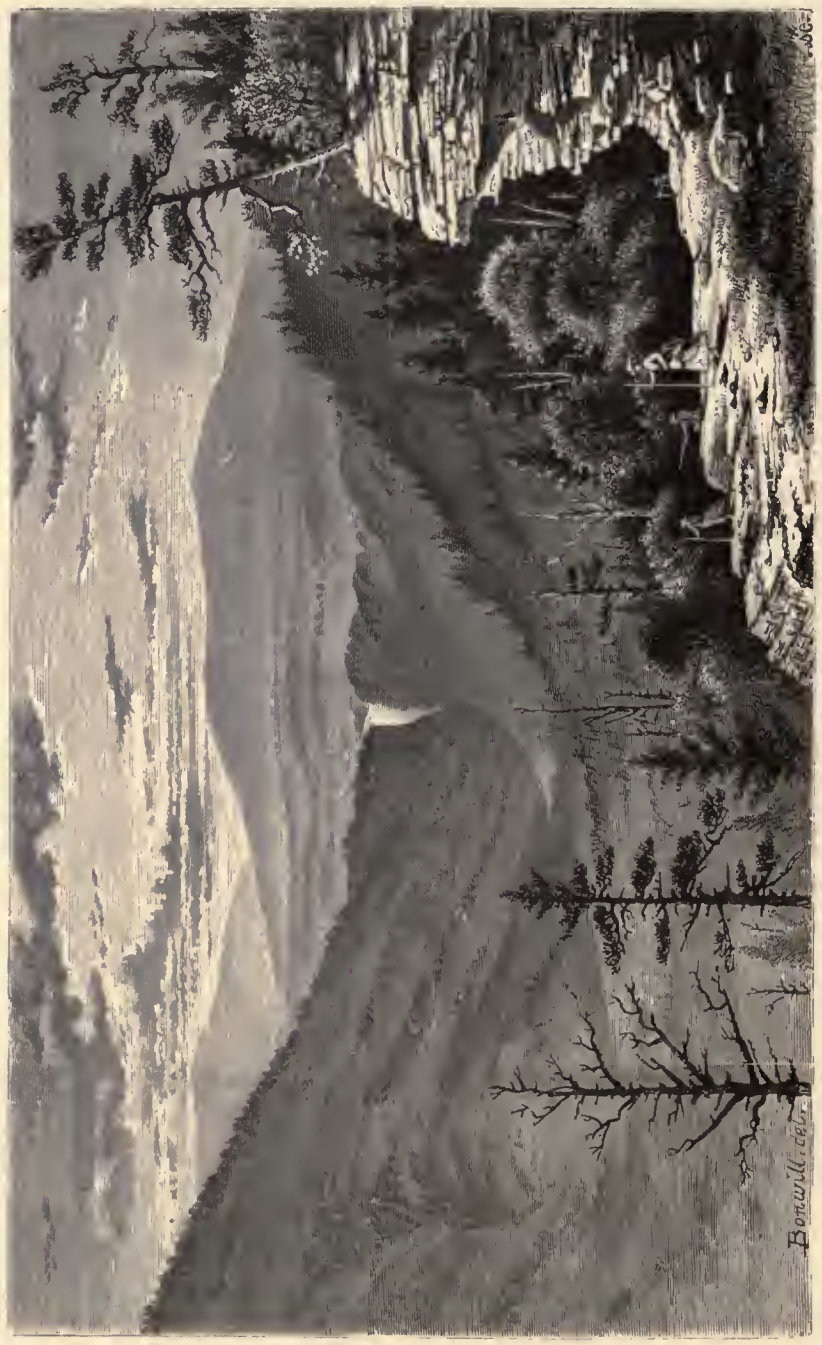
went to different localities. Other settlers supplied their places, however, and the town flourished. The "Hasbrouck House," one of the numerous "Washington Headquarters," is at this place. It is now the property of the State, and a sum of money is annually appropriated to keep it in good condition. It contains a considerable collection of relics of the wars of the country.

The natural scenery in the vicinity of Newburgh is considered by many the grandest on the river. "Before the town is the lofty range of the Fishkill Mountains, on which signal-fires were lighted during the Revolution: and the group of the Highlands, through which the Hudson flows. These are reflected in a broad and beautiful bay, at all times animated with a variety of watercraft and wild fowl. One of the finest and most comprehensive views of Newburgh Bay may be obtained from the hill, just below Newburgh and Fishkill railway station, looking southwest. At Newburgh is the eastern terminus of a branch of the New York and Erie Railway, which passes through some very picturesque scenery."

Proposed Bridge across the Hudson at Poughkeepsie.

Poughkeepsie is one of the most beautiful and thriving cities in the State. It is charmingly situated on the eastern bank of the Hudson River, on a high level plateau overlooking the country along the river from the Catskills to the Highlands, and has a population of twenty-five thousand inhabitants, among whom are a large number of distinguished professional and literary gentlemen and many eminent retired merchants. It was first settled by the Dutch toward the close of the seventeenth century. The building erected by Baltus Van Kleek, in the year 1705, remained standing until 1835. Poughkeepsie is famous for her schools, having eighteen private institutions of learning. Among these are the celebrated Vassar Female College and the Eastman Business College. The Great Bridge to span the river here for a direct East and West Railroad line will be a magnificent structure. To the enterprise and foresight of Mr. EASTMAN is due the inception of the bridge idea. When this great work of internal improvement is finished, a complete revolution will be effected in the transportation of the products of the great manufacturing centres of the East and the mineral regions of Pennsylvania. These can be exchanged without the necessity of the roundabout and expensive journey by way of New York.

About six miles below Hudson, is Oak Hill Station, opposite the mouth of the Catskill river, a stream which flows down from the hills of Schoharie, a distance of nearly forty miles. The scenery in the Catskills is very beautiful. At every turn of the road leading to the mountains, which skirts the margin of a clear stream that is heard oftener than it is seen, the traveler encounters some new scene of loveliness. The mountains rise up abruptly from the plain, dark and solemn, casting their shadows below. The road is very winding, "and in its ascent along the side of the glen, or more properly magnificent gorge, it is so enclosed by the towering hills on one side, and the lofty trees that shoot up on the other, that little can be seen beyond a few rods, except the sky above, or glimpses of some distant summit, until the pleasant nook in the mountain is reached, wherein the cabin of Rip Van Winkle is nestled. After that the course of the road is more nearly parallel with the river and the plain, and through frequent vistas glimpses may be caught of the country below, that charm the eye, excite the fancy and the imagination, and make the heart throb quicker and stronger with pleasurable emotions." Irving's descriptions and his version of the legend of "Rip Van Winkle," have made the Catskills famous. The cabin which is said to have been occupied by the somnolent Rip, is still standing. The scenery through the mountains is majestic and inspiring. The "Mountain House" is built upon a grand rock-platform nearly three thousand feet above tide-water, a considerable distance below some of the higher summits, it is true, but yet portions of four States and ten thousand square miles of territory may be seen from it. From the top of the South Mountain, three hundred feet above the "Mountain House," and of the North Mountain, which is further off and higher, even a more extensive view may be obtained. All through the mountains there are bits of scenery which form the delight of artists. Sunset Rock, an illustration of which is given, is a lovely and picturesque scene. At evening, when the tops of the trees are gilded by the radiance of the setting sun, whose red gleam shines through the clouds, giving the sky the appearance of a mingled column of fire and smoke, the beauty of the rock is of so rare a type, that the most practical of men could hardly have failed to give it its present name.



Sunset Rock, Catskill Mountains.

Above this point, as is well known, the magnificent and sublime scenery that has marked the course of the Hudson nearly from its mouth, gives place to a landscape, graceful and picturesque indeed, but utterly wanting the bold and imposing aspects characteristic of the lower portion of the river. The great cities of Albany and Troy are situated on it. The river is formed by two small streams flowing from the Adirondack Mountains, one rising in Hamilton, and the other in Essex County, New York, which unite in Warren County, about forty miles from the source of each. There is some very picturesque scenery near the source of the river, but as we have so fully illustrated and devoted so much space to the Adirondacks, we think a further description unnecessary.

THE GREAT LAKES AND THEIR GREAT CITIES.

COMPARATIVELY little is known by Americans of the group of great inland seas—Ontario, Erie, Huron, Superior, and Michigan—which form our northern frontier. Their position being far to the north of the line of western travel is one reason for this ignorance and indifference, and the absolute supremacy of railways in the matter of passenger transportation is another; but the beauty of their surroundings and their singularity as the only great fresh-water lakes in the world, should have recommended them to the notice of a larger number of tourists. The popular "route through the lakes" is from Buffalo to some of the cities on Lake Michigan in a steamer. There are five great inland ports on the lakes—Buffalo, Cleveland, Detroit, Milwaukee, and Chicago—and these cities owe their prosperity, nay their very existence, to their being the

Main Street, Buffalo, opposite the Churches.

entrepots and distributing centres for the immense freight traffic carried on on the bosom of these great bodies of water.

Buffalo is situated in the north-eastern corner of New York State on Lake Erie. A mere village before the completion of the Erie canal, it has since grown with almost magical rapidity, and is now one of the most prosperous and beautiful cities in America. As is the case with almost all of the lake ports, the trees have been carefully preserved, and the long shaded avenues give it a most picturesque appearance. Two, and sometimes three, rows of elms and other deciduous trees line either side of many of the streets, and to a stranger accustomed to the long and dusty brick pavements that characterize the business avenues of most American cities, their effect is both novel and

Buffalo Harbor, from the Breakwater.

pleasing. Main street, as its name indicates, is the principal thoroughfare and centre of the retail trade, and the marked beauty of its church edifices diverts attention from the stately blocks devoted to the service of mammon. St. Paul's Cathedral (Episcopalian) is the architectural ornament of the city. Its spire, of solid freestone, almost as high as that of Trinity Church, New York, contains a fine set of chimes, which are rung by the only trained band of chime-ringers in the country. Near it is the First Presbyterian Church, a modest structure overrun with ivy, while but a short distance away lies St. Joseph's Cathedral, which boasts of possessing, with but one exception, the finest chimes in the world. They were purchased at the French World's Fair, but, through ignorance, were so badly hung that much of their effect is lost.

Delaware, Niagara, Court and Genesee, four streets that cross each other at different angles, are noted for their magnificent residences. A superb system of parks designed by Frederick Law Olmsted, the architect of Central Park, New York city, is now in course of construction, which, when completed, will add very much to the attractiveness of the city. The land taken for park purposes was formerly a common, and consists in all of about five hundred acres, situated in the eastern, northern, and western parts. It is proposed to connect these by a boulevard that will run entirely around the upper portion of the city, and thus form a continuous drive of nearly ten miles.

Fort Porter has hitherto been the pleasure-ground of the city. There is nothing in the fort itself deserving of special mention, but the view from it is superb. Toward Lake Erie are the spires, elevators, and docks of Buffalo, with the long pier on which the new light-house is situated; beyond is the new breakwater, with its light, reduced by the distance to a mere line drawn across the water: but the centre of attraction in this beautiful landscape is the lake itself in its ever-varying aspects, with its long lines of foam-tipped waves now glistening with blinding brilliancy in the light of the sun, or under the influence of a calm presenting those soft tints of green for which the lakes are remarkable, or again, under the gathering shadows of night, lying dark, gloomy, and saturnine. To the right is seen the Canadian shore, and a dark patch of gray locates the ruins of Fort Erie. Further on is the town of Victoria or Waterloo as it is variously called, and down the Niagara river the new International Bridge projects from shore to shore.

One of the finest and most comprehensive views of Buffalo is the one from the lake, an illustration of which is given. Directly in front, and stretching away off to the right of us, we see a long pier or breakwater, erected at immense cost, and still incomplete, which protects the front of the city from the treacherous waves of the lake, and forms a wide and spacious harbor, in which a navy might ride. On the nearer end behold one of those eyes, whose glances, scintillating afar, have so often at night

proved a blessing and a comfort to the storm-tossed mariner; for this calm, pleasant-looking sheet of water, which is now a mirror, reflecting the white, fleecy clouds floating far above it, can get up, without the slightest apparent effort, storms of the most appalling character. Beyond, on an inner pier, projecting boldly from the mouth of the creek, is another beacon, which guides us directly to the haven we seek. In front of the entire city stretches a sea-wall, behind which, on the right, are sheltered the immense many-shaped and dingy-brown elevators which betoken the source of the city's business and wealth; and on the left, the depots, trestles, manufactories and other adjuncts of trade and commerce. The background is made up of massive business structures and private residences, peeping above the trees; while the numerous graceful spires rising majestically heavenwards exhibit the good taste with which the city's accumulated wealth has been spent.

Buffalo Creek, looking out.

We embark from Buffalo in one of the numerous steamers that ply the lakes, and, once upon Lake Erie, the first thing that strikes the voyager is the turbidity of its waters, especially near the shores, arising from the shallowness of the lake. For the benefit of those of our readers who may not happen to be statisticians, we may say that Lake Erie, which has a mean length of about two hundred and forty miles, and a breadth ranging from thirty to sixty miles, rarely exceeds, and then only in exceptional places, one hundred and twenty feet in depth. It is to this shallowness that the severity of the storms that visit this lake are attributed, and the paucity of good harbors render them the more dangerous. The only historical fact of interest connected with the lake is the naval battle fought upon its waters, September 10, 1813, in which Lieutenant Perry, with a squadron mounting but 54 guns, manned by 490 officers and men, vanquished the British under Captain Barclay, who had 63 guns, and 502 officers and men. The whole of the English squadron was captured, and the victory was thus modestly and concisely epitomized by Perry, who, when success was certain, wrote to General Harrison on the back of an old letter resting in his naval cap: "We have met the enemy, and they are ours—two ships, two brigs, one schooner, and one sloop."

To the lover of the picturesque there is much of interest in the islands of Lake Erie, ten or more in number, which lie off Sandusky Bay, having an area varying from 2,800 acres to a mere dot upon the water. These islands are now coming into prominence owing to their adaptability for grape culture. The large steamers on the way up and down the lakes generally pass them in the night, and thus, in order to see them, one must take one of the numerous small craft that ply between Sandusky and the islands. Put-in-Bay Island has gained considerable reputation as a summer resort. It has six hundred inhabitants and two large hotels. Kelley's Island, the largest of the group, possesses, in addition to its vineyards, valuable quarries of limestone, which supply the furnaces of the vicinity with lime and flux stone.

The second large port on the lakes is Cleveland, more poetically known as the "Forest City." The principal industry of Cleveland is oil-refining, and the refineries of the city have a capacity for stilling fifteen thousand barrels a day. The trade is very profitable, but there is an unusual amount of risk incurred, the danger from fire and explosion being very great. The crude petroleum is brought from the oil-regions of Pennsylvania in long trains of cylinder-shaped cars, that have the appearance of boilers on wheels. It is drawn from the cars to a huge tank through long ranges of pipes, and is there kept until required for use at the stills. The architecture of the city gives outward evidence of its prosperity. It would be difficult to find, outside of New York city, an American street as beautiful as Euclid Avenue. It is lined for a distance of three miles with large and costly mansions, erected in the middle of extensive grounds; and the smooth green lawns, the conservatories, and the noble trees lining the sidewalks, give it an appearance of wealth and refinement.

From Cleveland the lake steamers bound for Lakes Huron and Superior, pass Detroit, the "City of Straits." Detroit produces a highly pleasing impression upon the traveler. Though it is said to be one of the oldest towns in the country, it looks fresh, bright and modern. The streets are wide, the squares numerous, and the houses in the business portion of the city lofty and

handsome, while the up-town parts of the leading avenues are bordered with handsome private residences, the majority of which are in cosy and shady gardens. There are few American towns where trees and shrubbery are more plentiful. The moment you leave the business quarter you see gardens all around, which the abundant vapors of the two lakes and the Detroit river keep in luxuriant condition. One can, of course, not look for picturesque elements in or about Detroit, the country being flat and full of monotony, relieved only by the large expanses of water. But there is something winningly neat and intensely patriarchal in the little wooden cottages, growing like mushrooms, and pushing the outskirts of the town further and further out into the country. Nearly all of them are painted white, have brightly colored roofs, and a piece of ground planted with shrubs and flowers, the general picture thus obtaining a bright and shiny touch not frequently to be beheld in more go-ahead communities of this part of the world.

View of Milwaukee Bay, Lake Michigan.

After Detroit comes Milwaukee, Chicago's most dangerous rival. Milwaukee is the eastern outlet for the great grain crops of Wisconsin. It has the best harbor on Lake Michigan, and since the Chicago fire it has taken its position as a leading inland port. There was not in the year 1834 a sufficient number of white inhabitants in Milwaukee county to fill the offices necessary for its organization: to-day its county-seat has a population of more than one hundred thousand, and its beautiful bay, with its immense and costly breakwater, bears upon its breast a commerce represented by eight thousand arrivals of vessels every year. In grace of curvature, beauty of color, and the boldness of its bluffs, it compares favorably with the finest sheets of water in the world, and is thought to resemble the Bay of Naples.

Milwaukee is the largest grain market in the world, and the transactions of its Chamber of Commerce amount to over a hundred million dollars a year. The elevators, therefore, are an essential element of the city's prosperity. Our river illustration shows, in the fore-ground, the oldest elevator in the northwest, a structure as antiquated in its appliances as in appearance, but yet substantial enough for years of further service. The shipping and manufacture of iron is also an important interest and one which will, in all probability, grow so rapidly in the future as to rival the immense business in cereals and produce—the product of the rich and almost untouched mineral regions of the northwest coming naturally to Milwaukee, where it finds a home market, and whence ten tributary railroads carry it to other manufacturing centres. The brewing interest is also largely represented, and so celebrated is its lager beer that it commands the highest price the country over.

The natural attractions of Milwaukee are numerous. Lake Michigan stretches out as broad and blue and beautiful as the sea, and washes upon the beach waters of perfect purity. The river above the city is a shady sylvan stream. The high bluffs at the lake shore sink to the river and rise again on the west side, affording charming atmospheric effects and vistas of climbing buildings. The city is principally built of white brick, from which it

derives its title of the Cream City. The country round about is fertile and varied, and full of pleasant rambles.

The Milwaukee river has nowhere a width exceeding three hundred feet, but it is deep enough for the passage of the largest vessels. It is spanned by drawbridges at about every second street, and passes through the city like a great canal. With its tributaries, the Menomonee and Kinnikinnick, and its extensive system of side cuts, it affords over thirty miles of dockage within the city limits. Spars and sails are seen passing between stately buildings with an effect as curious as would be the spectacle of a ship crossing Broadway at Grand Street. The swinging of the bridges is a momentarily recurring excitement, and one not soothing to the temper.

The population of Milwaukee is made up of different nationalities. The great body of the inhabitants are Germans; but Bohemia, Poland, Denmark, Sweden, Ireland, and many other countries are strongly represented. To this confusion of nationalities is due the retention of customs which are usually abandoned by immigrants in their new home. Wooden shoes are seen on the streets; women wear red stockings and surround their heads with white cloths after the fashion of the German peasants; and wedding parties are sometimes seen on Sunday, walking the streets decked with ribbons and flowers.

From Milwaukee to the Garden City is but a few hours' pleasant sail, and on our way we meet the long train of heavily laden boats bearing the rich products of the West for Eastern and European markets. Chicago presents the most extraordinary example of rapid and, until the fire, uninterrupted progress of any city in this, or any other country, and to it there exists no parallel in

Milwaukee River.

ancient or modern times. There are men now living who recollect the site of the present city as a wet prairie, and in 1830 there were but seventy inhabitants. When, as has been eloquently said, it is remembered that this insignificant nucleus has grown within one generation to over four hundred and fifty thousand, the present local estimate of the city's population, the question presses for solution—by what magic has this marvelous result been achieved? What peculiar combination of forces or circumstances has wrought a progress so wonderful and so entirely unparalleled?

The story of the settlement of Chicago is thus told in Appleton's *American Encyclopedia:* "Under them (the canal commissioners of the Illinois and Michigan canal) James Thompson surveyed the town of Chicago, his first map being dated August 4, 1830; it embraced the area of three-eighths of a square mile. In 1831, it contained twelve families, besides the garrison in Fort Dearborn. The town of Chicago was organized August 10, 1833, with five trustees; it contained 560 acres, 550 inhabitants, 29 voters, 175 buildings, and property valued at $60,000; the taxable valuation was $19,560, and the first year's taxes were $48.90. On September 26, 1833, 7,000 Pottawattamies assembled there in council, and signed a treaty to remove beyond the Mississippi; they ceded some 20,000,000 acres to the United States for $1,100,000. Chicago was incorporated as a city March 4, 1837. The first election under the charter was held May 1 following, when W. B. Ogden was chosen mayor. The first census was taken July 1, 1837, when the city contained a population of 4,170." It was not, however, until 1845 that the city became the entrepot of the immense grain-producing country in the interior. It is well known that the early settlers always chose as their

Grain-Vessels leaving Chicago.

abiding place a suitable location on some river, whence their products could be floated to market; and as the means of communication which now make Chicago the Emporium of the West are wholly, as regards communication with the interior, artificial, it is plain that for many years she labored under many disadvantages. But civilization advanced with rapid strides and claimed as her own the fertile prairies of Illinois, so that when the pioneers of the network of railroads that now intersect the State were built, the great commercial position of Chicago became evident. A new era dawned on the city, and in 1845 the shipments of wheat eastward, which only commenced in 1842, amounted to 1,000,000 bushels, and rapidly increased until in 1866, they reached 65,000,000 bushels!

The buildings, and particularly the residences, before the fire, were to a great extent constructed of wood, which was one cause of the conflagration. This terrible calamity must be so fresh to the minds of all our readers that it is hardly necessary to dwell upon it here; but as this volume will probably find its way to many country readers to whom statistics are not always accessible, we subjoin a few facts and figures. "The total area burnt over, including streets, was 2,100 acres, or nearly 3⅓ square miles; number of buildings destroyed 17,450; persons rendered homeless, 98,500; killed, about 200. Among the buildings were the court-house, custom-house, and post-office, chamber of commerce, gas works, three railroad depots, nine daily newspaper offices, thirty-two hotels, ten theatres and

halls, eight public schools and several branches, forty-one churches, five elevators containing 1,642,000 bushels of grain, and all the national banks but one." The loss occasioned by the fire amounted in round figures to $200,000,000, of which one-half was covered by insurance ; but owing to the failure of all the local insurance companies, and many companies in other cities, a considerable portion of this amount was not collectable.

Scarcely a trace now exists of this terrible conflagration, which may be called the most tragic event of modern times. The great fire in Boston swept out of existence property which, in point of mere money value, might compare with, if not rival, Chicago's terrible loss. But in Boston it was only a loss of business property and merchandise, which, in most instances, was experienced by those who possessed, or had the means of getting, much more ; whereas among the sufferers in Chicago were thousands of clerks and mechanics who had devoted their whole lives to the accumulation of their little property, and who not only lost their all, but, for the time at least, having nothing but the clothing they had hurriedly huddled on, were reduced to the acceptance of the charity which was so quickly extended from every quarter.

The loss was enormous, but capital quickly poured in from abroad and the eastern centres, and the rapidity with which the work of reconstruction was accomplished can be only described as being little short of marvelous. Along Washington, Madison, Monroe, State and Clark streets, and the streets that run parallel with and across them, have since been erected the most superb blocks devoted to business purposes to be found in this, or we think, any other country. Description fails to give any idea of the regularity of design with which the buildings have been erected, and the great width of the streets shows them to great advantage.

Williams, J David, *ed.*

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