







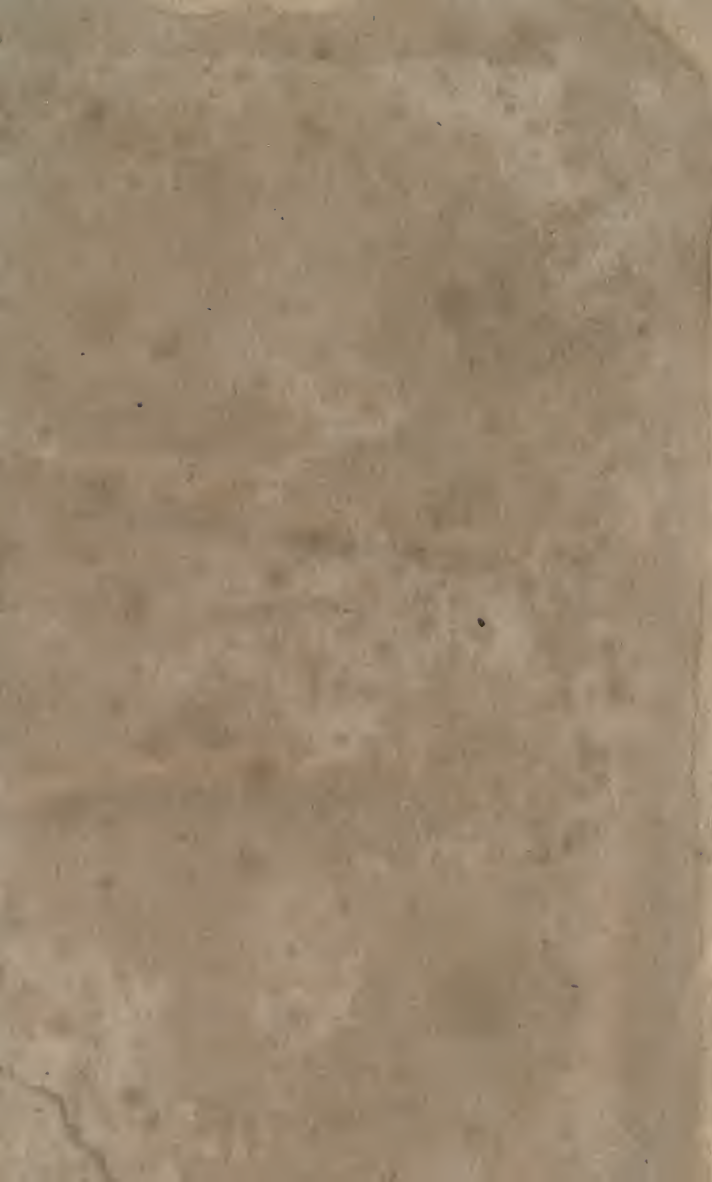
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THE
WONDERS
OF
CREATION,
NATURAL AND ARTIFICIAL.

BEING AN ACCOUNT

OF THE MOST REMARKABLE MOUNTAINS, RIVERS, LAKES,
CATARACTS, MINERAL SPRINGS, MISCELLANEOUS CURI-
OSITIES, AND ANTIQUITIES IN THE WORLD.

COMPILED FROM

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IN TWO VOLUMES.

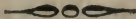
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AUTHOR OF THE JUVENILE INSTRUCTOR, &c.
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SECOND EDITION.

Here NATURE joins her charms with those of ART,
T' inform the MIND and sooth the wayward HEART.
NATURE unfolds a wide diffused store,
E'en far as NILE's loud thundering cat'racts roar ;
And ART her moss grown DOMES....these works sublime!
Now crumbling 'neath the fretting foot of TIME.

VOL. I.



BOSTON :

PUBLISHED BY JOHN M. DUNHAM.

.....
1808.

WONDERS

CHEMISTRY

NATURAL AND ARTIFICIAL

BY J. W. BOYD

IN THE MOST INTERESTING MANNER, AND WITH
A COMPLETE COURSE OF EXPERIMENTAL CHEMISTRY
AND MINERALOGY IN THE MOST

COMPLETE

EDUCATIONAL SYSTEM OF THE

BY THE AUTHOR OF THE

IN TWO VOLUMES

BY

J. W. BOYD

OF THE UNIVERSITY OF CALIFORNIA

AND

REAR ADMIRAL U.S.N.

THE AUTHOR HAS BEEN HONORED BY THE
AMERICAN CHEMICAL SOCIETY WITH THE
DIPLOMA OF HONOR FOR HIS SERVICES
IN THE PROMOTION OF CHEMISTRY
AND MINERALOGY IN THE UNITED STATES
AND ABROAD.

VOL. I.

NEW YORK

1880

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1808

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PREFACE.



IT will be first necessary to enter into the general plan of the work. The first volume is devoted to the curiosities and antiquities of America. Under North America, is inserted the principal Mountains, Rivers, Lakes, Caves, Cataracts, Mineral Springs, Miscellaneous Curiosities, and Antiquities. Under South America will be found the same articles ; together with its valuable mines, some particulars of the manners, customs, &c. of the ancient Mexicans, and Peruvians, and the opinions and remarks of the most profound writers who have written on the subject of the first peopling of the American Continent. The curiosities and antiquities of Europe, Asia, and Africa, being least interesting to us, are condensed together, in order to form the second volume. In a publication like this, much *originality* cannot be expected ; it has been the chief aim of the

PREFACE.

Compiler, to make his extracts from the most authentic, and classic writers, whether European or American, and to arrange them in the most clear and perspicuous manner ; attending throughout more to the useful than the ornamental.

For the purpose of making this compilation worthy the encouragement and approbation of the public, he has spared no exertions on his part ; having perused nearly three hundred volumes, of different authors, upon a variety of subjects, whether relating to Geography, Travels, History, or Antiquities, for the purpose of either comparing their different accounts, or of making extracts. He would be deficient in gratitude, a virtue which all ought to practise, if he omitted to mention in this public manner, his obligations to three of the most profound authors and distinguished scholars, who have illumined, by their labours, the horizon of American literature ; Dr. MORSE, Dr. WATERHOUSE, and the Rev. Mr. HARRIS. These, not only spoke in terms of approbation of this publication ; but have higher claims to our esteem. To Dr. MORSE, for the willingness with which he gave his assent to our making

PREFACE.

what extracts we chose from his "Geography" and "Gazetteer." To Dr. WATERHOUSE, for the use of his "Manuscript Journal," of his Tour to the Saratoga Springs, containing a critical analysis of these celebrated springs. To the Rev. Mr. HARRIS, for the readiness with which he gave us leave to make any compilations of utility to us, from his ingenious "Tour to the Ohio."

Here the reader may expatiate on things worthy admiration, and view, as they rise, those wonders, which owe their existence to the immediate hand of God, or the effect of human invention. He must not be discouraged by the length of the journey, for he will find such a variety of entertaining objects by the way, as will make him forget the pains he may take in climbing the rugged Alps, or traversing the deserts of Africa. Besides, if he make proper reflections on the surprising works of Providence, as well as those the art of man has produced, he will not only have the pleasure of gratifying his curiosity, but probably enlarge his stock both of piety and knowledge.

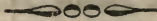
In short, every part of the world has been gleaned, from the frigid to the temperate re-

PREFACE.

gions, in order to obtain the most rare and charming flowrets, to form an odoriferous **BOQUET**, of the most variegated beauty, whose collected sweets, might exhale the most delicious odours to the senses of the delighted readers.

As the outlines, and manuscript of this work, before publication, received the approbation of several distinguished literati of our country, the author submits it with more confidence to the public ordeal, conscious, however, that it will either rise or fall, according to its intrinsic merit.

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THE

WONDERS OF CREATION,

NATURAL AND ARTIFICIAL.



NORTH AMERICA.

ACCORDING to our plan, we shall first describe those wonders, whether natural or artificial, that are scattered over the vast American continent ; conceiving, that to traverse our own country first, and afterward proceed to other regions, would be the most agreeable route to Americans. In forming our mountains in the new world, nature has constructed her works on a large scale ; presenting to our view objects, whose magnitude and situation naturally engage our attention. The centre of North America seems to present a vast fertile plain, watered by the Missouri and its auxiliary streams. On the west, so far as discovered, a range of mountains proceeds from New Mexico, in a northern direction, and joins the ridge called the Stony mountains, which extend to the vicinity of the Arctic ocean. The Stony mountains are

said to be about 3500 feet above their base, which may perhaps be 3000 feet above the sea. In general, from the accounts of navigators who have visited this coast, it seems to resemble Norway, being a wide alpine country of great extent ; while the shore, like that of Norway, presents innumerable creeks and islands. This alpine tract, from the Stony mountains and Mackenzie's river westward, to the source of the Oregon and Beering's strait, may perhaps contain the highest mountains in North America, when completely explored by the eye of science. On the northeast, Greenland, Labrador, and the countries around Hudson sea, present irregular masses, covered with eternal snow, with black naked peaks, resembling in form the spires of the Alps, but of far inferior elevation, mountains generally decreasing in height toward the pole.

The most celebrated mountains in North America, are those called the Apalachian or Alleghany, passing through the territory of the United States, from the southwest to the northeast. According to the best maps, they commence on the north of Georgia, where they give source to many rivers, running south to the Gulf of Mexico ; and to the Tennessee, and others running north. There are several collateral ridges, as the Iron or Bald mountains, the White Oak mountains, and others ; the exterior skirt on the northwest being the Cumberland mountains. The Apalachian chain thence extends through the western territory of Virginia, accompanied with its collateral ridges ; the breadth

of the whole being often seventy miles, and proceeds through Pennsylvania, then passes Hudson river, and afterward rises to more elevation, but seems to expire in New Brunswick. The Apalachian chain may thus extend about 900 miles in length, and from 60 to 200 miles in breadth. In no chain, perhaps, are the collateral ridges more distinct ; and a naturalist would at once pronounce, that the central or highest must be granitic, the next schistose, and the exterior belts calcareous. The granite seems commonly to consist of white felspar, bluish or rather pellucid quartz, and black mica. The schistose band, generally metalliferous in other regions, here presents copper ore ; and in Canada lead and silver ore are said to have been discovered. The limestone contains, as usual, many petrifications, particularly the cornu ammonis, a small scollop shell, and several sorts of corals. The height of the chief summits does not appear to be precisely ascertained, but probably does not exceed 4000 feet above the sea, and they are often clothed with forests. PINKERTON.

The name of the various branches taken collectively, appears not yet to have been determined. Some writers have called them the Endless mountains ; others the Apalachian mountains, from a tribe of Indians, who live on a river which proceeds from this mountain, called the Apalachicola ; but the most common name is the Alleghany mountains, so called, from the principal ridge : this ridge is prescriptively styled the *spine* of the United States.

The towering mountains, which appear in the state of New Hampshire, where they assume the name of the White mountains, are thought the highest lands in New England. In clear weather they are discovered, before any other land, by vessels coming in to the eastern coast; but by reason of their white appearance, are frequently mistaken for clouds. They are visible on the land at the distance of 80 miles on the south and southeast sides; they appear higher when viewed from the northeast, and it is said, they are seen from the neighbourhood of Chamblee and Quebec. The Indians gave them the name of Agiocochook: they had an ancient tradition that the country was once drowned, with all its inhabitants, except one Powaw and his wife, who, foreseeing the flood, fled to these mountains, where they were preserved, and that from them the country was repopled. They had a superstitious veneration for the summit, as the habitation of invisible beings: they never venture to ascend it, and always endeavour to dissuade every one from the attempt. From them, and the captives whom they sometimes led to Canada through the passes of these mountains, many fictions have been propagated, which have given rise to marvellous and incredible stories; particularly, it has been reported, that at immense and inaccessible heights, there have been seen carbuncles, which are supposed to appear luminous in the night. Here nature has formed her works on a large scale, and presents to view, many objects which do not ordinarily occur. A person who is unacquainted

with a mountainous country, cannot, upon his first coming into it, make an adequate judgment of heights and distances ; he will imagine every thing to be nearer and less than it really is, until, by experience he learns to correct his apprehensions, and accommodate his eye to the magnitude and situation of the objects around him. When amazement is excited by the grandeur and sublimity of the scenes presented to view, it is necessary to curb the imagination and exercise judgment with mathematical precision, or the temptation to romance will be invincible. The White mountains are the most elevated part of a ridge, which extends northeast and southwest to an immense distance. The area of the base is an irregular figure, the whole circuit of which is not less than 60 miles. The number of summits within this area cannot, at present be ascertained ; the country around them being a thick wilderness. The greatest number which can be seen at once, is at Dartmouth, on the northwest side, where seven summits appear at one view, of which four are bald. Of these, the three highest are most distant, being on the eastern side of the cluster ; one of these is the mountain, which makes so majestic an appearance all along the shore of the eastern countries of Massachusetts : it has lately been distinguished by the name of *Mount Washington*. To arrive at the foot of this mountain, there is a continual ascent of 12 miles from the plain of Pigwacket, which brings the traveller to the height of land, between Saco and Ameriscoggin rivers. At this height there is a level of

about a mile square, part of which is a meadow, formerly a beaver pond, with a dam at each end. Here, though elevated more than 3000 feet above the level of the sea, the traveller finds himself in a deep valley. On the east is a steep mountain, out of which issue several springs, one of which is the fountain of Ellis river, a branch of Saco, which runs south; another of Peabody river, a branch of Ameriscoggin, which runs north. From this meadow toward the west there is an uninterrupted ascent, on a ridge, between two deep gullies, to the summit of Mount Washington. The lower part of the mountain is shaded by a thick growth of spruce and fir. The surface is composed of rocks, covered with very long green moss, which extends from one rock to another, and is, in many places, so thick and strong, as to bear a man's weight. This immense bed of moss serves as a sponge to retain the moisture brought by the clouds and vapours, which are frequently rising and gathering round the mountains; the thick growth of wood prevents the rays of the sun from penetrating to exhale it; so that there is a constant supply of water deposited in the crevices of the rocks, and issuing in the form of springs, from every part of the mountain. The rocks which compose the surface of the mountain, are in some parts slate, in others flint; some specimens of rock crystal have been found, but of no great value. No limestone has yet been discovered, though the most likely rocks have been tried with aquafortis. There is one precipice on the eastern side, not only completely per-

pendicular, but composed of square stones, as regular as a piece of masonry: it is about five feet high, and from 15 to 20 in length. The uppermost rocks of the mountain, are the common quartz, of a dark grey colour; when broken, they shew very small shining specks, but there is no such appearance on the exterior part. The eastern side of the mountain rises in an angle of 45 degrees, and requires six or seven hours hard labour to ascend it. Many of the precipices are so steep, as to oblige the traveller to use his hands, as well as feet, and to hold by the trees, which diminish in size until they degenerate into shrubs and bushes. Above these, are low vines, some bearing red, and others blue berries, and the uppermost vegetation is a species of grass, called winter grass, mixed with the moss of the rocks. Having surmounted the upper and steepest precipice, there is a large area, called the plain. It is a dry heath, composed of rocks covered with moss, and bearing the appearance of a pasture in the beginning of the winter season. In some openings between the rocks, there are springs of water, in others, dry gravel. Here the grouse or heath bird resorts, and is generally out of danger. The extent of this plain is uncertain; from the eastern side, to the foot of the pinnacle, or sugar loaf, it is nearly level, and it may be walked over in less than an hour. The sugar loaf is a pyramidal heap of grey rocks, which, in some places are formed like winding steps. This pinnacle has been ascended in one hour and a half. The traveller having gained the summit, is recompensed for his toil, if the sky be

serene, with a most noble and extensive prospect. On the southeast side, there is a view of the Atlantic ocean, the nearest part of which is 65 miles, in a direct line. On the west and north, the prospect is bounded by the high lands, which separate the waters of Connecticut and Ameriscoggin rivers, from those of Lake Champlain and St. Lawrence. On the south it extends to the furthestmost mountains of New Hampshire, comprehending a view of the Lake Winipiseogee. On every side of these mountains, are long winding gullies, beginning at the precipice below the plain, and deepening in the descent. In winter, the snow lodges in these gullies, and being driven by the northwest and northeast winds, from the top, is deepest in those which are situated on the southerly side. It is observed to lie longer in the spring on the south, than on the northwest side, which is the case with many other hills in New Hampshire. A ranging company, who ascended the highest mountain on the northwest part, April 29th, 1725, found the snow four feet deep on that side ; the summit was almost bare of snow, though covered with white frost and ice, and a small pond of water, near the top, was hard frozen. In 1774, some men who were making a road through the eastern pass of the mountains, ascended the mountain to the summit on the 6th of June ; and on the south side, in one of the deep gullies, found a body of snow 13 feet deep, and so hard as to bear them. On the 19th of the same month, some of the same party ascended again, and in the same spot the snow was five feet deep.

In the first week in September, 1788, two men who attempted to ascend the mountain, found the bald top covered with snow and ice, then newly formed, and they could not reach the summit; but this does not happen every year so soon; for the mountain has been ascended as late as the first week in October, when the snow was upon it; and though the mountains begin to be covered at times with snow, as early as September, yet it goes off again, and seldom gets fixed until the end of October, or the beginning of November; but from that time it remains until July. In the year 1784, snow was seen on the south side of the largest mountain, until the 12th of July; in 1790, it lay until the month of August. During the period of 9 or 10 months, the mountains exhibit more or less of that bright appearance, from which they are denominated white. In the spring, when the snow is partly dissolved, they appear of a pale blue, streaked with white; and after it is wholly gone, at the distance of 60 miles, they are altogether of the same pale blue, nearly approaching a sky colour; while at the same time, viewed at the distance of 8 miles, or less, they appear of the proper colour of the rock. These changes are observed by people who live within constant view of them; and from these facts and observations, it may with certainty be concluded, that the whiteness of them is wholly caused by the snow, and not by any other white substance, as some suppose. There are indeed in the summer months, some streaks, which appear brighter than other parts; but these, when viewed attentively

with a telescope, are plainly discerned to be the edges or sides of the long deep gullies, enlightened by the sun, and the dark parts are the shaded sides of the same. In the course of a day, these spots may be seen to vary, according to the position of the sun. A company of gentlemen visited these mountains in July, 1784, with a view to make particular observations on the several phenomena which might occur. It happened, unfortunately, that thick clouds covered the mountains almost the whole time ; so that some of the instruments, which, with much labour, they had carried up, were rendered useless. These were a sextant, a telescope, an instrument for ascertaining the bearings of distant objects, a barometer, a thermometer, and several others for different purposes. In the barometer, the mercury ranged at $22^{\circ} 6'$, and the thermometer stood at 44° . It was their intention to have placed one of each at the foot of the mountain, at the same time that the others were carried to the top, for the purpose of making corresponding observations ; but they were unhappily broken in the course of the journey through the rugged roads and thick woods ; and the barometer, which was carried to the summit, had suffered so much agitation, that an allowance was necessary to be made, in calculating the height of the mountain, which was computed, in round numbers, at 5500 feet above the meadow, in the valley below, and nearly 10,000 feet above the level of the sea. They intended to have made a geometrical mensuration of the altitude ; but in the meadow, they could not obtain a base of sufficient length,

nor see the summit of the sugar loaf; and in another place, where these inconveniences were removed, they were prevented by the almost continual obscuration of the mountains by clouds. Their exercise in ascending the mountain, was so violent, that when Dr. Cutler, who carried the thermometer, took it out of his bosom, the mercury stood at fever heat, but it soon fell to 44° ; and by the time that he had adjusted his barometer and thermometer, the cold had nearly deprived him of the use of his fingers. On the uppermost rock, the Rev. Mr. Little began to engrave the letters N. H. but was so chilled with the cold, that he gave the instruments to Col. Whipple, who finished the letters. Under a stone they left a plate of lead, on which their names were engraven. The sun shone clear while they were passing over the plain; but immediately after their arrival at the highest summit, they had the mortification to be enveloped in a dense cloud, which came up the opposite side of the mountain. This unfortunate circumstance prevented their making any further use of their instruments. Being thus involved, as they were descending from the plain, in one of the long deep gullies, not being able to see to the bottom, on a sudden, their pilot slipped, and was gone out of sight, though happily, without any other damage, than tearing his clothes. This accident obliged them to stop; when they turned their eyes upward, they were astonished at the immense depth and steepness of the place, which they had descended, by fixing their heels on the prominent parts of the rock, and found it im-

practicable to reascend the same way ; but having discovered a winding gully of a more gradual ascent, in this they got to the plain, and then came down on the eastern side. This deep gully was on the southeast. From these circumstances, it may be inferred, that it is more practicable and safe to ascend or descend on the ridges, than in the gullies of the mountain. These vast and irregular heights, being copiously replenished with water, exhibit a great variety of beautiful cascades ; some of which fall in a perpendicular sheet or spout, others are winding and sloping, others spread and form a basin in the rock, and then gush in a cataract over its edge. A poetic fancy may find full gratification amidst these wild and rugged scenes, if its ardour be not checked by the fatigue of the approach. Almost every thing in nature, which can be supposed capable of inspiring ideas of the sublime and beautiful, is here realized. Aged mountains, stupendous elevations, rolling clouds, impending rocks, verdant woods, crystal streams, the gentle rill, and the roaring torrent, all conspire to amaze, to sooth, and to enrapture. On the western part of these mountains is a pass, commonly called the notch, which in the narrowest part, measures but 22 feet, between two perpendicular rocks. From the height above it, a brook descends, and meanders through a meadow, formerly a beaver pond. It is surrounded by rocks, which on one side are perpendicular, and on the other, rise in an angle of 45 degrees ; a strikingly picturesque scene ! This defile was known to the Indians, who formerly led their captives

through it to Canada ; but it had been forgotten or neglected, until the year 1771, when two hunters passed through it, and from their report, the proprietors of lands on the northern parts of Connecticut river, formed the plan of a road through it, to the upper Coos, from which it is distant 25 miles. Along the eastern side of the meadow, under the perpendicular rock, is a causeway of large logs, sunk in the mud by rocks, blown with gunpowder, from the mountain. On this foundation, is constructed a road, which passes through the narrow defile, at the south end of the meadow, leaving a passage for the rivulet, which glides along the western side. This rivulet, which gives rise to Saco, descends towards the south ; and at a little distance from the defile, its waters are augmented by two streams from the left, one of which descends in a trench of two feet wide, and is called the flume, from the near resemblance which it bears to an artificial flume. Over these are thrown strong bridges ; and the whole construction of this road is firm and durable ; much labour has been expended upon it, and the net proceeds of a confiscated estate were applied to defray the expense. In the descent, the pass widens, and the stream increases ; but for eight or ten miles from the notch, the mountains on each side are so near, as to leave room only for the river and its intervals, which are not more than half a mile wide. In the course of this descent, several curious objects present themselves to view. On the side of one mountain is a projection, resembling a shelf, on which stand four large square

rocks, in a form resembling as many huge folio volumes. In two or three places, at immense heights, and perfectly inaccessible, appear rocks of a white and red hue, the surfaces of which are polished like a mirror, by the constant trickling of water over them. These being exposed to the west and south, are capable, in the night, of reflecting the moon and star beams to the wondering traveller, in the deep, dark valley below, and by the help of imagination, are sufficient to give rise to the fiction of carbuncles. To encompass these mountains, as the roads are laid out through the eastern and western passes, and round the northern side of the whole cluster, it is necessary to travel more than seventy miles, and to ford eight considerable rivers, beside many smaller streams. The distance between the heads of rivers, which pursue such different courses from this immense elevation, and which fall into the sea so many hundred miles asunder, is so small, that a traveller may, in the course of a day, drink the waters of Saco, Ameriscoggin and Connecticut rivers. These waters are all perfectly limpid and sweet, excepting one brook, on the eastern side of Mount Washington, which has a saponaceous taste, and is covered with a very thick and strong froth. It is said, that there is a part of the mountain where the magnetic needle refuses to traverse : this is probably caused by a body of iron ore. It is also said, that a mineral, supposed to be lead, has been discovered near the eastern pass ; but that the spot cannot now be found. What stores the bowels of the mountains contain, time must unfold : all searches

for subterraneous treasures, having hitherto proved fruitless. The most certain riches which they yield, are the freshets, which bring down the soil to the intervals below, and form a fine mould, producing, by the aid of cultivation, corn and herbage in the most luxuriant plenty. Dr. BELKNAP.

Agamenticus, a remarkable mountain, lies about four leagues north of the entrance of Piscataqua, and there are three inferior summits, called Frost's hills, at a small distance, on the northwest. These are situated within the county of York, formerly the Province of Maine. The first ridge is continued through the towns of Rochester, Barrington, and Nottingham, and the several summits are distinguished by different names, as Teneriffe, Saddleback, &c. but the general name is the Blue hills. Beyond these, are several higher ones, as mount Major, Moose mountain, &c. These are not in a continued range, but detached; between them are many smaller elevations. Farther back the mountains rise higher; and among the third range, Chocorua, Ossapy, and Kyarsarge, claim the preeminence. Beyond these, is the lofty ridge, called the height of land, because it separates the branches of the river Connecticut from those of the Merrimack. In this ridge is the Grand Monadnock, 22 miles east of the river Connecticut. Thirty miles north of this, lies Sunnapee mountain, and 48 miles farther, in the same direction, is Mooshelock. The ridge then is continued northeasterly, dividing the waters of the river Connecticut from those of Saco and Ameriscoggin. Here the mountains rise much

higher, and the most elevated summits in this range are the White mountains.

Over the tops of several of the highest mountains, are small collections of water, and on others, marshy spots, which are frequented by aquatic birds. The roads over those mountains which are passable, are frequently wet and miry, while the vallies below are dry. About two or three feet under the surface of the mountain, is a firm earth, called the pan, which is impenetrable by water ; the rains and dews are therefore retained in the softer soil, or formed into springs and brooks. This soil is made by the rotting of fallen leaves and wood, the growth of past ages.

Several phenomena respecting the larger mountains, afford matter of amusement, and some are of real use. People who live near them, humorously style the mountains their almanack ; because, by the ascent and attraction of vapours, they can form a judgment of the weather. If a cloud is attracted by a mountain and hovers on its top, they predict rain ; and if after rain, the mountain continues capped, they expect a repetition of showers. A storm is preceded for several hours, by a roaring of the mountain, which may be heard 10 or 12 miles. This is frequently observed by people who live near the Grand Monadnock. It is also said, that when there is a perfect calm on the south side, there is sometimes a furious wind on the north, which drives the snow, so that it is seen whirling far above the trees. At Moultonborough, lying under the southwest side of the great Ossapy mountain,

it is observed, that in a northeast storm, the wind, falls over the mountain like water over a dam ; and with such force as frequently to unroof the houses. The altitude of this mountain has not been ascertained ; but that of the Grand Monadnock was measured in 1780, by J. Winthrop, Esq. and announced an elevation of 3254 feet above the level of the sea. The base of this mountain is about five miles in diameter from north to south ; and about three from east to west. Its summit is a bald rock ; and on the sides are some appearances of the explosion of subterraneous fires. A similar phenomenon has been observed on West river mountain, in the township of Chesterfield, adjoining Connecticut river. In 1730, the garrison of Fort Dummer, distant four miles, was alarmed with frequent explosions, and with columns of fire and smoke, emitted from the mountain. The like appearances have been observed at various times since ; particularly one in 1754, which was the most violent of any. There are two places, where the rocks bear marks of having been heated and calcined. A company of persons having conceived a notion of precious metals being contained in this mountain, have penetrated it in various directions, and have found further evidences of internal fires, particularly a large quantity of scorixæ ; in some parts loose, in others, adhering to the rocks. The only valuable effect of their industry, is the discovery of a fine, soft, yellow earth, which when burned, is changed into a brown pigment ; and another of the colour of the peach blossom. There is also observed on the

earth, which has been thrown out, a white incrustation, which has the taste of nitre. The top of the mountain is an area of about 20 rods square, which is hollow ; and in a wet season, is filled with water, as is common on the tops of mountains ; but there is no appearance of such a crater as is peculiar to volcanos. Under the mountain, are many fragments of rocks which have fallen from it ; but whether by explosions, or any other convulsions, or by the force of the frost, cannot be ascertained. DR. BELKNAP.

The mountain, called Sideling hills, is eight miles over. This is not like the neighbouring Alleghany mountains, a distinct ridge, but a succession of ridges, with long ascents and descents on the main sides, and intermediate risings and short vallies between. " It was a fine clear morning," says Mr. Harris, " when we began to ascend. As we advanced, the prospect widened and became very interesting. The deep and gloomy valley below was a vast wilderness, skirted by mountains of every hue and form ; some craggy and bare, and others covered to the top ; but even this extensive wild was pleasing, and gave scope to boundless reflection. Quitting the elevated region to which we had reached, we descended about half a mile, and then rose another and more lofty gradation. Hence the view was still more diversified and magnificent, crowded with mountains upon mountains in every direction, between and beyond which were seen the blue tops of others more distant, mellowed down to the softest shades, until all was lost in unison with the clouds. As we descended, we beheld the mists ris-

ing from the deep vallies, and the clouds thickening around. It was cold and blustering, and we expected an immediate tempest and rain ; but as we mounted the third ridge, the clouds broke away over our heads ; and as they dispersed, the sun would shine between, and give a glittering radiance to the opening scene. We soon got beyond the clouded region, and saw the misty volumes floating down to the vallies and encircling the lower hills ; so that before we reached the summit, we had the pleasure of looking abroad in an unclouded sky :

— — — — — “ Here could we survey
The gather'd tempests rolling far beneath,
And stand above the storm.”

The whole horizon was fringed with piles of distant mountains. The intermediate vallies were filled with clouds, or obscured with thick mists and shades ; but the lofty summits, gilded with the blaze of day, lighted up under an azure heaven, gave a surprising grandeur and brilliancy to the whole scene.”

Through the large tract of country which lies between the west side of Connecticut river, and the east side of Hudson river and Lake Champlain, there is one continued range, termed “ the Green mountains,” from which Vermont derives its name. These mountains begin in the province of Canada ; from thence they extend through the states of Vermont, Massachusetts, and Connecticut, and terminate within a few miles of the sea coast. Their general direction is from N. N. E. to S. S. W. ; and their extent is through a tract of country not less

than 400 miles in length. They are one continued range or collection of mountains, appearing as if they were piled one upon another. They are generally from 12 to 15 miles in width, are much intersected with vallies, abound with springs and streams of water, and are every where covered with woods. Their appearance, is among the most grand and majestic phenomena, which nature exhibits. The altitude of Kellington peak, one of the Green mountains, by a mensuration made in 1792, admitting the waters of the river St. Lawrence at Quebec to be of the same level as the sea, is 3454 feet above the level of the ocean. The altitude at which a perpetual congelation takes place in this latitude ($43^{\circ} 30'$) is about 8066 feet above the level of the sea. This is near four fifths of a mile higher than the tops of our highest mountains. But although they are far below the freezing point in summer, their phenomena and productions are very much affected by the degree of cold, to which they are constantly exposed. The tops of these mountains are generally composed of rocks, covered over with moss. The trees appear to be very aged, but they are of a small size ; and all of them of the species called evergreens ; pine, spruce, hemlock, and fir, intermixed with shrubs and bushes. The powers of vegetation regularly diminish as we approach the summit of a high mountain ; the trees degenerate in their dimensions, and frequently terminate in a shrubbery of spruce and hemlock, two or three feet high, whose branches are so interwoven and knit together, as to prevent a passage between them.

Trees thus diminished, with shrubs and vines bearing different berries, and a species of grass, called winter grass, mixed with the moss of the rocks, are all the vegetable productions, which nature brings forth on the heights of these mountains. WILLIAMS' *History of Vermont*.

The Enchanted mountain, about two miles from Brasstown, (Tennessee) is famous for curiosities. There are on several rocks, a number of impressions resembling the tracks of turkies, bears, horses, and human beings, as visible and perfect, as they could be made on snow or sand. The latter are remarkable for having uniformly six toes each; one only excepted, which appears to be the print of a negro's foot. By this we must suppose the originals to have been the progeny of Titan or Anak. One of these tracks is very large, the length of the foot 16 inches, the distance of the extremes of the outer toes, 13 inches, the proximate breadth behind the toes seven inches, the diameter of the heel ball five. One of the horse tracks is likewise of an uncommon size, the transverse and conjugate diameters are eight by ten inches; perhaps the horse the Great Warrior rode. There are many other fanciful figures, the meaning of which it is difficult to decipher. The most favourable conjecture concerning them is, that they are the real tracks of the animals they represent; and what gives probability to this conjecture, is the circumstance of a horse's foot having apparently slipped several inches and recovered again; and the figures having all the same direction like the trail of a company on a jour-

ney. If it be a *lusus naturæ*, the old dame never sported more seriously ; if the operation of chance, perhaps there was never more apparent design ; if it were done by art, it might be to perpetuate the remembrance of some remarkable event of war or engagement fought on the ground. The vast heaps of stones near the place, supposed the tombs of warriors slain in battle, seem to favour the supposition. The texture of the rocks is soft. The part on which the sun has the greatest influence, and which is the most indurated, can easily be cut with a knife, and appears to be of the nature of pipe-stone. Some of the Cherokees entertain an opinion that it always rains when any person visits the place, as if sympathetic nature wept at the recollection of the dreadful catastrophe which these figures were intended to commemorate.

In Montgomery county, (New York) is a small rapid stream emptying into Scroon lake, west of Lake George : it runs under a hill, the base of which is 60 or 70 yards diameter, forming a curious and most beautiful arch as white as snow. The fury of the water and the roughness of the bottom, added to the terrific noise within, has hitherto prevented any person from passing through the chasm. DR. MORSE.

The Ararat, or Pilot mountain, 16 miles northwest of Salem, (North Carolina) is worthy attention. It is discernible at the distance of 60 or 70 miles, overlooking the country below. It was in former times called the Pilot, by the Indians, as it served them for a beacon, to conduct

their routes in the northern and southern wars. On approaching it, a grand display of nature's workmanship, in rude dress, is exhibited. From its broad base, the mountain rises in easy ascent, like a pyramid, near a mile high, to where it is not more than the area of an acre broad ; when, on a sudden, a vast stupendous rock, having the appearance of a large castle, with its battlements, erects its perpendicular height to upwards of 300 feet, and terminates in a flat, which is generally as level as a floor. To ascend this precipice, there is only one way, which, through cavities and fissures of the rock, is with some difficulty and danger effected. When on the summit, the eye is entertained with a vast delightful prospect of the Apalachian mountains, on the north, and a wide extended level country below, on the south ; while the streams of the Yadkin and Dan, on the right and left hand, are discovered at several distant places, winding through the fertile low ground, on their way towards the ocean. Dr. MORSE.

In the township of Wills borough, (New York) is a curious split rock. A point of a mountain, which projected about 50 yards into Lake Champlain, appears to have been broken by some violent shock of nature. It is removed from the main rock or mountain, about 20 feet, and the opposite sides so exactly suit each other, that one needs no other proof of their having been once united. The point broken off contains about half an acre, and is covered with wood. The height of the rock, on each side the fissure, is about 12 feet ; round this point is a spa-

cious bay, sheltered from the southwest and northwest winds by the surrounding hills and woods. On the west side are four or five finely cultivated farms, which altogether, at certain seasons, and in certain situations, form one of the most beautiful landscapes imaginable. Sailing under this coast for several miles before you come to split rock, the mountains rude and barren, seem to hang over the traveller and threaten destruction. A water, boundless to the sight, lies before him : man feels his own littleness, and infidelity itself, pays an unwilling homage to the Creator. Instantly and unexpectedly the scene changes, and peeping with greedy eye through the fissure, nature presents to the view a silver bason, a verdant lawn, a humble cottage, a golden harvest, a majestic forest, a lofty mountain, an azure sky, rising one above another "in just gradation to the amazing whole."

Dr. MORSE.

In Dorset, (Vermont) is a mountain exceedingly high, the top of which, for at least three parts of the year, is enveloped with clouds ; it is not unfrequent to see its top rising a great height above them, and the rain descending in cataracts down their sides, with almost the velocity of the falls of Niagara, while the sun beams shoot their brightest rays on the adjacent fields and neighbourhood. In 1780, a ponderous rock, about 20 tons weight, broke off from this mountain, and forced its way near 400 yards down a precipice ; the firmest rooted trees, the most enormous crags bowed submissive, and when it reached the bottom, so irresistible was its

force, that it buried itself about 15 feet under the earth. The place where it sunk is a small flat piece of low land which receives the waters of Dorset, Danby, and the East mountain: here they divide, one part takes its course to the north, and is the head of Otter creek, the other part assumes a southwesterly direction through Manchester, Sunderland, and Aslington, and from thence into the state of New York. GRAHAM.

The Shining mountains, bounding Louisiana on the west are little known. That range, of which the Shining mountains are a part, begins at Mexico, and continuing northward on the back, or to the east of California, separate the waters of those rivers that fall either into the Gulf of Mexico, or the Gulf of California. From thence continuing their course still northward, between the sources of the Mississippi and the rivers that run into the South sea, they appear to end in about 47° or 48° of north latitude; where a number of rivers arise, and empty themselves either into the South sea, into Hudson's bay, or into the waters that communicate between these two seas. Among these mountains, those that lie to the west of the river St. Pierre, are called Shining mountains, from an infinite number of crystal stones, of an amazing size, which, when the sun shines full upon them, sparkle so as to be seen at a great distance. It is said, that a little to the northwest of the heads of the Missouri and St. Pierre, there is a nation rather smaller and whiter than the neighbouring tribes, who cultivate the ground, and in some measure the arts.

Also, that some of the nations inhabiting those parts that lie to the west of the Shining mountains, have gold so plenty among them, that they make their most common utensils of it. The people dwelling near them are supposed to be some of the different tribes that were tributary to the Mexican kings, and who fled from their native country, to seek an asylum in these parts, about the time of the conquest of Mexico by the Spaniards, more than two centuries ago. CARVER.

That there exists a Salt mountain in the province of Louisiana is beyond a doubt. There has been found about 1000 miles up the Missouri, and not far from that river, a *Salt mountain*!! The existence of such a mountain might well be questioned, were it not for the testimony of several respectable and enterprising traders, who have visited it, and who have exhibited several bushels to the curiosity of the people of St. Louis, where some of it still remains. A specimen of the same salt has been sent to Marietta. This mountain is said to be 180 miles long, and 45 in width, composed of solid rock salt, without any trees or shrubs on it! Salt springs are very numerous beneath the surface of the mountain, and they flow through the fissures and cavities of it. DR. MORSE.

Mount Vernon, though not remarkable, as a mountain; yet, being the residence of our late venerable Washington, deserves attention. The seat is situated 9 miles below Alexandria, on the banks of the Patowmac; the way to it, however, by land, is much farther, on account of the numerous creeks

that fall into the Patowmac, the mouths of which it is impossible to pass near to. Very thick woods remain standing within four or five miles of the place ; the roads through them are very bad, and so many of them cross one another in different directions, that it is a matter of very great difficulty to find out the right one. The mount is a high part of the bank of the river, which rises abruptly about 200 feet above the level of the water. The river before it is 3 miles wide, and on the opposite side it forms a bay about the same breadth, which extends for a considerable way up the country. This, at first sight, appears to be a continuation of the river ; but the Patowmac takes a very sudden turn to the left, 2 or 3 miles above the house, and is quickly lost to the view. Downwards to the right, there is a prospect of it for 12 miles. The Maryland shore, on the opposite side, is beautifully diversified with hills, which are mostly covered with wood : in many places, however, little patches of cultivated ground appear, ornamented with houses. The scenery altogether is most delightful. The house, which stands about 60 yards from the edge of the mount, is of wood, cut and painted, so as to resemble hewn stone. The rear is towards the river, at which side is a portico of 96 feet in length, supported by 8 pillars. The front is uniform, and at a distance looks tolerably well. The dwelling house is in the centre, and communicates with the wings on each side, by means of covered ways, running in a curved direction. Behind these wings on the one side, are the different offices belonging

to the house, and also to the farm, and on the other, the cabins for the slaves. In front, the breadth of the whole building, is a lawn with a gravel walk round it, planted with trees, and separated by hedges on either side, from the farm yard and garden. As for the garden, it wears exactly the appearance of a nursery, and every thing about the place indicates that more attention is paid to profit than pleasure. The ground in the rear of the house is also laid out in a lawn, and the declivity of the mount towards the water, is a deer park. Nor shall we pass without some notice of Monticello, (or little mountain in the Italian language) the charming country residence of our present President, Thomas Jefferson. This mountain is about three miles from Charlottesville, and two from Milton, which is on the head waters of Rivanna river. It is thickly wooded on one side, and walks are carried round it with different degrees of obliquity, running into each other. On the south side is the garden, and a large vineyard, that produces abundance of fine fruit. The house is most singularly situated, being built on the top of the mountain, the apex of which has been cut off, so as to leave an area of about an acre and a half. At present (1796) it is in an unfinished state ; but if carried on according to the plan laid down, it will be one of the most elegant private habitations in the United States. A large apartment is laid out for a library and museum, meant to extend the breadth of the house ; the windows of which are to open into an extensive green-house and aviary. In the centre is another very spacious apartment,

of an octagon form, reaching from the front to the rear of the house ; the large folding glass doors of which, at each end, open under a portico. An apartment like this, extending from front to back, is very common in a Virginian house : it is called a saloon, and during summer is the one generally preferred by the family, on account of its being more airy and spacious than any other. The house commands a magnificent prospect on the one side of the blue ridge of mountains for near 40 miles, and on the opposite one, of the low country, in appearance, like an extended heath, covered with trees, the tops of which alone are visible. The mists and vapours arising from the low grounds, give a continual variety to the scene. WELD.

The Volcanic mountain, in the island of St. Vincent's, called *Morne Garou*, is too remarkable to be passed in silence. The mountain in question is situated on the northwest part of the island, and is the highest in it. It is constantly reported to have emitted volcanic eruptions ; and the ravines at the bottom seem to corroborate the traditions of the inhabitants in this respect. Mr. Anderson is the only person who ever ascended to its summit. He began his journey the 26th February, 1784, having been furnished by a friend with two stout negroes and a boy. They arrived at the foot of the mountain before 7 in the morning, having each a good cutlass, to cut through the woods, or to defend themselves in case of an attack from the caribbees, or runaway negroes. Having scrambled up a rock upwards of 40 feet high, they found themselves in

the bottom of a deep ravine, which having ascended a little way, they arrived at the habitation of Mr. Gasco. The difficulty of going through woods in the West Indies is very great. It was upwards of 2 hours before they got upon the ridge, and there the passage became more difficult: they were now surrounded by a thick forest: the fatigue of cutting their way soon became intolerable to the negroes; so that in the afternoon, Mr. Anderson returned to Mr. Gasco's to spend the night. Early next morning he set out in company only with the boy. He proceeded up the ravine about a mile and a half, without any considerable obstruction. However, it now began to narrow fast; and there were many rocks and precipices to climb over. At length the ravine terminated at the bottom of a very high precipice. It was impossible to know the extent of this, as the top was covered with thick wood: he began to ascend, digging holes with his cutlass to put his feet in, and taking hold of the tufts as lightly as possible. Notwithstanding all his care, however, he frequently slipped down a considerable way; but as it was only loose sand, he could easily push his cutlass into it, and thus, by taking hold of it, recover himself again. On getting up to the top of the precipice, he found himself on a very narrow ridge, covered with wood, and bounded by 2 ravines: proceeding onwards, they found the ridge exceedingly narrow, with a tremendous gulf on each side, into which they were every moment in danger of falling. Here a sulphureous smell began to be perceived, which our author

knew must proceed from the top of the mountain, as the wind then blew that way, and as it grew stronger as he advanced, he was in hopes its summit could not be far distant. Perceiving a rising before him, he imagined, that by getting upon it he might have a view of the top of the mountain ; but when this was done, he could only see a peak on the northwest side of the mountain, to which, by appearance, he judged himself little nearer than when at the bottom. The woods now became extremely difficult to pass through : in a little time he had a view of the ravine on the left, which was of prodigious depth, and ran from near the top of the mountain to the sea. Its bottom seemed to be a rock, nearly resembling lava in colour. About 4 in the afternoon, he had no prospect of the top of the mountain, but imagined, that if he could get into the ravine before night, he might easily reach it next morning. After cutting through a great way, however, he found himself, about sunset, on the brink of a precipice, where he narrowly escaped falling. They were now about half way down, but all the rest of the way seemed a perpendicular precipice, which it was impossible to pass : the top of the mountain was yet a great way off, and there was no other resource, than to attempt the ridge they had left. The evening was now so far advanced, that they took up their residence where they were. At day break, they renewed their work, and soon had the satisfaction to perceive the woods became thin, and about 12 o'clock they obtained a full view of the summit, about a mile dis-

tant. It seemed to be composed of 6 or 7 ridges, very much broken in the sides. Mr. Anderson directed his course towards a high peak, that overlooked a large excavation, where the ridges met, and which he supposed to be the centre of the volcano. The fatigue of the work, however, reduced them to such a situation that they were scarcely able to stand. The negros now refused to proceed, so that Mr. Anderson was obliged to return, and reached Mr. Malonne's that night, near a mile from the foot of the mountain. On the 4th of March, our traveller set out about 4 in the morning, in company with a Mr. Fraser. They met with little difficulty until they came to the place from whence they had returned. Within a quarter of a mile of the top, they found the climate suddenly altered, the air being extremely cold, and the summit of the mountain barren. About noon they reached the summit, and were surprised at the sight of an extraordinary cavity. It is situated in the centre of the mountain. Its diameter is somewhat more than a mile, and its circumference a circle. Its depth is about a quarter of a mile, and it narrows very regularly to the bottom. Its sides are smooth and covered with moss, except towards the south, where there are a number of small holes and fissures. This is the only place to go to the bottom. On the west, is a section of a red granite cut smooth, and having the same declivity with the other parts. All the rest of the surrounding sides seem to be composed of sand, which has undergone the action of fire : it has a crust smooth,

and about an inch thick, almost as hard as rock ; on breaking which, nothing appears but sand. In the centre stands a burning mountain, about a mile in circumference : out of the summit rises a small eminence 10 feet high, and conical ; from the apex of which a column of smoke constantly issues. Great quantities of smoke issue from most parts of the mountain ; and the heat is so intense that it is impossible to ascend it. At the bottom, on the north side, is a very large rock split asunder ; each of the halves which are rent in all directions, are separated to a considerable distance from each other, and the crevices have glossy efflorescences, tasting like vitriol. From the external appearances of this mountain, he conjectures that it had but lately began to burn, as on several parts he saw shrubs and grass which seemed to have been but recently scorched and burnt : there were also several holes on the south, from which smoke issued, that appeared to have broken out but lately. On the two opposite sides of the mountain, are two lakes of water, about a stone's throw in breadth : they appear to be deep in the middle, and have a bottom of a kind of clay. The water is chalybeate, and has a pleasant taste. These lakes probably derive their existence from the rain water running down the sides of the crater. *Wonders of Nature and Art.*

At St. Christopher's, also, is a mountain not unworthy notice. We shall extract an account of it from a letter of the Rev. Mr. Smith, to one of his friends. From Chianne, about 8 miles from Basse Terre, proceeding through the woods, our traveller,

with 9 others, began to ascend the mountain, the ascent growing steeper and steeper, the higher they advanced ; and in like proportion, the large trees began to grow shorter. Before they passed all the trees, they entered among the clouds, which felt raw and cold. From those woods to the top, which is almost half a mile, there are no trees at all, and scarcely a bush. Being at last arrived at the top with great fatigue, the clouds were at least half a mile beneath them, but the wind dispersing them, a charming view was opened of the woods and plantations below, besides an unbounded prospect of the Atlantic ocean. The top of this mountain is a small plain, not 300 yards wide, extending at the verge of a deep cavity, exactly round, and about a mile in circumference. He judges its perpendicular depth to be about 220 yards, and observes, he looked down into it with horror, observing large and continual clouds of steam arise from the veins of sulphur, &c. with which the bottom of it abounds. The rim of this cavity, except where it joins to and makes part of the plain, is not above 20 yards broad ; and the inside of it, for at least half way downwards, appears to be solid rock, overrun with moss. " Upon maturely weighing the whole state of this mountain," says he, " we unanimously agreed it was on fire under us, and that the cavity was formerly (perhaps ages ago) occasioned by some furious and dreadful eruption, when it might have been a volcano for a while, like Vesuvius or *Ætna*." Upon the rim of the cavity, to the southeast, there is a large and steep rocky mount, called Mount Misery.

It is the highest point of land on St. Christopher's, its height being reckoned a mile and a half, perpendicular from the sea. The whole breadth of one part of the above mentioned rim is taken up by a large single rock, almost as smooth as if it had been cut by the chisel. From angle to angle at the base, it measures 7 or 8 yards, is somewhat blunted, or rather broken off at the top, and a third part downwards, from thence, it seems to be cracked quite through, sideways. The colour of the rock resembles the red part of oriental granite, and like that, is extremely hard. Near this pyramid, by the help of bushes and roots, they ventured to slide down 40 or 50 yards into the cavity, until they came to some wild banannas, which were ready to quench their thirst, with most clear and excellent water, that run out of them upon sticking a pen-knife just where the leaves join to the top of the body of the tree, and to form a small hollow, as if on purpose to receive the blessings of Heaven, the rain and the dew, and reserve them for the thirsty traveller. Keeping on in a steep descent, through the wood of banannas, cabbage trees, &c. they arrived at the bottom of the cavity, when having crossed a little plain, they came to an uneven spot of ground, consisting of 30 acres or upwards. Here they found a very large rock, jutting out of the side of the hill; at the bottom of it were 3 or 4 round holes in the earth as wide as a hat-crown, from whence issued hot steams, like smoke out of chimneys, which tinged the edges of the holes with seemingly, fair brimstone. *Wonders of Nature and Art.*

There are numbers of volcanic mountains in the Mexican empire, that have overwhelmed the country at different times. Pojauhtecal, called by the Spaniards, Volcan de Orizaba, began to send forth smoke in 1545, and continued to do so for 20 years ; but after that, for the space of more than two centuries, there has not been observed the smallest sign of burning. This celebrated mountain, which is of a conical figure, is indisputably the highest land in all Mexico ; and, on account of its height, is the first land descried by seamen who are steering that way, at the distance of 50 leagues. It is higher than the Peak of Teneriffe. Its top is always covered with snow, and its border adorned with large cedars, pine, and other trees of valuable wood, which make the prospect of it every way beautiful. The Popocatepu and Tztaceiuhatl, which lie near each other, 33 miles southeast from Mexico, are also of a surprising height. Popocatepu, for which they have substituted the name of Volcan, has a mouth or vent, more than half a mile wide, from which, in the time of the Mexican kings, it frequently emitted flames ; and in the sixteenth century, many times threw out quantities of ashes upon the places adjacent ; but since that time hardly any smoke has been observed. Tztaceiuhatl, or Seirra Nevada, threw out, also, at some times, smoke and ashes. Both mountains have tops always covered with snow in such quantities, as to supply, with what precipitates from the neighbouring rocks, the cities of Mexico, Gilopoli, Cholula, and the adjacent places, to the distance of 40 miles

from these mountains, where an incredible quantity is yearly consumed in cooling and congealing liquors.

The mountain Juruyo, situated in the valley of Urecho, is a great curiosity. Before the year 1760, there was nothing of it but a small hill, where there was a sugar plantation. But on the 29th of September, 1760, it burst with furious shocks, and entirely consumed the sugar works, and the neighbouring village of Guacana; and from that time has continued to emit fire and burning rocks, which have formed themselves into 3 high mountains, whose circumference was nearly 6 miles in 1766; according to the account communicated by the Governor of that province, who was an eye witness of the fact. The ashes at the eruption were forced to the almost incredible distance of 150 miles.

DR. MORSE.

De Rochefoucault's travels present some valuable information concerning the orology of North America. The primitive calcareous rock is mingled, in veins or banks, with the granitic, and is evidently contemporary. Near Philadelphia, large pieces of talc appear instead of mica. There are also veins of horneblende, quartz, and marble, in the position of metallic veins. It is a remarkable feature in the mineralogy, that the granitic mountains approach nearest to the sea, while at a greater distance the rocks are calcareous; and the red primitive limestone is sometimes covered with breccia and argillaceous schistose. The lakes of Upper Canada are surrounded with calcareous rocks; while in Lower Canada, from Montreal to

the sea, the granite predominates. At the isle of St. Helen, this substance is apparent, and the mountain of Beloeil displays much black schorl. The black slate of our traveller is the black schistose limestone of Kalm. The rock of Quebec is said to consist of grey granite, mingled with schorls ; and was called the rock of diamonds, because quartz and crystals were found. In the vicinity blocks of granite are mingled with limestone, and the bank of Newfoundland is supposed to be a mass of granite covered with sand. Towards New York and Boston the rocks are of a soft granite, interspersed with limestone and schistose ; but towards Carolina and Florida the granitic mountains are at a considerable distance from the sea, which seems gradually to have retired. But from the travels of Kalm, a more skilful naturalist, it would appear, that the rocks of North America often consist of a substance unknown to modern systems of mineralogy, and which it has been proposed to term *calcareous granite*, the absence of felspar being supplied by limestone. He describes this substance as consisting of grey limestone, purple, or garnet coloured quartz, and black mica. The limestone effervesces strongly with aqua fortis ; and there are some particles of felspar. Another mountain near the river St. Lawrence, is composed of red felspar, black mica, white limestone, with grains of the purple or red quartz. Sometimes this calcareous granite is schistose, or assumes the form of gneiss. Part of the hills near the isle of Orleans, is composed of grey quartz, reddish and grey limestone,

and grains of sand. Near fort St. Frederic, or Crown Point, Kalm observed fragments of granite mixed with schorl, without any addition; and he found ammonites about two feet in diameter.—Towards the lake Champlain he observed quantities of red sand, which seemed to be decomposed or pounded garnets. The Apalachian mountains he does not appear to have examined; but he mentions the calcareous granite as frequent in Pennsylvania, and often used in buildings at Philadelphia. He describes the lapis ollaris of New England as sometimes spotted with starry asbestos; while green soap rock and amianthus are common in Pennsylvania. The hatchets of the savages were frequently of fine basalt; their knives of quartz and petrosilex; their kettles of lapis ollaris, grey or green; and their tobacco pipes of the same substance, but those of the chiefs, of beautiful red serpentine, from the west of the Mississippi.

RIVERS.

THE noble river Mississippi, both for its extent and utility, claims precedence among the most considerable rivers in North America. Its source has been traced to three small lakes, about latitude 47°, and enters the sea in latitude 29°, after a comparative course of about 1400 British miles. The

Mississippi receives the waters of the Ohio and Illinois, and their numerous branches from the east, and the Missouri, and other rivers from the west. These mighty streams united, are borne down with increasing majesty, through vast forests, and meadows, and discharged into the Gulf of Mexico. The great length and uncommon depth, says Mr. Hutchins, and the excessive muddiness and salubrious quality of its waters after its junction with the Missouri are very singular. The direction of the channel is so crooked, that from New Orleans to the mouth of the Ohio, a distance which does not exceed 460 miles in a straight line, is about 856 by water. It may be shortened at least 250 miles, by cutting across eight or ten necks of land, some of which are not thirty yards wide. Charlevoix relates, that in the year 1722, at Point Coupee or Cut Point, the river made a great turn, and some Canadians by deepening the channel of a small brook, diverted the waters of the river into it. The impetuosity of the stream was so violent, and the soil of so rich and loose a quality, that in a short time the point was cut entirely through, and travellers saved fourteen leagues of their voyage. The old bed has no water in it, the times of the periodical overflowings excepted. The new channel has since been sounded with a line of 30 fathoms, without finding bottom. Several other points of great extent, have, in like manner, been since cut off, and the river diverted into new channels. In the spring floods the Mississippi is very high, and the current so strong, that it is with difficulty it can be ascended ;

but this disadvantage is remedied in some measure by eddies or counter currents, which are generally found in the bends close to the banks of the river, and assist the ascending boats. The current at this season descends at the rate of about five miles an hour. In autumn, when the waters are low, it does not run faster than two miles ; but it is rapid in such parts of the river as have clusters of islands, shoals, and sand banks. The circumference of many of these shoals being several miles, the voyage is longer and in some parts more dangerous than in the spring. The merchandize necessary for the commerce of the upper settlements, on or near the Mississippi, is conveyed in the spring and autumn in batteaux, rowed by eighteen or twenty men, and carrying about forty tons. From New Orleans to the Illinois, the voyage is generally performed in eight or ten weeks. A prodigious number of islands, some of which are of great extent, intersperse that mighty river. Its waters after overflowing its banks below the river Ibberville on the east, and the river Rouge on the west, never return within them again, there being many outlets or streams by which they are conducted into the bay of Mexico, more especially on the west side of the Mississippi, dividing the country into numerous islands. These singularities distinguish it from every known river in the world. Below the Ibberville the land begins to be very low on both sides of the river, across the country, and gradually declines, as it approaches nearer the sea. The island of New Orleans, and the lands opposite, are

to all appearance of no long date ; for in digging ever so little below the surface, you find water, and great quantities of trees. The many beaches and breakers, as well as inlets which have arisen out of the channel, within the last half century, at the several mouths of the river, are convincing proofs that this peninsula was wholly formed in the same manner. And it is certain, that when La Salle sailed down the Mississippi to the sea, the opening of that river was very different from what it is at present. The nearer you approach the sea, this truth becomes more striking. The bars that cross most of these small channels, opened by the current, have been multiplied by means of the trees carried down with the streams ; one of which, stopped by its roots or branches in a shallow part, is sufficient to obstruct the passage of thousands more, and to fix them at the same place. Astonishing collections of trees are daily seen in passing between the Balize and the Missouri. No human force is sufficient to remove them, and the mud carried down by the river, serves to bind and cement them together. They are gradually covered, and every inundation not only extends their length and breadth, but adds another layer to their height. In less than ten years time, canes, shrubs, and aquatic timber grow on them, and form points and islands which forcibly shift the bed of the river. Nothing can be asserted with certainty respecting the length of this river. Its source is not known, but supposed to be upwards of 3000 miles from the sea as the river runs. We only know that from St. Anthony's

falls, in latitude 45° , it glides with a pleasant clear current, and receives many large and very extensive tributary streams, before its junction with the Missouri, without greatly increasing the breadth of the Mississippi, though they do its depth and rapidity. The muddy waters of the Missouri, discolour the lower part of the river, until it empties into the bay of Mexico. The Missouri is a longer, broader, and deeper river than the Mississippi, and affords a more extensive navigation; it is in fact, the principal river, contributing more to the common stream than does the Mississippi. It has been ascended by French traders about twelve or thirteen hundred miles, and from the depth of the water and breadth of the river at that distance, it appeared to be navigable many miles further. From the Missouri river to nearly opposite the Ohio, the western bank of the Mississippi is, some few places excepted, higher than the eastern. From Mine au fer, to the Ibberville, the eastern bank is higher than the western, on which there is not a single discernible rising or eminence for the distance of 750 miles. From the Ibberville to the sea there are no eminences on either side, though the eastern bank appears rather the highest of the two, as far as the English turn. Thence the banks gradually diminish in height to the mouths of the river, where they are but a few feet higher than the common surface of the water. The slime which the annual floods of the river Mississippi leave on the surface of the adjacent shores, may be compared with that of the Nile, which deposits a similar manure, and

for many ages past has insured the fertility of Egypt. When its banks shall have been cultivated as the excellency of its soil and temperature of its climate deserve, its population will equal that of any other part of the world. The trade, wealth, and power of America, may, at some future period, depend, and perhaps centre upon the Mississippi. This also resembles the Nile in the number of its mouths, all issuing into a sea that may be compared to the Mediterranean, which is bounded on the north and south by the two continents of Europe and Africa, as the Mexican bay is by North and South America. The smaller mouths of this river might be easily stopped, by means of those floating trees, with which the river, during the floods, is always covered. The whole force of the channel being united, the only opening then left would probably grow deep, and the bar be removed. DR. MORSE.

From the preceding description, it appears, that setting aside the capricious destinations of the savage tribes, the Missouri must be regarded as the chief river which constitutes what is called the Mississippi. Measured on the same merely comparative scale, which has been adopted to give a general idea of the length of the rivers in Europe and Asia, the Missouri or Mississippi will be about 2000 miles in length. The great river of St. Lawrence is far inferior, being chiefly remarkable for its breadth. In South America, the Maranon, or river of Amazons, measured on the same comparative scale, will be found to be about 2300, and the Rio de la Plata about 1900. In the same comparative way, meas-

ured on the accurate planisphere of Mr. Arrow-smith, the Kian Ku exceeds the Missouri, and rivals the Maranon, which last is probably also rivalled by the Ob. Some deceptions have arisen on this curious subject, as the large rivers in America have been computed by actual navigation of the whole, or a part, in which every winding is taken into the account ; while the length of those in Asia has been merely assumed from the general appearance in maps, without due attention to the innumerable deviations. A favourable climate, and other circumstances, render the American rivers more navigable ; the Ob being impeded by ice, and the Kian Ku by the alpine rocks of Tibet.* PINKERTON.

From the accounts of captains Clark and Lewis, now on their return from a tour through the interior parts of Louisiana, we are enabled to collect the following interesting particulars. It appears that

* The Mississippi should properly be termed the Missouri, the last being the most considerable river, and rising from sources in the western chain, about 600 British miles more remote than the farthest source of the Mississippi, so that the comparative course of the Missouri may be about 2000 British miles. Le Page du Pratz, in his history of Louisiana, says, that the French word Mississippi is a contraction of the savage term Meact Chassipi, which literally denotes the ancient father of rivers. Mr. Hutchins observes, that the natives still call it Meschasiipi. The precise import of the word does not seem to be completely ascertained. It is believed, however, that the word signifies the great river ; or, according to some, Fish river. The terminating word, sippi, or sipi, has a very extensive range in North America, and unquestionably means a river. When the army of Soto visited Florida, in 1539, they found different names applied to the river, in different places : but nothing like Mississippi occurs in that celebrated expedition. PINKERTON.

they have discovered a more practicable route, than that of Mackenzie, to the Pacific ocean. Their route is by the way of the Missouri to the foot of the rapids below the great falls of that river, a distance of 2575 miles, thence by land passing by the Rocky mountains, to a navigable part of Kooskooske 340, and with the Kooskooske 73 miles, Lewis' river 154 miles, and the Columbia 413 to the Pacific ocean, making the total distance from the confluence of the Missouri and Mississippi, to the discharge of the Columbia into the Pacific ocean, 3555 miles. The navigation of the Missouri may be deemed good; its difficulties arise from its falling banks, timber imbedded in the mud of its channel, its sand bars, and the steady rapidity of its current; all which may be overcome with a great degree of certainty, by using the necessary precautions. The passage by land of 340 miles, from the falls of the Missouri to the Kooskooske, is the most formidable part of the track proposed across the continent. Of this distance, 200 miles is along a good road, and 140 over tremendous mountains, which, for 60 miles, are covered with eternal snows. A passage, however, is practicable, from the latter part of June to the last of September; and the cheap rate at which horses are to be obtained from the Indians of the Rocky mountains, and west of them, reduce the expenses of transportation to a mere trifle. The navigation of the Kooskooske, Lewis' river, and the Columbia, is safe and good from the first of April to the middle of August, by making three portages on the latter river. The first of which, in

descending, is 1200 paces, at the falls of Columbia, 260 miles up that river; the second, of 2 miles, at the long narrows, 6 miles below the falls; and a third, also of 2 miles, at the great rapids, 65 miles lower down. The tide flows up the Columbia 183 miles, and within 7 miles of the great rapids. Large sloops may with safety ascend as high as tide water, and vessels of 300 tons burthen, reach the entrance of the Multnomah river, a large southern branch of the Columbia, which takes its rise on the confines of New Mexico, with the Callorado and Apostles' river, discharging itself into the Columbia, 125 miles from its entrance into the Pacific ocean. This track across the continent may be considered as of immense advantage to the fur trade, as all the furs collected in nine tenths of the most valuable fur country in America, may be conveyed to the mouth of the Columbia, and shipped from thence to the East Indies, by the first of August in each year; and will, of course, reach Canton earlier than those which are annually exported from Montreal, arrive in Great Britain.

The river St. Lawrence, after the Mississippi, well deserves the precedence among the mighty rivers of the new world. It derives its source from lake Ontario. From this lake, to Montreal, it is called Iroquois. From Montreal, it assumes the name of St. Lawrence; and continuing its course, passes by Quebec, meets the tide near 500 miles from the sea, and is so far navigable for large vessels. After having received in its course, St. John's, Seguina, Despraires, Ottawa, Trois Ri-

vieres, and innumerable other smaller streams, it falls into the ocean at cape Rosieras, by a mouth 90 miles broad, in which is the island of Anticosti. Beyond the town of Sorelle, 15 leagues from Montreal, the St. Lawrence expands to a great breadth. Here it abounds with small islands, situated so closely to each other, that it is impossible to think without astonishment, of large vessels, like those which go to Montreal, passing between them ; the channel through them is very intricate. This wide part of the river is called Lac St. Pierre ; the greatest breadth of it is about 4 leagues and a half, and its length, from the islands at the head of the lake downwards, about 8 leagues. From hence to Quebec, the river is not more than 2 miles across, and in some parts, it narrows to the breadth of three quarters of a mile. The tide ebbs and flows in the river within a few leagues of Lac St. Pierre ; the expansion of the water at the lake, and the strong current which sets out from it, prevents its action higher up. From Montreal, as far as the town of Trois Rivieres, which stands 4 leagues below Lac St. Pierre, the shores on each side of the St. Lawrence are very flat ; the land then begins to rise, and on the southeast side it continues lofty the whole way down to Quebec. On the opposite side, however, below Trois Rivieres, the banks vary considerably ; in some places they are high, in others, very low, until you approach within a few leagues of Quebec, when they assume a bold and grand appearance on each side. The scenery along various parts of the river is very fine ; it is impossible, in-

deed, but there must be a variety of pleasing views along a noble river like the St. Lawrence, winding for hundreds of miles through a rich country, diversified with rising grounds, woodlands, and cultivated plains. What particularly attracts the attention, however, in going down this river, is, the beautiful disposition of the towns and villages on its banks. Nearly all the settlements in Lower Canada are situated close upon the borders of the rivers, and from this circumstance, the scenery along the St. Lawrence and others, differs materially from that along the rivers in the United States. The banks of the Hudson river, which are more cultivated than those of any of the other large rivers here, are wild and desolate in comparison with those of the St. Lawrence. For several leagues below Montreal, the houses stand so closely together, that it appears as if it were but one village, which extended the whole way. All the houses have a remarkably neat appearance at a distance, and in each village, though it be ever so small, there is a church. The churches are kept in the neatest order, and most of them have spires, covered, according to the custom of the country, with tin, that, from being put on in a particular manner, never becomes rusty.* It is pleasing beyond description, to behold one of those villages opening to the view, as you sail round a point of land covered with trees, the houses in it overhanging the river, and the spires

* The square plates of tin are nailed on diagonally, and the corners are carefully folded over the heads of the nails, so as to prevent any moisture from getting to them.

of the churches sparkling through the groves, with which they are encircled, before the rays of the setting sun. There is scarcely any part of the river, where you pass along for more than a league, without seeing a village or church. Near Montreal, there are two or three considerable mountains, the largest of which stands at the distance of a mile from the town. The view from hence, is grand beyond description. A prodigious expanse of country is laid open to the eye, with the noble river of St. Lawrence winding through it, which may be traced from the remotest part of the horizon. The river comes from the right, and flows smoothly on, after passing down the tremendous rapids above the town, where it is hurried over huge rocks, with a noise that is heard even up the mountain. On the left, below you, appears the town of Montreal, with its churches, monasteries, and glittering spires, and the shipping under its old walls; several little islands in the neighbourhood of the town, partly improved, partly overgrown with wood, add greatly to the beauty of the scene. La Prairie, with its large church, on the distant side of the river, is seen to the greatest advantage, and beyond it a range of lofty mountains, which terminate the prospect. Such an endless variety, and such a grandeur is there in the view from this part of the mountain, that even those who are most habituated to the view, always find it a fresh subject of admiration.

WELD.

The Patowmac takes its rise on the northeast side of the Alleghany mountains, and after running

in a meandering direction for upwards of 400 miles, falls into the Chesapeak bay. At its confluence with the bay, it is 7 miles and a half wide ; about 30 miles higher, at Nominy bay, 4 and a half ; at Aquia, 3 ; at Hallowing point, 1 and a half, and at Alexandria, and from thence to the Federal city, it is 1 mile and a quarter wide. The depth of water at its mouth, is 7 fathoms ; at St. George's island, 5 ; at Alexandria 4, and from thence to Washington, 7 miles distant, 3 fathoms. The navigation of the Patowmac, from the Chesapeak bay to the city, 140 miles distant, is remarkably safe, and so plain, that any navigator of common abilities, that has once sailed up the river, might venture to take up a vessel drawing 12 feet of water, without a pilot. This could not be said of any other river on the continent, from the St. Lawrence to the Mississippi. In its course it receives several large streams, the principal of which falls in at the Federal city. This river is called the eastern branch of the Patowmac ; but it scarcely deserves that name, as it extends no more than 30 miles up the country. At its mouth, it is nearly as wide as the main branch of the river ; and close to the city, the water is in many places 30 feet deep. Thousands of vessels might lie here, and sheltered from all danger, arising either from freshets, or from ice upon the breaking up of a severe winter. Thus it appears that the Federal city is possessed of some essential qualifications for making it a place of importance ; namely, a good harbour, from which there is a ready passage to the ocean, and a fine situation for trading with the interior parts of the country.

The waters in the Patowmac continue near the same depth that it is opposite to the city,* for one mile higher, where a large rock rises up in the middle of the river, on each side of which there are sand banks. It is said there is a deep channel between this rock and the shore, but it is so intricate that it would be dangerous to attempt to take a large

* The city of Washington is laid out on the neck of land between the forks formed by the eastern and western or main branch of the Patowmac river. This neck of land, together with an adjacent territory, which, in the whole, is ten miles square, was ceded to Congress by the states of Maryland and Virginia. The ground on which the city immediately stands, was the property of private individuals, who readily relinquished their claim to one half of it in favour of Congress, conscious that the value of what was left to them would increase, and amply compensate them for their loss. The profits arising from the sale of that part which had thus been ceded to Congress, will be sufficient, it is expected, to pay for the public buildings, for the watering of the city, and also for paving and lighting of the streets. The plan of the city was drawn by a Frenchman of the name of L' Enfant, and is on a scale well suited to the extent of the country, one thousand, two hundred miles in length, and one thousand in breadth, of which it is to be the metropolis; for the ground already marked out for it, is not less than 14 miles in circumference. The streets run north, south, east, and west; but to prevent that sameness, necessarily ensuing from the streets all crossing one another at right angles, a number of avenues are laid out in different parts of the city, which run transversely, and in several places, where these avenues intersect each other, are to be hollow squares. The streets, which cross each other at right angles, are from 90 to 100 feet wide, and the avenues 160 feet. One of these is named after each state, and a hollow square also allotted to each, as a suitable place for statues, columns, &c. which, at some future period, the people of any one of these states may wish to erect to the memory of great men that may appear in the country. On a small eminence, due west of the capitol, is to be an equestrian statue of our ever lamented hero, GENERAL WASHINGTON.

vessel through it. The navigation, however, is safe to the little falls for river craft, 5 miles further on ; here a canal, which extends 2 miles and a half, the length of these falls or rapids, has been cut and perfected, which opens a free passage for boats, as far as the great falls, which are 7 miles from the others. The descent of the river at these, is 76 feet in a mile and a quarter ; but it is intended to make another canal here also ; a part of it is already cut, and every exertion is making to have the whole completed with expedition. From hence to fort Cumberland, 191 miles above the Federal city, there is a free navigation, and boats are continually passing up and down. Beyond this, the passage in the river is obstructed in numerous places ; but there is a possibility of opening it ; and as soon as the company, formed for the purpose, have sufficient funds, it will certainly be done. WELD.

Hudson river may be classed among our principal rivers, its length being near 250 miles, and passing its whole course in the state of New York. It rises in a mountainous country, between the lakes Champlain and Ontario. In its course southeasterly, it approaches within 8 miles of lake George ; then, after a short course, it turns southerly, and receives the Socondaga from the southwest, which heads in the neighbourhood of Mohawk river. The course of the river thence to New York is uniformly south, 12 or 15° west. From Albany to lake George is 65 miles. This distance, the river is navigable only for batteaux, and has two portages of half a mile each. The views on each side, be-

tween New York and Albany, are delightful. The following are the remarks of a late traveller, (Weld) on ascending the river between these places.

“ Scarcely a breath of air was stirring at the time of our departure, but the tide carried us up at the rate of two miles an hour. The sky remained all day as serene as possible, and as the water was perfectly smooth, it reflected, in a beautiful manner, the images of the various objects on the shore, and of the numerous vessels dispersed along the river at different distances, and which seemed to glide along, as it were by the power of magic, for the sails hung loose and motionless. The sun, setting in all his glory, added fresh beauties to this calm and peaceful scene, and permitted us for the last time to behold the distant spires of New York, illumined by his parting rays. To describe all the grand and beautiful prospects presented to the view on passing along this noble river, would be an endless task ; all the various effects that can be supposed to arise from a combination of wood and water, of hill and dale, are here seen in the greatest perfection. In some places, the river expands to the breadth of 5 or 6 miles, in others, it narrows to that of a few hundred yards, and in various parts it is interspersed with islands ; in some places again, its course can be traced as far as the eye can reach ; whilst in others, it is suddenly lost to the view, as it winds between its lofty banks ; here, mountains covered with rocks and trees, rise almost perpendicularly out of the water ; there, a fine champaign country presents itself, cultivated to the very margin of the river, whilst neat, fine farms

houses and distant towns embellish the charming landscapes." The banks of Hudson river, especially on the western side, as far as the highlands extend, are chiefly rocky cliffs. The passage through the highlands, which is 16 or 18 miles, affords a wild, romantic scene. In this narrow pass, on each side of which the mountains tower to a great height, the wind, if there be any, is collected and compressed, and blows continually, as through a bellows ; vessels, in passing through it, are often obliged to lower their sails. The tide flows a few miles above Albany, which is about 160 miles from New York. Ship navigation to Albany is interrupted by a number of islands and shoals, 6 or 8 miles below the city, called the *overslaugh*. It has been in contemplation to confine the river to one channel, by which means it will be deepened, and the difficulty of approaching Albany with vessels of a larger size, avoided. DR. MORSE.

The Ohio is one of the most beautiful rivers on earth. Its current gentle, waters clear, and bosom smooth and unbroken by rocks and rapids, a single instance only excepted. It is a quarter of a mile wide at fort Pitt ; 500 yards at the mouth of the Great Kanhaway ; one mile and 25 poles at Louisville ; a quarter of a mile on the rapids, 3 or 4 miles below Louisville ; half a mile where the low country begins, 20 miles above Green river ; 1 mile and a quarter at the receipt of the Tennessee ; and a mile wide at the mouth. Its length is as follows : from fort Pitt to Log's town, $18\frac{1}{2}$ miles ; Big Beaver creek, $10\frac{1}{4}$; Little Beaver creek, $13\frac{1}{2}$; Yellow creek. $11\frac{1}{4}$; Two

creeks, $21\frac{3}{4}$; Long Reach, $53\frac{3}{4}$; end Long Reach, $16\frac{1}{2}$; Muskingum, $25\frac{1}{2}$; Little Kanhaway, $12\frac{1}{4}$; Hockhocking, 16; Great Kanhaway, $82\frac{1}{2}$; Guian-dot, $43\frac{3}{4}$; Sandy creek, $14\frac{1}{2}$; Sioto, $48\frac{1}{4}$; Little Miami, $126\frac{1}{4}$; Licking creek, 8; Great Miami, $26\frac{3}{4}$; Big Bones, $32\frac{1}{2}$; Kentucky, $44\frac{1}{4}$; Rapids, $77\frac{1}{4}$; Low country, $155\frac{3}{4}$; Buffaloe river, $64\frac{1}{4}$; Wabash, $97\frac{3}{4}$; Big Cave, $42\frac{3}{4}$; Shawanee river, $52\frac{1}{2}$; Cherokee, 13; Massac, 11; Mississippi, 46; whole distance, 1188. In common winter and spring tides, it affords 15 feet water to Louisville, 10 feet to Le Tarte's rapids, 40 miles above the mouth of the Great Kanhaway, and a sufficiency at all times for light batteaux and canoes to fort Pitt. The rapids are in latitude $38^{\circ} 8'$. The inundations begin about the last of March, and subside in July. The rapids at Louisville descend about 30 feet in a length of a mile and a half. The bed of the river there is a solid rock, and is divided by an island into two branches, the southern of which is about 200 yards wide, and is dry four months in the year. The bed of the northern branch is worn into channels by the constant course of the water, and attrition of the pebble stones carried on with that, so as to be passable for batteaux, through the greater part of the year. Yet it is thought that the southern arm may be the most easily opened for constant navigation. The rise of the waters in these rapids does not exceed 10 or 12 feet. A part of this island is so high as to have been never overflowed, and to command the settlement at Louisville, which is opposite to it. The fort, however, is situated at the head of the falls. JEFFERSON.

The Connecticut is also a beautiful river. The original Indian name, which it still bears, signifies the long river.* This river has its source in a ridge of mountains which extend northeasterly to the Gulf of St. Lawrence. The head of its northwestern branch, is about 25 miles beyond the latitude of 45° ; and so far it has been surveyed. When it first enters Vermont it is about 10 rods wide; and in the course of 60 miles increases in its width to 24 rods. Its course, between Vermont and New Hampshire, a distance of 200 miles, is southwesterly; from thence to its mouth, the course is more southerly. After running about 400 miles through the country, and receiving a great number of other streams and rivers, it discharges itself into the ocean at Seabrook. In the months of April or May, it overflows its banks; and for a length of 300 miles, forms and fertilizes a vast tract of rich meadow. Vessels of 80 or 100 tons, go up this river as far as Hartford in Connecticut, 50 miles from its mouth. It is navigable for boats 300 miles further, except the falls, which the states of Vermont, Massachusetts, and Connecticut, are now making navigable by locks. While it increases the richness, and serves to transport the produce by its

* The names which the original inhabitants assigned to our mountains, plains, and vallies, are mostly lost. Many of our rivers, bays, and falls of water, are yet known by their ancient Indian names; on account of their originality, antiquity, signification, singularity, and sound, these names ought to be carefully preserved. In every respect they are far preferable to the unmeaning application and constant repetition of an improper English name.

perpetual majestic movement through an immense tract of country, it is always adding beauty and grandeur to the prospect. WILLIAMS' *Hist. Ver.*

Alatamaha is a noble river, which has its source in the Cherokee mountains, near the head of Tugilo, the great west branch of Savanna, and before it leaves the mountains, is joined and augmented by innumerable rivulets; thence it descends through the hilly country, with all its collateral branches, and winds rapidly among the hills 250 miles, and then enters the flat plain country, by the name of the Oakmulge: thence meandering 150 miles, it is joined on the east side by the Ocone, which likewise heads in the lower ridges of the mountains. After this confluence, having now gained a vast acquisition of waters, it assumes the name of Alatamaha, when it becomes a majestic river, flowing with gentle windings through a vast forest, near 100 miles, and enters the Atlantic by several mouths. The north channel glides by the heights of Darien, on the east bank, about 10 miles above the bar; and running from thence with several turnings, enters the ocean between Sapello and Wolf islands. The south channel, which is esteemed the largest, after it separates from the north, descends gently, winding by M'Intosh's and Broughton's islands; and lastly, by the west course of St. Simon's island, enters the ocean through St. Simon's sound, between the south end of the island of that name, and the north end of Jekyl island.

“How gently flow thy peaceful floods, O Alatamaha!” exclaims the enthusiastic Bartram: “How

sublimely rise to view, on thy elevated shores, yon magnolian groves, from whose tops the surrounding expanse is perfumed, by clouds of incense, blended with the exhaling balm of the liquid amber, and odours continually arising from circumambient aromatic groves of illicium, myrica, laurus, and bigonia. When exhausted with working my canoe," says the same traveller, "against the impetuous current, (which becomes stronger by reason of the mighty floods of the river) with collected force, pressing through the first hilly ascents, where the shores on each side the river present to view rocky cliffs, rising above the surface of the water, in nearly flat horizontal masses, (washed smooth by the descending floods, and which appear to be a composition of sandy limestone) I resigned my bark to the friendly current, reserving to myself the control of the helm. My progress was rendered delightful by the sylvan elegance of the groves, cheerful meadows, and high distant forests, which in grand order presented themselves to view. The winding banks of the river, and the high projecting promontories, unfolded fresh scenes of grandeur and sublimity. The forests and distant hills reechoed the cheering social lowings of domestic herds. The air was filled with the loud and shrill hoopings of the wary sharp-sighted crane. Behold, on yon decayed, defoliated cypress tree, the solitary wood-pelican, dejectedly perched upon its utmost elevated spire; he there, like an ancient venerable sage, sets himself up as a mark of derision for the safety of his kindred tribes. The crying bird, another faithful

guardian, screaming in the gloomy thickets, warns the feathered tribes of approaching peril; and the plumage of the swift sailing squadrons of Spanish curlew, white as the robe of innocence, gleam in the cerulean skies. Thus tranquil and secure, and meditating on the marvellous scenes of primitive nature, as yet unmodified by the hand of man, I gently descended the peaceful stream, on whose polished surface were depicted the mutable shadows from its pensile banks; whilst myriads of finny inhabitants sported in its pellucid floods."

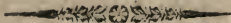
We shall give some account of the Unjigah, or Peace river, as described by Mackenzie, in his voyage, in 1793, to discover a route to the Pacific ocean. The most southernmost source of this river is in a lake, about two miles in length, and from 300 to 500 yards wide, latitude $54^{\circ} 24'$ north; longitude 221° west of Greenwich. This mighty stream, after a winding course through a vast extent of country, receiving many large rivers in its progress, and passing through the Slave lake, empties itself into the Frozen ocean, in 70° north latitude, and about 135 degrees, west longitude. About 50 miles this side of what is called the old establishment, is the fall. The river at this place is about 400 yards broad, and the fall about 20 feet high. Here are two carrying places; the first is 800 paces in length, and the last, in about a mile onwards, is something more than two thirds of that distance. The country, in general, is low, from the entrance of the river to the falls; and with the exception of a few open parts covered with grass, it is clothed

with wood. Where the banks are very low, the soil is good, being composed of the sediment of the river, and petrified leaves and vegetables. Where they are more elevated, they display a face of yellowish clay, mixed with small stones. On a line with the falls, and on either side of the river, there are said to be very extensive plains, which afford pasture to numerous herds of buffaloes. The banks of the river, from the falls, are in general lofty, except at low woody points, accidentally formed in the manner already mentioned: they also display, in all their parts, a face of clay, intermixed with stone. In some places, there likewise appears a black mould. On proceeding onward, in latitude $55^{\circ} 58' 48''$, the west side of the river displays a succession of the most beautiful scenery that can be conceived. The ground rises at intervals to a considerable height, and stretches inwards to a considerable distance. At every interval or pause in the rise, there is a very gently ascending space or lawn, which is alternate with abrupt precipices to the summit of the whole, or, at least, as far as the eye can distinguish: this magnificent theatre of nature has all the decorations, which the trees and animals can afford it: groves of poplars, in every shape, vary the scene, and their intervals are enlivened with vast herds of elks and buffaloes; the former choosing the steeps and uplands, and the latter preferring the plains. At the time of Mackenzie's arrival, the buffaloes were attended with their young ones, who were frisking about them; and it appeared that the elks would soon exhibit the same enlivening cir-

cumstance. The whole country displayed a delightful appearance ; fruits on the exuberant trees were advancing fast to a state of maturity, and the velvet rind of their branches, reflecting the oblique rays of a rising or setting sun, added a splendid gaiety to the scene, which no expressions are qualified to describe.

In 56 degrees of north latitude, the appearance of the country becomes more sublime. The river in this place is not more than 50 yards wide, and flows between stupendous rocks, from whence huge fragments sometimes tumble down, and falling from such a height, dash into small stones, with sharp points, and form the beach between the rocky projections. Along the face of some of these precipices, there appears a stratum of a bituminous substance, which resembles coal ; some of the pieces of it appear to be excellent fuel, others resist, for a considerable time, the action of fire, and do not emit the least flame. The most difficult and dangerous carrying place, both on account of the rapidity of the current, and danger of the passage, is in lat. $56^{\circ} 0' 8''$ and long. $120^{\circ} 29' 30''$ west from Greenwich. Here their toil (Mackenzie and his party) was almost incredible, being obliged to cut down wood and make themselves a passage through morasses and over mountains almost impassible for seven miles, and to carry their laden canoe for that distance on their backs. After all, they observe, that the Indian carrying way, though allowed to be 10 miles, will be found more safe and expeditious, than the passage which their toil and

perseverance formed and surmounted. Immediately above this carrying way, it is thus described : " About 200 yards below us, the stream rushed, with an astonishing but silent velocity, between perpendicular rocks, which are not more than 35 yards asunder ; when the water is high, it runs over these rocks, in a channel three times that breadth, where it is bounded by far more elevated precipices. In the former are deep round holes, some of which are full of water, while others are empty, in whose bosom are small round stones, as smooth as marbles. Some of these natural cylinders would contain 200 gallons. At a small distance below the first of these rocks, the channel widens in a kind of zigzag progression ; and it was really awful to behold with what infinite force the water drives against the rocks on one side, and with what impetuous strength it is repelled to the other ; it then falls back, as it were, into a more strait but rugged passage, over which it is tossed in high, foaming, half formed billows, as far as the eye could follow it."



LAKES.

LAKE Superior, formerly termed the upper lake, from its northern situation, is so called on account of its being superior in magnitude to any of the lakes on this vast continent. It might justly

be termed the Caspian of America, and is supposed to be the largest body of fresh water on the globe. Its circumference, according to the French charts, is about 1500 miles. According to Mackenzie, its greatest breadth is 120 miles, and its circumference, including the bays, but 1200. The water in general appears to lie on a bed of rocks: when it is calm and the sun shines bright, a person may sit in a canoe, where the depth is upwards of six fathoms, and plainly see huge piles of stone at the bottom, of different shapes, some of which appear as if they were hewn. The water at the same time appears as pure and as transparent as air; and the canoe seems as if hung suspended in that element. It is impossible to look attentively through this limpid medium at the rocks below, without finding, before many minutes are elapsed, your head swim and your eyes no longer able to behold the dazzling scene. Another extraordinary property in the waters of this lake, is, that although the water at the surface, is much warmed by the heat of the sun, yet when drawn up from about a fathom depth, it is very cold. It is situated between 46 and 50 N. lat. and between 9 and 18 W. long. from the meridian of Philadelphia. There are many islands in this lake, two of which are very large, and if the land of them is proper for cultivation, there appears to be sufficient to form on each a considerable province, especially on Isle Royal, which cannot be less than an hundred miles long, and in many places 40 broad. But it is difficult to ascertain the exact length or breadth of either. Even the French, who

always kept a small schooner on this lake, whilst they were in possession of Canada, by which they could have made this discovery, have only acquired a slight knowledge of the external parts of these islands. "From what I could learn," says Carver, "from the discourse of the neighbouring Indians, they suppose them from their first formation, to have been the residence of the Great Spirit ; and relate many ridiculous stories, enchantments, and magical tricks that have been experienced by such as were obliged through stress of weather to shelter on them. One of the Chipeway chiefs told me that some of their people being once driven on the island of Maurepas, which lies towards the north-east part of the lake, found on it a large quantity of a heavy, shining, yellow sand, that from their description must have been gold dust. Being struck with the beautiful appearance of it, in the morning, when they reentered their canoe, they attempted to bring some away ; but a spirit of an amazing size, according to their account, 60 feet in height, strode into the water after them, and commanded them to deliver back what they had taken away. Terrified at his gigantic stature, they were glad to restore their shining treasure ; on which they were suffered to depart without further molestation. Since this incident, no Indian that has ever heard of it, will venture near the same haunted coast. Beside this, they recounted to me many other stories of these islands, equally fabulous." A few Indians inhabit round the eastern borders of this lake, supposed to be the remains of the Algonquins, who

formerly possessed this country, but who have been nearly extirpated by the Iroquois of Canada. Lake Superior has nearly 40 rivers that fall into it, some of which are of considerable size. On the south side of it is a remarkable point or cape, of about 60 miles in length, called point Chegomegan. It might as properly be termed a peninsula, as it is nearly separated from the continent, on the east side, by a narrow bay, that extends from east to west. Canoes have but a short portage across the isthmus, whereas if they coast it round, it is more than a hundred miles. Two large rivers empty themselves into this lake, on the north and north-east side ; one is called the Nipegon river, or as the French pronounce it, Allanipegon, which leads to a band of Chipeways, inhabiting a lake of the same name ; and the other is termed the Michipicooton river, the source of which is situated towards James' bay, from whence there is but a short carriage to another river, which empties itself into that bay, at a fort belonging to the company. The country on the north and east parts of this lake is very mountainous and barren. The lake abounds with a great variety of fish. There are trouts weighing from five to fifty pounds, pickerel, red and white carp, black bass, herrings, and white fish. These last weigh from four to sixteen pounds. This lake is as much affected by storms as the Atlantic ocean ; the waves run as high, and are equally dangerous to ships. It discharges its waters from the southeast corner, through the straits of St. Marie. Lake Superior, as before observed,

though supplied by near 40 rivers, many of which are large, yet it does not appear that one tenth part of the waters which it receives, is discharged by the abovementioned strait. Great part of the waters evaporate, and Providence doubtless makes use of this inland sea, to furnish the interior parts of the country with that supply of vapours, without which, like the interior parts of Africa, they must have been a mere desert. The lake is often covered with fog, which when the wind is easterly falls on the western shore in torrents of rain. DR. MORSE.

Lake Huron, the entrance into which from lake Superior, is by the straits of St. Marie, is next in size to this lake. It lies between $43^{\circ} 30'$, and $46^{\circ} 30'$ of north latitude, and between 6° and 8° west longitude from Philadelphia. Its shape is nearly triangular, and its circumference about 1000 miles. On the north side of it is an island, remarkable for being near 100 miles in length, and no more than eight miles broad. Its name is Manataulin, which signifies a place of spirits, and is considered by the natives as sacred.

About the middle of the southwest side of the lake, is Saganaum bay ; about 80 miles in length, and in general, about 18 or 20 miles broad. The capes, that separate this bay from the lake, are 18 miles distant from each other ; near the middle of the intermediate space, stand two islands, which greatly tend to facilitate the passage of canoes and small vessels, by affording them shelter, as without this security, it would not be prudent to venture

across so wide a sea ; and the coasting round the bay, would make the voyage tedious.

Half way between Saganaum bay and the north-west corner of the lake, lies another, called Thunder bay. The Indians, and travellers, who have visited those parts, from time immemorial, have unanimously agreed to call it by this name, on account of the continual thunder they have always observed here. There seems to be no visible reason for this appellation ; the country, in general, not being subject to thunder, nor the hills around of a remarkable height, neither does the external parts of them seem to be covered with any sulphureous substance. But as this phenomenon must originate from some natural cause, it is conjectured that the shores of the bay, or the adjacent mountains, are either impregnated with an uncommon quantity of sulphureous matter, or contain some metal or mineral apt to attract, in a great degree, the electrical particles, that are hourly borne over them by the passing clouds.

The fish in this lake are much the same as those in lake Superior. Some of the land on its banks is very fertile, and proper for cultivation ; but in other parts it is sandy and barren. The promontory that separates this lake from lake Michigan, is composed of a vast plain, upwards of 100 miles long, but varying in its breadth, being from 10 to 15 miles broad. This tract is divided almost equally between the Chipeways and Ottawaws. At the northeast corner, this lake has a communication with lake Michigan, by the straits of Michillimak-

kinak. This strait is six miles broad, and the fort of its name stands on an island at the mouth of the strait. CARVER.

Lake Michigan is divided on the northeast from lake Huron, by the straits of Michillimackinac ; and is situated between latitude $42^{\circ} 10'$, and $46^{\circ} 30'$ north ; and between 11° and 13° west longitude from Philadelphia. Its greatest length is 280 miles, its breadth about 40, and its circumference 945 miles, and contains, by computation, 10,368,000 acres. There is a remarkable string of small islands beginning over against Askin's farm, and running about 30 miles southwest into the lake. These are called the Beaver islands. Their situation is pleasant, but the soil is barren.

On the northwest parts of this lake, the waters branch out into two bays ; that on the northward is called Noquet's bay ; the other to the southward, Puan's, or Green bay ; which last, with the lake, forms a long peninsula, called cape Townsend, or Vermillion point. Fort la Bay, an ancient fortification, built by the French for the protection of their trade, is situated on the southern extremity of Green bay. This bay is about 90 miles long, but differs much in its breadth, being in some places only 15 miles, in others from 20 to 30. It lies nearly from northeast to southwest. At the entrance of it from the lake are a string of islands, extending north and south, called the Grand Traverse. These are about 30 miles in length, and serve to facilitate the passage of canoes, as they shelter them from the winds, which sometimes come with violence across the

lake. These islands are mostly small and rocky. Many of the rocks are of an amazing size, and appear as if fashioned by the hands of artists. On the largest and best of these islands stands a town of the Ottawáws.

The country adjacent, either to the east or west side of the lake, is composed of but an indifferent soil, except where small brooks or rivers empty themselves into it: on the banks of these it is extremely fertile. Near the borders of the lake grow a great number of sand cherries, which are not less remarkable for the manner of their growth, than for their flavour. They grow upon a small shrub, not more than four feet high, the boughs of which are so loaded, that they lie in clusters on the sand. As they grow only on the sand, the warmth of which probably contributes to bring them to such perfection; they are called by the French *cherries de sable*. There also grow, round the lake, gooseberries, black currants, and an abundance of juniper. The waters of this, as well as the other great lakes, are clear and wholesome, and of sufficient depth for the navigation of small ships. In this lake are several kinds of fish; particularly trout, of an excellent quality, weighing from 20 to 60 pounds; and some have been taken in the strait which weighed 90 pounds. Lake Michigan receives many small rivers from the north and east, some 150, and even 200 yards broad, at their mouths. CARVER.

Lake Ontario is the most easterly of the four large lakes, through which the boundary line passes that separates the United States from the province

of Upper Canada. It is situated between 43° and 45° , north latitude, and between 1° and 5° , west longitude. Its length is 220 miles from east to west, and 70 miles wide in the broadest part, and according to calculation, contains 2,390,000 acres. This lake is less subject to storms, than any of the others, and its waters, in general, considering their great expanse, are wonderfully tranquil. The depth of water in the lake is very great; in some places it is unfathomable. On looking over the side of a vessel, the water owing to its great depth, appears to be of a blackish colour; but it is nevertheless very clear; any white substance thrown overboard, may be discerned at the depth of several fathoms from the surface; it is, however, by no means, so clear and transparent as the waters of some of the other lakes. The water is well tasted, and is that which is constantly used on board the vessels that traverse it. It receives the waters of Genessee river, on the southern side, and those of Onondago, at fort Oswego, on the southeast side. It has a communication with lake Erie by the river Niagara, which falls into it on the southern shore, about 30 miles to the eastward of the western extremity of this lake. It is near 300 yards wide at its mouth, and is the largest body of water flowing into lake Ontario. On the northeast it discharges its waters into Cateraqui river, which, after passing Montreal, assumes the name of St. Lawrence, till it flows in the Atlantic. This lake, and all the rivers which fall into it, abound with excellent salmon, and many different kinds of sea fish, which come up the river

St. Lawrence ; it also abounds with such a great variety of fresh water fish, that it is supposed there are many kinds, which have never yet been named. It is confidently asserted, not only by the Indians, but also by great numbers of the white people, who live on the shores of lake Ontario, that the waters of this lake rise and fall alternately, every seven years ; others, on the contrary, deny that such a fluctuation does take place ; and, indeed, it differs so materially from any that has been observed in large bodies of water in other parts of the globe, that we are tempted to believe it is merely an imaginary change ; nevertheless, when it is considered, that according to the belief of the oldest inhabitants of the country, such a periodical ebbing and flowing of the waters of the lake takes place, and that it has never been clearly proved to the contrary, we are bound to suspend our opinion on the subject. What Carver relates, rather tends to confirm the opinion that the waters of the lake do rise. " I had like," he says, " to have omitted a very extraordinary circumstance relative to the straits ; [the straits of Michillimackinac, between lakes Michigan and Huron.] According to observations made by the French, whilst they were in possession of the fort there, although there is no diurnal flood or ebb to be perceived in these waters, yet from an exact attention to their state, a periodical alteration in them has been discovered. It was observed, that they arose by gradual, but almost imperceptible degrees, till they had reached the height of three feet ; this was accomplished in seven years and a half ; and in the same

space of time, they as gently decreased, till they had reached their former situation ; so that in fifteen years, they had completed this inexplicable revolution. At the time I was there (about 40 years ago) the truth of these observations could not be confirmed by the English, as they had then been only a few years in possession of the fort ; but they all agreed that some alteration in the limits of the straits was apparent." It is to be lamented, that succeeding years have not thrown more light on the subject ; for since the fort has been in possession of the English, persons competent to determine the truth of observations of such a nature, have never staid a sufficient length of time there, to have had it in their power to do so. A long series of minute observations are necessary to determine positively, whether the waters of the lake do or do not rise and fall periodically. It is well known, for instance, that in wet seasons, the waters rise much above their ordinary level, and that, in very dry seasons, they sink considerably below it ; a close attention, therefore, ought to be paid to the quantity of rain that falls, and to evaporation ; and it ought to be ascertained, in what degree the height of the lake is altered thereby ; otherwise, if the lake happened to be higher or lower than usual on the seventh year, it would be impossible to say, with accuracy, whether it were owing to the state of the weather, or to certain laws of nature, that we are yet unacquainted with. At the same time, great attention ought to be paid to the state of the winds ; as well in respect to their direction, as to their velocity, for the

height of the waters, of all the lakes is materially affected thereby. At a future day, when the country becomes more populous and more wealthy, persons will no doubt be found, who will have leisure for making the observations, necessary for determining whether the lakes do or do not undergo a periodical change ; but, at present, the inhabitants on the borders of them, are too much engaged in commercial and agricultural pursuits, to attend to matters of mere speculation, which, however they might amuse the philosopher, could be productive of no solid advantages to the generality of the inhabitants of the country.

It is believed by many persons, that the waters of lake Ontario not only rise and fall every seventh year, but that they are likewise influenced by a tide, which ebbs and flows frequently in the course of 24 hours. Gentlemen of the country assert that a regular tide was observable at the bay of Canti ; that in order to satisfy themselves on the subject, they had stood for several hours together, on more than one occasion, at a mill, at the head of the bay, and that they had observed the waters to ebb and flow every four hours, to the height of 14 inches. There can be no doubt, however, but that the frequent ebbing and flowing of the water at this place, must be caused by the wind ; for no such regular fluctuation is observable at Niagara, at Kingston, or on the open shores of the lake ; and, owing to the formation of the bay of Canti, the height of the water must necessarily vary there with every slight change of the wind. The bay of Canti is a long, crooked is-

let, that grows narrower at the upper end, like a funnel; not only, therefore, a change of wind up or down the bay would make a difference in the height of the water at the uppermost extremity of it, but, owing to the waters being concentrated there at one point, they would be seen to rise or fall, if impelled even in the same direction, whether up or down the bay, more or less forcibly at one time of the day than at another. Now it is very seldom that the wind, at any part of the day or night, would be found to blow precisely with the same force, for a given space of two hours, that it had blown for the preceding space of two hours; an appearance like a tide must therefore be seen almost constantly at the head of this bay, whenever there was a breeze. No elevation has ever been observed here during a perfect calm. WELD.

Lake Erie is of an elliptical form, and situated between latitude $42^{\circ} 10'$ and $46^{\circ} 30'$ north, and between 11° and 15° west longitude. Its length about 300 miles, and its breadth, at the widest part, about 90. The depth of water in this lake, is not more than 20 fathoms, and in calm weather, vessels may securely ride at anchor in any part of it; but when stormy, the anchorage in an open part of the lake is not safe, the sands at bottom not being firm, and the anchors apt, therefore, to loose their hold. Whenever there is a gale of wind, the waters immediately become turbid, owing to the quantity of yellow sand that is washed up from the bottom of the lake; in calm weather the water is clear, and of a deep greenish colour. The northern shore of the lake

is very rocky, as likewise are the shores of the islands, of which there are several clusters toward the western extremity of the lake; but along most parts of the southern shore is a fine gravelly beach. The height of the land bordering on the lake is very unequal; in some places, long ranges of steep mountains rise from the very edge of the water; in others, the shores are so flat and low, that when the lake is raised a little above its usual level, in consequence of a strong gale of wind setting in toward the shore, the country is deluged for miles. A batteau is far preferable to a keel boat in coursing the lake. In navigating the lake in a batteau, it is customary to keep as close as possible to the land; and whenever there is any danger of a storm, you run the vessel on shore, which may be done with safety, as the bottom is perfectly flat. There is a great deficiency of good harbours along the shores of this lake. On its northern side there are but two places which afford shelter to vessels drawing more than seven feet water, viz. Long point, and point Abineau; and these only afford a partial shelter. If the wind should shift to the southward while vessels happen to be lying under them, they are thereby exposed to all the dangers of a rocky lee shore. On the southern shore, the first harbour you come to in going from fort Erie, standing at the eastern extremity of lake Erie, is that of Presqu' isle. Vessels drawing eight feet water may there ride in perfect safety; but it is a matter of no small difficulty to get into the harbour, owing to a long sand bar which extends across the mouth of it. Presqu'

isle is situated at the distance of 60 miles from fort Erie. Beyond this, nearly midway between the eastern and western extremities of the lake, there is another harbour, capable of containing small vessels, at the mouth of Cayahoga river, and another at the mouth of Sandusky river, which falls into the lake within the north western territory of the States. On going up the lake, it often happens that vessels, even after they have got close under these islands, the nearest of which is not less than 240 miles from fort Erie, are driven back by storms the whole way to that fort. The islands at the western end of the lake, which are of various sizes, lie very close to each other, and the scenery amongst them is very pleasing. The largest of them are not more than 14 miles in circumference, and many would scarcely be found to admeasure as many yards round. They are all covered with wood of some kind or other, even to the very smallest. The larger islands produce a variety of fine timber, amongst which are found oaks, hickory trees, and red cedars. None of these islands are much elevated above the lake, nor are they diversified with any rising grounds ; most of them, indeed, are as flat as if they had been overflowed with water, and in the interior parts of some of the largest of them there are extensive ponds and marshes. The fine timber, which these islands produce, indicates that the soil must be uncommonly fertile. Here are found in great numbers, amongst the woods, raccoons and squirrels ; bears are also, at times, found upon some of these islands during the winter season,

when the lake is frozen between the main land and the islands. All the islands are dreadfully infected with serpents, and on some of them rattlesnakes are so numerous, that in the height of summer, it is dangerous to land. WELD.

Lake Champlain may be esteemed no inconsiderable body of waters. Reckoning its length from Fairhaven to St. John's, a course nearly north, it will amount to about 200 miles. Its width is from one to eighteen miles, being very different in different places; the mean width may be estimated at five miles. This will give 1000 square miles, or 640 thousand acres, as the area of its surface. Its depth is sufficient for the navigation of the largest vessels. It contains about 60 islands of different sizes; the most considerable are N. and S. Hero, and Motte island. The waters which form this lake are collected from a vast tract of country; and the streams which arise in more than one half of Vermont, flow into it. There are several, which also fall into its eastern side, from the province of Canada. It is probable the rivers which flow into the west side, are as large, numerous, and extensive, as those on the east. The waters therefore from which lake Champlain is formed, seem to be collected from a tract of country, of a larger extent, than the whole state of Vermont. There are many marks and indications that the surface of this lake, was formerly 30 or 40 feet higher than it is now. The rocks in many places appear to be marked, and stained with the former surface of the lake, many feet higher than it has been, from its first

discovery by Sir Samuel Champlain, in 1608. Fossil shells, the limbs and bodies of trees, are frequently found at the depth of 15 or 20 feet in the earth; this is the case not only along the shores, but in the low lands, at the distance of two or three miles from them. The soil in many places near the shore, is evidently of the same factitious kind, as the intervals formed by the rivers. These and other circumstances, have left no doubt in the minds of the inhabitants along the lake shore, that the waters of it were formerly much higher, and spread to a much greater extent, than they now do. The waters generally rise from about the 20th of April until the 20th of June. Their rise is commonly from four to six feet, the greatest variation is not more than eight feet. The lake is early froze round the shores, but it is not commonly wholly shut up with ice, until the middle of January. Between the 6th, and the 15th of April, the ice generally goes off, and it is not uncommon for many square miles of it to disappear in one day. Dr. WILLIAMS.

The scenery along various parts of this lake is extremely grand and picturesque, particularly beyond Crown point; the shores are there beautifully ornamented with hanging woods and rocks; and the mountains on the western side, rise up in ranges one behind the other, in the most magnificent manner. WELD.

The vast lake or marsh called Ouaguaphenagaw, which lies between Flint and Oakmulge rivers, and from whence the river St. Mary has its source,

occupies a space of near 300 miles in circuit. This vast accumulation of waters, in the wet season, appears as a lake, and contains some large islands or knolls of rich high lands, one of which the present generation of Creeks represent to be a most blissful spot of the earth ; they say it is inhabited by a peculiar race of Indians, whose women are incomparably beautiful ; they also tell you, that this terrestrial paradise has been seen by some of their enterprising hunters, when in pursuit of game, who being lost in inextricable swamps, and bogs, and on the point of perishing, were unexpectedly relieved by a company of beautiful women, whom they call daughters of the sun, who kindly gave them such provisions as they had with them, which were chiefly fruit, oranges, dates, &c. and some corn cakes, and then enjoined them to fly for safety to their own country ; for that their husbands were fierce men, and cruel to strangers. They further say, that these hunters had a view of their settlements, situated on the elevated banks of an island or promontory, in a beautiful lake ; but that in their endeavours to approach it, they were involved in perpetual labyrinths, and like enchanted land, still as they imagined they had just gained it, it seemed to fly before them, alternately appearing and disappearing. They resolved at length, to leave the delusive pursuit, and to return ; which after a number of inexpressible difficulties, they effected. When they reported their adventures to their countrymen, their young warriors were inflamed with an irresistible desire to invade, and

make a conquest of so charming a country ; but all their attempts have hitherto proved abortive, never having been able again to find that enchanting spot, nor even any road or pathway to it ; yet they say that they frequently meet with certain signs of being inhabited, as the building of canoes, footsteps of men, &c. They tell another story concerning the inhabitants of this sequestered country, which seems probable enough ; which is, that they are the posterity of a fugitive remnant of the ancient Yamasas, who escaped massacre after a bloody and decisive conflict between them and the Creek nation, (who it is certain, conquered and nearly exterminated that once powerful people) and here found an asylum, remote and secure from the fury of their proud conquerors. It is however certain that there is a vast lake, or drowned swamp, well known and often visited both by white and Indian hunters, and on its environs the most valuable hunting grounds in Florida. WELD.

The lake of a Thousand Islands, so called on account of the multiplicity of them which it contains, is the last lake, in descending the St. Lawrence, before you arrive at lake Ontario. Many of these islands are scarcely larger than a batteau, and none of them, except such as are situated at the upper and lower extremities of the lake, appear to contain more than 15 acres each. They are all covered with wood, even to the very smallest. The trees on these last are stunted in their growth, but the larger islands produce as fine timber as is to be found on the main shores of the lake. Many of

these islands are situated so closely together, that it would be easy to throw a pebble from one to the other ; notwithstanding which circumstance, the passage between them is perfectly safe and commodious for batteaux, and between some of them that are even thus close together, is water sufficient for a frigate. The water is uncommonly clear. The shores of these islands are rocky ; most of them rise very boldly, and some exhibit perpendicular masses of rock toward the water, upwards of 20 feet high. The scenery presented to view in sailing between these islands is beautiful in the highest degree. Some times, after passing through a narrow strait, you find yourself in a bason, landlocked on every side, that appears to have no communication with the lake, except by the passage through which you entered ; you are looking about perhaps, for an outlet, to enable you to proceed, thinking at last to see some little channel, which will just admit your batteau, when on a sudden, an expanded sheet of water opens upon you, whose boundary is the horizon alone ; again in a few minutes, you find yourself land locked, and again a spacious passage as suddenly presents itself ; at other times, when in the middle of one of these basons, between a cluster of islands, a dozen different channels, like so many noble rivers, meet the eye, perhaps equally unexpectedly, and on each side the islands appear regularly retiring until they sink from the sight in the distance. Every minute, during the passage of this lake, the prospect varies. The numerous Indian hunting encampments

on the different islands, with the smoke of their fires rising up between the trees, add considerably to the beauty of the scenery. The lake of a Thousand Islands is 25 miles in length, and about six in breadth. WELD.

The Slave lake, through which the Peace river passes, in latitude about $61^{\circ} 28'$ north, is a large collection of waters, being according to Mackenzie's chart, near 150 miles in length, and 69 in breadth, and filled with numerous islands. The country around, in some places, is one continued view of high hills, and islands of solid rocks, whose surface is occasionally enlivened with moss, shrubs, and a few scattered trees, of a very stunted growth, from an insufficiency of soil to nourish them. But notwithstanding their barren appearance, almost every part of them produces berries of various kinds, such as cranberries, juniperberries, raspberries, partridgeberries, gooseberries, and the pathagomenan, which is something like a raspberry. It grows on a small stalk about one and a half feet high, in wet, mossy spots. These fruits are in great abundance, though they are not to be found in the same places, but in situations and aspects suited to their peculiar natures. In others, the land which bounds the lake is loose and sandy, but well covered with wood, composed of trees of a large growth. It gradually rises from the shores, and at some distance, forms a ridge of high land, running along the coast, thick with wood, and a rocky summit rising above it. This lake abounds with fish, the principal of which are, pike, carp, poisson inconnu, white fish, and trout.

The principal lake, in Spanish North America, so far as yet explored, is that of Nicaragua, which is about 170 British miles in length, northwest to southeast, and about half that breadth. This grand lake is situated in the province of the same name toward the south of the isthmus, and has a great outlet, the river St. Juan, to the Gulf of Mexico, while a smaller stream is supposed to flow into the Pacific. In the hands of an enterprising people, this lake would supply the long wished for passage from the Atlantic into the Pacific, and in the most direct course that could be desired. Nature has already supplied half the means, and it is probable, that a complete passage might have been opened, at half the expense wasted in fruitless expeditions to discover such a passage by the northwest, or northeast. This speculation must depend on circumstances, but if a passage were once opened, the force of the ocean would probably enlarge it; and a tribute at this new sound would be a considerable source of revenue. PINKERTON.

A remarkable production of nature, in the island of Trinidad, is Tar lake, called by the French La Bray. It lies on the leeward side of the island, about half way from the Bocas to the south end, where the mangrove swamps are interrupted by sand banks and hills, and on a point of land which extends into the sea about two miles, opposite the mountains of Paria on the north of the gulf. This cape is about 50 feet above the level of the sea. From the sea it appears a mass of black vitrified rocks; but on a close examination, it is found a

composition of bituminous scoriæ, vitrified sand, and earth, cemented together ; in some parts, beds of cinders only are found. In approaching this cape, there is a strong sulphureous smell. This point of land is about two miles broad, and on the east and west sides, from the distance of about half a mile from the sea, falls with a gentle declivity to it, and is joined to the main land on the south, by the continuation of the mangrove swamps ; so that the bituminous plain is on the highest part of it, and only separated from the sea by a margin of wood. Its colour and even surface present, at first, the aspect of a lake of water ; but it is probable that it got the appellation of *lake*, when seen in the hot and dry weather, at which time its surface to the depth of an inch is liquid, and then, from its adhesive quality, it cannot be walked upon. It is about three miles in circumference. At my first approach, says Mr. Anderson, it appeared a plain, smooth as glass ; but when I had proceeded some yards, I found it divided into areolæ of different sizes and shapes. The chasms or divisions anatomosed through every part of it, the surface of the areolæ smooth and horizontal, the margins undulated, each undulation enlarged to the bottom till they join the opposite. On the surface, the margin or first undulation is distant from the opposite from four to six feet, and the same depth before they coalesce ; but where the angles of the areolæ oppose, the chasms or ramifications are wider and deeper. When I was at it, all the chasms were full of water, the whole forming one true, horizontal plain,

which rendered my investigation of it difficult and tedious, being necessitated to plunge into the water a great depth, in passing from one areolæ to another. The most accurate idea that can be formed of its surface, will be from the areolæ and the ramifications on the back of a turtle. Some parts of the surface are covered with a thin and brittle scoria, a little elevated. As to its depth I can form no idea of it; for in no part could I find a substratum of any other substance: in some parts, however, I found calcined earth mixed with it. Although I smelt sulphur very strong on passing over many parts of this plain, I could discover no appearance of it, nor any rent or crack, through which the steams might issue: probably, it was from some part of the adjacent woods; for although sulphur is the basis of this bituminous matter, yet the smells are very different, and easily distinguished, for its smell comes the nearest to pitch of any thing I know. A piece put in the fire, will boil up a long time, without suffering much diminution, and after a long time's severe heat, the surface will burn, and form a thin scoria, under which the rest remains liquid. Heat seems not to render it fluid, nor to occupy a larger space than when cold; from which, I imagine there is but little alteration on it during the dry months, as the solar rays cannot exert their force above an inch below the surface. I was told by one person, that in the dry season the whole was a smooth mass; and by another, that the ravines contained water fit for use during the year. But neither of these assertions can I believe: for if, accord-

ing to the first, it was a homogeneous mass, something more than an external cause must affect it, to give it the present appearances : nor without some hidden cause can the second be granted. Although the bottoms of these ramified channels admit not of absorption, yet, from their open exposure, and the black surface of the circumjacent parts, evaporation must go on amazingly quick, and a short time of dry weather must soon empty them ; nor from the situation and structure of the place, is there a possibility of supply but from the clouds.

To show that the progress of evaporation is inconceivably quick here, at the time I visited it, there were, on an average, two thirds of the time, incessant torrents of rain ; but from the afternoon being dry with a gentle breeze, (as is generally the case during the rainy season in this island) there evidently was an equilibrium between the rain and the evaporation ; for in the course of three days, I saw it twice, and perceived no alteration on the height of the water, nor any outlet for it but by evaporation.

I take this substance to be the *bitumen asphaltum* of Linnæus. Mixed with a little common greese, or pitch, it is much used for the bottoms of ships, for which intention it is collected by many ; and I should conceive it a preservative against the *borer*, so destructive to ships in this part of the world.

Beside this place, where it is found in a solid state, it is found liquid in many parts of the woods. The soil, in general, for some distance round La Bray, consists of cinders and burnt earths ; and

where not so, it is a strong argillaceous soil, the whole exceedingly fertile. Every part of the country, to the distance of 30 miles, has every appearance of being formed by convulsions of nature, from subterraneous fires. In several parts of the woods are hot springs ; some, by Fahrenheit's thermometer, were 20 and 22 degrees hotter than the atmosphere at the time of trial. From its position to them, this part of the island has certainly experienced the effects of volcanic eruptions, which have heaped up those prodigious masses of mountains that terminate the province of Paria on the north ; and, no doubt, there has been, and still is, a communication between them. One of these mountains, opposite La Bray in Trinidad, has every appearance of a volcanic mountain. However, the volcanic effects have been very weak here, as no traces of them extend above two miles from the sea, in this part of the island, and the greater part of it has had its origin from a very different cause to that of volcanos ; but they have certainly laid the foundation of it, as is evident from the high ridge of mountains, which surround its windward side, to protect it from the depredations of the ocean, and is its only barrier against that overbearing element, and may probably be called the skeleton of the island.

I find the whole island formed of an argillaceous earth, either in its primitive state, or under its various metamorphoses. The bases of the mountains are composed of schistus argillaceous, and talcum lithormargo ; but the plains or lowlands remaining nearly in the same moist state as at its formation,

the component particles have not experienced the vicissitudes of nature, so much as the more elevated parts, consequently, retain more of their primitive form and properties. As argillaceous earth is formed from the sediment of the ocean, from the situation of Trinidad to the continent, its formation is easily accounted for, granting first the formation of the ridge of mountains that bounds its windward side, and the high mountains on the continent that nearly joins it : for the great influx of currents into the gulf of Paria, from the coasts of Brasil and Andalusia, must bring a vast quantity of light earthy particles from the mouth of the numerous large rivers, which traverse these parts of the continent ; but the currents being repelled by these ridges of mountains, eddies and smooth water will be produced where they meet and oppose, and therefore the earthy particles would subside and form banks of mud, and, by fresh accumulations, would soon form dry land : and from these causes it is evident, such a tract of country as Trinidad must be formed. But these causes still exist, and the effect from them is evident ; for the island is daily growing on the leeward side, as may be seen from the mud beds, that extend a great way into the gulf, and these constantly increase. But, from the great influx from the ocean at the south end of the island, and its egress into the Atlantic again, through the Bocas, a channel must ever exist between the continent and Trinidad. *Wonders of Nature and Art.*

CAVES.

THE first article we shall insert, under this head, is an account of a singular cavern, lately discovered, at Clarendon, (Vermont) on the southeast side of a mountain.

The mouth of this cave is not more than two and a half feet in diameter. In its descent, the passage makes an angle with the horizon of about 35 or 40°; but continues of nearly the same diameter, through the whole length, which is 31½ feet. At that distance from the mouth, it opens into a spacious room, 20 feet long, 12½ feet wide, and 18 or 20 feet high. Every part of the floor, sides, and roofs of this room, appear to be a solid rock, but very rough and uneven. The water is continually percolating through the top, and has formed stalactites of various forms, many of which are conical, and some have the appearance of massive columns. At the north part of this room, there is another aperture of about forty inches diameter, very rough, and uneven. This aperture is the beginning of another passage, through the internal parts of a solid rock. The direction of this passage is oblique, and full of steps or notches, and its length about 24 feet. Descending through this aperture, another spacious room opens to view. The dimensions of this apartment are 20 feet in width, 30 in length, and 20 in height. In the spring of the year, the whole of this lower room is full of

water, and at all other seasons, water is to be found in the lower parts of it. No animal has ever been found to reside in this cave, and it evidently appears to be the production of nature, untouched by the hand of man. WILLIAMS' *Hist. Vermont.*

There is another cave in the same state, on a mountain in Dorset. It is an excavation in a solid marble rock. The entrance, which is a perpendicular ledge, 20 feet in height, is about 12 feet broad, and as many in height. Within, it descends about 25 degrees, is 25 feet in breadth, 20 feet in height, and 150 in length. At the farther extremity, two narrow passages run off to an unknown distance into the mountain, in very few places affording room for persons to stand erect. There are, in this cavern, no stalactites, nor, indeed, any other proper petrifications. There is found, however, in several places, a white, friable, calcareous earth, that appears to be formed by water, which percolates through the incumbent strata, and which, from the descent of the cavern and the rise of the rock above, is, within 30 feet of the entrance, 150 feet in thickness. Dr. MORSE.

In the town of Wrentham, (Massachusetts) is a curious cavern, called Wampom's rock, from an Indian family of that name, who resided in it for a number of years. It is situated on the south side of a hill, and is surrounded by a number of broken rocks. It is nearly square, each side measuring about nine feet. The height is about eight feet in front, but from the centre it lessens to about four

feet. At present, it serves only as a shelter for cattle and sheep. Dr. MORSE.

In the town of Middletown, (Rhode Island) is a place called Purgatory. It joins to the sea, on the east side of the island. It is a large cavity or opening, in a high bed of rocks, about 12 feet in diameter at top, and about 40 feet deep before you reach the water, of which, as it joins the sea, it has always a large depth. The rocks on each side appear to have been once united, and were probably separated by some convulsion in nature. Dr. MORSE.

In the township of Shrewsbury, Monmouth county, (New Jersey) on the side of a branch of Navesink river, is a remarkable cave, in which there are three rooms. The cave is about 30 feet long, and 15 broad. Each of the rooms are arched; the centre of the arch is about five feet from the bottom of the cave; the sides not more than two and a half. The mouth of the cave is small; the bottom is a loose sand, and the arch is formed in a soft rock, through the pores of which, the moisture is slowly exudated, and falls in drops on the sand below. Dr. MORSE.

In Pomfret, (Connecticut) is a cavern, which, on account of a singular incident that happened there, may, with propriety be called Putnam's den. The aperture of the den, on the east side of a very high ledge of rocks, is about two feet square, from thence it descends obliquely 15 feet, then running horizontally about 10 more, it ascends gradually 16 feet toward its termination. The sides are composed of smooth and solid rocks, which seem to have been

divided from each other by some former earthquake. The top and bottom are also of stone, and it is in no place high enough for a man to raise himself upright. The incident above alluded to, is thus related by Colonel Humphreys, in his "Life of General Putnam."

"In one night, he (General Putnam) had 70 fine sheep and goats killed by a she wolf, which, with her whelps, had for several years infested the vicinity. The young were commonly destroyed by the vigilance of the hunters, but the old one was too sagacious to come within reach of gun shot. The wolf, at length, became such a nuisance, that Mr. Putnam entered into a combination with five of his neighbours to hunt alternately until they could destroy her. Two, by rotation, were to continue in pursuit. Having followed her to Connecticut river, and found she had turned back in a direct course towards Pomfret, they immediately returned, and by 10 o'clock the next morning, the bloodhounds had driven her into a den, about three miles from the house of Mr. Putnam. The people soon collected with dogs, guns, fire, straw, and sulphur, to attack the common enemy. With this apparatus, several unsuccessful efforts were made to force her from the den. The hounds came back badly wounded, and refused to return. The smoke of blazing straw had no effect, nor did the fumes of burnt brimstone compel her to quit her retirement. Wearied with such fruitless attempts, (which had brought the time to 10 o'clock at night) Mr. Putnam tried once more to make his dog enter, but in

vain. He proposed to his negro man to go down into the cavern and shoot the wolf; the negro declined the hazardous service. Then it was that his master, angry at the disappointment, and declaring he was ashamed to have a coward in his family, resolved himself to destroy the ferocious beast. His neighbours strongly remonstrated against the perilous enterprize; but he knowing that wild animals were intimidated by fire, and having provided several strips of birch bark, the only combustible material which he could obtain, that would afford light in this deep and darksome cave, prepared for his descent. Having accordingly divested himself of his coat and waistcoat, and having a long rope ~~fastened~~ round his legs, by which he might be pulled back at a concerted signal, he entered head foremost, with the flaming torch in his hand. Having groped his passage to the horizontal part of the den, the most terrifying darkness appeared in front of the dim circle of light afforded by his torch. It was silent as the house of death. None but monsters of the desert had ever before explored this solitary mansion of horror. He, cautiously, proceeding onward, came to the ascent, which he slowly mounted on his hands and knees, until he discovered the glaring eyeballs of the wolf, who was setting at the extremity of the cavern. Startled at the sight of fire, she gnashed her teeth, and gave a sullen growl. As soon as he had made the necessary discovery, he kicked the rope, as a signal for pulling him out. The people at the mouth of the den, who had listened with painful anxiety, hearing the

growling of the wolf, and supposing their friend to be in the most imminent danger, drew him forth with such celerity, that his shirt was stripped over his head, and his skin severely lacerated. After he had adjusted his cloaths, and loaded his gun with nine buckshot, holding a torch in one hand, and the musquet in the other, he descended the second time. When he drew nearer than before, the wolf, assuming a still more fierce and terrible appearance, howling, rolling her eyes, snapping her teeth, and dropping her head between her legs, was evidently in the attitude and on the point of springing at him. At the critical instant, he levelled, and fired at her head. Stunned with the shock, and suffocated with the smoke, he immediately found himself drawn out of the cave. But having refreshed himself, and permitted the smoke to dissipate, he went down the third time. Once more he came within sight of the wolf, who appearing very passive, he applied the torch to her nose, and perceiving her dead, he took hold of her ears, and then kicking the rope, (still tied round his legs) the people above, with no small exultation, dragged them both out together."

Two miles west of New Haven (Connecticut) is a mountain, on the top of which is a cave, remarkable for having been the residence of Generals Whalley and Goffe, two of the judges of Charles I. who was beheaded. They arrived at Boston, July, 1660, and came to New Haven the following year, and retired and concealed themselves behind West mountain, three miles from New Haven. They soon after removed to Milford, where they lived conceal-

ed until October, 1664, when they returned to New Haven, and immediately proceeded to Hadley, where they remained concealed for about ten years, in which time Whaley died, and Goffe soon after fled. In 1665, John Dixwell, Esq. another of the king's judges, visited them while in Hadley, and afterwards proceeded to New Haven, where he lived many years, and was known by the name of John Davids. Here he died, and was buried in the public burying place, where his grave stone is standing to this day, with this inscription: "J. D. Esq. deceased March 18th, in the 82d year of his age, 1688." Dr. MORSE.

In the year 1792, an extraordinary cavern was discovered, at a place called by the Indians Sepascot, on the estate of the Miss Rutsens, in Dutchess county, (New York.) A lad, passing by chance near its entrance, which lies between two huge rocks on the declivity of a steep hill, on prying into the gloomy recess, he saw the top of a ladder, by which he descended about 10 feet, and found himself in a subterraneous apartment, more capacious than he chose to investigate. He found, however, that it had been the abode of persons, who, probably, during the war, not daring to be seen openly, had taken shelter there, as bits of cloth and pieces of leather were scattered about on the floor. He then left the place, and little more was thought about it, until some weeks ago, when the writer of this account made one of a party, who went from the seat of a gentleman in the neighbourhood, on purpose to examine it. We found the entrance

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much smaller than we had expected, and with some difficulty gained the ladder, by means of which the remaining descent was easy. We had six candles with us to scrutinize the recesses of the apartment, where, perhaps, light, for upwards of 5000 years before, had never gleamed. We found the cave divided by a narrow passage into two divisions: the first being about 17 feet in length, and so low, that a child of eight years of age, could but just walk upright in it, the breadth about eight or ten feet. The second between 12 and 14 feet in length, but much higher and broader than the first. In this last room we found that three bats had taken up their winter quarters, and hung suspended from the roof, as it were, by the very tips of their wings. But what makes the cave peculiarly worthy of notice, is the petrifying quality of the water, which, by a gentle oozing, drops from every part of the ceiling, the whole of which exactly resembles a mill gutter in a frosty morning, with a thousand icicles impending. These concretions are formed by the water, and probably, are constantly increasing. They have almost every appearance of icicles, and may be broken off by the hand, if not more than two inches in circumference. They appear of a consistence much like indurated lime, almost transparent, and are all perforated quite through the whole length, with a hole of the size of that in a tobacco pipe, through which aperture the water unremittingly drops, although very slowly. When a person is in the remotest room, and the lights are removed into the first, these pendent drops of water make an ap-

pearance more splendid than can well be imagined. Some of these stony icicles have at length reached the bottom of the cave, and now form pillars, some more than two feet in girth, of the appearance of marble, and almost as hard. They put one in mind of Solomon's Jachin and Boaz; imagination very easily giving them pedestals and chapiters, and even wreathen works. But what we most admired, was the skeleton of a large snake, turned into solid stone by the petrifying quality of the water before mentioned. It was with some difficulty torn up with an axe, from the rock it laid upon, (some of which adhered to it) and is now in the possession of the relator. We found the inmost recess of this cavern very warm, and felt the want of free air, by difficult respiration, although the candles burnt perfectly clear. *Museum.*

In the township of Chester, (New Hampshire) a singular cavern has been discovered. About five miles distance from Chester meeting house, near the road leading to Concord, is an eminence called Rattlesnake hill. Its base is nearly circular, and about half a mile in diameter. It is very rugged, especially on the southern side, where it is almost perpendicular; and its summit frowns tremendous, above 400 feet high. In this side, at the height of 10 yards, is an aperture in the rocks, of about five feet high, and 20 inches broad, which is the entrance of what is called the Devil's den; concerning which, many frightful stories are told, to increase the terrors of the evening, among the children of the neighbouring villages; and, indeed, the eyes

of men sometimes assume a peculiar brightness; while recounting the imaginary dangers, which they had there fortunately escaped. This entrance is about six feet long; it then contracts its height to about two feet and a half, and displays its breadth horizontally on the right 15 feet, where it is irregularly lost among the contiguous rocks. This form of the cavity continues about 10 feet, when it suddenly becomes about eight feet high, and three wide, the sides nearly perpendicular, continuing thus about nine feet. In the midway of which, on the same plane, and nearly at right angles on the left, is an aperture of five feet high and four wide, which continues 10 or 12 feet, where it is lost irregularly among the rocks. Opposite to this, on the right, lies a spacious chamber, parallel to the said plane, elevated about four feet, 15 or 20 feet square, and about three feet high; floored and ceiled by a regular rock, from the upper part of which are dependent many excrescences, nearly in the form of a pear, some of which are more than an inch long; but there is a much greater number of every possible inferior size; these are easily separable from the rock, and several of them are deposited in the museum at Cambridge, where they are shewn for petrified water. Their colour and consistence are those of a common stone; but when approached in the cave with a flambeau, they throw about a sparkling lustre of almost every hue. This appearance is caused by a large drop of water, which hangs about the end of each; and when the echo of its fall has reverberated round the vault,

another begins to kindle in succession. At the end of the above mentioned nine feet, is a perpendicular descent of about four feet, where the passage, becoming not more than 18 inches wide, but a least 15 feet high, and still nearly perpendicular, bends gently to the right, in an arch of a very large circle, for about 30 feet ; where eight or nine feet of the height falls into breadth, and all in seven or eight feet more is lost among the rocks in considerable chinks. The general direction of this cave is nearly north, and upon an ascent of about three degrees. The cavity is terminated by rocks, on all sides, save that the above mentioned 30 feet has a gravelly bottom, at the farther end of which rises a small rivulet, strongly impregnated with sulphur. This rivulet increases imperceptibly in its descent, along the 30 feet ; when it falls suddenly into a transverse chink, about three inches wide, which receives it perpendicularly about 10 feet, when the little subterraneous cascade is intercepted by some thin lip of a rock, and thrown about in quite a merry strain, for such a solitary mansion. The rocks, which wall this narrow passage, are cased with a shell of a reddish colour, about half an inch thick, which is easily separable from the rock, in flakes as large as a man's hand. These flakes emit a strong scent of sulphur, when thrown into the fire ; and this circumstance has given rise to a conjecture, that subterraneous fires have formerly raged here ; but whatever truth there may be in this opinion, the cave is now exceedingly cold, and

a more gloomy situation is scarcely imaginable. BELKNAP'S *Hist. New Hampshire*.

On the east side of Suetara, a river of Pennsylvania, which falls into the Susquehanna, close to its waters, is a remarkable grotto. Its entrance is very spacious, and there is somewhat of a descent toward the other extremity; insomuch that it is supposed the surface of the river is rather higher than the bottom of the cave. The upper part is like an arched roof of solid limestone rock, perhaps 20 feet thick. On entering, are found many apartments, some of them very high, like the choir of a church. There is, as it were, a continual rein within the cave, for the water petrifying as it falls, pillars are gradually formed to support the roof. I saw this cave, says the relator, about 30 years ago, and observed 10 such pillars, each six inches in diameter, and six feet high; all so ranged, that the pillars inclosed by them, resembled a sanctuary in a Roman church: and I can assure you, that no royal throne ever exhibited more grandeur, than the delightful prospect of this *lusus naturæ*. Satisfied with the view of this, we discovered the resemblances of several monuments, incorporated into the wall, as if the bodies of departed heroes were there deposited. Our guide then conducted us to a place, where, he said, hung the bell. This is a piece of stone issuing out of the roof, which, when struck, sounds like a bell. Some of the stalactites are of a colour resembling sugar candy, and others resemble loaf sugar; but it is a pity that their beauty is now almost destroyed by the

country people. The water, as it falls, runs down the declivity, and it is both wholesome and pleasant to drink, when it has discharged its petrifying matter. It is remarkable that we found several holes at the bottom of the cave, going down perpendicularly, perhaps into the abyss, which renders it dangerous to be without a light. At the end of the cave, there is a pretty stream, which takes its course through part of it, and then looses itself among the rocks ; here is also its exit, by an aperture which is very narrow. Through this the vapours continually pass outwards, with a strong current of air, and at night, these vapours ascending, resemble a great furnace. Part of these vapours and fogs appear, on ascending, to be condensed at the head of this great alembic, and the more volatile parts are carried off through the aperture communicating with the exterior air, before mentioned, by the force of the air in its passage. *American Philosophical Transactions.*

Among the numerous caves scattered in different parts of North America, that called Madison's, claims a conspicuous place ; situated on the north side of the Blue ridge, near the intersection of the Rockingham and Augusta line with the south fork of the southern river of Shenandoah, (Virginia.) It is in the heart of a mountain, about 200 feet high, which is so steep on one side, that a person standing on the top of it, might easily throw a pebble into the river which flows round the base ; the opposite side of it is, however, very easy of ascent, and on this side the path leading to the cavern runs, excepting for the last 20 yards, when it suddenly turns along

the steep part of the mountain, which is extremely rugged, and covered with immense rocks and trees, from top to bottom. The mouth of the cavern, on this steep side, about two thirds of the way up, is guarded by a huge pendent stone, which seems ready to drop every instant, and it is hardly possible to stoop under it, without reflecting with a certain degree of awe, that were it to drop, nothing could save you from perishing within the dreary walls of that mansion to which it affords an entrance.

Preparatory to entering, says a late writer,* the guide, whom I had procured from a neighbouring house, lighted the ends of three or four splinters of pitch pine, a large bundle of which he had brought with him : they burnt out very fast, but while they last are most excellent torches. The fire he brought along with him, by means of a bit of green hickory wood, which, when first lighted, will burn slowly without any blaze till the whole is consumed.

The first apartment you enter is about 25 feet high, and 15 broad, and extends a considerable way to the right and left, the floor ascending towards the former ; here it is very moist, from the quantity of water continually trickling from the roof. Fahrenheit's thermometer, which stood at 67° in the air, fell to 61° in this room. A few yards to the left, on the side opposite to you on entering, a passage presents itself, which leads to a sort of antichamber as it were, from whence you proceed into the sound room, so named from the prodigious reverberation of the sound of a voice, or musical

instrument at the inside. This room is about 20 feet square ; it is arched at top, and the sides of it, as well as of that apartment which you first enter, are beautifully ornamented with stalactites. Returning from hence into the antichamber, and afterwards taking two or three turns to the right and left, you enter a long passage about 13 feet wide, and perhaps about 15 in height perpendicularly : but if it were measured from the floor to the highest part of the roof obliquely, the distance would be found much greater, as the walls on both sides slope very considerably, and finally meet at top. This passage descends very rapidly, and is, I should suppose, about 60 yards long. Toward the end it narrows considerably, and terminates in a pool of clear water, about three or four feet deep. How far this pool extends it is impossible to say. A canoe was once brought down by a party, for the purpose of examination ; but they said, that after proceeding a little way upon the water, the canoe would not float, and they were forced to return. Their fears, most probably, led them to suppose it was so. I fired a pistol with a ball over the water, but the report was echoed from the after part of the cavern, and not from that part beyond the water, so that I should suppose the passage extended much further than could be traced with the eye. The walls of this passage consist of a solid rock of limestone on each side, which appears to have been separated by some convulsion. The floor is of a deep sandy earth, and it has repeatedly been dug up for the purpose of getting saltpetre, with which

the earth is strongly impregnated. The earth, after being dug up, is mixed with water, and when the grosser particles fall to the bottom, the water is drawn off and evaporated ; from the residue the saltpetre is procured. There are many other caverns in this neighbourhood, and also farther to the westward, in Virginia ; from all of them great quantities of salt petre are thus obtained. The gunpowder made with it, in the back country, forms a principal article of commerce, and is sent to Philadelphia in exchange for European manufactures.

About two thirds of the way down this long passage just described, is a large aperture in the wall on the right, leading to another apartment, the bottom of which is about 10 feet below the floor of the passage, and it is no easy matter to get down into it, as the sides are very steep and extremely slippery. This is the largest and most beautiful room in the whole cavern ; it is somewhat of an oval form, about 60 feet in length, 30 in breadth, and in some parts nearly 50 feet high. The petrifications formed by the water dropping from above, are most beautiful, and hang down from the ceiling in the form of elegant drapery, the folds of which are similar to what those of large blankets or carpets would be if suspended by one corner in a lofty room. If struck with a stick a deep hollow sound is produced, which echoes through the vaults of the cavern. In other parts of this room the petrifications have commenced at the bottom, and formed into pillars of different heights, some of them reach nearly to the roof. If you go to a remote part of this apart-

ment, and leave a person with a lighted torch moving about amidst those pillars, a thousand imaginary forms present themselves, and you might almost fancy yourself in the infernal regions, with spectres and monsters on every side. The floor of this room slopes down gradually from one end to the other, and terminates in a pool of water, which appears to be on a level with that at the end of the long passage; from their situation it is most probable that they communicate together. The thermometer which I had with me, stood in the remotest part of the chamber, at 55° . From hence we returned to the mouth of the cavern, and on coming into the light it appeared as if we really had been in the infernal regions; for our faces, hands, and clothes, were smutted all over, every part of the cave being covered with soot from the smoke of the pine torches which are so often carried in. The smoke from the pitch pine is particularly thick and heavy. Before this cave was much visited, and the walls blackened by the smoke, its beauty, I was told by some of the old inhabitants, was great indeed, for the petrifications on the roof and walls are all of the dead white kind.

A Blowing cave has been discovered at the Panther gap, in the ridge which divides the waters of the Cow and Calf pastures (Virginia.) It is in the side of a hill, is of about 100 feet diameter, and emits constantly a current of air, of such force, as to keep the weeds prostrate to the distance of 20 yards before it. This current is strongest in dry, frosty weather, and in long spells of rain weakest.

Regular inspirations and expirations of air, by caverns and fissures, have been probably enough accounted for, by supposing them combined with intermitting fountains ; as they must of course inhale air, while their reservoirs are emptying themselves, and again emit it while filling. But a constant issue of air, only varying in its force as the weather is dryer or damper, will require a new hypothesis.

Dr. MORSE.

In the county of Munroe (Virginia) near the Kanhawa, there is a remarkable cave extending entirely through the base of a high mountain, the distance of upwards of two miles. Persons have passed from one side of this mountain to the other, through this subterraneous passage. The earth, on the bottom of this cave, is strongly impregnated with nitre ; and saltpetre in any quantity may be made from it. Dr. MORSE.

Another singular cave, in the same state, is near the North mountain, in the county of Frederick. The entrance into this is on the top of an extensive ridge. You descend about 30 or 40 feet, as into a well, from whence the cave then extends, nearly horizontally, 400 feet into the earth, preserving a breadth of from 20 to 50 feet, of a height of from 15 to 12 feet. After entering the cave a few feet, the mercury, which in the open air was at 50° , rose to 57° of Fahrenheit's thermometer. Dr. MORSE.

In the bank of the Ohio river, about 130 miles above its junction with the Mississippi, is a large cave, called by the Indians, "The habitation of the Great Spirit." For about three or four miles be-

fore you come to this place, you are presented with a scene truly romantic. On the Indian side of the river you see large ponderous rocks piled one upon another, of different colours, shapes, and sizes. Some appear to have gone through the hands of the most skilful artists ; some represent the ruins of ancient edifices ; others thrown promiscuously in and out of the river, as if nature intended to shew us with what ease she could handle those mountains of solid rock. You see again purling streams winding their course down their rugged front ; whose appearance in a moonlight night, added to the murmuring noise they occasion, is truly beautiful, though it rather disposes the mind to solemnity : while others project so far that they seem almost disposed to leave their doubtful situation. After a small relief from this scene, you come to a second, which is something similar to the first ; and here, with strict scrutiny, you discover the cave. Before its mouth stands a delightful grove of cypress trees, arranged immediately on the bank of the river. They have a very fine appearance, and add much to the cheerfulness of the place. The mouth of the cave is but a few feet above the ordinary level of the river, and is formed by a semicircular arch of about 80 feet at its base, and 25 feet in height, the top projecting considerably over, forming a regular concave. From the entrance to the extremity, which is about 180 feet, it has a regular and gradual ascent. On either side is a solid bench of rock ; the arch coming to a point above the middle of the cave, where you discover an opening sufficiently

large to receive the body of a man, through which comes a small stream of very clear and well tasted water, which is made use of by those who visit this place. From this hole a second cave is discovered, whose dimensions, form, &c. are not known. The rock is of limestone. The sides of the cave are filled with inscriptions, names of persons, dates, &c. HARRIS' TOUR.

On the west of Lake Ontario, is a curious cavern, called by the Messisaugas Indians, Manito'ah Wigwam, or house of the devil. The mountains which border on this lake, at this place, break off abruptly, and form a precipice of 200 feet perpendicular descent; at the bottom of which the cavern begins. The first opening is large enough for three men to walk conveniently abreast. It continues of this bigness for 70 yards in a horizontal direction; then it falls almost perpendicularly 50 yards, which may be descended by irregular steps from one to four feet distant from each other. It then continues 40 yards horizontally, at the end of which is another descent, down which are no steps. In spring and autumn, there are, once in about a week, explosions from this cavern which shake the ground for 16 miles around. DR. MORSE.

CATARACTS.

THE cataracts of Niagara, deserve a conspicuous place under this head, as being the most stupendous of the kind either in this or any other country. They are situated in Niagara river, about 10 miles from the town of Niagara or Newark. The road leading from lake Ontario to Erie runs within a few hundred yards of them. This road is carried along the top of the lofty steep banks of the river : for a considerable way it runs close to their very edge, and in passing along it, the eye of the traveller is entertained with a variety of the most grand and beautiful prospects. The river instead of growing narrower as you proceed upwards, widens considerably : at the end of nine or ten miles it expands to the length of a mile, and here it assumes much the appearance of a lake ; it is enclosed, seemingly, on all sides, by high hills, and the current, owing to the great depth of the water, is so gentle as to be scarcely perceptible from the top of the banks. It continues thus broad for a mile or two, when on a sudden the waters are contracted between the high hills on each side. From hence up to the falls the current is exceedingly irregular and rapid. At the upper end of this broad part of the river, and nearly at the foot of the banks, is situated a small village, that has been called Queenstown, but which, in the adjacent country, is better known by the name of "the Landing."

About half way up the banks, at the distance of a few hundred yards from Queenstown, there is a very extensive range of wooden barracks, which, when viewed a little way off, appears to great advantage. From the town of Niagara to Queenstown, the country in the neighbourhood of the river is very level ; but here it puts on a different aspect ; a confused range of hills, covered with oaks of an immense size, suddenly rises up before you, and the road that winds up the side of them is so steep and rugged, that it is absolutely necessary for the traveller to leave his carriage, if he should be in one, and proceed to the top on foot. Beyond these hills you again come to a level unbroken country ; but the soil here differs materially from that on the opposite side ; it consists of a rich dark earth intermixed with clay, and abounding with stones ; whereas on the side next lake Ontario, the soil is of a yellowish cast, in some places inclining to gravel and in others to sand.

From the brow of one of the hills in this ridge, which overhangs the little village of Queenstown, the eye of the traveller is gratified with one of the finest prospects in nature ; you stand amidst a clump of large oaks, a little to the left of the road, and looking downwards, perceive through the branches of the trees with which the hill is clothed, from the summit to the base, the tops of the houses of Queenstown, and in front of the village, the ships moored in the river ; the ships are at least 200 feet below you, and their masts appear like slender reeds peeping up among the thick foliage of the trees.

Carrying your eye forward, you may trace the river in all its windings, and finally see it disembogue into lake Ontario, between the town and the fort; the lake itself terminates your view in this direction, except merely at one part of the horizon, where you just get a glimpse of the blue hills of Toronto. The shore of the river, on the right hand, remains in its natural state, covered with one continual forest; but on the opposite side of the country is interspersed with cultivated fields, and neat farm houses down to the water's edge. The country beyond the hills is much less cleared than that which lies towards the town of Niagara, on the navigable part of the river.

From the sudden change of the face of the country in the neighbourhood of Queenstown, and the equally sudden change in the river with respect to its breadth, depth, and current, conjectures have been formed, that the great falls of the river must originally have been situated at the spot where the waters are so abruptly contracted between the hills; and indeed it is highly probable that this was the case, for it is a fact well ascertained, that the falls have receded very considerably since they were visited by Europeans, and that they are still receding every year. So great was our impatience, that every step we advanced towards these stupendous falls, our expectations rose to a higher pitch; our eyes were continually on the look out for the white mist which hovers over them; and an hundred times, I believe, did we stop our carriage in hopes of hearing their thundering sounds; neither how-

ever was the mist to be seen, nor the sound to be heard, when we came to the foot of the hills ; nor after having crossed over them, were our eyes or ears more gratified. This occasioned no inconsiderable disappointment, and we could not but express our doubts to each other, that the wonderful accounts we had heard of the falls were without foundation. These doubts were nearly confirmed, when we found that after having approached within half a mile of the place, the mist was but just discernible, and that the sound even then was not to be heard ; yet it is nevertheless true, that the tremendous noise of the falls may be distinctly heard, at times, at the distance of 40 miles ; and the cloud formed from the spray may be seen still farther off ; but it is only when the air is very clear, and there is a fine blue sky ; which however are very common occurrences in this country, that the cloud can be seen at such a great distance. The hearing the sound of the falls afar off, also depends upon the state of the atmosphere ; it is observed, that the sound can be heard at the greatest distance, just before a heavy fall of rain, and when the wind is in a favourable point to convey the sound toward the listener. The day we approached the falls was thick and cloudy.

On that part of the road leading to lake Erie, which draws nearest to the falls, there is a small village : here we alighted, and having disposed of our horses, and made a slight repast, we crossed over some fields toward a deep hollow place, surrounded with large trees, from the bottom of which

issued thick volumes of whitish mist, that had much the appearance of smoke rising from large heaps of burning weeds. Having come to the edge of this hollow place, we descended a steep bank of about 50 yards, and then walked for some distance over a wet marshy piece of ground, covered with thick bushes, at last came to the Table rock. This rock is situated a little to the front of the Great fall, above the top of which it is elevated about 40 feet. The view from it is sublime; but before I attempt to give an idea of this view, it will be necessary to take a more general survey of the river and falls.

Niagara river issues from the eastern extremity of lake Erie, and after a course of 36 miles, discharges itself into lake Ontario. For the first few miles from lake Erie, the breadth of the river is about 300 yards, and it is deep enough for vessels drawing nine or ten feet water; but the current is so extremely rapid and irregular, and the channel so intricate, on account of the numberless large rocks in different places, that no other vessels than batteaux ever attempt to pass along it. As you proceed downwards, the river widens, no rocks are to be seen either along the shores or in the channel, and the waters glide smoothly along, though the current continues very strong. The river is navigable with safety for batteaux as far as fort Chipe-way, about three miles above the falls; but here the bed of it again becomes rocky, and the waters are violently agitated, by passing down successive rapids, so much so indeed, that were a boat, by any

chance, to be carried a little way beyond Chipeway, where people usually stop, nothing could save it from being dashed to pieces, long before it came to the falls. With such astonishing impetuosity do the waves break on the rocks, in these rapids, that the mere sight of them from the top of the bank is sufficient to make you shudder. I must observe, however, that it is only on each side of the river that the waters are so much troubled; in the middle of it, though the current is also there uncommonly swift, yet the breakers are not so dangerous but boats may pass down, if dexterously managed, to an island which divides the river at the very falls. Notwithstanding the great danger in getting to this island, and the greater danger of coming from it, yet, many persons have the foolhardiness to proceed thither, merely for the sake of beholding the falls from the opposite side of it, or for the sake of having it in their power to say that they had been upon it. The river forces its way amidst the rocks with redoubled impetuosity, as it approaches towards the falls; at last, coming to the brink of the tremendous precipice, it tumbles headlong to the bottom, without meeting any interruption from rocks in its descent. Just at the precipice, the river takes a considerable bend to the right, and the line to the falls, instead of extending from bank to bank in the shortest direction, runs obliquely across. The width of the falls is considerably greater than the width of the river, admeasured some way below the precipice. The river does not rush down the precipice in one unbroken sheet; but it is divided by

islands into three distinct collateral falls. The most stupendous of these, is that on the northwestern side of the river, commonly called the Great, or Horseshoe fall. The height of this is only 142 feet, whereas the others are each 160 feet high ; but to its inferior height, it is indebted principally for its grandeur ; the precipice, and, of course, the bed of the river above it, being so much lower at the one side than the other, by far the greater part of the water of the river finds its way to the lower side, and rushes down with greater velocity at that side than it does at the other, as the rapids above the precipice are strongest there. It is from the centre of the Horseshoe fall, that arises that prodigious cloud of mist, which may be seen so far off. The extent of the Horseshoe fall can only be ascertained by the eye ; the general opinion is that it is not less than 600 yards in circumference. The island which separates it from the next fall is supposed to be about 350 yards wide ; the second fall is about five yards wide ; the next island about 30 yards : and the third, commonly called the fort Schloper fall, from being situated toward the side of the river on which that fort stands, is judged to admeasure, at least, as much as the large island. The whole extent of the precipice, therefore, including the islands, is, according to this computation, 1335 yards. This is certainly not an exaggerated statement. The quantity of water carried down the falls is prodigious. It will be found to amount to 670,255 tons per minute ; though calculated from the following data, which ought to be correct, as determined by a

person of experience, viz. that where lake Erie, towards its eastern extremity, is $2\frac{1}{2}$ miles wide, the water is six feet deep, and the current runs at the rate of two knots an hour ; but Niagara river, between this part of lake Erie and the falls, receives the waters of several large creeks, the quantity carried down the falls must, therefore, be greater than the foregoing computation makes it to be ; if we say that 672,000 tons of water are precipitated down the falls every minute, the quantity will not, probably, be much overrated. To return to the Table rock, situated on the verge of the Horseshoe fall. Here the spectator has an unobstructed view of the tremendous rapids above the falls, and of the circumjacent shores, covered with thick woods ; of the Horseshoe fall, some yards below him ; of the fort Schloper fall at a distance to the left ; and of the frightful gulf beneath, into which, if he has but courage to approach to the exposed edge of the rock, he may look down perpendicularly. The astonishment excited in the mind of the spectator, by the vastness of the different objects, which he contemplates from hence, is great indeed, and few persons, on coming here for the first time, can for some minutes collect themselves sufficiently to be able to form any tolerable conception of the stupendous scene before them. It is impossible for the eye to embrace the whole of it at once ; it must gradually make itself acquainted, in the first place, with the component parts of the scene, each one of which is in itself an object of wonder ; and such a length of time does this operation require, that many who

have had an opportunity of contemplating the scene for years together, have thought that every time they beheld it, each part has appeared more wonderful and more sublime, and that it has only been at the time of their last visit, that they have been able to discover all the grandeur of the cataract.

The next spot from which we surveyed the falls, was from the part of the cliff nearly opposite to that end of the fort Schloper fall which lies next to the island. You stand here, on the edge of the cliff, behind some bushes, the tops of which have been cut down in order to open the view. From hence you have a better prospect of the whole cataract, and are enabled to form a more correct idea of the position of the precipice, than from any other place. The prospect from hence is more beautiful, but I think less grand than from any other spot. The officer who was so polite as to direct our movements, shewed us a drawing of his which exhibited a view of the cataract in the depth of winter. The ice at this season of the year accumulates at the bottom of the cataract in immense mounds, and huge icicles, like the pillars of a massy building, hang pendent in many places from the top of the precipice, reaching nearly to the bottom. Leaving this place, we returned through the woods bordering upon the precipice upon the open fields, and then directed our course by a circuitous path, to a part of the cliff where it is possible to descend to the bottom of the cataract. The river, for many miles below the precipice, is bounded on each side by steep, and in most parts perpendicular cliffs, form-

ed of earth and rocks, and it is impossible to descend to the bottom of them, except at two places, where large masses of earth and rocks have crumbled down, and ladders have been placed from one break to another, for the accommodation of passengers. The first of these places which you come to in walking along the river, from the Horseshoe fall downwards, is called the Indian Ladder. These ladders, of which there are several, one below another, consist simply of long pine trees, with notches cut in their sides, for the passenger to rest his feet on. The trees, even when first placed there, would vibrate as you stepped upon them, owing to their being so long and so slender; age has rendered them still less firm, and they now certainly cannot be deemed safe, though many persons are still in the habit of descending by their means. We did not attempt this route, but proceeded to the other place, which is lower down the river, called Mrs. Simcoe's ladder, having been originally placed there for the accommodation of the lady of the late governor. This route is much more frequented than the other; the ladders are strong and firmly placed, and none of them, owing to the frequent breaks in the cliffs, are required to be of such a great length, but that even a lady might pass up or down them without fear of danger.

On arriving at the bottom of the cliff, you find yourself in the midst of huge piles of misshapen rocks, with great masses of earth and rocks projecting from the sides of the cliff, and overgrown with pines and cedars, hanging over your head, appar-

ently ready to crumble down and crush you to atoms. Many of the large trees grow with their heads downwards ; being suspended by their roots, which had taken such a firm hold in the ground, at the top of the cliff, that when part of it gave way the trees did not fall altogether. The river before you here is somewhat more than a quarter of a mile wide ; and on the opposite of it, a little to the right, the fort Schloper fall is seen to great advantage : what you see of the Horseshoe fall also appears in a very favourable point of view ; the projecting cliff conceals nearly one half of it. The fort Schloper fall is skirted at bottom by milk white foam, which ascends in thick volumes from the rocks ; but it is not seen to rise above the fall like a cloud of smoke, as is the case at Horseshoe fall ; nevertheless, the spray is so considerable, that it descends on the opposite side of the river, at the foot of Simcoe's ladder, like rain.

Having reached the margin of the river, we proceeded towards the Great fall, along the strand, which for a considerable part of the way thither, consists of horizontal beds of limestone rock, covered with gravel, except, indeed, where great piles of stone have fallen from the sides of the cliff. These horizontal beds of rocks, in some places, extend very far into the river, forming points which break the force of the current, and occasion strong eddies, along particular parts of the shore. Here great numbers of the bodies of fishes, squirrels, foxes, and various other animals, that, unable to stem the current of the river above the falls, have

been carried down them, and consequently killed, are washed up. The shore is likewise found strewed with trees, and large pieces of timber, that have been swept away from the saw mills above the falls, and carried down the precipice.

Among the stories current in the country, relating to this cataract, there is one that records the helpless fate of a poor Indian, which I select, as the truth of it is unquestionable. The unfortunate hero of this tale, intoxicated, it seems, with spirits, had laid himself down to sleep at the bottom of his canoe, which was fastened to the beach at the distance of some miles above the falls. His squaw sat on the shore to watch him : whilst they were in this situation, a sailor from one of the ships of war on the neighbouring lakes, happened to pass by ; he was struck with the charms of the squaw, and instantly determined upon enjoying them. The faithful creature, however, unwilling to gratify his desires, hastened to the canoe to arouse her husband ; but before she could effect her purpose, the sailor cut the cord, by which the canoe was fastened, and set it adrift. It quickly floated away with the stream from the fatal spot, and ere many minutes elapsed, was carried down in the midst of the rapids. Here it was distinctly seen by several persons that were standing on the adjacent shore, whose attention had been caught by the singularity of the appearance of a canoe in such a part of the river. The violent motion of the waves soon awoke the Indian, he started up, looked wildly around, and perceiving his danger, instantly seized his

paddle, and made the most surprising exertions to save himself ; but finding in a little time that all his efforts would be of no avail, in stemming the impetuosity of the current, he with great composure put aside his paddle, wrapt himself up in his blanket, and again laid himself down in the bottom of his canoe. In a few seconds he was hurried down the precipice ; but neither he nor his canoe were ever seen more. It is supposed that not more than one third of the different things that happen to be carried down by the falls, reappear at the bottom.

From the foot of Simcoe's ladder you may walk along the strand for some distance without inconvenience ; but as you approach the Horseshoe fall, the way becomes more and more rugged. In some places, where the cliff has crumbled down, huge mounds of earth, rocks, and trees, reaching to the water's edge, oppose your course, it seems impossible to pass them ; and indeed, without a guide, a stranger would never find his way to the opposite side : for to get there it is necessary to mount nearly to their top, and then to crawl on your hands and knees, through long dark holes where passages are left open between the torn up rocks and trees. After passing these mounds, you have to climb from rock to rock close under the cliff, for there is but little space here between the cliff and river, and those rocks are so slippery, owing to the continual moisture from the spray, which descends very heavily, that without the utmost precaution it is scarcely possible to escape a fall.

There is nothing whatsoever to prevent you from passing to the very foot of the Great fall ; and you might even proceed behind the prodigious sheet of water that comes pouring down from the top of the precipice, for the water falls from the edge of a projecting rock ; and moreover, caverns of a very considerable size have been hollowed out of the rocks, at the bottom of the precipice, owing to the violent ebullition of the water, which extends some way underneath the bed of the upper part of the river. I advanced within about six yards of the edge of the sheet of water, just far enough to peep into the caverns behind it ; but here my breath was nearly taken away by the violent whirlwind that always rages at the bottom of the cataract, occasioned by the concussion of such a vast body of water, against the rocks. I confess I had no inclination at this time to go farther, nor did any of us afterward attempt to explore the dreary confines of these caverns, where death seemed to await him that should be daring enough to enter their threatening jaws. No words can convey an adequate idea of the awful grandeur of the scene at this place. Your senses are appalled by the sight of the immense body of water that comes pouring down so closely to you from the top of the stupendous precipice, and by the thundering sound of the billows dashing against the rocky sides of the caverns below ; you tremble with reverential fear, when you consider that a blast of the whirlwind might sweep you from off the slippery rocks on which you stand, and precipitate you into the dreadful gulf beneath ; from

whence all the power of man could not extricate you ; you feel what an insignificant being you are in the creation, and your mind is forcibly impressed with an awful idea of the power of that mighty Being who commanded the waters to flow.

Since the falls of Niagara were first discovered, they have receded very considerably, owing to the disrapture of the rocks which form the precipice. The rocks at the bottom are first loosened by the constant action of the water upon them : they are afterwards carried away, and those at top being thus undermined, are soon broken by the weight of water rushing over them : even in the memory of many of the present inhabitants of the country, the falls have receded several yards. A British officer, who had been employed on lake Erie upwards of 30 years, informed me, that when he first came into the country, it was a common practice for young men to go to the island in the middle of the falls ; that after dining there, they used frequently to dare each other to walk into the river toward certain large rocks in the midst of the rapids ; and sometimes to proceed through the water even beyond these rocks. No such rocks are to be seen at present ; and were a man to advance two yards into the river from the island, he would be inevitably swept away by the torrent. It has been conjectured that the falls of Niagara were originally situated at Queenstown ; and indeed the more pains you take to examine the course of the river from the present falls downward, the more reason is there to imagine that such a conjecture is well founded. From the precipice

nearly down to Queenstown, the bed of the river is strewed with large rocks, and the banks are broken and rugged ; circumstances which plainly denote that some great disruption has taken place along this part of the river, and we need be at no loss to account for it, as there are evident marks of the action of water upon the sides of the banks, and considerably above their present bases : now the river has never been known to rise near these marks during the greatest floods ; it is plain, therefore, that its bed must have been once much more elevated than it is at present. Below Queenstown, however, there are no traces on the banks to lead us to imagine that the level of the water was ever much higher there than it is now. The sudden increase of the depth of the river just below the hills at Queenstown, and its sudden expansion there at the same time seem to indicate that the waters must for a great length of time have fallen from the top of the hills, and thus have formed that extensive deep bason below the village. In the river, a mile or two above Queenstown, there is a tremendous whirlpool, owing to a deep hole in the bed ; this hole was probably also formed by the waters falling for a great length of time on the same spot, in consequence of the rocks which composed the then precipice having remained firmer than those at any other place did. Tradition tells us, that the Great fall, instead of having been in the form of a horse-shoe, once projected in the middle. For a century past, however, it has nearly remained in the present form ; and as the ebullition of the water at the

bottom of the cataract is so much greater at the centre of this fall than in any other part, and as the water consequently acts with more force there in undermining the precipice than at any other part, it is not unlikely that it may remain nearly in the same form for ages to come.

At the bottom of the Horseshoe fall, is found a kind of white concrete substance, generally called spray. Some persons have supposed that it is formed from the earth, and particles of the water, which descending, owing to their great specific gravity, quicker than the other particles, adhere to the rocks, and are there formed into a mass. This concrete substance has precisely the appearance of petrified froth; and it is remarkable, that it is found adhering to those rocks, against which the greatest quantity of the froth, that floats upon the water, is washed by the eddies.

We did not think of ascending the cliff till the evening was far advanced. Just as we left the foot of the Great fall, the sun broke through the clouds, and one of the most beautiful and perfect rainbows that ever I beheld, was exhibited in the spray that arose from the fall. It is only at evening and morning that the rainbow is seen in perfection; for the banks of the river, and the steep precipice, shade the sun from the spray, at the bottom of the fall, in the middle of the day.

The falls of Niagara are much less difficult of access now, than they were some years ago. Charlevoix, who visited them in the year 1720, tells us, that they were only to be viewed from one spot,

and that from thence the spectator had only a side prospect of them. Had he been able to have descended to the bottom, he would have had ocular demonstration of the existence of caverns beneath the precipice, which he supposed to be the case, from the hollow sound of the falling of the waters ; from the number of carcasses washed up there on different parts of the strand, and would also have been convinced of the truth of a circumstance which he totally disbelieved, namely, that fish were oftentimes unable to stem the rapid current above the falls, and were consequently carried down the precipice.

The most favourable season for visiting the falls, is about the middle of September ; for then the woods are seen in all their glory, beautifully variegated with the rich tints of autumn ; and the spectator is not then annoyed with vermin. In the summer season, you meet with rattlesnakes at every step, and musketoes swarm so thickly in the air, that, to use a phrase of the country, " You might cut them with a knife." The cold nights in the beginning of September, effectually banish these noxious animals. WELD'S *Travels*.

The Falling spring in Augusta, (Virginia) forms in its course a remarkable cascade. It is a water of James' river, where it is called Jackson's river, rising in the warm spring mountains, about 20 miles southwest of the warm spring, and flowing into that valley. About three quarters of a mile from its source, it falls over a rock 200 feet into the valley below. The sheet of water is broken in its breadth

by the rocks, in two or three places, but not at all in its height. Between the sheet and rock, at the bottom you may walk across dry. This cataract will bear no comparison with that of Niagara, as to the quantity of water composing it; the sheet being only 12 or 15 feet wide above, and somewhat more spread below; but it is higher by more than 50 feet. Dr. MORSE.

There is a remarkable fall in Connecticut river, at Walpole, known by the name of the Great fall. The breadth of the river, above the fall, is 22 rods. A large rock divides the stream into two channels, each about 90 feet wide, on the top of the shelving bank. When the water is low, the eastern channel appears crossed by a bar of solid rock, and the whole stream falls into the western channel, where it is contracted to the breadth of 16 feet, and flows with astonishing rapidity; but the depth of the water is not known, nor has the perpendicular height of the fall been ascertained. There are several pitches, one above another, in the length of half a mile, the largest of which, is that where the rock divides the stream. Notwithstanding the velocity of the current, the salmon pass up the fall, and are taken many miles above; but the shad proceed no farther. In the rocks of this fall, are many cavities of various depths, made by the circular motion of small stones, impelled by the force of the descending water. On the steep sides of the island rock, hang several arm chairs, fastened to ladders, and secured by a counterpoise, in which fishermen sit to catch salmon and shad with dipping nets.

Merrimack river is remarkable as containing two falls. In its course through New Hampshire, it passes over several falls, the most beautiful of which is called the isle of Hookset, but the grandest is Amoskeag. Hookset is about eight miles below the town of Concord, the descent of the water is not more than 15 feet perpendicular in 30 rods, a high rock divides the stream, and a smaller rock lies between that and the western shore. From an eminence on the western side, there is a delightful landscape; the waters above and below the fall, the verdant banks, the cultivated fields, and the distant hills, in the back ground, form a picturesque scene, which relieves the eye of the traveller from the dull uniformity of a road through the woods.

Eight miles below Hookset, lies Amoskeag fall, it consists of three large pitches, one below the other, and the water is supposed to fall about 80 feet in the course of half a mile. The river here is so crooked, that the whole of the fall cannot be viewed at once; though the second pitch, which may be seen from the road on the western side, appears truly majestic. In the middle of the upper part of the fall, is a high, rocky island, on some parts of which there are several holes, like those at the Great fall, in Connecticut.

The Catâract, or great falls, in the Passaik river, which rises in Morris county, is one of the greatest natural curiosities in New Jersey. The river is about 40 yards wide, and moves in a slow, gentle current, until coming within a short distance of a deep cleft in a rock, which crosses the channel, it

descends, and falls above 70 feet perpendicularly, in one entire sheet. One end of the cleft, which was evidently made by some violent convulsion in nature, is closed; at the other, the water rushes out with incredible swiftness, forming an acute angle with its former direction, and is received into a large bason, whence it takes a winding course through the rocks, and spreads into a broad, smooth stream. The cleft is from four to twelve feet broad. The falling of the water occasions a cloud of vapour to arise, which, by floating amidst the sun beams, presents to the view rainbows, that add beauty to the tremendous scene. Dr. MORSE.

Four miles northeast of Providence, (Rhode Island) lies a small village, called Pawtucket, through which runs a river of the same name. In this river is a beautiful fall of water, directly over which a bridge has been built, which divides Massachusetts from Rhode Island. The fall, in its whole length, is upwards of 50 feet. The water passes through several chasms in a rock, which runs diametrically across the bed of the stream, and serves as a dam to the water. This is a busy place, and the seat of various branches of manufactures. Dr. MORSE.

In the Little river, a branch of the Thames, (Connecticut) is a remarkable cataract. A rock, 10 or 12 feet in perpendicular height, extends quite across the channel of the river. Over this, the whole river, in one entire sheet, pitches upon a bed of rock below. Here the river is compressed into a very narrow channel between two craggy cliffs,

one of which towers to a considerable height. The channel descends gradually, is very crooked, and covered with pointed rocks. Upon these the water swiftly tumbles, foaming with the most violent agitation, 15 or 20 rods, into a broad bason, which spreads before it. At the bottom of the perpendicular falls, the rocks are curiously excavated by the constant pouring of the water. Some of the cavities, which are all of a circular form, are five or six feet deep. The smoothness of the water above its descent; the regularity and beauty of the perpendicular fall; the tremendous roughness of the other, and the craggy towering cliff which impends over the whole, present to the view of the spectator, a scene indescribably delightful and majestic. Dr. MORSE.

“The Yohiogany river,” says Mr. Harris, “pursuing a northwesterly course, as it passes through a gap in Laurel hill, it precipitates itself over a ledge of rocks, which lie nearly at right angles to the course of the stream, and forms a noble cascade, called the Ohiopyle falls. Dr. Rittenhouse, who has published a description of these falls, accompanied with an engraving, found the perpendicular height of the cataract to be “about 20 feet,” and the breadth of the river 240 feet. For a considerable distance below the falls, the river is very rapid, and boils and foams vehemently, occasioning a continual mist to arise from it. The river at this place runs to the southwest, but presently winds round to the northwest, and, continuing this general course for 30 or 40 miles, it loses its name by uniting with

the Monongahela, which comes from the southward, and contains, perhaps, twice as much water."

In the north part of the township of Adams, in Berkshire county, (Massachusetts) is a singular curiosity. A pretty mill stream, called Hudson's brook, which rises in Vermont, and falls into the north branch of Hoosuck river, has, for 30 or 40 rods, formed a deep channel through a quarry of white marble. The hill, gradually descending towards the south, terminates in a steep precipice, down which, probably, the water once tumbled; but finding, in some places, natural chasms in the rocks, and in others, wearing them away, as is evident from their appearance, it has formed a channel in some places more than 60 feet deep. Over this channel, where deepest, some of the rocks remain, and form a natural bridge. From the top of this bridge to the water, it is 62 feet; its length is about 12 or 15, and its breadth about 10. Partly under this bridge, and about 12 feet below it is another, which is wider, but not so long; for at the east end they form one body of rock, 12 or 14 feet thick, and under this the water flows. It is evident, from the appearance of the rocks, that the water, in some places, formerly flowed 40 or 50 feet above its present bed. Many cavities of different figures and dimensions, but generally circular, are worn out in the rocks. One of these in the solid rock, is about four feet in diameter, and four or five feet deep; the rock is on one side worn through at the bottom. A little above the bridge, on the west side of the chasm, is a cave or little room, which

has a convenient entrance at the north, and a passage out at the east. From the west side of this cave, a chasm extends into the hill, but soon becomes too narrow to pass. The rocks here, which are mostly white, though in some places clouded or streaked with other colours, appear to be of that species of coarse white marble, which is common at Lanesborough, and in other towns in Berkshire county. Dr. MORSE.

Powow river, which rises in New Hampshire, deserves notice on account of its falls. At the falls, the descent of the water, in the distance of 50 rods, is 500 feet, and in its passage carries one bloomery, five saw mills, seven grist mills, two linseed mills, one fulling mill, and one snuff mill, besides several wheels, auxiliary to different labours. The rapid fall of the water ; the dams, at very short distances, crossing the river ; the various wheels and mills arising almost immediately one over another ; and the very irregular and grotesque situation of the houses, and other buildings, on the adjoining grounds, give this place a romantic appearance, and afford, in the whole, one of the most singular views to be found in this country. Dr. MORSE.

At the mouth of Queechey, commonly called Water Queechey river, (Vermont) there is one of the most beautiful cascades in New England. The river, here about 258 feet wide, pours over a ledge of rocks, 40 feet high, in an almost perpendicular manner, just broken enough to throw the water in every fantastical and delightful form. Dr. MORSE.

At Rockingham, (Vermont) there are some curious and most beautiful falls of water, called Bellow's falls : it passes over a bar of solid rock, about 300 yards in a zigzag direction, and with a most astonishing velocity. It is a real phenomenon, and well worthy the attention of the traveller. Over this fall is a good wooden bridge, built by colonel Hale. GRAHAM.

There is a remarkable fall in the Mohawk river, near the small village of Cohos. This river takes its rise to the northeast of lake Oneida, and after a course of 140 miles, disembogues into the Hudson or North river, about 10 miles above Albany. The Cohos fall is about three miles from its mouth. The breadth of the river is 300 yards ; a ledge of rocks extends quite across, and from the top of them the water falls about 50 feet perpendicular ; the line of the fall from one side of the river to the other, is nearly straight. The appearance of this fall varies very much, according to the quantity of water ; when the river is full, the water descends in an unbroken sheet from one bank to the other, whilst at other times, the greater part of the rocks are left uncovered. The rocks are of a remarkable dark colour, and so also is the earth in the banks, which rise to a great height on either side. There is a very pleasing view of this cataract as you pass over the bridge across the river, about three quarters of a mile lower down. WELD.

We shall here describe two beautiful scenes in the vicinity of Quebec. The one is the fall of the river Montmorenci, whose stream runs into the St.

Lawrence, about seven miles below Quebec ; the other, that of the Chaudiere, whose stream joins the same river, nearly at an equal distance above the city. The Montmorenci runs in a very irregular course, through a wide and thickly wooded country, over a bed of broken rocks, till it comes to the brink of a precipice, down which it descends in one uninterrupted, and nearly perpendicular fall of 240 feet. The stream of water in this river, except at the time of floods, is but scanty, but being broken into foam by rushing with such rapidity as it does over the rocks at the top of the precipice, it is thereby much dilated, and in its fall, appears to be a sheet of water of no inconsiderable magnitude. The breadth of the river at top, from bank to bank, is about 50 feet only. In its fall, the water has the exact appearance of snow, as when thrown in heaps from the roof of a house, and it seemingly descends with a very slow motion. The spray at the bottom is considerable, and when the sun happens to shine bright in the middle of the day, the prismatic colours are exhibited in it, in all their variety and lustre. At the bottom of the precipice, the water is confined in a sort of bason, as it were, by a mass of rock, extending nearly across the fall, and out of this, it flows with a gentle current to the St. Lawrence, which is about 300 yards distant. The banks of the Montmorenci, below the precipice, are nearly perpendicular on one side, and on both inaccessible, so that if a person be desirous of getting to the bottom of the fall, he must descend down the banks of the St. Lawrence, and walk along the margin of that

river, till he comes to the chasm through which the Montmorenci flows. To a person sailing along the St. Lawrence, past the mouth of the chasm, the fall appears in great beauty.

General Haldimand was so delighted with the scene, that he has built a house close to this cataract. In front of the house is a neat lawn, that runs down the whole way to the St. Lawrence. There is also a summer house, situated nearly at the top of the fall, hanging directly over the precipice, so that if a bullet were dropped from the window, it would descend in a perpendicular line, at least 200 feet. This house is supported by large beams of timber, fixed in the sides of the chasm, and, in order to get to it, you have to pass over several flights of steps, and one or two wooden galleries, which are supported in the same manner. The view from hence is tremendously grand.

The fall in the river Chaudiere is not half the height of that of Montmorenci, but then it is no less than 250 feet in breadth. The scenery around this cataract, is much superior in every respect to that in the neighbourhood of the Montmorenci. Contiguous to the latter, there are few trees of any great magnitude, and nothing is near to relieve the eye; you have the fall, and nothing but the fall to contemplate. The banks of La Chaudiere, on the contrary, are covered with trees of the largest growth, and amidst the piles of broken rocks, which lie scattered about the place, you have some of the wildest and most romantic views imaginable. As for the fall itself, its grandeur varies with the season,

When the river is full, a body of water comes rushing over the rocks of the precipice, that astonishes the beholder ; but in dry weather, and, indeed, during the greater part of the summer, we may say, the quantity of water is but trifling. At this season, [August] there are few but what would prefer the falls of the Montmorenci river, and we are tempted to imagine that, upon the whole, the generality of people would give it the preference at all times. WELD.

The view of the Great falls of the river of Patowmac, from the Maryland shore, is pleasing, but not so much so, as from the opposite side. "Having reached the river close to the falls," says Mr. Weld, "I rode along through the woods, with which its banks are covered, for some distance higher up, to a place where there was a ferry, and where I crossed into Virginia. From the place where I landed, to the falls, which is a distance of about three miles, there is a wild romantic path, running along the margin of the river, and winding at the same time round the base of a high hill covered with lofty trees and rocks. Near to the shore, almost the whole way, there are clusters of small islands, covered with trees, which suddenly opposing the rapid course of the stream, form very dangerous eddies, in which boats are frequently lost when navigated by men who are not active and careful. On the shore prodigious heaps of white sand are washed up by the waves ; and in many places the path is rendered almost impassable by piles of large trees, which have been brought down

from the upper country by floods, and drifted together."

"The river, at the ferry, is about one mile and a quarter wide, and it continues much the same breadth as far as the falls, where it is considerably contracted and confined in its channel by immense rocks on either side. There also its course is very suddenly altered, so much so indeed, that below the falls for a short distance it runs in an opposite direction from what it did above ; but soon after it resumes its former course. The water does not descend perpendicularly, excepting in one part close to the Virginian shore, when the height is about 30 feet ; but comes rushing down with tremendous impetuosity over a ledge of rocks in several different falls. The best view of the cataract is from the top of a pile of rocks, about 60 feet above the level of the water, and which, owing to the bend in the river, is situate nearly opposite to the falls. The river comes from the right, then gradually turning, precipitates itself down the falls, and winds along at the foot of the rocks on which you stand, with great velocity. The rocks are of a slate colour, and lie in strata ; the surface of them in many places is sparkling and glossy."

Between Newark and the Posaick river, is a marsh, which extends upwards of 20 miles, and is about two miles wide where you pass over it. The road is here formed with large logs laid close together, and on each side are ditches to keep it dry. The Posaick river runs close upon the borders of this marsh ; and there is an excellent wooden

bridge across it. About 15 miles above it, there is a remarkable fall in the river. The river, at the fall, is about 40 yards wide, and flows with a gentle current till it comes within a few perches of the edge of the fall, when it suddenly precipitates itself, in one entire sheet, over a ledge of rocks, of nearly eight feet in perpendicular height: below, it runs on through a chasm, formed of immense rocks on each side; they are higher than the fall, and seem to have once been united together. In this neighbourhood there is a mine of very rich copper. WELD.

St. Anthony's falls receive their name from Father Louis Hennipin, a French missionary, who travelled in these parts in the year 1680, and was the first European ever seen by the natives. This amazing body of waters, which are about 250 yards over, form a most pleasing cataract; they fall perpendicularly about 30 feet, and the rapids below, in the space of 300 yards more, render the descent considerably greater; so that when viewed at a distance, they appear to be much higher than they really are. In the middle of the falls stands a small island about 40 feet broad, and somewhat longer, on which grow a few cragged hemlock and spruce trees; and about half way between this island and the eastern shore, is a rock, lying at the very edge of the fall, in an oblong position, that appears to be about five or six feet broad, and 30 or 40 long. These falls vary much from all others, as you may approach to them without finding the least obstruction from any intervening hill or precipice. The

country around them is extremely beautiful. It is not an uninterrupted plain, where the eye finds no relief; but composed of many gentle ascents, which in the summer are covered with the finest verdure, and interspersed with little groves, that give a pleasing variety to the prospect. On the whole, when the falls are included, which may be seen at the distance of four miles, a more pleasing and picturesque view cannot be found throughout the universe. We have endeavoured to give the reader as just an idea of this enchanting spot, as possible; but all description, whether of the pencil or the pen, must fall infinitely short of the original. At a small distance below the falls, stands a little island, of about an acre and a half, on which grows a great number of oak trees, every branch able to support the weight, was full of eagles' nests. The reason that this kind of bird resorts in such numbers to this spot, is, that they are here secure from the attacks either of man or beast, their retreat being guarded by the rapids, which the Indians never attempt to pass. Another reason is, that they find a constant supply of food for themselves and their young, from the animals and fish which are dashed to pieces by the falls, and driven on the adjacent coast. - CARVER.

MINERAL SPRINGS.

WE shall begin this article, with an account of the medicinal springs in the county of Saratoga,* as being more celebrated than any in the United States. These, which are most frequented on account of superior accommodations, are called Ballstown springs, from their being found within the limits of a town of that name. They are situated about 12 miles west of Stillwater, and about 14 from that part of the banks of the Hudson or North river, famous for the victory of general Gates, over general Burgoyne. They are 206 miles from the city of New York, 36 north of Albany, and about 30 south of lake George.

These medicinal springs are found in the bottom of a valley, or excavation, forming a kind of bason, of about 50 acres in extent. In this hollow, grow lofty pines, which are overtopped by others that cover and ornament the hills, which rise at a greater or less distance above the brim of the bason. A brook runs through this singular valley, and empties itself by the only natural slope in it. The woods are pretty well cleared near the springs. There is a large house for entertainment, with neat bathing houses, and shower baths for the convenience of invalids.

* The compiler here acknowledges the kindness of Dr. Waterhouse, in giving him free permission to extract from any part of his excellent Manuscript Journal, containing the most accurate analysis of these medicinal waters that has ever been made.

These, together with the greatest part of this valley, belong to a merchant of eminence in New York, (Nicholas Low, Esq.) The largest spring, however, belongs to the public. Sir William Johnson made this benevolent reservation, when he sold this tract of land to private individuals. In tracing the history of these medicinal springs, I could only learn that an Indian chief discovered them to a sick French officer, in the early part of their wars with the English. But whether they were these very springs in this bason, or those at ten miles distance, properly called the Saratoga springs, I know not.

The soil, for half a dozen miles round this place, is poor and sandy, producing little less than pine trees, shrub oaks, fern, and mullen. In the neighbouring hills, ores have been accidentally found, especially iron and copper, or rather what the mineralogists call *ferruginous* and *capreous pyrites*. These have been accidentally discovered; for in a country like this, covered with wood, there is yet no temptation, to explore the earth beyond its surface for fuel.

The valley of Ballstown and its environs may be made an enchanting spot, equal, nay superior in some respects, to any of the watering places in Europe. There is, for example, a smaller bason, so near to the one already mentioned, that were they of equal size, their two circles would form the figure 8. This small bason is so regular in its form, as to seem the result of art, rather than nature. It is not improbable, that in this hollow, a spring of water similar to that in the large bason, may be dis-

covered, and be converted, by the hand of taste, into an ornamental fountain. A little higher up, orchestras for music may be erected, and even houses for entertainment built on the very brim of this bowl of nature's forming.

The Kayaderassoras river, which is about 10 yards wide, gives several hints to the man of taste, to turn its waters to the use and beauty of the future town which these medicinal springs will one day raise in this place.

The medicinal waters which have made this spot so famous of late, are remarkably limpid, considering they contain iron, and mineral alkali, common salt, and lime. They are brisk and sparkling, like champagne. In drinking, they strike the nose and palate, like bottled cyder; and slightly affect the head of some people, by their inebriating quality. They derive this exhilarating property, from what some philosophers call the *spiritus mineralis*; or what Bergman calls the *aerial acid*; Fourcroy, the *cretacious acid*; and Dr. Priestly, *fixed air*; and is that animating *something* which gives activity to yeast, and life to malt liquors. It is used in the neighbourhood of the springs, instead of yeast, in making bread, and is found to raise it more speedily and effectually than any other ferment in ordinary use.

Its purity gives it a decided preference over the sediment of beer, which is the leaven commonly used by families who make their own bread. Horses drink these waters with avidity.

The effects on flame and on animal life, which the

philosopher expects to find from the well known properties of fixed air, the ignorant country people consider with different sensations. They see with astonishment, that a candle will not burn near the surface of these waters ; that fish and frogs are killed in a few minutes, and that geese and ducks cannot swim in these springs but a few minutes, before they expire !

These waters are apt to burst bottles when corked in very hot weather, especially during a thunder storm ; but with care may be transported in bottles to any distance. These waters boil with a very moderate degree of heat ; they are, nevertheless, remarkably cold ; for when the mercury of Fahrenheit's thermometer stood at 86 in the open air, and 79 in the brook running near the spring ; it stood in one of those mineral springs at 49, and in the other at 51. The first was constantly secluded from the rays of the sun ; the last always exposed without a covering.

The most celebrated chalybeate waters in Europe are, 1st the Pymont, from a town so called in the circle of Westphalia, just on the confines of Brunswick ; 2d the Spa, (or, as we pronounce it, Spaw) which is a beautiful village in the bishopric of Leige, in Flanders ; and 3d the Seltzer, from a town of that name in the archbishopric of Triers, in Germany. The Pymont is the richest of all the chalybeates ; the Spaw is the next, and these are they which very near resemble the waters of Ballstown, in the county of Saratoga, in taste, chymical analysis, and medicinal virtues.

The Pyrmont water, the Spaw, and the Seltzer, form a considerable article of commerce.

The Saratoga waters are equally precious, and may become as valuable, in a commercial view, in the United States, as the former are in Europe, when they are drank ; not merely medicinally, but as a luxury. A few men of opulence and enterprize might give our chalybeates a circulation through the United States, which would be as lucrative to them, as beneficial to the public. Physicians seldom direct their patients to drink more than three quarts of these waters in 12 hours ; some, who visit these springs, drink the enormous quantity of three gallons, and even more, in a day. Cold as they are, they may be drunken with safety in the hottest weather, owing to that exhilarating volatile spirit already mentioned. They increase every natural excavation, and what is a little extraordinary, they are cathartic, diuretic, and sudorific, at the same time. On the first trial they are apt to disagree with many people ; they create uneasiness in the stomach and bowels, and cause a heat in the glands of the throat, until they begin to pass off freely by the kidneys. Then they become pleasant, and operate agreeably. They blacken the teeth, and also the alvine fœces. They are deemed specific in anorexia, or want of appetite ; and in dyspepsia, or difficulty of digestion. They are highly serviceable in most hypochondriac cases, and are equally serviceable in some difficulties and obstructions, which will be more particularly mentioned hereafter. They give relief in the stone and gravel. Their

credit is not so well established in the gout, nor in the rheumatism. They are manifestly prejudicial to the consumptive, and to the constitutions or habits that are prone to inflammations. Their use occasions heats in the glands of the throat, and stiffness of the neck; and in such as are subject to teeth ache, an aggravation of the pain.

They are highly and justly celebrated in cutaneous diseases; but here discretion is requisite. They throw out pimples in those who have them not; and increase all irruptions already out. They inflame sores, which render it necessary to drop their use for a few days, and then begin again; at length they cease to have this effect, the sores dry up, and they vanish. Exercise in a carriage, or on horseback, generally assists their salutary operation. But much cannot and ought not to be expected without temperance, especially in eating.

Thousands drink and bathe in these Saratoga waters (for by that name I include those at Ballstown, as well as those in the limits of the town of Saratoga) in the course of a year: the majority declare themselves pleased and benefited by their use; many reap no advantage whatever, and some are destroyed by them. In fine, they are a very powerful and precious remedy in the hands of the judicious, and ought to be enumerated among the most valuable productions of our country.

About 15 miles from Ballstown valley, and within the limits of the town of Saratoga, there is a cluster of springs, which are more properly called Saratoga Springs. They are situated in a shallow vale,

or marsh, in several respects resembling those of Ballstown. These waters appear to have received as strong if not stronger impregnation of the same kind of ingredients that enter those of Ballstown, and may be a stream of the same fountain running through the same kind of calcareous earth. One of these springs is covered by a natural cretaceous, or rather calcareous pyramid, about five or six feet high. This hollow pyramid, or cone, has a hollow in the top about six inches over. If we look into the hole we see the mineral water boiling vehemently like a pot over the fire ; the water is nevertheless intensely cold ; and is, I think, in every respect, smarter than at Ballstown. The calcareous matter extends for several rods from the basis of the pyramid. There are several idle stories related of this spring. One is, that it overflows at certain stages of the moon. This is not true. As this is found to be false, they tell you it overflows once a year ; but this I believe has as little foundation in truth as the other. People who live at these springs think they must relate something marvellous, by way of enhancing the value of the waters, and reconciling you to the great expense attending these visits.

There is another medicinal spring at the pleasant village of New Lebanon, which is situated partly in a vale, and partly on the declivity of hills.

The spring discovers itself on a commanding eminence, overlooking a fine valley, and surrounded with several good houses, which afford much better accomodations for the valetudinarians, than

are to be found at any of the springs in the county of Saratoga. I confess myself at a loss to determine the contents of these waters by chymical analysis, or any of the ordinary tests. I suspect this impregnation is from some cause weakened. Excepting from their warmth, which is about that of new milk, I should never have suspected them to come under the head of medicinal waters. They are used for the various purposes of cookery, and for common drink by the neighbours; and I never could discover any other effects from drinking them, than what we might expect from rain or river water of that temperature.

There was no visible change produced in this water by the addition of an alkali, nor by a solution of alum; nor was any effervescence raised by the oil of vitriol; neither did it change the colours of gold, silver, or copper; nor did it redden beef or mutton boiled in it; nor did it extract black tincture from galls; neither did it curdle milk, the whites of eggs or soap.

The qualities of the waters of the pool at Lebanon is, therefore, very different from those of Saratoga. These are mild, and warmish, those very cold, smart and exhilarating.

Frogs are found in the pool of Lebanon, and plants grow and flourish in and around it; but plants will not grow within the vapour of those of Saratoga, and as for small animals, they soon expire in it. Hence we conclude that, *spiritus mineralis*, which some call aerial acid, or fixed air, abounds in the one, but not in the other.

Yet the Lebanon is famous for having wrought many cures, especially in rheumatisms, stiff joints, and scabby eruptions, and even in visceral obstructions and indigestions; all of which is very probable. If a person who has brought on a train of chronic complaints, by intemperance in eating and drinking, should swallow four or five quarts of rain or river water in a day, he would not feel so keen an appetite for animal food, or thirst for spirituous liquors. Hence such a course of water drinking, will open obstructions, rince out impurities, render perspiration free, and thus remove the unnatural load from the animal machine, which causes and keeps up its disorders. Possibly, however, there may be *something* so subtile in these waters as to elude the scrutinizing hand of the chymists, since they all allow that the analysis of mineral waters is one among the most difficult things in the chymical art."

In the new town of Renssalaer, nearly opposite the city of Albany, a medicinal spring has lately been discovered, combining most of the valuable properties of the celebrated waters of Saratoga. Should further experiments confirm the favourable opinion already entertained of this spring, it will prove a fortunate discovery for the city of Albany, and for the country adjoining, as well as for the invalids who annually resort to Saratoga, under many inconveniences, and at a great expense.

At Stafford, in the county of Tolland (Connecticut) is a mineral spring which has obtained considerable celebrity. It is situated at the foot of

a lofty hill, near the western branch of the Willamantick, and about 25 rods from the confluence of the several streams which form that river. The spring was known and used by the Indian natives. When setting out on their hunting parties, from the southward, they for many years after the settlement of the town, used to resort to the spring to erect wigwams in the neighbourhood, and to drink of and bathe in the water. It was not till the years 1766 and 1767, that the waters began to be considerably used by the English. For a number of years the spring was visited by large numbers from various parts of the country. The resort to it has continued every year to the present time ; and for two or three years past has been greatly increasing. The mineral water of Stafford is very strongly chalybeate. It is undoubtedly more highly impregnated with iron, than any other water yet discovered in this country. The carbonic acid is, in this water, the solvent of the iron. The water has also been found to contain a small portion of the sulphurated hydrogen gas. The sirup of violets, and other purple vegetable juices, instantly strike the water a beautiful green. Powder of the galls of Aleppo, of Peruvian and white oak bark, and hyson tea, on being mixed with it, almost immediately produce a brilliant purple tinge. Caustic, fixed alkali, throws down a precipitate of a reddish brown colour. Silver, on being wet with the water, acquires a blackish hue. Prussiates of lime and potash produce in it a very discernible blue tinge. Two gallons of water afford by evaporation 12 grains of

sediment. The temperature of the water by Fahrenheit's thermometer, is from 50 to 52°. This is nearly the same in every season of the year. It never freezes at the fountain in the coldest weather. Its taste, when first taken from the spring, is lively and somewhat pungent, and its appearance perfectly transparent. Being removed a few hours, it grows turbid and mawkish to the taste. When the water has been suffered to stand a considerable time in the bathing vats, the whole surface is covered with a shining pellicle, exhibiting the various colours of the rainbow, and a very copious sediment of a reddish brown colour, and apparently of the ferruginous kind, is deposited at the bottom, and adheres to the sides of the vats. This phenomenon undoubtedly arises from the extrication of the carbonic acid, by which the iron contained in the water is held in solution. The effects of the water when used as a remedy are various. To almost all, it proves diuretic. It sometimes operates as a cathartic, frequently excites a nausea, and sometimes proves emetic. It is generally in a greater or less degree, diaphoretic. This water has been highly celebrated for the cure of cutaneous affections. When used with prudence, and persisted in for a sufficient space of time, a failure in obtaining relief, in those generally obstinate and very troublesome complaints, rarely happened. In dropsical affections, in the gout, rheumatism, piles, in the foulest ulcers, of the scorbutic, scrophulous, and even cancerous kinds, in loss of appetite, an impaired state of the digestive faculties, in loss of motion

from paralytic affections, in long continued weaknesses of the eyes, in nervous headaches, and in all those peculiar female cases, where a strong and powerfully aperient chalybeate can be considered as a proper remedy, the mineral waters of Stafford have been found highly beneficial. The prospects in the immediate vicinity of the spring, are most strikingly picturesque. Great inconvenience was formerly suffered by visitors, from the almost total want of accommodations in the vicinity of the spring; but that evil is now in a good degree removed. Dr. MORSE.

The Green springs are also celebrated for their medicinal qualities. They lie about 20 miles from Columbia, (Virginia) on the road running almost wholly through a pine forest. In the neighbourhood of the springs, beside the tavern and the quarters of the slaves, there is but one more building at this place. This is a large farm house, where people that resort to these springs, are accommodated with lodgings, about as good as those at the tavern, which are wretched indeed. These habitations stand in the centre of a cleared spot of land of about 50 acres, surrounded with wood. The springs are just on the margin of the wood, at the bottom of a slope, which begins at the houses, and are covered with a few boards, merely to keep the leaves from falling in. The waters are chalybeate, and are drunk chiefly by persons from the low country, whose constitutions have been relaxed by the heats of summer. WELD.

In the western part of Botetourt county, situated in the same state, in a delightful climate, are several medicinal springs, whereto numbers of people resort towards the latter end of summer, as much for the sake of escaping the heat in the low country, as for drinking the waters. Those most frequented are called the Sweet springs, and are situated at the foot of the Alleghany mountains. During the last season, upwards of 200 persons resorted to them with servants and horses. The accommodations at the springs are most wretched at present ; but a set of gentlemen from South Carolina have, it is said, purchased the place, and are going to erect several commodious dwellings in the neighbourhood for the reception of company.

Beside these springs, there are others in Jackson's mountain, a ridge which runs between the Blue mountains and the Alleghany. One of the springs here is warm, and another quite hot ; a few paces from the latter, a spring of common water issues from the earth, but which, from the contrast, is generally thought to be as remarkable for its coldness, as the water of the adjoining one is for its heat. There is also a sulphur spring near these ; leaves of trees falling into it become thickly incrust- ed with sulphur in a very short time, and silver is turned black almost immediately. At a future period the medicinal qualities of all those springs will probably be accurately ascertained ; at present they are but very little known. As for the relief obtained by those persons that frequent the Sweet springs, in particular, it is strongly conjectured that

they are more indebted for it to the change of the climate, than to the rare qualities of the waters.

WELD.

There is a sulphur spring on Howard's creek, or Green Briar. In the low grounds of the Great Kanhaway, seven miles above the mouth of Elk river, is a singular curiosity. It is a hole in the earth of the capacity of 30 or 40 gallons, from which issues constantly a bituminous vapour, in so strong a current, as to give to the sand about its orifice the motion which it has in a boiling spring. On presenting a lighted candle or torch within 18 inches of the hole, it flames up in a column of 18 inches diameter, and four or five feet in height, which sometimes burns out within 20 minutes, and at other times has been known to continue three days, and then has been still left burning. The flame is unsteady, of the density of that of burning spirits, and smells like burning pit coal. Water sometimes collects in the bason, which is remarkably cold, and is kept in ebullition by the vapor issuing through it. If the vapor be fired in that state, the water soon becomes so warm, that the hand cannot bear it, and evaporates wholly in a short time.

JEFFERSON.

The Burning spring, in the western parts of Virginia, is an extraordinary curiosity. It was known a long time to the hunters. They frequently encamped by it for the sake of obtaining good water. Some of them arrived late one night, and, after making a fire, took a brand to light them to the spring. On their coming to it, some fire dropped

from the brand, and in an instant the water was in a flame, and so continued ; over which they could roast their meat as soon as by the greatest fire. It was left in this situation, and continued burning for three months without intermission. The fire was extinguished by excluding the air from it, or smothering it. The water taken from it in a vessel will not burn. This shews that the fire is occasioned by nothing more than a vapour that ascends from the water. Dr. MORSE.

After these, may be mentioned the Natural Well, on the lands of a Mr. Lewis, in Frederick county. It is somewhat larger than a common well ; the water rises in it as near the surface of the earth as in the neighbouring artificial wells, and is of a depth as yet unknown. It is said there is a current in it tending sensibly downwards. If this be true, it probably feeds some fountain, of which it is the natural reservoir, distinguished from others, like that of Madison's, by being inaccessible. It is used with a bucket and windlas, as an ordinary well. Dr. MORSE.

There is a creek in the northern parts of Pennsylvania, called Oil creek, which empties into the Alleghany river. It issues from a spring, on the top of which floats an oil, similar to that called Barbadoes tar ; and from which one man may gather seven gallons in a day. The troops sent to guard the western posts, halted at this spring, collected some of the oil, and bathed their joints with it. This gave them great relief from the rheumatic complaints with which they were afflicted. The wa-

ters, of which the troops drank freely, operated as a gentle cathartic. Dr. MORSE.

Dr. Hunter and Mr. Dunbar visited Louisiana in the autumn of 1803, and beginning of 1804. According to him the country abounds in salt springs, some of which are of equal strength with the water of the ocean. He visited the famous medicinal or hot springs of Ouachitta, and found them amongst the greatest natural curiosities in the country. They issue from a hill, or mountain, of upwards of 200 feet in height, and near 100 from its base; and on immersing the thermometer, it rose in some to 130, and, in others, to 150 degrees, Fahrenheit; the surface of the ground, for some distance round, is so warm, as to be felt by the feet in passing over it, and snow melts on it immediately as it falls. The doctor is of opinion, that they possess extraordinary medicinal virtues. Dr. MORSE.

A few miles distant from Long lake, (Florida) is a vast fountain of hot mineral water, which issues from a high ridge on the river St. Juans, in a great cove, or bay, a few miles above the mouth of the creek, which you ascend from the lake. It boils up with great force, forming immediately a vast circular bason, capacious enough for several shallops to ride in, and runs with rapidity into the river 3, or 400 yards distant. The creek, which is formed instantly by this admirable fountain, is wide and deep enough for a sloop to sail up into the bason. The water is perfectly diaphanous, and here are continually a great variety of fish; they appear as plain, as though lying before your eyes, although

many feet deep in the water. This tepid water has a most disagreeable taste, brassy, and vitriolic, and very offensive to the smell, much like bilge water, or the washing of a gun barrel, and is smelt at a great distance. A pale bluish or pearl coloured coagulum covers every inanimate substance that lies in the water, as logs, limbs of trees, &c. Alligators and gar are numerous in the bason, as also many other tribes of fish. The forbidding taste and smell of these waters seem to be owing to vitriolic and sulphureous fumes or vapours, and these being condensed, form this coagulum, which represents flakes of pearly clouds in the clear waters in the bason. A charming orange grove, with magnolias, oaks, and palms, half surround this vast fountain. A delightful stream of water issues from the ridge, meandering along, and enters the creek just below the bason. BARTRAM.

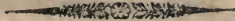
Six Miles springs is a singular curiosity, situated a small distance up the Little river, which falls into St. George's lake. This enchanting fountain throws up, from dark, rocky caverns below, tons of water every minute, forming a bason, capacious enough for shallops to ride in, and a creek of four or five feet depth of water, and 20 yards over, which runs six miles through green meadows, pouring its limpid waters into the great lake George, where they remain unmixed. About 20 yards from the upper edge of the bason, and directly opposite the mouth of the creek, is a continual ebullition, where the waters are thrown up in such abundance and force, as to jet and swell up two or three feet above the sur-

face : white sand, and small particles of shells are thrown up with the waters, near the top, when they diverge from the centre, subside with the expanding flood, and sink again, forming a large funnel round about the aperture, or mouth of the fountain, which is a vast perforation through a bed of rocks. Here you behold a vast circular expanse of water, where, at the same instant, numerous bands of fish are seen, some clothed in the most brilliant colours : the voracious crocodile, stretched along at full length, as the great trunk of a tree, the devouring garfish, inimical trout, and all the varieties of gilded bream, the barbed catfish, stingray, skate, and flounder, spotted bass, sheep's head, and omnious drum, all in their respective bands, with free intercourse performing their evolutions ; there are no signs of enmity, no attempts to devour each other ; the different bands seem peaceably to move a little aside, as it were, to make room for the others to pass by. **BARTRAM.**

The Alligator hole, about 12 miles from the river Little St. Juan's, lately formed by an extraordinary eruption, is one of those vast circular sinks, described by Bartram. This is on the verge of a spacious meadow ; some detached groups of rocks, and large spreading live oaks, shade it on every side ; it is about 60 yards over, and the surface of the water six or seven feet below the bason ; the water is cool, and pleasant to drink, and well stored with fish. The account of this eruption, by a person who was present, and which was confirmed by the Indians, is thus. Being near the place, before it had any

existence in its present form, as he was looking for horses in these parts, he was astonished by a rushing noise, like a mighty hurricane, and looking round, saw the earth overflowed by torrents of water, which came, wave after wave, rushing down a vale near him, which it filled with water, and soon began to overwhelm the higher grounds, attended with a terrific noise and tremour of the earth ; recovering from his surprise, he resolved to proceed for the place from whence the noise seemed to come, and soon came in sight of the fountain, and saw, with amazement, the floods rushing upwards many feet high, and the waters spreading themselves far and near. He at length concluded, that the fountains of the deep were again broken up, and that an universal deluge had commenced, and instantly fled to alarm the town, about nine miles distant ; but before he could reach it, he met several of the inhabitants, who, already alarmed by the noise, were hurrying on toward the place ; upon which he returned with them : taking their stand on an eminence to watch its progress, and the event. It continued to jet and flow in this manner several days, forming a large, rapid creek or river, descending and following the windings of the valley for seven or eight miles, emptying itself into a vast savanna, where was a lake, which received and gave vent to its waters. The fountain, however, gradually ceased to overflow, and finally withdrew itself beneath the surface of the earth, leaving this capacious basin of waters, which, though continually near full, has never since overflowed. There yet remains

the dry bed of the canal, generally four, five, and six feet below the natural surface of the land ; the perpendicular, ragged banks of which, on each side, shew the different strata of the earth, and, at places where ridges, or a swelling bank crossed and opposed its course and fury, are vast heaps of fragments of rocks, white chalk, stones, and pebbles, which were collected and thrown into the lateral vallies, until the main stream prevailed over and forced them aside, overflowing the levels and meadows, for some miles distance from the principal stream.



MISCELLANEOUS CURIOSITIES.

AS there are many interesting articles that would not with propriety, come under any of the above heads, we thought it most proper to include them, under the general denomination of Miscellaneous Curiosities, and shall first begin with an account of the passage of the Patowmac through the Blue ridge, which Mr. Jefferson classes among the most sublime scenes in nature.*

* A late ingenious traveller, Mr. Weld, does not seem to think this scene is so stupendous. "The passage," says he, "of the rivers through the ridge at this place is certainly a curious scene, and deserving of attention ; but I am far from thinking with Mr. Jefferson, that it is "one of the most stupendous scenes in nature, and worth a voyage across the Atlantic ;" nor has it been my lot to

You place yourself on a very high point of land. On your right comes up the Shenandoah, having ranged along the foot of the mountain a hundred miles to seek a vent. On your left approaches the Patowmac, in quest of a passage also. In the moment of their junction, they rush together against the mountain, rend it asunder, and pass off to the sea. The first glance of this scene hurries our senses into the opinion, that this earth has been created in time, that the mountains were formed first, that the rivers began to flow afterwards, that in this place particularly, they have been dammed up by the Blue ridge of mountains, which have formed an ocean which filled the whole valley ; that continuing to rise, they have at length broken over at this spot, and have torn the mountain down from its summit to its base. The piles of rocks on each hand, but particularly on the Shenandoah, the evident marks of their disrapture, and avulsion from

meet with any person that had been a spectator of the scene, after reading his description of it, but what also differed with him very materially in opinion. To find numberless scenes more stupendous, it would be needless to go farther than Wales. A river, it is true, is not to be met with, in that country, equal in size to the Patowmac, but many are to be seen there rushing over their stony beds with more turbulence and impetuosity, than either the Patowmac or Shenandoah. The rocks, the precipices, and the mountains of the Blue ridge, at this place, are diminutive and uninteresting also, compared with those which abound in that country. Indeed, from every part of Mr. Jefferson's description, it appears as if he had beheld the scene, not in its present state, but at the very moment when the disruption happened, and when every thing was in a state of tumult and confusion."

their beds by the most powerful agents of nature, corroborate the impression. But the distant finishing which nature has given to the picture, is of a very different character. It is a true contrast to the foreground. It is as placid and delightful, as that is wild and tremendous: for the mountain being cloven asunder, she presents to your eye, through the cleft, a small catch of smooth blue horizon, at an infinite distance in the plain country, inviting you, as it were, from the riot and tumultuous roaring around, to pass through the breach and participate of the calm below. Here it ultimately composes itself; and that way too the road happens actually to lead. You cross the Patowmac above the junction, pass along its side through the base of the mountain for three miles, its terrible precipices hanging in fragments over you, and within about 20 miles reach Fredericktown, and the fine country around it. This scene so stupendous! so worthy the attention of all! yet here are people who have passed their lives within half a dozen miles, and have never been to survey these monuments of a war between rivers and mountains, which must have shaken the earth itself to its centre. The height of these mountains have never been ascertained with any degree of exactness. The Alleghany being the great ridge which divides the waters of the Atlantic from those of the Mississippi, its summit is doubtless more elevated above the ocean than that of any other mountain. But its relative height, compared with the base on which it stands, is not so great as that of some others; the

country rising behind the successive ridges like the steps of stairs. The mountains of the Blue ridge, and of those of the Peaks of Otter* are thought to be of a greater height, measuring from their base, than any others in the country, and perhaps in the United States. From data upon which may be formed a tolerable conjecture, we suppose the highest peak to be about 4000 feet perpendicular, which is not a fifth part of the height of the mountains of South America. JEFFERSON.

The Tennessee, which rises in the mountains of Virginia, is the largest branch of the Ohio. The *whirl* or *suck* is the place where this river breaks through the Great ridge, or Cumberland mountain,

* Mr. Weld's idea is, that the height ascribed to the Peaks of Otter is rather exaggerated. "According to Mr. Jefferson, the principal peak is about 4000 feet in perpendicular height; but it must be observed, that Mr. Jefferson does not say that he measured the height himself; on the contrary, he acknowledges that the height of the mountains in America have never yet been ascertained with any degree of exactness; it is only from certain data from which he says, a tolerable conjecture may be formed, that he supposes this to be the loftiest peak. Positively to assert that this peak is not so high, without having measured it in any manner, would be absurd; as I did not measure it, I do not therefore pretend to contradict Mr. Jefferson; I have only to say, that the most elevated of the Peaks of Otter, appeared to me but a very insignificant mountain in comparison with Snowden, in Wales, and every person that I conversed with that had seen both, and I conversed with many, made the same remark. Now the highest Peak of Snowden is found by triangular admeasurement to be no more than 3568 feet, reckoning from the quay at Carnarvon. None of the other mountains in the Blue ridge are supposed, from the same data, to be more than 2,000 feet in perpendicular height."

in latitude about 35° , and is reckoned a greater curiosity than the bursting of the Patowmac through the Blue ridge. The river which a few miles above is half a mile wide, is here compressed to the width of about 70 yards. Just as it enters the mountain, a large rock projects from the northern shore, in an oblique direction, which renders the bed of the river still narrower, and causes a double bend ; the water of the river is of course thrown with great rapidity against the southern shore, whence it rebounds around the point of the rock, and produces a whirl, which is about 80 yards in circumference. Canoes have often been carried into this whirl, and escaped by the dexterity of the rowers, without damage. In less than a mile below the whirl, the river spreads into its common width, and, except muscle shoals, flows beautiful and placid, until it mingles with the Ohio. Dr. MORSE.

The Rock bridge, in the county of Rockbridge, (Virginia) may also be classed among the greatest curiosities in the United States. It stands about 10 miles from Fluvanna river, and about the same distance from the Blue ridge. It extends across a deep cleft in a mountain, which by some great convulsion of nature, has been split asunder from top to bottom, and it seems to have been left there purposely to afford a passage from one side of the chasm to the other. The cleft or chasm is about two miles long, and is in some places upwards of 300 feet deep ; the depth varies according to the height of the mountain, being deepest where the mountain is most lofty. The breadth of the chasm

also varies in different places ; but in every part it is uniformly wider at top, than towards the bottom. That the two sides of the chasm were once united, appears evident, not only from projecting rocks on the one side, corresponding with suitable cavities on the other, but also from the different strata of earth, sand, clay, &c. being exactly similar from top to bottom on both sides ; but by what great agent they were separated, whether by fire or by water, remains hidden amongst those arcana of nature, which we vainly endeavour to develope.

The arch consists of a solid mass of stone, or of several stones cemented so strongly together, that they appear but as one. This mass, it is to be supposed, at the time that the hill was rent asunder, was drawn across the fissure from adhering closely to one side, and being loosened from its bed of earth at the opposite one. It seems as probable that the mass of stone forming the arch was thus forcibly plucked from one side, and drawn across the fissure, as that the hill should have remained disunited at this one spot from top to bottom, and that a passage should afterward have been forced through it by water. The road leading to the bridge runs through a thick wood, and up a hill ; having ascended which, nearly to the top, you pause for a moment at finding a sudden discontinuance of the trees at one side ; but the amazement which fills the mind is great indeed, when, on going a few paces towards the part which appears thus open, you find yourself on the brink of a tremendous precipice. You involuntarily draw back, stare round, then again come

forward to satisfy yourself that what you have seen is real, and not the illusions of fancy. You now perceive, that you are upon the top of the bridge, to the very edge of which, on one side, you may approach with safety, and look down into the abyss, being protected from falling by a parapet of fixed rocks. The walls, as it were, of the bridge at this side are so perpendicular, that a person leaning over the parapet of rock might let fall a plummet from the hand to the very bottom of the chasm. On the opposite side this is not the case, nor is there any parapet ; but from the edge of the road, which runs over the bridge, is a gradual slope to the brink of the chasm, upon which it is somewhat dangerous to venture. This slope is thickly covered with large trees, principally cedars and pines. The opposite side was also well furnished with trees formerly, but all those that grew near the edge of the bridge have been cut down by different people, for the sake of seeing them tumble to the bottom. Before the trees were destroyed in this manner, you might have passed over the bridge without having had any idea of being upon it ; for the breadth of it is no less than 80 feet. The road runs nearly in the middle, and is frequented daily by waggons.

At the distance of a few yards from the bridge, a narrow path appears, winding along the sides of the fissure, amidst immense rocks and trees, down to the bottom of the bridge. Here the stupendous arch appears in all its glory, and seems to touch the very skies. To behold it without rapture, indeed,

is impossible ; and the more critically it is examined, the more beautiful and the more surprising does it appear. The height of the bridge to the top of the parapet, is 213 feet by admeasurement with a line, the thickness of the arch 40 feet, the space of the arch at top 90 feet, and the distance between the abutments at bottom 50 feet. The abutments consist of a solid mass of limestone on either side, and, together with the arch, seem as if they had been chiselled out by the hand of art. A small stream, called Cedar creek, running at the bottom of the fissure, over a bed of rocks, adds much to the beauty of the scene.

The fissure takes a very sudden turn just above the bridge, according to the course of the stream, so that when you stand below, and look under the arch, the view is intercepted at the distance of about 50 yards from the bridge. Mr. Jefferson's statement, that the fissure continues strait, terminating with a pleasing view of the North mountains, is erroneous. The sides of the chasm are thickly covered in every part with trees, excepting where the huge rocks of limestone appear.

Beside this view from below, the bridge is seen to very great advantage from a pinnacle of rocks, about 50 feet below the top of the fissure ; for here not only the arch is seen in all its beauty, but the spectator is impressed in the most forcible manner with ideas of its grandeur, from being enabled at the same time to look down into the profound gulf over which it passes. WELD.

Another natural bridge, in the county of Lee, is well worthy attention. This bridge is 134 feet higher than the Rock bridge, in Rockbridge county; being 339 feet in perpendicular height; its summit projects 85 feet over its base; it fronts to the southwest, and is arched as regular as it could be by the chisel of art: the arch in front is about 200 feet high, and slopes off to 60 feet to the distance of 106 feet from the entrance; from its mouth in a straight direction, measures 406 feet; thence at right angles, 300; thence crossing the second line at 30 feet from the wall, to the other end, 340 feet; the roof is regularly arched, and gradually descends to 18 feet, which is the lowest part of the intersection of the second angle; it then rises to 20, 30, 40, and 75 feet, which is the height of the northeast entrance. The stream of water which runs under this bridge, is from 35—40, to 55 feet wide, at its common height. The head of this stream, (Stock creek) is from three to five miles above the bridge, rising out of a knob or spur of Clinch mountain, and empties itself three miles below into Clinch river. This creek is suddenly raised by rains, at times, to 15 and 18 feet perpendicular, but it soon runs out. There is a waggon road over the bridge, which is only used in time of freshets, and that is the only part that can be crossed. On approaching the southwest front, it produces the most pleasing and awful sensation; the front is a solid rock of limestone, the surface very smooth and regular, formed in a semicircle, the rock of a bright yellow colour, which colour is heightened by the rays of

the sun ; the arch is partly obscured by a spur of the ridge, which runs down the edge of the creek, in front of the arch. Across the creek, stand several beautiful trees ; the most elegant and luxuriant is a cucumber tree, teeming with rich fruit ; this, with two white cedars, and three walnut trees, adds very much to the beauty of the scene ; to describe it, would be a vain attempt, and which can only be attempted by a skilful artist. If the scene below creates such pleasing sensations, what must that from above produce ? It fills the mind with horror ; from the summit of the bridge where the road passes, to the verge of the fissure, the mountain descends about 45 degrees of an angle, and is from 45 to 50 feet perpendicular height ; you involuntarily slide down feet foremost, holding on to every twig you pass, until you reach the verge, which is from six to eight feet less steep ; the rock is covered with a thick stratum of earth, which gives growth to many large trees. From this landing place to the verge is a descent of nine feet, so steep, that it cannot be approached near enough to look over. To the west of the arch about 400 yards, the ascent to the verge is much leveller, where you may look down the abyss. My guide was an old hunter, who had for many years been accustomed to clambering over the steepest mountains. On approaching the verge, the horror of the scene below, intimidated him for a few moments, but he could presently walk along the verge with composure. This bridge may be passed by thousands, without a knowledge

of it, unless attracted by the roaring of the waters below. DR. MORSE.

In Schoharie, (New York) is a singular curiosity. "Perhaps," says a writer in the Balance, "there is not a more astonishing instance of petrification in the western world, than is to be seen about a half of a mile southeast from the court house in Schoharie county. It is a hill, whose size almost entitles it to the appellation of a mountain, which may be pronounced a mere mass of petrified shells. I went to the top of the hill, which is some thousand feet higher than the ground where the court house stands, and examined the rock as I went up, and then along the top of the ridge for one mile. The rock is generally covered with a thin soil, but lies bare at different intervals, not far distant from each other, in its whole extent ; and, in some places, projects from the ground, 10 or 12 feet. Every inch of the rock exhibits petrified shells in their perfect form. In one place, I broke off a piece of the rock, in a deep fissure, 10 feet from the surface of the rock, and found it to be of the same composition. Wherever the rock is exposed to the sun, it resembles brimstone ; where it is hid from the sun, it is dark, coarse, and rough. It seems to be composed wholly of river shells ; I could find no oyster shells. There is one thing particularly worthy of remark. Although it is a ridge so elevated, that no water of a petrifying quality, or otherwise, can possibly run there, I saw a bench of moss, which a gentleman had found there, perfectly petrified."

Bartram describes nearly a similar instance of petrification. "Before I leave Augusta," (Georgia) says he, "I shall recite a curious phenomenon, which may furnish ample matter for philosophical discussion. On the Georgia side of the Savanna river, about 15 miles below Silver bluff, the road crosses a ridge of high swelling hills of uncommon elevation, and perhaps 70 feet higher than the surface of the river; these hills are from three feet below the common vegetative surface, to the depth of 20 or 30 feet, composed entirely of fossil oyster shells, internally of the colour and consistency of clear, white marble: they are of an incredible magnitude, generally 15 or 20 inches in length, from six to eight wide, and two to four in thickness, and their hollows sufficient to receive an ordinary man's foot; they appear all to have been opened before the period of petrification; a transmutation they seem evidently to have suffered; they are undoubtedly very ancient, or perhaps antediluvian. The adjacent inhabitants burn them to lime, for building. The heaps of shells lie upon a stratum of yellowish sandy mould of several feet in depth, upon a foundation of soft, white rocks, that has the outward appearance of free stone, but, on a strict examination, is really a testaceous concrete, or composition of sand and pulverized sea shells."

The tremendous precipice near the Portage la Loche, is worthy the attention of the reader. This portage is the ridge that divides the waters which discharge themselves into Hudson's bay, from those that flow into the northern ocean; and is in

latitude $56^{\circ} 20'$, and longitude $109^{\circ} 15'$ west. It is of a level surface, in some parts abounding with stones ; but in general it is an entire sand, and covered with the cypress, the pine, the spruce, fir, and other trees natural to its soil. Within three miles of the northwest termination, there is a small round lake, whose diameter does not exceed a mile, and which affords a trifling respite to the labour of carrying. Within a mile of the termination of the portage is a very steep precipice, whose ascent and descent appears to be equally impracticable in any way, as it consists of a succession of eight hills ; some of which are almost perpendicular ; nevertheless, the Canadians contrive to surmount all these difficulties, even with their canoes and lading. This precipice, which rises upwards of 1000 feet above the plain beneath it, commands a most extensive, romantic, and ravishing prospect. From thence the eye looks down on the course of the little river, by some called the Swan river, and by others the Clear Water and Pelican river, beautifully meandering for upwards of 30 miles. The valley, which is at once refreshed and adorned by it, is about three miles in breadth, and is confined by two lofty ridges of equal height, displaying a most delightful intermixture of wood and lawn, and stretching on till the blue mist obscures the prospect. Some parts of the inclining heights are covered with stately forests, relieved by promontories of the finest verdure, where the elk and buffalo find pasture. These are contrasted by spots where fire has destroyed the woods, and left a dreary void be-

hind it. Nor, when I beheld this wonderful display of uncultivated nature, says the indefatigable Mackenzie, from whose travels this account is extracted, was the moving scenery of human occupation wanting to complete the picture. From this elevated situation, I beheld my people, diminished, as it were, to half their size, employed in pitching their tents in a charming meadow ; and among the canoes, which, being turned upon their sides, presented their reddened bottoms in contrast with the surrounding verdure. At the same time, the process of gumming them produced numerous small spires of smoke, which, as they rose, enlivened the scene, and at length, blended with the larger columns that ascended from the fires where the suppers were preparing. It was in the month of September when I enjoyed a scene, of which I do not presume to give an adequate description ; and as it was the running season of the elk, the whistling of that animal was heard in all the variety which the echoes could afford it.

Let us now proceed to a less cheerful scene, the Dismal swamp, in Virg. whose gloomy recesses are not altogether unworthy of notice. It commences at nine miles from Norfolk, and extends into North Carolina, occupying in the whole about 150,000 acres. This great tract is entirely covered with trees ; juniper and cypress trees grow where there is most moisture ; and on the dry parts, white and red oaks, and a variety of pines.

These trees grow to an enormous size, and between them the brushwood springs up so thick that

the swamp in many parts is absolutely impervious. In this respect it differs totally from the common woods in the country. It abounds also with cane reeds, and with long rich grass, upon which cattle feed with great avidity, and become fat in a short space of time ; the canes, indeed, are considered to be the best green food that can be given them. The people who live on the borders of the swamp, drive all their cattle into it to feed ; care however is taken to train them to come back regularly to the farms every night by themselves, otherwise it would be impossible to find them. This is effected by turning into the swamp with them, for the first few weeks they are sent thither to feed, two or three old milk cows accustomed to the place, round whose necks are fastened small bells. The cows come back every evening to be milked ; the rest of the cattle herd with these, following the noise of the bells ; and when they return to the farm, a handful of salt, or something of which they are equally fond, is given to each as an inducement for them to return again. In a short time the cattle become familiar with the place, and having been accustomed from the first day to return, they regularly walk to the farms every evening.

In the interior parts large herds of wild cattle are found, most probably originally lost on being turned in to feed. Bears, wolves, deer, and other wild indigenous animals are also met with there. Stories are common in the neighbourhood of wild men being found in it, who were lost, it is supposed, in the swamp, when children. The swamp varies much

in different parts ; in some the surface of it is quite dry, and firm enough to bear a horse ; in others it is overflowed with water ; and elsewhere so miry that a man would sink up to his neck if he attempted to walk upon it ; in the driest part, if a trench is cut only a few feet deep, the water gushes in, and it is filled immediately. Where the canal that connects the water of Albemarle sound with Norfolk is cut, the water in many places flows in from the sides, at the depth of three feet from the surface, in large streams, without intermission ; in its colour it exactly resembles brandy, which is supposed to be occasioned by the roots of juniper trees ; it is perfectly clear, and by no means unpalatable ; it is said to possess a diuretic quality ; and the people in the neighbourhood, who think it very wholesome, prefer it to any other. Certainly there is something very uncommon in the nature of the swamp, for the people living upon the borders of it, do not suffer by fever and ague, or bilious complaints, as is generally the complaint with those resident in the neighbourhood of other swamps and marshes. Whether it is the medicinal quality of the water, however, which keeps them in better health or not, has not been determined.

As the Dismal swamp is so near to Norfolk, where there is a constant demand for shingles, staves, &c. for exportation, and as the best of these articles are made from the trees growing upon the swamp, it of course becomes a valuable species of property. The canal now cutting through it will also enhance its value, as when it is completed,

lumber can then be readily sent from the remotest parts. The more southern parts of it, when cleared, answer uncommonly well for the culture of rice ; but in the neighbourhood of Norfolk, as far as 10 feet deep from the surface, there seems to be nothing but roots and fibres of different herbs mixed with a whitish sand, which would not answer for the purpose, as rice requires a very rich soil. The trees, however, that grow upon it, are a most profitable crop, and instead of cutting them all down promiscuously, as commonly is done, they only fell such as have attained a large size, by which means they have a continued succession, for the manufacture of those articles above mentioned. Eighty thousand acres of the swamp are the property of a company incorporated under the title of "The Dismal Swamp Company." Before the war broke out, a large number of negroes were constantly employed by the company in cutting and manufacturing staves, &c. and their affairs were going on very prosperously ; but at the same time that Norfolk was burnt they lost all their negroes, and very little has been done by them since. The lumber now sent to Norfolk is taken principally off those parts of the swamp which are private property. WELD.

On the North Fork of Holstein, half a mile south of the river, and 17 or 18 from Abington, are Preston's Salines, (in Tennessee) which are deserving observation. The tract also which contains these salines is a great natural curiosity. It was discovered by Capt. Charles Campbell, about 1745, who

was one of the first explorers of the western country. In 1753, he procured a patent for it from the governor of Virginia. His son, the late Gen. William Campbell, the same who behaved so gallantly in the American war in the years 1780, and 1781, became owner of it on his death ; but it was not till the time of his death, when salt was very scarce and dear, that salt water was discovered, and salt made by a poor man. Since that time, under the direction of Col. Arthur Campbell, it has been improved to a considerable extent, and many thousands of inhabitants are supplied from it with salt of a superior quality, and at a low price. The tract consists of about 300 acres of flat marsh land, of as rich a soil as can be imagined. In this flat, pits are sunk, in order to obtain salt water. The best is found from 30 to 40 feet deep ; after passing through the rich soil or mud, from six to ten feet, you come to a very brittle limestone rock, with cracks or chasms, through which the salt water issues into the pits, whence it is drawn by buckets, and put into the boilers, which are placed in furnaces adjoining the pits. The hills that surround this flat are covered with fine timber. Near this Mr. King has a well more than 200 feet deep, 10 feet square, constantly more than half full of water. Thirty two gallons of this, and some of the other wells, make one bushel of salt. Two hundred bushels have been made in a day. It is equal to Liverpool salt. He can supply the state of Tennessee and the southwest of Virginia with this valuable article. The bones of the giant sized mam-

moth have been dug up, by labourers, near these salines, in sinking salt pits. They were from three to seven feet below the surface of the earth. Other bones of this enormous animal have been found at a lick near Nashville.

Under the head, of Miscellaneous Curiosities, we shall also mention the extensive meadows, or, as the French call them *prairies*, which answer to what in the southern states are termed savannas. They are rich, fertile plains, without the least vestige of trees, but enriched with luxurious grass. Some of these, in the state of Ohio, are from 30 to 40 miles in extent. On passing them, as far as the eye can discern, there is not a tree to be seen; but there is plenty of deer, wild cattle, bears, wolves, and innumerable flocks of turkies; these with the verdant grass, form a rich, and diversified landscape. In clearing out a spring, near some ruins, a copper coin has been lately discovered, on the bank of the Little Miami river, near its entrance into the Ohio, at the depth of about four feet beneath the surface of the earth. From a *fac simile*, it appears that the characters impressed on the coin, are the ancient Persian. Dr. MORSE.

A singular change which happened in Poultney river, (Vermont) in 1783, we shall describe for the gratification of the curious. This river empties into East bay, which communicates with lake Champlain, at Whitehall. A little above its junction with East bay, a ridge of land crosses in a northerly direction, the river running a northwesterly course, on meeting the ridge, turned suddenly to

the northeast, and, keeping that course about half a mile, then turning westerly, passed the ridge over a very high ledge of rocks. For several years, the river had gradually worn away the bank on the side of the ridge, just in the bend where the river turned to the northeast. In May, 1783, during a remarkable freshet, the river at this place broke the ridge, and, meeting no rock, it wore a channel 60 feet deep, nearly to a level with the stream below, leaving the former channel and falls dry. The channel of the river, for a considerable way above this place, was lowered to a great depth, so that the low meadow lands, along the river, which before were overflowed with every freshet, have now become a dry plain. The earth, thrown out of this prodigious chasm, filled East bay, for several miles, where it had been navigable for vessels of 40 tons burden, so that a canoe could with difficulty pass at low water, and even obstructed the navigation at Fiddler's Elbow, a narrow place near the entrance from Whitehall to South bay. These obstructions, (both at the Narrows, and in East bay) have since been mostly removed, by the force of the current. Similar alterations seem to have been made in other rivers. Connecticut river has lowered its channel from 80 to 100 feet perpendicular, through the whole length of this state. From the various steps, ranged one above another, and which must, at various times, have formed the bank of the river, the alterations seem not to have been made at once, nor in a continuance through the whole length of the river, but

at remote and unequal periods. These changes appear, in some instances, to have been occasioned by the river suddenly shifting its channel, as was the case of the river at Fairhaven; in some instances, by a gradual attrition of the rocks, which, in some remote period of antiquity, formed numerous cataracts. On the plain where Dartmouth college stands, which is nearly 100 feet above the present bed of the river, logs of timber have been dug up, at the depth of 25 and 30 feet below the surface. This is about the depth of the river at present in the highest freshets, and of what is called the made, or meadow lands on the river, and both are formed in the same manner with alternate strata of clay, sand, and gravel. Some of the earth, which has in a lapse of time, been scooped out of the immense chasm, has, doubtless, been carried into the sea; while large quantities have served to fill the numerous lakes, of larger or smaller dimensions, through which the river once made its way. In Burlington, on the Winouski, a little above the chasm worn in the rocks, as mentioned above, is a large bow of intervalle land. On a part of this, which now lies considerably higher than the river, a well was dug by the owner, a Mr. Lane, in the summer of 1786. Through the whole depth of the well, which was 50 feet, the earth was composed of a fine river sand; 25 feet below the surface, were dug up a large number of frogs, in a torpid state, which were found bedded in the earth like small stones. After being exposed a short time to the air, they discovered signs of life, and soon were able to leap about.

They did not, however, continue, but presently became languid, and died. This was probably owing to their being exposed to the burning heat of a summer's sun, without water. They might unquestionably, have recovered the usual vigour of their species, had more attention been paid to them. These frogs must have been buried in the spot where they were found, by some extraordinary inundation of the river, while in that state of torpor, in which they always pass the winter in those climates, and have continued in that situation for centuries. Forty nine feet below the surface, in the same well, was found a log of timber. Dr. MORSE.

The greatest curiosity in the city of Mexico, is their floating gardens. When the Mexicans, about 1325, were subdued by the Colhuan and Tepanecan nations, and confined to the small islands in the lake, having no land to cultivate, they were taught by necessity to form moveable gardens, which floated on the lake. Their construction is very simple. They take willows and the roots of marsh plants, and other materials which are light, and twist them together, and so firmly unite them, as to form a sort of platform, which is capable of supporting the earth of the garden. Upon this foundation, they lay the light bushes, which float on the lake, and over them spread the mud and dirt, which they draw up from the bottom of the lake. Their regular figure is quadrangular ; their length and breadth various, but generally about eight rods long, and three wide ; and their elevation, from the surface of the water, is less than a foot. These were the

first fields the Mexicans owned, after the foundation of Mexico ; there they first cultivated the maize, great pepper, and other things, necessary for their support. From the industry of the people, their fields soon became numerous. At present, they cultivate flowers, and every sort of garden herbs upon them. Every day of the year, at sunrise, innumerable vessels, or boats, loaded with various kinds of flowers and herbs, which are cultivated in these gardens, are seen arriving by the canal, at the great market place of Mexico. All plants thrive in them surprisingly ; the mud of the lake makes a very rich soil, which requires no water from the clouds. In the largest gardens, there is commonly a little tree, and a little hut, to shelter the cultivator, and defend him from the rain or sun. When the owner of a garden, or the *chinampa*, as he is called, wishes to change his situation, to get out of a bad neighbourhood, or to come nearer his family, he gets into his little boat, and by his own strength alone, if the garden is small, or with the assistance of others, if it is large, conducts it wherever he pleases, with the little tree and hut upon it. That part of the island where these floating gardens are, is a place of delightful recreation, where the senses receive the highest possible gratification. DR. MORSE.

ANTIQUITIES.

AS some account of the place, where rest the remains of that great discoverer, Christopher Columbus, must be interesting to our readers, we shall proceed to gratify their wishes.

The cathedral belonging to the Spanish part of St. Domingo, has the honour to possess the remains of a man, whose genius has had an influence over the whole world, those of Christopher Columbus. This great man, this father of the art of modern navigation, desired to have his ashes conveyed to the island, that may be considered as the foundation of his fame. There is no one, certainly, who does not expect to hear of a mausoleum of Columbus, in the metropolitan church of Santo Domingo ; but so far, alas ! from any such thing existing, the certitude of his mortal remains being deposited here, is in some sort, supported only by tradition. Moreau de Saint Mery, in his description of this island, anxious to obtain correct information of Columbus, made applications for this purpose to a number of men in office ; the following is one of the certificates he obtained : “ I, Don Pedro de Galvez, preceptor, canon, &c. do certify, that the sanctuary being taken down, in order to be rebuilt, there was found, in the side of the choir where the gospel is sung, a stone case, with a leaden urn in the inside of it, a little damaged, which contained several human bones ; also, that it is remembered, that there is a

nother, of the same description, on the epistle side ; also, that according to a tradition, handed down through the old people of this country, and a chapter of the synod of this holy cathedral church, that the case found in the gospel side, contains the remains of admiral Christopher Columbus ; and that found in the epistle side, those of his brother Bartholomew. In witness whereof, I have hereunto set my hand, this 26th day of April, 1783.” What a subject of reflection for the philosopher ! Scarcely are three hundred years past since the discovery of this new world, and already we hardly know what are become of the precious remains of this sagacious, enterprising, and intrepid discoverer ! But what must excite our astonishment more than all the rest, is, that even the family of Columbus has fallen into the general supineness, to give it no harder name. Columbus has not received even the tardy justice that is rendered to great men, when death has disarmed envy of its sting. It was not enough, that, during his life time, he should see the name of another given to the discovery, by which he had, in a manner augmented the universe, every thing must unite to reward his labours, by the most shameful, and most unheard of ingratitude.

Under this head, we shall class a singular curiosity, found in Rowan county, (North Carolina) 10 miles from Salisbury, 200 from the sea, and 70 from the mountains, called a subterraneous wall. It stands on uneven ground, near a small brook. The stones of the wall are all of one kind, and contain iron ore. They are of various sizes, but gene-

rally weighing about four pounds. All are of a long figure, commonly seven inches in length, sometimes twelve. The ends of the stones form the sides of the wall. Some of these ends are square, others nearly of the form of a parallelogram, triangle, rhombus, or rhomboides; but most of them irregular. Some preserve their dimension through the whole length; others terminate like a wedge. The alternate position of great and little ends, aid in keeping the work square. The surface of some is plain, of some concave, of others convex. Where the stones are not firm, they are curiously wedged by others. The most irregular are thrown into the middle of the wall. Every stone is covered with cement, which, next to the stone, has the appearance of iron rust. Where it is thin, the rust has penetrated through. Sometimes the cement is an inch thick, and where wet, has the fine, soft, oily feeling of putty. The thickness of the wall is uniformly 22 inches, the length yet discovered is about 300 feet, and the height 12 or 14. Both sides of the wall are plastered with the substance in which the stones are laid. The top of the wall appears to run nearly parallel with the top of the ground, being generally about a foot below the surface. In one place, it is several feet. There is a bend or curve of six feet or more, after which it proceeds in its former direction. The whole appears to be formed in the most skilful manner, but when, or for what purpose, is left entirely to conjecture. Six or eight miles from this wall, another has since been discovered, 40 feet long, four or five feet high, seven inch-

es thick. These stones are all of one length, but of different kinds. Dr. MORSE.

The ancient labours of the aborigines of this country, found in different parts, but more especially in the Western Territory, are singular objects of curiosity.

Within four miles of the junction of the Elk and Kanhawa rivers, is a curious specimen of Indian labour, and of their progress in one of the arts. This specimen is found upon a rock of hard free stone, which lies sloping to the south, touching the margin of the river, and presents a flat surface of this rock, about 12 feet in length, and 9 in breadth, with a plain side to the east of eight or nine feet in thickness. Upon the upper surface of this rock, and also upon the side, we see the outlines of several figures, cut without relief, except in one instance; and somewhat larger than the life. The depth of the outline may be half an inch; its width three quarters nearly, in some places. In one line, ascending from the part of the rock nearest the river, there is a tortoise; a spread eagle, executed with great expression, particularly the head, to which is given a shallow relief; and a child, the outline of which is very well drawn. In a parallel line there are other figures; but among them, that of a woman only can be traced. These are very indistinct. Upon the side of the rock, are two awkward figures, which particularly caught my attention. One is that of a man, with his arms uplifted, and his hands spread out, as if engaged in prayer. His head is made to terminate in a point;

or rather he has the appearance of something upon the head, of a triangular or conical form. Near to him is another similar figure, suspended by a cord fastened to his heels. I recollect the story which father Hennepin relates of one of the missionaries from Canada, who was treated in somewhat a similar manner ; but whether this piece of seemingly historical sculpture has reference to such an event, can be only matter of conjecture. A turkey, badly executed, with a few other figures, may also be seen. The labour and the perseverance requisite to cut these rude figures in a rock so hard, that steel appeared to make but little impression upon it, must have been great indeed. MADISON.

In the midst of a large oblong square, adjoining the town of Ottasse (which is surrounded with a low bank) is standing a high pillar, round like a pin ; it is about 40 feet in height, and between two and three in diameter, at the earth, gradually tapering upwards to a point ; it is one piece of pine wood, and arises from the centre of a low, circular, artificial hill ; but it hangs a little to one side. The Indians say that their ancestors found it in the same situation, when they first arrived, and possessed the country ; and that the red men or Indians, then the possessors, whom they vanquished, were as ignorant as themselves concerning it ; saying, that their ancestors likewise found it standing. This monument excites the following queries : for what purpose was it designed ? What method they employed to bring it to the spot, and how they raised it erect ? There is no species of the pine,

whose wood, i. e. so large a portion of the trunk, is supposed to be incorruptible, exposed in the open air to all weathers, but the long leaved pine (*Pinapalustris*) and there is none growing within 12 or 15 miles of this place. BARTRAM.

There has been observed in the environs of Keowe, a town of the Cherokees, on the base of the rocky hills, immediately ascending from the low grounds near the river bank, a number of singular antiquities, the work of the ancients ; they seem to have been altars for sacrifice or sepulchres ; they are constructed of four flat stones, two set on an edge for the sides, one closed one end, and a very large flat one lays horizontally at top, so that the other end was open ; this fabric, was four or five feet in length, two feet high, and three in width. The Indians and traders can give no account of them ; they are on the surface of the ground, and are of different dimensions. BARTRAM.

“ I made a little excursion,” says Bartram, “ up the Savanna river, four or five miles above for James, to see some remarkable Indian monuments. These wonderful labours of the ancients stand in a level plain, very near the bank of the river, now 20 or 30 yards from it ; they consist of conical mounts of earth, and four square terraces, &c. The great mount is in the form of a cone, about 40 or 50 feet high, and the circumference of its base 2 or 300 yards, entirely composed of the loamy rich earth of the low grounds ; the top or apex is flat ; a spiral path leading from the ground to the top, is still visible ; where now grows a large beautiful red cedar

(*Juniperus Americana*;) there appears four niches, excavated out of the sides of this hill at different heights from the base, fronting the four cardinal points; these niches or sentry boxes, are entered into from the winding path, and seem to have been meant for resting places, or look outs. The land hereabouts is exceeding fertile and productive. We know not what could induce the Indians to form this mound, the ground for a great space being subject to inundations, at least once a year; from whence we may conclude they had no settled habitations here. We must suppose, however, that they were to serve some important purpose, in those days, as they were public works, and would have required the labour of a whole nation, circumstanced as they were, to have constructed one in an age. There are several less ones round about the great one, with some very large tetragon terraces on each side, near 100 yards in length, and their surface four, six, eight, and ten feet above the ground. We suppose, however, that as there is generally a narrow space in these low lands, immediately bordering on the river's bank, which is 8 or 10 feet higher than the adjoining low grounds, that lie between the stream and the heights of the adjacent main land; which, when the river overflows its banks, are many feet under water, when, at the same time this ridge on the river's bank, is above water and dry: and at such inundations, appears as an island in the river. Now these people might have had a town on this ridge, and this mount, raised for a refuge in case of an inundation, which are un-

foreseen, and surprise them suddenly, spring and autumn.”

As no persons have so critically described the antiquities of our country, or given more ingenuous theories concerning their origin and use, than those profound investigators, Jefferson, Madison, and Harris, we shall give the reader the pleasure of reading their remarks on these subjects entire. Those of Jefferson claim the first place. I know of no such thing existing, says he, as an Indian monument ; for I would not honour with that name arrow points, stone hatchets, stone pipes, and half shapen images. Of labour on the large scale, I think there is no remains as respectable as would be a common ditch for draining of lands, unless indeed it would be the barrows, of which many are to be found all over this country. These are of different sizes, some constructed of earth, and others of loose stones. That they were repositories of the dead, has been obvious to all ; but on what particular occasion constructed, was a matter of doubt. Some have thought they covered the bones of those who have fallen in battles fought on the spot of interment. Some ascribed them to the custom, said to prevail among the Indians, of collecting at certain periods the bones of all their dead, wheresoever deposited at the time of death. Others again supposed them the general sepulchres for towns, conjectured to have been on or near these grounds ; and this opinion was supported by the quality of the lands in which they are found (those constructed of earth being generally in the softest and most fertile

meadow grounds on river sides) and by a tradition said to be handed down from the aboriginal Indians, that when they settled in a town, the first person who died was placed erect, and earth put about him so as to cover and support him; that, when another died, a narrow passage was dug to the first, the second reclined against him, and the cover of earth replaced, and so on. There being one of these in my neighbourhood, I wished to satisfy myself whether any, and which of these opinions, were just. For this purpose I determined to open and examine it thoroughly. It was situated on the low grounds of the Rivanna, about two miles above its principal fork, and opposite some hills, on which has been an Indian town. It was of a spheroidal form, of about 40 feet in diameter at the base, and had been of about 12 feet altitude, though now reduced by the plough to $7\frac{1}{2}$, having been under cultivation about a dozen years. Before this, it was covered with trees of 12 inches diameter, and round the base was an excavation of five feet depth and width, from whence the earth had been taken, of which the hillock was formed. I first dug superficially in several parts of it, and came to collections of human bones, at different depths, from six inches to three feet below the surface. These were lying in the utmost confusion, some vertical, some oblique, some horizontal, and directed to every point of the compass, entangled, and held together in clusters by the earth. Bones of the most distant parts were found together; as, for instance, the small bones of the foot in the hollow of the

skull ; many skulls would sometimes be in contact, lying on the face, on the side, on the back, top or bottom, so as, on the whole, to give the idea of bones emptied promiscuously from a bag or basket, and covered with earth, without any attention to their order.

The bones, of which the greatest number remained, were skulls, jaw bones, teeth, the bones of the arms, thighs, legs, feet, and hands. A few ribs remained, some vertebræ of the neck and spine, without their processes, and one instance only of the bones, which serve as a base to the vertebral column. The skulls were so tender, that they generally fell to pieces on being touched. The other bones were stronger. There were some teeth which were judged to be smaller than those of an adult ; a skull, which on a slight view, appeared to be that of an infant, but it fell to pieces on being taken out, so as to prevent satisfactory examination ; a rib, and a fragment of the under jaw of a person about half grown ; another rib of an infant, and part of the jaw of a child, which had not cut its teeth. This last furnishing the most decisive proof of the burial of children here, I was particular in my attention to it. It was part of the right half of the under jaw. The processes by which it was articulated to the temporal bones, were entire, and the bone itself, firm to where it had been broken off, which, as nearly as I could judge, was about the place of the eyetooth. Its upper edge, wherein would have been the sockets of the teeth, was perfectly smooth. Measuring it with that of an adult, by placing their

hinder processes together, its broken end extended to the penultimate grinder of the adult. This bone was white, all the others of a sand colour. The bones of infants being soft, they probably decay sooner, which might have been the cause so few were found here. I proceeded then to make a perpendicular cut through the body of the barrow, that I might examine its internal structure. This passed about three feet from its centre, was opened to the former surface of the earth, and was wide enough for a man to walk through, and examine its sides. At the bottom, that is, on the level of the circumjacent plain, I found bones ; above these, a few stones, brought from a cliff a quarter of a mile off, and from the river, one eighth of a mile off ; then a large interval of earth, then a stratum of bones, and so on. At one end of the section were four strata of bones, plainly distinguishable ; at the other, three ; the strata in one part not ranging with those in another. The bones nearest the surface were least decayed. No holes were discovered in any of them, as if made with bullets, arrows, or any other weapons. I conjectured, that in this barrow, might have been a thousand skeletons. Every one will readily seize the circumstances above related, which militate against the opinion, that it covered the bones only of persons fallen in battle ; and against the tradition also, which would make it the common sepulchre of a town, in which the bodies were placed upright, and touching each other. Appearances certainly indicate that it has derived both origin and growth from the accustomary collection

of bones, and deposition of them together ; that the first collection had been deposited on the common surface of the earth, a few stones put over it, and then a covering of earth, that the second had been laid on this, had covered more or less of it in proportion to the number of bones, and was then also covered with earth ; and so on. The following are the circumstances which give it this aspect : 1. The number of bones. 2. Their confused position. 3. Their being in different strata. 4. The strata in one part having no correspondence with those in another. 5. The different states of decay in these strata, which seem to indicate a difference in the time of inhumation. 6. The existence of infant bones among them. But, on whatever occasion they may have been made, they are of considerable notoriety among the Indians ; for a party passing about 30 years ago, through the part of the country, where this barrow is, went through the woods directly to it, without any instructions or inquiry, and having staid about it some time, with expressions which were construed to be those of sorrow, they returned to the high road, which they had left about six miles to pay this visit, and pursued their journey. There is another barrow much resembling this in the low grounds of the south branch of Shenandoah, where it is crossed by the road leading from the Rockfish gap to Staunton, both of these have, within these dozen years, been cleared of their trees, and put under cultivation, are much reduced in their height, and spread in width by the plough, and will, probably, disappear in time. There is another on the hill in the Blue ridge of mountains,

a few miles north of Wood's gap, which is made up of small stones thrown together. This has been opened, and found to contain human bones, as the others do. There are also many others in other parts of the country.

The theory of Madison, concerning the ancient fortifications, shall next engage our attention. In a letter to Dr. Barton, he thus proceeds : Having lately visited that beautiful river Kanhawa, and a considerable part of the country within its neighbourhood, an opportunity was afforded, of examining with attention, some of those remarkable phenomena, which there present themselves, and which have been so much the subject of conversation, and of literary discussion. To remove error, of whatever kind, is, in effect, to promote the progress of intelligence ; with this view, I will endeavour to prove to you, that my journey has enabled me to strike one, at least, from that long catalogue, which so often tortures human ingenuity. You have often heard of those remarkable fortifications, with which the western country abounds ; and you know also, how much it has puzzled some of our literati, who supposed themselves, no doubt, most profound in historical, geographical, and philosophical lore, to give a satisfactory account of such surprising monuments of military labour and art.

Some have called to their aid the bold and indefatigable Ferdinando Soto ; others, the fabulous Welch prince of the 12th century ; and all have made a thousand conjectures, as lifeless as either Soto or the prince. Had they first examined into

the fact, and endeavoured to settle this most essential prerequisite, they would soon have seen, that the inquiry might be very easily terminated; and that what had so greatly excited the *admiration of the curious*, existed only in their own imaginations. No one was more impressed than myself with the general opinion, that there did exist regular and extensive fortifications, of great antiquity, in many parts of that vast country, which is washed by the various tributary streams of the Ohio and the Mississippi. The first specimen which I beheld, was examined with an ardent curiosity, and with a full conviction, that it was the work of a people, skilled in the means of military defence. The appearance is imposing: the mind seems to acquiesce in the current opinion, and more disposed to join in a fruitless admiration, than to question the reality of those fortifications. But as my observations were extended, and new specimens daily presented themselves, the delusion vanished; I became convinced, that those works were not fortifications, and never had the smallest relation to military defence.

The reasons, upon which this conviction, so contrary to that which has been generally received, was founded, I shall now submit to your consideration. Only let me first observe, that those supposed fortifications differ as to area and form. Some are found on the banks of rivers, presenting a semi-ellipsis, the greater axis running along the banks; others are nearly circular, remote from water, and small; their diameters seldom exceeding 40 or 50 yards. The first of these species is the largest;

their longer axis, at a mean rate, may be estimated at 250 yards ; their shorter, at 200 or 220. It is said, and I believe upon good authority, that some have been found large enough to comprehend 50 acres, and even more. Some are also reported to be square ; but I did not see any of that form. I shall confine myself to those which I have seen, and which are to be met with in the low grounds of the rivers Kanhawa, Elk, and Guyandot, or their adjacent uplands ; though I am persuaded the conclusion, which I undertake to establish, will be applicable to all those works, which have been dignified with the appellation of fortifications, in whatever part of the western country they may be found, since, from the information I have obtained, there are certain striking features, in which they all agree, and which indicate one common origin and destination.

1. These works were not designed for fortifications, because many of them have the ditch within the enclosure, and because the earth thrown up, on the supposed parapet, wants the elevation necessary for a defensive work. Both these circumstances occur, without exception, so far as my observations went, in all those which present an entire, or nearly a regular circle. The imaginary breastwork induces a belief, that it never exceeded four or five feet in height. At present, the bank seldom rises more than three feet above the plain, and it is well known, that in ground which does not wash, a bank of earth, thrown up in the usual way, will lose very little of its height in a century, or 20 centuries ; one

fourth for depression, would be more than a sufficient allowance. But we will not rest our argument upon what may, perhaps, be deemed a disputable point. The ditch, even at this day, affords a certain criterion by which we may judge of the original elevation of the bank. Its width seldom exceeds four feet at its margin; its depth is little more than two feet. Such a ditch, making every allowance for the operation of these causes, which tend continually to diminish its depth, whilst some of them are, at the same time, increasing its width, could not have yielded more earth, than would form a bank of the elevation mentioned. If the width now, be not greater than that ascribed, we may be assured that originally, it was a very trifling fosse.

But you will naturally ask, are there not some found, which present a different aspect, and which evidence more laborious efforts? No, on the contrary, it is remarkable, that the kind of which I am now writing, have as constant a similitude to each other, as those rude edifices, or cabins, which our first settlers reared.

The description of one will answer for all; there is no anomaly, except now and then, in the diameter of the circle; and here, the variation will only amount to a few yards. Permit me now to ask, whether the military art does not necessarily require that the ditch should be *exterior*; and whether among any people advanced to such a degree of improvement in the arts, as to attempt defensive works by throwing up earth, a single instance can be adduced, in which the ditch has not an exterior posi-

tion? Again, can we believe that a work, having a bank or ditch not higher or deeper than I have mentioned, could be intended as a fortification? The moment which gave birth to the idea of a defensive work, would also show that it must, in its execution, be rendered adequate to the end contemplated. It is scarcely worth while to go back to Livy or Polybius, upon this occasion. But they both inform us, "that the Romans, in the early period of their warfare, dug trenches, which were, at least, eight feet broad, by six deep: that they were often 12 feet in breadth, sometimes 15 or 20; that of the earth dug out of the fosse, and thrown on the side of the camp, they formed the parapet, or breastwork; and to make it more firm, mingled with it tuft, cut in a certain size and form. Upon the brow of the parapet, palisadoes were also planted, firmly fixed, and closely connected." The form of the fortification was always square. System appears to have been the tutelary deity of the Romans. They always proceeded upon one plan. As to the form, indeed, there appears to be no reason why that should not vary, not only among different nations, but with the same nation, as different situations might require. The Creeks generally preferred the round figure; but with them, the nature of places decided the question as to form. In other respects, the decision must be made according to fixed and unalterable principles. The same reasons which determined every particular as to height, depth, and position of the earth thrown up, among the Romans, would equally determine the conduct of any other nation.

What defence required ; what would oppose a sufficient obstacle to human agility, was the point to be decided ; and this point to be decided in nearly the same manner by every people unacquainted with gunpowder. The decision would not admit of such fosses and parapets as we find dispersed over the western country. Man, in this new world, has lost no portion of his former agility.

2. Because, near to most of these imaginary fortifications, and I think I may say, near to every one, which is formed upon the plan first mentioned, in a direct line with the gate way, you will find, a mound of an easy ascent, from 10 to 12 feet in height. These mounds effectually command the whole enclosure. There is not a missile weapon which would not, from the height and distance of the mound, fall within the fortification ; nor would they fall in vain. But to rear a fortification, and then build a castle or mound without, at the distance of 40 or 50 yards, which would give to an enemy the entire command of such a fortification, would be as little recommended by an Esquimaux, as by a Bonaparte. The truth is, no such blunder has been committed ; there is no discordancy of means to be here found. On the contrary, we may trace a perfect harmony of parts. These mounds are universally cemeteries. Wherever they have been opened, we find human bones, and Indian relics. They have grown up gradually, as death robbed a family of its relatives, or a tribe of its warriors. Alternate strata of bones and earth, mingled with stones and Indian relics, establish this position. And

hence it is, that we find near the summit of these mounds articles of European manufacture, such as the tomahawk and knives ; but never are they seen at any depth in the mound. Beside, it is well known, that among many of the Indian tribes, the bones of the deceased are annually collected and deposited in one place ; that funeral rites are then solemnized with the warmest expressions of love and friendship ; and that this untutored race, urged by the feelings of nature, consign to the bosom of the earth, along with the remains of their deceased relatives and friends, food, weapons of war, and often those articles which they possessed and most highly valued when alive. This custom has reared, beyond a doubt, these numerous mounds ; thus, instead of having any relation to military arrangements, or involving the absurdity before mentioned, they furnish, on the contrary, strong evidence, that the enclosures themselves were not destined for defensive works ; because, reared as these mounds have been, by small, yet successful annual increments, they plainly evince that the enclosures, which are so near them, have been not the temporary stations of a retiring or weakened army, but the fixed habitation of a family, and a long line of descendants.

That these mounds, or repositories of the dead, sometimes also called barrows, were formed by depositions of bones and earth, at different periods, is now rendered certain, by the perfect examination to which one of them, situated on the Rivanna, was subjected by the author of the Notes on Virginia.

His penetrating genius seldom touches a subject, without throwing upon it new light ; upon this he has shewn all that can be desired. The manner in which the barrow was opened, afforded an opportunity of viewing its interior with accuracy. "Appearances," says he, "certainly indicate that it has derived both origin and growth from the accustomary collection of bones, and deposition of them together ; that the first collection had been deposited on the common surface of the earth, a few stones put over it, and then a covering of earth ; that the second had been laid over this, had covered more or less of it, in proportion to the number of bones, and was then also covered with earth, and so on. The following are the particular circumstances which gave it this aspect.

1. The number of bones. 2. Their confused position. 3. Their being in different strata. 4. The strata in one part having no correspondence with those in another. 5. The different states of decay in these strata, which seem to indicate a difference in the time of inhumation. 6. The existence of infant bones among them." p. 173, first Paris ed.

The number of bones in this barrow or mound, which was only 40 feet in diameter at the base, and above 12 in height, authorized the conjecture that it contained a thousand skeletons. Now as all these numerous mounds, or barrows, have the most obvious similarity, we may conclude, that what is true of one of them is, *ceteris paribus*, applicable to all. The only difference consists in their dimensions.

I visited one, situated on the low grounds of the Kanhawa, which might almost be called the pyramid of the west. Its base measured 140 yards in circumference ; its altitude is nearly 40 feet. It resembles a truncated cone ; upon the top there is a level of 12 or 13 feet in diameter. A tall oak, of two feet and a half in diameter, which had grown on the top, and had long looked down upon the humble foresters below, had experienced a revolutionary breeze, which swept it from its majestic station, apparently, about six or seven years before my visit. Within a few miles of this stands another, which is said to be higher. No kind of excavation near the mound is to be seen. On the contrary, it is probable, from the examination which was made, that the earth composing the mound was brought from some distance ; it is also highly probable, that this was done at different periods, for we cannot believe that savages would submit to the patient exertion of labour requisite to perform such a work, at any one undertaking. Near to this large one are several upon a much smaller scale. But if that upon the Rivanna, which was so accurately examined, contained the bones of a thousand persons, this upon the Kanhawa would contain 40 times that number, estimating their capacities by cones. But who will believe that war has ever been glutted with so many Indian victims by any one battle ? The probability seems to be, that these mounds, formed upon so large a scale, were national burying places ; especially as they are not connected with any particular enclosure ; whilst those upon a smaller scale, and

which are immediately connected with such a work, were the repositories of those who had there once enjoyed a fixed habitation. But whether this conjecture be admitted or not, the inference, from what has been said under this head, that those enclosures could not be designed as fortifications, will, I think, be obvious to every one.

3. Because these supposed fortifications, not unfrequently lie at the very bottom of a hill, from which stones might be rolled in thousands into every part of them, to the no small annoyance, we may readily conceive, to the besieged.

4. Because, in those works, which are remote from a river or a creek, you find no certain indications of a well; and yet that water is a very necessary article to a besieged army, will be acknowledged on all hands.

5. Because those works are so numerous, that, supposing them to be fortifications, we must believe every inch of that extensive country, in which they are found, has been most valiantly and obstinately disputed. For, upon the Kanhawa, to the extent of 80, or 100 miles, and also upon many of the rivers, which empty their waters into it, there is scarcely a square mile, in which you will not meet with several. Indeed, they are as thick, and as irregularly dispersed, as you have seen the habitation of farmers, or planters, in a rich and well settled country; but, notwithstanding their frequency, you no where see such advantageous positions selected, as the nature of the ground, and other circumstances, would immediately have recommended to the rudest en-

gineer, either for the purpose of opposing inroads, or of giving protection to an army, which was too weak to withstand an invading enemy. The union of Elk and Kanhawa rivers, affords a point of defence, which could not have escaped the attention of any people ; and yet we find no fortification at this place, but many through the low grounds in its vicinity.

I could add many other reasons : I might observe, that some are upon so small a scale, whilst others are upon one so large, as equally oppose the idea of their being places of defence. If one of 40, or 50 yards in diameter, should be deemed too small for a defensive work, what shall we say to that whose outline embraces fifty or even an hundred acres ? What tribe of Indians would furnish men sufficient to defend such a breastwork in all its points ? But, I believe, the reasons assigned, when collectively taken, will be deemed conclusive ; or, as abundantly establishing a perfect conviction, that these western enclosures were not designed for fortifications. This was my object. What was the real design of them, may be left to future inquiry. It is true, that we want here a compass to guide us, and are left to find our way through this night of time, in the best manner we can. I have already said, that these enclosures carried along with them strong evidence of their being fixed habitations. If so, then they were designed merely as lines of demarcation ; shewing the particular spot, or portion of ground, which a family wished to appropriate ; and, indeed, they may be considered as exemplars

of the manner in which land limits would be ascertained, previous to that period when geometry begins to point out a mode more worthy of intelligent beings. This rude mode might, in a sequel of years, have introduced a geometry among the aborigines of America. Though they had not a Nile to obliterate land marks, still, the desire of saving labour, would produce in one case, what anxiety to preserve property did in the other. If the same mode has not been continued, it has arisen from the means, which European and American art has supplied, of accomplishing the same end with much more facility. The people inhabiting this country must have been numerous. The frequency of their burying places is a proof. The traveller finds them in every direction, and, often, many in every mile. Under a mild climate, a people will always multiply in proportion to the quantity of food, which they can procure. Here, the waters contain fish in considerable abundance, some weighing not less than 60, or 80 pounds. Not far distant, are those extensive and fertile plains, which were crowded with wild animals. The mildness of the climate is also remarkable. It appears to equal that of Richmond or Williamsburg; though the huge range of mountains, which attend the Alleghany, have not yet disappeared, and though the latitude of the place where Elk and Kanhawa rivers meet, according to an observation which I made, with an imperfect instrument, is $38^{\circ} 2'$. All these circumstances were highly favourable to population, and also to permanent residence. Another circumstance, the face of the

country, on locality, would serve to prevent this increase of population from diffusing itself on every side, and, consequently, would condense a tribe; for the Kanhawa, and its tributary streams, are hemmed in by high and craggy hills, often approaching to mountains, and beyond which, to a considerable extent, the country in general is fit only for the habitation of wild beasts. It is true, that on the northwest side of the Ohio, there are works, which seem to claim higher pretensions to the rank assigned them. They present more elevated parapets, deeper ditches, with other indications of military art. Perhaps, however, when more accurately examined, in all their aspects, they will be found to be only the habitation of the chief of some powerful tribe. The love of distinction prevails with no less force in the savage, than the civilized breast. Mackenzie, in his unadorned narratives, mentions frequently the habitation of the chief, or king, as much larger, and even as commodious, when compared with those of inferior rank. In latitudes so high as those which he traversed, with heroic perseverance, necessity compelled the savage to contrive more warm and durable habitations; but the same principle, which would give marks of distinction to the residence of the chieftain in one climate, would produce the same effect in any other, though they might assume different appearances. Besides, it might not be improper to recollect, in an examination of these works, that the French began to build forts in the Miami, and Illinois country, as early as

the year 1680; and that they were afterwards systematically continued, until the loss of Canada.

Lastly, we are arrived to the ingenious investigation of the Rev. Mr. Harris. The various mounds and walls of earth, discovered in various parts of the western region, have excited the astonishment of all who have seen or heard of them. When, and by whom they were constructed, and for what purpose, are questions, which have hitherto baffled the researches of the most inquisitive antiquarians. The present race of Indians retain no traditions, that can lead to any discovery. Their history is lost in the oblivion of ages. The uniform regularity, and prodigious extent of the works, are convincing proofs, that they were erected by a people, not only numerous, but well acquainted with the art of fortification and defence. The large trees, with which these long deserted monuments are overgrown, apparently of the same age with the surrounding forests, intimate the length of years that the whole has remained an uncultivated waste, and add the testimony of remote antiquity to these venerable works.* All serves to surprise and embarrass the mind.

These works are scattered over the whole face of the country. You cannot ride 20 miles in any direction, without finding some of the mounds, or

* "On the sides, and even up to the summit of these ramparts and mounds, having grown for ages past, and regularly gone to decay, some of the richest and finest timber of the forest, producing an increment of vegetable mould, nearly equal in depth, to that which forms the whole surface of the surrounding country."

vestiges of the ramparts. As those at Marietta, have been most accurately examined and measured, I shall be more particular in my description of them, which I shall compile principally from the account given of them, by the Rev. Dr. Cutler, and Capt. J. Heart ; using the measurement of General Rufus Putnam, and taking the liberty of blending with their statements, such remarks as I made myself on the spot.

The situation of these works is on an elevated plain, above the present bank of the Muskingum, on the east side, and about half a mile from its junction with the Ohio. They consist of walls and mounds of earth, in direct lines, and in square and circular forms. The largest, Square fort, by some called the town, contains 40 acres, encompassed by a wall of earth from six to ten feet high, and from 25 to 36 feet in breadth, at the base. On each side are three openings, at equal distances, resembling 12 gateways. The entrances at the middle are the largest, particularly on the side next the Muskingum. From this outlet is a covert way formed of two parallel walls of earth, 251 feet distant from each other, measuring from centre to centre. The walls at the most elevated part of the insides, are 21 feet in height, and 42 in breadth, at the base ; but on the outside, average only five feet high. This forms a passage of about 360 feet in length, leading by a gradual descent to the low grounds, where it probably, at the time of its construction, reached to the margin of the river. Its walls commence at 60 feet from the ramparts of the fort, and increase in

elevation as the way descends, towards the river : and the bottom is crowned in the centre, in the manner of a well formed turnpike road. Within the walls of the fort, at the northwest corner, is an oblong, elevated square, 188 feet long, 132 broad, and 9 feet high ; level on the summit, and nearly perpendicular at the sides. At the centre of each of the sides, the earth is projected, forming gradual ascents to the top, equally regular, and about six feet in width. Near the south wall is another elevated square, 150 feet by 120, and 8 feet high ; similar to the other, excepting that instead of an ascent to go up on the side next the wall, there is a hollow way 10 feet wide, leading toward the centre, and then rising with a gradual slope to the top. At the southeast corner, is a third elevated square, 108 by 54 feet, with ascents at the ends ; but not so high nor so perfect as the other. A little to the southwest of the centre of the fort, is a circular mound, about 30 feet in diameter, and 5 in height ; near which are four small excavations at equal distances, and opposite each other. At the southwest corner of the fort is a semicircular parapet, crowned with a mound, which guards the opening in the wall. Toward the southeast is a smaller fort, containing 20 acres, with a gateway in the centre of each side, and at each corner. These openings are defended with circular mounds. On the outside of the smaller fort is a mound, in form of a sugar loaf, of a magnitude and height which strike the beholder with astonishment. Its base is a regular circle 115 feet in diameter, and its perpendicular altitude is 30

feet. It is surrounded with a ditch four feet deep, and 15 wide, and defended by a parapet four feet high, through which is an opening or gateway, toward the fort, 20 feet wide. There are other walls, mounds, and excavations, less conspicuous and entire, but exhibiting equal proofs of art and design. The places called graves, are small mounds of earth, from some of which human bones have been taken. In one were found the bones, in their natural position, of a man buried nearly east and west, with a quantity of isinglass on his breast. In the others the bones laid promiscuously, some of them appeared partly burnt and calcined by fire, and stones evidently burnt, charcoal, arrow heads, and fragments of a kind of earthen ware.

An opening being made at the summit of the great conic mound, there was found the bones of an adult in a horizontal position, covered with a flat stone. Beneath this skeleton were thin stones placed vertically at small and different distances, but no bones were discovered. That this venerable monument might not be defaced, the opening was closed without farther search. It is worthy of remark, that the walls and mounds were not thrown up from ditches, but raised by bringing the earth from some distance, or taking it up uniformly from the surface of the plain. The parapets were probably made of equal height, and breadth; but the waste of time has rendered them lower and broader in some parts than others. It is in vain to conjecture what tools or machines were employed, in the construction of these works; but there is no reason

to suppose that any of the implements were of iron. Plates of copper have been found in some of the mounds, but they appear to be parts of armour. Nothing that would answer the purpose of a shovel has ever been discovered. Adverting to this circumstance, how astonishing must be the constancy and patience necessary to endure the tediousness, and overcome the difficulty, of such labours, and succeed in spite of the unfitness of the instruments that were employed !

At the commencement of the settlement, the whole of these works was covered with a prodigious growth of trees. "When I arrived," says Dr. Cutler, "the ground was in part cleared, but many large trees yet remained on the walls around. The only possible data for forming any probable conjecture respecting the antiquity of the works, I conceived, must be derived from the growth upon them. By the concentric circles, each of which denotes the annual growth, the age of the trees might be ascertained. For this purpose, a number of the trees were felled ; and in the presence of governor St. Clair, and many other gentlemen, the number of circles were carefully counted. The trees of the greatest size were hollow. In the largest of these which were sound, there were from 3 to 400 circles. One tree, somewhat decayed at the centre, was found to contain at least 463 circles. Its age was undoubtedly more than 463 years. Other trees, in a growing state, were, from their appearance, much older. There were likewise the strongest marks of a previous growth as large as the present. Decayed

stumps could be traced at the surface of the ground, on different parts of the works, which measured from six to eight feet in diameter. In one of the angles of a square, a decayed stump measured eight feet in diameter at the surface of the ground ; and though the body of the tree was so mouldered as scarcely to be perceived above the surface of the earth, we were able to trace the decayed wood, under the leaves and rubbish, nearly 100 feet. A thrifty beech, containing 133 circles, appeared to have vegetated within the space that had been occupied by an ancient predecessor, of a different kind of wood. Admitting the age of the present growth to be 450, and that it had been preceded by one of equal size and age, which, as probably as otherwise, was not the first, the works have been deserted more than 900 years. If they were occupied 100 years, they were erected more than 1000 years ago."

The works at Marietta, although very capacious, are not comparable either in height or extent to some others that have been discovered. About 90 miles farther up in the country, on a large plain, bounded by one of the western branches of the Muskingum, are a train of ancient works, nearly two miles in extent ; the ramparts of which are yet in some places upwards of 18 feet perpendicular height. At Licking are very extensive works, some of them different in construction from those at Marietta ; particularly several circular forts with but one entrance. They are formed of a parapet from 7 to 12 feet in height, without any ditch ; the interior being of the same level with the plain on

which they are raised. Forts of this kind, which are also found in other places, are from 3 chains to 15, and more, in diameter. There are also large walls and mounds on the Great Miami, and on the Scioto. On a side hill at Wakkatomaka, are circular breastworks and redoubts, rising one above another.

That these parapets were erected for defence, I think very probable; indeed this has been a prevailing opinion. It is true, that their present height is not such as to secure the besieged from missile weapons; but two circumstances have contributed to lower them several feet; 1st, the gradual washing away of the earth, of which they are composed; and 2dly, the filling up of the interior, and the accretion of soil over the whole surface of the plain, by the annual deposit of leaves, and the decay of timber. This accretion is widened by finding logs completely covered, and the utensils, &c. of the ancient possessors, four and five feet below the surface. These utensils, which lie pretty much on the same level, are entirely different in kind and shape from the stone tools, and flint arrow heads of the northern Indians, which are frequently picked up on the surface: they undoubtedly belonged to a people better acquainted with the arts, and seem to have been for other uses than those of the latter possessors of the region. It is not unlikely, that these "fenced cities," were rendered secure by a wooden wall, or palisade on the top of the parapet, and that the passages were gateways, protected by towers, which would be able to defend the whole

distance of the wall between them ; while those in front would ward off the assailants at the passage. The elevated squares might be the foundations of larger towers and arsenals. Their vicinity to the walls, agree with such a conjecture. The excavations or caves were undoubtedly wells, now filled up ; water being an essential article in a besieged place.* Some of these are above 40 feet in diameter, and about five feet in depth. I know that some have conjectured that these works were only sacred enclosures, and that the elevated squares were the area of temples, or places of sacrifice ; and it must be confessed they bear considerable resemblance to those described by Clavigero, to which ancient accounts in Mexico have attributed their appropriation.

On a subject where all is conjecture, it is impossible to form a decided opinion. That opinion must have the preference, which has the most probability in its favour. Allowing these works to have been erected by emigrants from the north of Asia, which I think has more than the support of probability, from the attestations of correspondent structures in the country they left, and the intimations of history in the region where they finally settled ; I

* Mr. Kalin in his travels, informs us that his countrymen, the Swedes, on their arrival in that part of America called New Jersey, in making a settlement on the river Delaware, discovered some wells at the depth of 20 feet, that were enclosed by walls of brick, a species of manufacture with which we are certain none of the savage tribes of America were acquainted, either at the time of their discovery, or in any posterior period of their history.

say, allowing them to have been erected by Asiatic emigrants, they must have been places of defence ; for the journeying of these hordes was not the excursion of a colony in search of a settlement, but the flight of a discomfited people before their pursuers. The Mexican annals testify this. The smaller mounds on the great plains are filled with bones, laid in various directions, in an equal state of decay, and appear to be piled over heaps of slain, after some great battle. Whereas the larger mounds, near the fenced cities, are composed of strata, if I may so say, of bones in more regular order, of full grown people and of infants, and in different stages of decay ; and seem formed of the bodies of such, as died of sickness, or were killed in occasional skirmishes, at different times, and with intervals, perhaps, of some years. In some have been found plates of copper, rivetted together, copper beads, various implements of stone, and a very curious kind of porcelain. None of the Indians, who now inhabit these regions, have the art of making earthen ware ; much more, of melting metals, and forming them into ornaments ; nor have they any distinct tradition that their ancestors had. They regard these things when they find them, with the same surprise and curiosity, that we do. It is true, that in the voyage of captains Armadas and Barlow, to the coast of Virginia, in 1584, mention is made of earthen pots used by the natives,* “ very

* “ From the great number of artificial mounds of earth, to be seen through the settlement of the Natches, it must, at some former

large, white, and sweet ;” but I suspect they were not of their own manufacture, but the relics of a former and more highly civilized race. This may also be true of the copper beads, which the Indians wore, as related by Verazzano, in his voyage to Florida, in 1524. Whereas it is well known, that the Mexicans were skilled in the art of casting metals, and in pottery.* I have mentioned that the relics of the ancient inhabitants are found several feet below the surface. While at Marietta, I was careful to observe the appearance of the soil, where workmen were digging cellars, and, in several instances, found at the depth of four and five feet, some evidences of former settlers ; particularly in one instance, a well laid hearth of flat stones, with cinders of pitcoal, charcoal, &c. At Waterford, at a place where the river had undermined the bank, under the roots of a sycamore stump, whose diameter was more than four feet, and five feet below the surface, I also discerned a hearth. The ground on which the stones were laid, was reddened by the

period, have been well populated. These mounds, or tumuli, are generally square, and flat on the top. Add to this circumstance, in favour of the former population of that district, the following fact, which is very conclusive ; in all parts where new plantations are opened, broken Indian earthen ware is to be met with ; some of the pieces are in tolerable preservation, and retain distinctly the original ornaments, but none of it appears to have been ever glazed.”

ELLICOT'S *Journal*.

* “They had an excellent manufacture of earthen ware, of three colours, red, black, and white, painted in different patterns.” BERN. DIAZ DEL CASTILLO.

heat and coals, and bones were above. The time for such an accumulation of soil, and for the growth of so large a tree, must have been many centuries. Among the antiquities of this territory, (though without the limits of the state of Ohio) may also be mentioned the inscriptions engraven on a large stratum of rocks, on the southeast side of the river Ohio, about two miles below the mouth of Indian, or King's creek, which empties into the Ohio, 50 miles below Pittsburg. The greater part of the rocks lie nearly in a horizontal direction, and so close to the edge of the river, that, at times, the water entirely covers them. At the distance of a few yards, however, from the bank of the river, there are several large masses of the same species of rock, on which are inscriptions also. These, it is probable, have been formerly attached to the horizontal stratum, and have either been removed by the hand of man, or by some violent inundation of the river. It is, at least, certain, that the inscriptions upon both are of the same kind, and there can be little doubt, that they have both been engraven at the same time.

Having given this sketch of the antiquities of this part of the country, I will endeavour to throw some light upon their origin and authors. The Abbe Clavigero commences his history of Mexico, with an account of the Toltecas, the oldest nation of which there is any account in that part of the world. He describes them as celebrated for their superior civilization, and skill in astronomy and the arts. He says, they understood the method of

casting gold and silver into whatever forms they pleased, and that they acquired the greatest reputation for the cutting of all kinds of gems. From the ancient historic paintings and traditions of this nation, it appears, that, banished from their native country, they began an emigration in the year 1, Tecpatl, that is, about the middle of the sixth century.* In the course of their emigration, they sometimes rested but a short time at a place, and at other times tarried long, erected them houses, and attended to the concerns of agriculture. In this wandering manner did they travel, always southwards, for the space of 104 years, till they arrived at a place, to which they gave the name of Tollantzinco, about 50 miles to the east of that spot, where, some centuries after, was founded the city of Mexico. They appear to be a very numerous, enterprizing, and powerful people. It may seem, indeed, that 104 years is hardly sufficient for so long a peregrination, and for the erection of works of such extent and magnitude, as those found through all the continent of America, as far as it has yet been discovered, from the lake of the Woods to Mexico. Let it, however, be observed, that the limited time, depending partly upon tradition, and partly upon hieroglyphical annals, not accurately understood 800 years after they were commenced, may not be chronologically exact. The fact, however, of an emigration, at an

* Clavigero says 596, but afterward he says, "their departure happened in 544, and their monarchy commenced in 667."

early period, from a more northern region, of a numerous and warlike people, cannot be doubted. That they erected the fortifications and mounds as they progressed onwards, seems highly probable. Like works and tumuli are found in Mexico; and by the ancient historians, are ascribed to the Toltecas. Being of a more recent date, than those we have been describing, their contents are more perfect; the vases and other implements are more entire, and the bones are not so much decayed. Like the mounds in the more northern regions, they contain a variety of valuable articles, which were interred with the dead. Hence the historians of the discovery of America remark, that "the insatiable avarice of the conquerors of Mexico and Peru, rifled the Indian sepulchres of the gold and jewels, (bijoux) of which they were full."*

Admitting the date given by Clavigero, as an authority, and supposing them to have commenced their route, in the year of Christ 544, and that they reached the Muskingum 53 years afterward; we shall be carried back 1209 years from the present, (1803.) The calculation of Dr. Cutler upon the age of the trees, makes 900 years, which allows 309 years for the forest to have started up after the places were forsaken. As the sepulchral mounds of the ancient Mexicans, resembled those of which we are treating, so their fortifications are of the same structure. Clavigero declares, "It is certain and indubitable, from the depositions made by Cor-

* LAFITAW.

tez, and all those who saw the ancient cities, of that empire, that the Mexicans and all the neighbouring nations, lived in societies, raised walls, bastions, palisades, ditches, and entrenchments for their defence. It is true, such fortifications were not comparable to those of the Europeans, because neither was their military architecture perfected, nor had they occasion to cover themselves from artillery, of which they had no experience, or conception; but they gave plain proofs of their industry in inventing many different kinds of expedients, to defend themselves from their native enemies." Speaking in another place, of the Mexican antiquities in the royal armoury, in Madrid, he says, "We are certain, from the testimony of all the writers of Mexico, that those nations used such plates of copper in war, and that they covered their breasts, their arms, and thighs with them, to defend themselves from arrows." In connection with the warlike character and military genius of the Toltecas, it may be mentioned, that, "Tendille, a Mexican, remarking a partly gilt helmet of one of Cortez's soldiers, observed, that it resembled one which had belonged to their ancestors, and which was placed on the head of their god Huitzicopochtli, and therefore expressed a wish to carry it to Montezuma. Accordingly, Cortez gave it to him."*

Having described the elevated mounds, and squares, and forts in the western parts of North America, and in Mexico, it may be well to inquire, if

* Conquest of Mexico.

such are found in any other part of the world, and whether we may not thus discover whence America was first peopled. For this purpose, I have collected the following documents. The most early accounts, which history affords of these kinds of tumuli, is in the *Melpomene* of Herodotus, c. 71, where it is said, that "the sepulchres of the Scythian kings are in the country of the Gerrhians, who live in the remotest parts of Scythia, where the Borysthenes is first known to be navigable. They lay the king in the sepulchre prepared for him, upon a bed, encompassed on all sides with spears fixed in the ground. Upon the whole are disposed pieces of wood covered with branches of willow. In the spaces which remain vacant, they bury one of the king's concubines, whom they previously strangle, together with the cupbearer, the cook, the groom, the waiter, his horses, and the choicest of his effects. To these, they add cups of gold, for silver and brass are not used among them. This done, they throw up the earth with great care, and endeavour to raise a mound as high as possible." Here we receive the best and most authentic account of the Scythian mode of sepulture; and it refers us to the very regions, where multitudes of these mounds exist at this day.

Olaus Wormius says, these sepulchral barrows are works of no slight labour, or small expense. The length of time, the number of the people, and the toil bestowed upon their construction, rude as many appear, mark strongly the zealous efforts which they employed to do honour to the deceased,

and to perpetuate the glory of their princes, heroes, and benefactors. Peringskiold describes several of the same kind in Sweden, particularly a large one at Upsal, 150 yards in circumference, and 30 yards high; the antiquity of which he supposes to be at least 3000 years.*

M. Cocherell gives an account of a Gaulish monument of similar structure and contents, in Normandy. Stones, axes wrought to the finest edge, spears, lances, arrow heads, &c. were found among the bones it contained.†

Terfeus relates,‡ that Odinus brought the first urns into the northern regions, introduced there the custom of burning the dead, of putting the most valuable things of the deceased into the grave with their ashes, and of erecting monuments and laying stones over the sepulchres of the most eminent persons. On this occasion he quotes Stephanes in these words; “*Primitus namque defunctis justa solvitur in campo plano, juxta Regiam, aut defuncti prædium, circulum miræ magnitudinis lapidibus efformabant, oblongum tamen viginti circiter orgy-arum longitudine, latitudine trium. In hoc defuncti cremabant cadaver, cineres collectos, urnis in cludebant, ac in circi meditullio locatos, grandibus undique stripabant lapidibus, arena glebaque terrestri replebant, ac in formam monticuli desuper collem extruebant.*” Strahlenburg says he found

* Monumenta Sueo Gothica.

† Quoted in Montfaucon, *Antiquité Expliquée*.

‡ *Series Dynast. Reg. Dan.*

every thing to correspond with this description, both as to the stones and the dimensions.

The Russians call these sepulchres *Bogri*, or *Mutiguii*; and vast numbers of them are found in Siberia, and in the deserts which border on that government southwards. “ In these tombs are found all sorts of vessels, urns, ornaments, trinkets, cimatars, daggers, plates, medals, and jewels of gold, silver, &c. The graves of the poorer sort have likewise such things in them of copper and brass, arrows, &c.” “ As to the graves themselves they are of different structures. Some are only raised up of earth as high as houses, and placed so near together, and in such numbers on the spacious plains, that, at a distance, they appear like a ridge of hills. Others are set round with rough hewn stones, and some with square free stones, and are either of an oblong or a triangular form. In some places these tombs are entirely built with stone. Hence we find in the ancient maps of Tartary the Greater, a number of mounds called ‘ the pyramidical sepulchres of the Tartarian kings;’ by which they must needs mean these monuments, though they are not so properly pyramids.” In the fifth volume of the French translation of the travels of Professor Pallas is a long and circumstantial account of these ancient monuments.

M. De Stehlin, secretary to the Imperial Academy at Petersburg, declares that there is not one instance of the tumuli being found to the northward of latitude 58°. They are of all dimensions. The circumference of some is 30 Russian toises, others

50, 100, and even 500 toises. Their altitudes are also various, from 5 to 6, 12, and even 30 toises. Each toise measuring seven English feet. The Russians in effecting a practicable road to China, discovered in latitude 50° north, between the rivers Irtysh and Obalet, a desert of a very considerable extent, overspread in many parts with tumuli or barrows. This desert constitutes the southern boundary of Siberia. Historians and journalists make mention of these tumuli, with several particulars concerning them.

M. Strahlenburg, in his history of Russia and Tartary, relates that, in the year 1720, some Russian regiments, being sent from Tobolski, the capital of Siberia, up the river Irtysh, to the great plains or deserts, found in the tumuli there many ornamental antiquities; as they likewise did on the western boundary of the desert, between the rivers Tobol and Ischim. He farther mentions, that Scythian antiquities are annually brought from the pagan tombs which lie on each side the river Irtysh, on the deserts of the Calmuck Tartars; and that a vast number of molten images, and other things in gold, silver, and other metals, have been brought from the Siberian and Tartarian tombs; some of which he has engraved in his history.

Mr. Bell, in his journey from Petersburg to Pe-kin, informs us that eight or ten days journey from Tomsky, situated on the river Tom (which falls into the Oby, and empties itself into the Frozen ocean, in latitude 53° and 54° north, and which makes the northeast boundary of the great desert

mentioned above by Strahlenburg) are found many tombs and burying places, of ancient heroes, as reported, who probably fell in battle ; but when and between whom, and upon what occasion these battles were fought, is not certain. The account which Mr. Bell received from the Tartars in the Baraba, is that Tamerlane had many engagements with the Calmuck Tartars in this country, whom he in vain attempted to subdue. • Many persons go every summer from Tomsky to these tumuli, and find considerable quantities of gold, silver, and brass, and some precious stones, among the ashes and remains of dead bodies ; also hilts of swords, armour, ornaments for saddles and bridles, and other trappings ; with the bones of those animals to which the others belonged, among which are the bones of elephants. From these circumstances it appears, that when any chief, or person of distinction, was interred, it was usual to bury in the same tumulus with him, his arms, and favourite horse, &c. And this custom, which is reputed to be of great antiquity, prevails at this day among the Calmucks, and other Tartarian hordes. The borderers upon those deserts have for years continued to dig for the treasure deposited in these tumuli, which still remain unexhausted. The Russian court being informed of these depredations, sent a principal officer with sufficient troops, to open such of these tumuli as were too large for the marauding parties to undertake, and to secure their contents. The officer, upon taking a survey of the numberless monuments of the dead spread over this vast desert, concluded that

the barrow of the largest dimensions most probably contained the remains of the prince, or chief; and he was not mistaken; for after removing a very deep covering of earth and stones, the workmen came to three vaults constructed of stones of rude workmanship; containing the bones, habiliments, and rich ornaments, armour, &c. &c. of the chief. A particular account of this tumulus, by Mr. Dermédoff at Petersburg, accompanied with four large drawings of the antiquities, is inserted in the second volume of the *Archeologia*.

The situation, construction, form, and general contents of these Asiatic tumuli, and the ancient American mounds, are so similar, that there can be no hesitation in ascribing them to the same people. Other strong reasons for believing that the aborigines of America were descendants from the ancient Scythians, and passed into this continent from the eastern parts of Asia, are, that many of the customs of the Scythians are still in use among the Indian tribes; in particular that of scalping their prisoners, and of putting them to death by a variety of ingenious and protracted tortures. They have many things, also, in common with the Tartar tribes of Asia; as the fabric and constructure of birch canoes; the method of marching in what we call "Indian file;" and the construction of implements of war, and instruments of the chase. Whereas the northern nations, by whom they seem to have been encroached upon, and gradually expelled from the first settlements they made, till they were finally driven into Mexico and Peru, most probably mi-

grated from the northwest parts of Europe. This seems probable from the character and physiognomy discoverable in the people, who have emigrated from the northeast extremity of the American continent.

As the tusks, grinders, and skeletons of the Mammoth, found in different parts of our territories, have excited considerable attention, we shall give Mr. Jefferson's observations on the subject. The tradition of the Indians is, that he was carnivorous, and still exists in the northern parts of America. A delegation of warriors from the Delaware tribe, having visited the governor of Virginia, during the revolution, on matters of business ; after these had been discussed, and settled in council, the governor asked them some questions relative to their country ; and among others, what they knew or had heard of the animal whose bones were found at the Salt licks on the Ohio. Their chief speaker immediately put himself in an attitude of oratory, and with a pomp suited to what he conceived the elevation of his subject, informed him that it was a tradition handed down from their fathers, " That in ancient times a herd of these tremendous animals came to the Big Bone licks, and began an universal destruction of the bears, deer, elks, buffaloes, and other animals which had been created for the use of the Indians : that the Great Man above, looking down and seeing this, was so enraged, that he seized his lightning, descended on the earth, seated himself on a neighbouring mountain, on a rock, of which his seat and the print of his feet are still to

be seen ; and hurled his bolts among them till the whole were slaughtered except the big bull, who presenting his forehead to the shafts, shook them off as they fell ; but missing one, at length, it wounded him in the side ; whereon, springing round, he bounded over the Ohio, over the Wabash, the Illinois, and finally over the great lakes, where he is living at this day." It is well known that on the Ohio, and in many parts of America farther north, tusks, grinders, and skeletons of unparalleled magnitude are found in great numbers, some lying on the surface of the earth, and some a little below it.

Mr. Stanley, taken prisoner by the Indians near the mouth of the Tennessee, relates, that being carried over the mountains west of the Missouri, to a river which runs westwardly ; these bones abounded there : and that the natives described to him the animal to which they belonged, as still existing in the northern parts of their country ; from which description he judged it to be an elephant. Bones of the same kind have been found, some feet below the surface of the earth, in salines opened on the North Holston, a branch of the Tennessee, about the latitude of $36^{\circ} 30'$ north. From the accounts published in Europe, I suppose it to be decided, that these are of the same kind with those found in Siberia. Instances are mentioned of like animal remains found in the more southern climates of both hemispheres ; but they are either so loosely mentioned as to leave a doubt of the fact, so inaccurately described as not to authorize the classing them with the great northern bones, or so rare as to found

a suspicion that they have been carried thither as curiosities, from more northern nations. So that on the whole there seems to be no certain vestiges of the existence of this animal farther south than the salines last mentioned. It is remarkable that the tusks and skeletons have been ascribed by the naturalists of Europe, to the elephant, while the grinders have been given to the hippopotamus, or river horse. Yet it is acknowledged that the tusks and skeletons are much larger than those of the elephant, and the grinders many times greater than those of the hippopotamus, and essentially different in form. Wherever these grinders are found, there also we find the tusks and skeleton; but no skeleton of the hippopotamus nor grinders of the elephant. It will not be said that the hippopotamus and the elephant come always to the same spot; the former to deposit his grinders, and the latter his tusks and skeleton. For what become of the parts not deposited there? We must agree then that these remains belong to each other, that they are of one and the same animal, that this was not a hippopotamus, because the hippopotamus has no tusks, nor such a frame; and because the grinders differ in their size as well as in the number and form of their points. That it was not an elephant, I think ascertained by proofs equally decisive. I will not avail myself of the authority of the celebrated anatomist (Hunter) who from an examination of the form and structure of the tusks, has declared they were essentially different from those of the elephant; because another anatomist (D'Aubenton) equally celebrated, has de-

clared, on a like examination, that they are precisely the same. Between two such authorities I will suppose this circumstance equivocal.

But, 1. The skeleton of the mammoth (for so the incognitum has been called) bespeaks an animal of five or six times the cubic volume of the elephant, as Buffon has admitted. 2. The grinders are five times as large, are square, and the grinding surface studded with four or five rows of blunt points : whereas those of the elephant are broad and thin, and their grinding surface flat. 3. I have never heard an instance, and suppose there has been none, of the grinder of an elephant being found in America. 4. From the known temperature and constitution of the elephant, he could never have existed in these regions where the remains of the mammoth have been found. The elephant is a native only of the torrid zone and its vicinities ; if, with the assistance of warm apartments, and warm clothing, he has been preserved in life in the temperate climates of Europe, it has only been for a small portion of what would have been his natural period ; and no instance of his multiplication in them has ever been known. But no bones of the mammoth, as I before observed, have ever been found farther south than the salines of the Holston, and they have been found as far north as the arctic circle. These, therefore, who are of opinion that the elephant and mammoth are the same, must believe, 1. That the elephant known to us can exist and multiply in the frozen zone ; or, 2. That an internal fire may once have warmed these regions, and since abandoned

them ; of which, however, the globe exhibits no unequivocal indications ; or, 3. That the obliquity of the elliptic, when these elephants lived, was so great as to include within the tropics all these regions in which the bones are found, the tropics being, as before observed, the natural limits of habitation for the elephant. But if it be admitted that this obliquity has really decreased, and we adopt the highest rate of decrease yet pretended, that is, of one minute in a century, to transfer the northern tropic to the arctic circle, would carry the existence of these supposed elephants 250,000 years back ; a period far beyond our conception of the duration of animal bones left exposed to the open air, as these are in many instances. Besides, though these regions would then be supposed within the tropics, yet their winters would have been too severe for the sensibility of the elephant. They would have had too but one day and one night in the year, a circumstance to which we have no reason to suppose the nature of the elephant fitted. However, it has been demonstrated, that, if a variation of obliquity in the elliptic takes place at all, it is vibratory, and never exceeds the limits of nine degrees, which is not sufficient to bring these bones within the tropics. One of these hypotheses, or some other equally voluntary and inadmissible to cautious philosophy, must be adopted, to support the opinion that these are the bones of the elephant. For my own part, I find it easier to believe that an animal may have existed, resembling the elephant in his tusks, and general anatomy, while his nature was in other respects ex-

tremely different. From the 30th degree of south latitude, to the 30th of north, are nearly the limits which nature has fixed for the existence and multiplication of the elephant known to us. Proceeding thence northerly to 36 30 degrees, we enter those assigned to the mammoth. The further we advance north, the more their vestiges multiply, as far as the earth has been exposed in that direction: and it is as probable as otherwise, that this progression continues to the pole itself, if land extends so far. The centre of the frozen zone then may be the acme of their vigour, as that of the torrid is of the elephant. Thus nature seems to have drawn a belt of separation between these two tremendous animals; whose breadth indeed is not precisely known, though at present we may suppose it about $6\frac{1}{2}$ degrees of latitude; to have assigned to the elephant the regions south of these confines, and these north to the mammoth, founding the constitution of the one in her extreme of heat, and that of the other in the extreme of cold. When the Creator has therefore separated their nature as far as the extent of the scale of animal life allowed to this planet would permit, it seems perverse to declare it the same, from a partial resemblance of their tusks and bones. But to whatever animal we ascribe these remains, it is certain such an one has existed in America, and that it has been the largest of all terrestrial beings.

There are some antiquities in and near Mexico, worth attention. The ancient city of Mexico, as it stood on the same ground the present city stands on, was probably square, or pretty near that figure;

and its dimensions may be guessed at from the number of families residing in it, which the histories of its conquest make to be about 60,000. There was a noble square in the middle of the city, which at the time of the great fair, was resorted to by a prodigious concourse of people, and contained a great number of booths and tents, wherein they lodged their merchandize. The city was divided into two parts ; the one inhabited by the court, the nobility, and persons of distinction ; the other by tradesmen, and persons of inferior rank. The former part was much the largest, where the streets were spacious, the houses of white hewn stone, one story high, and they had flat roofs, adorned with battlements. Their ceilings were of cedar, cypress, or other odoriferous wood ; and their hangings either of furs, and beautiful feathers, or cotton linen painted with a variety of figures of plants and animals : but notwithstanding their wealth, none of the nobility were served in plate, which was the prerogative only of the emperor.

The palace of Montezuma, the last emperor, was so very large, that it had 30 gates, which opened into as many different streets, the principal front making one side of the above mentioned square. The materials of this building were polished jasper, black, red, and white ; and over each gate were the arms of Montezuma, being a griffin, with the wings extended, and a tiger in its talons. The whole consisted of several square courts, and was so vastly extensive, as to contain apartments for 3000 of the emperor's women, and a proportionable number of

domestics. Another palace assigned to Cortez and his army, was likewise of a surprising extent, containing commodious rooms and apartments, for 500 Spaniards, and 6000 Indians, auxiliaries: and when the Spanish general had planted his artillery, and placed his guards, it had much the appearance of a fortress, being surrounded with a thick stone wall, and flanked with towers.

When Cortez and his army first entered the streets of Mexico, they were met by 200 noblemen of the emperor's household, clothed in one livery, with large plumes of feathers on their heads, all of the same fashion and colour. These, after meeting and paying their compliments to the Spanish general, fell back, and then dividing themselves, made a lane for the Spaniards. Then came another body of the nobility, of a superior dignity, who made a most splendid appearance; and in the midst of them, was the emperor Montezuma, carried in a chair of beaten gold, on the shoulders of his favourite courtiers, whilst four of them sustained a canopy over his head. The whole was adorned with beautiful feathers, through which the gold appeared predominant, and the emperor was preceded by three officers with rods of gold, the harbingers of his approach, on whose appearance, the people fell upon their faces, not daring to look upon their monarch. Cortez dismounting when the Mexican emperor drew near, the latter alighted from his chair, and carpets were spread in the streets for him to tread on. He advanced with a solemn slow pace, leaning on the arms of two of his relations, and was

met by Cortez with a profound reverence, which the emperor answered, by touching the ground with his hand, and afterward held it to his lips, which was looked upon as a great condescension, and added to the esteem and veneration, his subjects already had for the Spaniards. The conference between the Mexican emperor and Cortez was short at this interview, after which, Montezuma commanded one of his princes to conduct the general to the palace appointed for his residence, and then returned to his own.

Beside the two palaces already mentioned, Montezuma had several pleasure houses, in and about the city; in one of which, were great galleries, supported by pillars of jasper, and stored with all sorts of land fowl and birds, that Mexico produced. The sea fowl were preserved in reservoirs of salt water; and those that were bred up in lakes and rivers, in others of fresh water; and so numerous were these fowl, that it is said to have been the business of 300 men to look after them. In one square of the palace, were kept all manner of wild beasts, in their respective dens, or cages, in a most singular order. In another square of the same palace, were apartments for dwarfs and monsters, fools and naturals, of the human species, kept for the diversion or service of the court. Here were also armouries, well stored with all sorts of Indian weapons; and the artificers, that formed and cleaned these arms, had apartments in the same quarter.

All these palaces of the Mexican emperors, had spacious and elegant gardens, laid out in fine shady

walks, beds of fragrant and medicinal herbs, and parterres of beautiful flowers, and embellished with magnificent summer houses, baths, arbours, and fountains. But there was a building in the most solitary part of the gardens, which surprised the Spaniards more than any thing they met with, and it was called the house of sorrow, because the emperor used to retire thither on the death of his relations, or on any calamity, public or private. The roof, the ceiling, and the sides, were black ; and only just so much light was admitted, as to discover the dismal obscurity. In this gloomy mansion, the Spanish authors pretend, that Montezuma used to converse familiarly with the prince of darkness.

The principal of the Mexican temples, was dedicated to Viztlipuzli, the god of war. The whole edifice formed a large square, and was encompassed by a wall of hewn stone, and adorned on the outside, with knots of twisted serpents. At a little distance from the chief gate, was a place of worship, built of stone, having an ascent of 30 steps, which led to a long flat roof, and the front of it, as the Spaniards relate, was decorated with the skulls of men, who had been sacrificed to their idols. On each side of the square was a magnificent gate, and over every one of them, four statues, supposed to represent some subordinate deities. At the foot of the wall within, were the apartments of the priests, and of the inferior officers and servants ; and yet there was room enough left for eight or ten thousand persons to dance on solemn festivals. In the middle of the square, was a structure of a pyra-

midal form, three sides of which were smooth, and the fourth ascended by 120 steps. There was a terrace on the top, 40 feet square, laid with jasper of different colours. This was surrounded with twisted rails, and on each side was a marble statue, supporting a large candlestick, between which, was a green stone, five spans high from the ground, which terminated in a point; and on this, it is said, they extended the human victims, they sacrificed, throwing them on their backs, and ripping them open with sharp flints, instead of knives; after which, they tore out their hearts, and offered them to their idols.

On the farther side, opposite the stairs, stood a chapel of exquisite materials and architecture, where an idol was placed above an altar. This image was of the human form, and set on a throne sustained by an azure globe, which they called heaven, and from the sides of it issued four rods, whose ends resembled the heads of serpents. On the head of the image was a helmet, adorned with plumes of various colours, and its countenance was severe and terrible. In the right hand, it held a twining serpent, which served for a staff; and in the left hand, four arrows, which were revered as the gift of heaven. It likewise bore a shield, adorned with fine white plumes, in form of a cross.

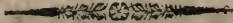
On the left hand was another chapel, in which was the image of Tlalock, another of the Mexican deities, almost in every respect resembling the former. These two idols were so intimately united, in the opinion of the poor Indians, that they as-

cribed to them the same attributes, and paid them the same honours. The walls and altars of these chapels were immensely rich, being covered with jewels and precious stones, set on feathers of various colours. There were eight of these temples in Mexico, of similar architecture, and equal wealth; beside 2000 small ones, dedicated to so many different gods, every street having its tutelar deity; every distress, or calamity, its particular altár.

On an island in the lake, about two leagues from Mexico, was situated Iztacpalapa, the two cities having a communication by a spacious stone causeway. This town consisted of 10,000 houses, many of which were built like those of Mexico. The rooms of the Cacique's palace, were hung with cotton linen, finely painted; and among the curiosities in the garden, he had a square reservoir, with stairs to go down to the bottom, each side being 400 paces. Another city, called Cholula, was, for beauty, like Valladolid, in Spain, containing 20,000 souls, and having suburbs of equal dimensions. The city of Tlascala was also built with stone and brick, like the houses of Mexico, and was situated on four eminences, which were united and defended by a stone wall; so well were the Mexicans skilled in architecture, in those days, though now there are not any towns in the country built of brick or stone, except those in possession of the Spaniards. As to the Indian antiquities about Mexico, the Spaniards have destroyed the greatest part of them, but about 7 leagues from the city, there still remain two remarkable pieces, viz. the pyramids of the sun and

moon, the founders of which are not known. They appear cut out in steps, like those of Egypt; and on the top of them once stood two images of a monstrous size, representing the sun and moon, which the Indians worshipped. The pyramid of the sun stands about 200 paces from the other, and is about a fourth part higher. *Wonders of Nature and Art.*

SOUTH AMERICA.



MOUNTAINS.

THE mountains of South America constitute some of the grandest objects in natural geography ; being not only the most lofty on the face of the globe, but intermixed with volcanoes of the most sublime and terrible description. The extent is also prodigious, the Andes stretching in one line from the capes of Isidro and Pilares, in the southern extremity of the continent, to the west side of the gulf of Darien, a space of no less than 4600 miles, as they generally follow the windings of the coast, at the medial distance of about 100 miles. The chief summits are near the equator, not far from the city of Quito.

Chimborazo, the highest of these mountains, about 100 British miles to the south of Quito, and about 10 miles to the north of Riobamba, was computed by the mathematicians, sent by the king of France, at 3217 toises above the level of the sea, or 20,280 feet : about 5000 feet higher than Mont Blanc. But these mountains are elevated on the high plain of Quito, which constitutes more than one third of the computed height ; so that, con-

sidered as mere excrescences from the land, they still yield to Mont Blanc. PINKERTON.

Acosta relates, that he once ascended one of the highest of these mountains in Peru, called Pariacaca ; and that he went prepared according to the best instructions he could get, with several more who had the like curiosity ; but, notwithstanding all his precautions, when he came near the top, he was seized with such pains, that he thought he should have fallen to the ground ; and, the rest of the company feeling similar emotions, they all hastened down as fast as they could, without waiting for one another. They were all taken with violent retchings, and not only brought up green phlegm, and choler, but a great deal of blood. This lasted for three or four hours, till they had descended to the lower part of the mountain ; but it seems the sickness generally goes off before they get to the bottom, and is attended with no ill consequences. People, who pass this ridge of mountains, in any part of them for upwards of 500 leagues, are affected in like manner, but more in some places than in others. Acosta had passed the Andes at four different places, and always felt the like disorder, but not so much as at Pariacaca ; and the best remedy they found against it, was, to stop their mouths, noses, and ears, as much as possible, the air being so subtile and piercing, that it affects the entrails both of men and beasts. This, indeed, is no wonder, since the height of the Andes is such, that the Alps, in comparison to them, seem but as ordinary houses in regard to lofty towers. Hence, our author

concluded, that the air on the top of these mountains, was too pure and subtile for animals to breathe in, they requiring a grosser medium;* and this, he supposed, occasioned the above mentioned disorder in the stomach. As to the retchings, complained of by those who pass the Andes, it is remarkable, that those who have travelled over that high chain of them in Chili, called the Cordillera, are not affected with such disorders, but only with a difficulty of breathing, which is perceived more or less on the tops of all high mountains; so that in Peru, there may possibly be a concurrence of some other causes, beside the thinness of the air, to produce the above effects, since the mountains of Chili are considerably higher, and, consequently the air at the top of them is more rarefied.

In order to give a more perfect idea of the climate on the top of these mountains, we shall give some account of that which prevailed on Pichincha, when the mathematicians, sent thither by the kings

* As too gross, so too rare an air is unfit for respiration, as appears, not only from experiments made by the air pump, but from the accounts of those, who have been on the tops of very lofty mountains, where the air is considerably rarefied. A clergyman who had visited the high mountains of Armenia, told Mr. Boyle, that, whilst he was on the upper part of them, he was forced to fetch his breath oftener than usual; and, taking notice of it when he came down, the people told him it was what they themselves had frequently experienced. The same ecclesiastic made the like observation, on the top of a mountain in the Cevennes; and a traveller on one of the highest ridges of the Pyrenees, called Pic de Midi, found the same inconvenience, he and his company being obliged to breathe shorter and oftener than in the lower air.

of France and Spain, were stationed there, in order to make observations on the figure of the earth. It ought to be observed, that this mountain is almost directly under the equinoctial, and that though it is famous for its great height, it is 1278 feet, in a perpendicular line, lower than the mountain of Coto-paxi ; but it will be impossible for the reader to conceive the comparative coldness of the summit of the last mentioned mountain, from that felt on this, since it must exceed every idea that can be formed in the human mind, though both are situated in the midst of the torrid zone.

Pichincha was formerly a volcano, but the mouth, on one of its sides, is, at present, covered with sand and calcined matter, and neither fire nor smoke is seen to issue from it. Don Ulloa observes, that they found the cold on its top extremely intense, and the wind violent ; they were also frequently so involved in so thick a fog, or, in other words, a cloud, that an object, at six or eight paces distant, was scarcely perceptible. The air grew clear by the clouds descending nearer to the surface of the earth, where they surrounded the mountain on all sides, to a vast distance, representing the sea, with the rock standing like an island in the centre. When this happened, they heard the dreadful noise of the tempests, that discharged themselves on the city of Quito, and the neighbouring country. Looking down, they saw the lightning issue from the clouds, and heard the thunder roll far beneath them. While the lower parts were involved in clouds and rain, they enjoyed a delightful serenity ;

the wind was abated, the sky clear, and the enlivening rays of the sun moderated the severity of the cold. But, when the clouds rose, their thickness rendered respiration difficult, snow and hail fell continually, and the wind returned with all its violence ; so that it was impossible to overcome entirely, the fear of being, together with their hut, blown down the precipice, or of being buried beneath it, by the daily accumulation of ice and snow. Their fears were likewise increased by the fall of enormous fragments of rocks. Though the smallest crevice visible in their hut, was stopped, the wind was so piercing that it penetrated through ; and though the hut was small, crowded with inhabitants, and had several lamps constantly burning, the cold was so great, that every person was obliged to have a chafingdish of coals, and several men were constantly employed every morning to remove the snow which fell in the night. By the severity of the cold, their feet were swelled, and grew so tender, that they could not walk without extreme pain ; their hands were also covered with chilblains, and their lips so swelled and chapped, that every motion, in speaking, made them bleed.*

* Mr. Bouguer, who was engaged in the same expedition, says, " There is, in all this range of mountains, as far as I have travelled, a constant inferior boundary, beyond which, the snow never melts ; this boundary, in the midst of the torrid zone, I found to be 2434 fathoms above the level of the South sea. The snow, indeed, falls much lower, but then it is subject to be melted the very same day, whereas, above that, it preserves itself,

" The gather'd winter of a thousand years."

Cotopaxi, by barometrical experiments, is estimated at 18,600 feet, and situated about 25 miles S. E. of Quito. It became a volcano at the first arrival of the Spaniards in this country; and a new eruption happened in 1743, which had been for some days preceded by a continual rumbling in its bowels; after which an aperture was made in its summit, and likewise in three others near the middle of its declivity, at that period buried under prodigious masses of snow. The ignited substances ejected on that occasion, mixed with the vast quantity of snow and ice, melting amidst the flames, were carried down with such amazing rapidity, that, in an instant, the plain from Callao to Latacunga, was inundated; the houses of the poor inhabitants were borne down, and great numbers of them perished. The river of Latacunga was the canal of this dreadful flood; till, being too small for receiving the prodigious current, it overflowed the adjacent country, carried away all the buildings within its reach, and rendered the land, near the town of the same name, like a vast lake. The inhabitants retired to a spot of higher ground behind the town, while those parts of it that stood within the current, were entirely destroyed. During three days the volcano ejected cinders, while torrents of melted snow and ice, poured down its sides. The fire lasted several days longer, and was accompanied with terrible roarings of the wind, rushing through the mouth of the volcano. At last all was quiet, and neither fire nor smoke were to be seen. But, in May, 1744, the flame forced a passage through several other

parts of the sides of the mountain ; so that, in clear nights, the flames being reflected by the transparent ice, formed a very grand and beautiful illumination. But on the 13th of November following, it ejected such prodigious quantities of fire and ignited substances, that an inundation, equal to the former, soon ensued ; and the inhabitants of the town of Latacunga, for some time, gave themselves over for lost.

We are told that there are fiery meteors about these mountains, sometimes so high in the air, as to resemble stars ; and sometimes so low, as to frighten the mules, by buzzing about their ears and feet. But a phenomenon, which in this climate must appear very extraordinary, is said by Mr. Bouguer, to happen almost every day on the tops of these mountains ; though these gentlemen were the first who ever mentioned them in Europe. The first time, our author observed, was when they were on the summit of Pambamorca ; a mountain not so high as Pichincha. A cloud, in which they were involved at break of day, dissipating, they saw the rising sun extremely splendid, and the cloud passed on the other side, opposite to the sun, where it appeared very thin, and was about 20 yards from the place where they were standing ; when each of them saw in it, as in a lookingglass, his own image, and, what appeared still more extraordinary, the head was encompassed with a glory, like that seen round the heads of saints in pictures ; each head being, as it were, the centre of three concentric irises of very lively colours, and each with the same varieties as a rainbow, the red being outward ; the last or most

external colours of one, touched the first of the following ; and at the same distance from them all, was a fourth arch entirely white. These were perpendicular to the horizon ; and as the person moved, the phenomenon moved also. But, what was very extraordinary, though there were six or seven persons, each could see none but his own shadow, because the cloud had an uneven surface. The diameter of the arches gradually altered with the ascent of the sun above the horizon ; and the phenomenon itself, after continuing a considerable time, insensibly vanished. Several of the gentlemen, both French and Spanish, have particularly described this phenomenon ; and Mr. Bouguer concludes with saying ; “This was a kind of apotheosis to each spectator ; and I cannot forbear mentioning again, that each enjoyed the secret pleasure of seeing himself adorned with all these crowns, without perceiving those of his neighbours. I must, however, observe, that this phenomenon never appears, but when the aqueous particles of the cloud are frozen.”

Ulloa observes, that the roads, over some of these mountains, are not the least of these many extraordinary particulars relating to them. These are in many places so narrow, that the mules have scarcely room to set their feet ; and in others there is a continued series of precipices. These roads are, likewise, full of holes, near three quarters of a yard deep, in which the mules put their fore and hind feet. Whence they sometimes draw their bellies, and their riders' legs, along the ground. These

holes indeed serve as steps, without which the precipices would be in a manner impassable ; but, should the mule happen to put his feet between two of these holes, or not place them right, the rider falls, and if on the side of the precipice, inevitably perishes. But the manner of descending appears still more dangerous. On one side are frequent steep eminences, and on the other dreadful abysses ; and, as they generally follow the direction of the mountain, the road, instead of being on a level, forms steep eminences and declivities. The mules are sensible of the caution necessary in these descents ; for coming to the top of an eminence they stop, and having placed their fore feet close together, put their hind feet a little forwards, as if going to lie down. Having in this attitude taken a survey of the road, they slide down with the swiftness of a meteor. All the rider has to do is to keep himself fast in the saddle, for the least motion is sufficient to destroy the equilibrium of the mule, in which case they both unavoidably perish.

The tediousness and danger of the way, however, is in some parts alleviated and rendered more tolerable by the fine prospects and agreeable cascades, naturally formed among the rocks and mountains. In some parts, the water in the valley springs up to a great height, like artificial fountains, amongst odoriferous plants and flowers, that yield a delightful prospect. Many of these streams and springs are so exceedingly cold, that a man can scarcely drink them, or hold his hand in them above a minute ; but in some places there are hot springs which

leave a green tincture in the channel, through which they pass, and are reckoned good against many distempers. From most of the mountains descend large and rapid rivers ; and we read of a natural bridge of rocks over one of them, from the vault of which hang several pieces of stone resembling icicles, formed as the water drops from the rock, into various shapes and of different colours. This bridge is broad enough for three or four carts to pass abreast ; and there is another bridge near it laid over by art (as some say) between two rocks ; but our author, who saw it, thinks it rather the work of nature. It is so far above the river that he could not hear the stream, though it runs with great rapidity ; and though the river be of a considerable breadth, it appeared like a brook, when he looked down from the bridge, which he could not do without horror.

Acosta tells us that there are mountainous, uninhabited deserts, where a sudden blast of air sometimes strikes a traveller dead in an instant, and that the Spaniards formerly passed these mountains in their way to Chili ; but now either go by sea, or take another road by land, to avoid the danger of crossing them, in which journey many have perished, and others have lost their fingers and toes, and have been rendered cripples. The same author relates, that general Costilla marching over them with his army, great part of his men suddenly fell down dead, and that bodies remained there without stench or corruption. As incredible as this appears, it seems to be confirmed by the reports of European seamen, who assure us, that they have

seen great numbers of bodies of men, women, and children, lying dead upon the sands in Peru, and looking as fresh as if they had not lain there a week; but, when they were handled, they proved as dry and light as a sponge or piece of cork. Whatever was the cause of the death of those people, it is agreed on all hands, that the dryness of the Peruvian air, and the heat of the sands, preserved their bodies from putrefaction. *Wonders of Nature and Art.*

According to Homboldt, who lately visited South America, (see Journal de Physique, Messidor an, ix. July, 1801) there are three remarkable chains of mountains, which proceed from west to east parallel to the equator; and which by their height deserve attention as much as the Carpathian mountains, or the Pyrenees, though it has been supposed that, on the east of the Andes, immense plains extend to the shores of Guiana and Brazil, and even to Buenos Ayres, and Patagonia.

The most northern range, or that of the coast of Venezuela, is the most lofty, but narrowest. From the high plain of Quito, the great chain of the Andes extends, by Popayan and Choco, on the west of the river Atrato, towards the Isthmus, where on the banks of the Chagre, it only forms mountainous land about 1200 feet high. From the same Andes proceed several branches, one called the Sierra de Abibe, towards the province of St. Marta. This chain of the coast is restricted, as it approaches the gulf of Mexico, and cape of Vela, and afterward runs due east toward the mountain of Paria, or ev-

en to the isle of Trinidad. The greatest height is in the two Sierras Nevadas of St. Marta, and of Merida. The first being near 5000 varas, or Spanish yards, and the second, 5400 varas, about 2350 toises, or 14,000 English feet, above the sea. Several mountains of this chain are, perhaps, equal in height to Mont Blanc; perpetually covered with snow, and often pouring from their sides, streams of boiling sulphureous water: and the highest peaks are solitary amidst mountains of little height; that of Merida is near the plain of Caraccas, which is only 260 feet above the sea. The vallies in the branch, on the west of the lagoon of Maracaybo, are narrow, and run from north to south. That part which extends from Merida to the east, has vales running east and west, formed by parallel ridges; one of which passes to cape Codera, while the second is three or four leagues further to the south. Our author supposes that the wide plains were formerly lakes; but is too fond of bending nature to his theories, while he ought to have been contented with the observation of facts. The general height of the chain of the coast, is from six to eight hundred toises, the Nevada of Merida, as already mentioned, 2350, and the Silla de Caraccas, 1316; lowering towards the east, cape Codera is only 176 toises. But this depression is only of the primitive rock, for there are secondary calcareous mountains from cape Unara, which are higher than the gneiss, or foliated granite, and the micaceous schistus. These calcareous mountains, covered with calcareous freestone, follow this chain on its southern side,

and increase in height towards the eastern point of the continent. The chain of the coast is more steep towards the north than the south; and there is a dreadful perpendicular precipice of 1300 toises, in the Silla de Caraccas, above Caravelledo, the northern part of this chain being, perhaps, broken by the gulf of Mexico.

The second chain, that of Parima, or of the cataracts of Oronoko, is little known, and was scarcely deemed passable till within these 30 years, since the expedition of Ituriaga and Solano. The volcano of Duida is in latitude 3° 13 minutes. This chain leaves the Andes, near Popayan, and, stretching west to east from the source of the Guaviari, appears to stretch to the northeast of that river, forming the cataracts of Maypura, and Atures, in the Oronoko, latitude 5° , which are truly dreadful, but present the only passage yet opened towards the vale of Amazons. Thence, so far as can be judged from our author's confused description, this chain continued its course northeast to the river Caronis, the breadth being, sometimes, not less than 120 leagues: Homboldt must mean, that branches occur of that length. Further to the east, the continuation is little known. The ferocity of the Guaicas and Guajaribos, forbid any approach beyond the little cataract on the east of Chiguera, but Don Antonio Santos, disguised as an Indian, passed from the mouth of the river Caronis, to the little lake of Parima, and disclosed the continuation of this range, between 4° and 5° north latitude, where it is about 60 leagues in breadth, dividing the waters which fall

into the Oronoko, and Esquibo, from those that fall into the river Amazons. Further to the east, this range becomes still wider, descending south along the Mao, where the Dutch style a part of it Dorado, or the mountain of gold ; being composed of bright micaceous schistus, which has given a like reputation to a small isle, in the lake of Parima. To the east of Esquibo, this range takes a southeast direction, and joins the granitic mountains of Guiana, which give source to the river of Surinam, and others. This last group of mountains is of great extent, the same gneiss being found at $8^{\circ} 20'$, and $2^{\circ} 14'$. This wide range is inhabited by a number of savage tribes, little or not at all known in Europe. No where does it seem to rise to an equal height with the northern range of the coast, the mountain of Duida, not far from Esneralda, being reputed the highest, and, measured by Homboldt, was found 1323 toises above the sea ; but it is a picturesque and majestic mountain, ejecting flames towards the end of the rainy season, and situated near a beautiful plain, covered with palm trees and anannas. Towards the east, it seems to expire in broken rocks ; but there is no appearance throughout of any secondary strata, the rocks being granite, gneiss, micaceous schistus, and horneblende slate.

The third chain of primitive mountains, or that of Chiquitos, is only known to our author, by the accounts of those, who have passed the Pampas. It unites the Andes of Peru and Chili, with the mountains of Brazil and Paraguay, stretching from La Paz, Potosi, and Tucaman, through the prov-

inces of Moxos, Chiquitos, and Chaco, towards the government of the Mines, and of St. Paul, in Brazil. The highest summits appear to be between 15° and 20° ; the rivers there, passing to that of Amazons, or that of La Plata.

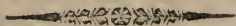
Between these three great ridges, are three immense vallies, that of Oronoko, that of the river of Amazons, and that of the Pampas of Buenos Ayres, from 19° to 52° south latitude, all opening to the east, but shut on the west of the Andes. The middle valley, or that of the Amazons, is covered with forests, so thick, that the rivers alone form roads; while those of Oronoko and Pampas, are savannas, or grassy plains, with a few scattered palms; and so level, that for 800 square leagues, there is no inequality above eight or ten inches in height. In the northern plain, the primitive rock is covered with limestone, gypsum, and freestone; while in that of Amazons, the granite every where rises to day. The general inclination is to the northwest, which, according to our author, is the usual arrangement of primitive rocks. Petrifications are uncommon even in the Andes, where there are sometimes patches of gypsum, and secondary limestone; while the range of Parima consists entirely of granite, and other primitive rocks. But in a calcareous freestone of the northern ridges of the coast, Humboldt found vast numbers of shells, seemingly of recent petrification, as they are those of the sea, now nine miles distant. The belemnite and ammonite, seem unknown, though s•

common in Europe. In the plain of Oronoko, petrified trees are found in a coarse breccia.

Among the primitive rocks, granite forms the chain of Parima; while in that of the coast, it is covered, or mingled with gneiss, and micaceous schistus. It is sometimes stratified in beds, from two to three feet thick: and sometimes contains large crystals of felspar. The micaceous schistus sometimes presents red garnets, and sappare; and in the gneiss of the mountain of Avila, green garnets appear. Sometimes nodules of granite are found in the same substance, or, in gneiss consisting of finer grains, gathered by some local attraction. In the range of Parima, there occur large masses of most brilliant talc, formerly imparting such reputation to the Dorado, situated between the rivers Esquibo and Mao, and other mountains, which, like burnished gold, reflect the light of the sun. Smectite, or soft jad, is formed into idols; and Condamine discovered that variety of hard jad, called Amazon stone, a name idly applied to the blue felspar of Siberia. Schistose chlorite also occurs; and beautiful horneblende slate rises through the streets of Guaiana, or S. Thome. Other substances are, decomposed felspar or kaolin, primitive limestone, pyrites, and antimony, native gold, grey copper, and malachite. The copper mines of Aroa are alone worked, producing about 1500 quintals, yearly. Slate is rare, but sometimes covers the micaceous schistus; and, in the northern chain, there are rocks of serpentine, veined with bluish

statite. The greenstein of Werner, sometimes occurs in that ridge.

Among the rocks called transitive by Werner, as connecting the primitive with the secondary, are trap, green slate, amygdaloid, and the schistose porphyry of that author, green with crystals of felspar. The secondary rocks are limestone, gypsum, argillaceous schistus, and freestone, or calcareous sandstone, with coarse breccia. PINKERTON.



RIVERS.

THE river of Amazons, so called from a female tribe, innured to arms, discovered on its banks, by the first navigators, but more properly by a native term the Maranon, is celebrated as the most distinguished river, not only in South America, but in the whole world; and this reputation is, no doubt, just, when its magnitude is considered, as well as its length. For in the latter attribute it seems to be rivalled by the Kian Ku of China, and, perhaps, by the Ob of Siberia. When on the comparative scale of merely tracing the course by an accurate map, and allowing for the great changes of direction, the length may be estimated at about 2300 miles; and that of the Rio de la Plata, about 1900; but the estuary of Ob is frozen, and that of the Kian Ku cannot exceed a mile or two in breadth, while the two grand rivers are of surprising magni-

tude. The voyage of Condamine contains the most accurate description, which has yet appeared, of this grand river. The source is not yet absolutely ascertained. The celebrated mathematician just quoted, says, that the Ucaial is the chief stream, as its sources are more remote than those of the supposed Maranon ; and it is a considerable river in the same parallel, where the other is only a torrent. On the other hand, the Maranon makes a greater circuit, and is of extraordinary depth. According to Ulloa, the Maranon issues from the lake of Lauricocha, near the city of Guanueo, south latitude 11° , whence it directs its course south for about 60 miles, then bends east, through the country of Juaxa, where, after falling from the east side of the Andes, it passes north to the city of Jaen. Thence it proceeds in its long progress towards the east, and joins the Atlantic, after a course, including all the windings, of 1100 leagues, or 8300 miles. Ulloa also doubts, whether the Ucaial must not be regarded as the principal stream. In the valuable map of La Cruz, what he calls the ancient Maranon, or Pari, corresponds with the description of Ulloa ; but receives the Apurimac, a river of longer course, rising near the town of Arequipa, on the west of the great lake of Titicaca, south latitude, $16^{\circ} 30'$. If this representation be just, there is no doubt, that the Apurimac is the original and proper river of Amazons ; and both of these sources belong to the Ucaial. The new Maranon, according to La Cruz, rises, indeed, from the lake of Lauricocha, near the source of the Pari ; but runs

northwest, instead of passing south, as Ulloa supposes, by confounding the old and the new Marañon, and the lake of Lauricocha, with that of Chinchay, a few miles to the south, which last gives source to the Pari.

These improvements in the geography seem to establish beyond all doubt, that the Ucaial, from its remotest branch the Apurimac, must be regarded as the genuine Marañon; while the river called the new Marañon (for the name towards its source is omitted) is of far shorter course, and was once styled the Marañon, from a mistake in its fountain. In the map of La Cruz, though the course of the Ucaial be more direct, it amounts to about 17 degrees at its junction with the supposed Marañon, which may be called the river of Lauricocha, while the latter does not exceed 14 degrees and a half. The Ucaial, thus consisting of two main sources, the old Marañon or Pari, and the Apurimac, after passing the great chain of the Andes, bends sometimes northwest, sometimes northeast, till it receives the new Marañon. But the course of the Ucaial being through a more remote country, and more unexplored than that of the Lauricocha; its chief features, and natural history, are less known; and the savages on its banks unfortunately massacred their missionary in 1695, so that Condamine and Ulloa are alike ignorant concerning this noble river, which probably presents objects more grand and interesting than those of the Lauricocha. The Apurimac, struggling through the Andes, must also afford many striking scenes, still lost to scien-

tific observation. The Lauricocha or new Marañon, on the contrary, has been repeatedly described, and was navigated by Condamine from near the town of Jaen, where it begins to be navigable ; thence passing northeast, it arrives at the exterior ridge of the Andes, which it cleaves at a pass called Pongo, a word in the Peruvian language implying a gate. This sublime scene displays the Lauricocha confined between two parallel walls of almost perpendicular rock. From a breadth of 250 fathoms, the river is here contracted to near 25 ; but the rapidity is not extreme, and a raft passes two leagues in about an hour. After the junction of these two great rivers, the Marañon, besides smaller streams, receives from the north the Napo, the Parana, Yupuro, and the great Negro, which has received the Parima ; and from the south the Cuchivara or Araza, and the prodigious stream called Madera, consisting of the Bene, the Mamore, and the Ytenas, the chief sources of which are from the eastern side of the Andes, watering a vast extent of this wide continent. The Madera may indeed be regarded as another grand source of the river of Amazons ; which is also joined from the south by the Topaisa and Shingu, while its estuary is connected with the great Brazilian river called Tocantinas. Like the Missouri and St. Lawrence, the Marañon is discoloured with mud. The breadth, at the Portuguese boundary, is said to be a league, but it is generally about two miles, and no bottom is found at 103 fathoms. The effect of the tides is perceivable to the distance of 600 miles, but Conda-

mine thinks that the swell is occasioned by the progress of the tide of the preceding day. The banks are generally crowned with vast forests of lofty trees, among which are many of a rare and medicinal nature. Serpents of prodigious size are found in the marshes, and alligators are also common. It seems certain, from the disquisition of Condamine, that some female warriors still exist towards the north of this great river. After it has received the Shingu, the breadth from shore to shore cannot be discovered by the eye. Near its mouth the Bore rises from 12 to 15 feet in height, and the noise of this eruption is heard at the distance of 2 leagues.

The Rio de la Plata, or river of silver, is the conjunct flood of the Paraguay, the Pilcomayo, the Parana, and the Urucuay. The main streams are the Paraguay and the Parana, and it would seem that the latter is the longest and most considerable, rising in the great mine mountains of Brazil, latitude 19 degrees, and bending south, then west till it receives the Iba Parana, after which it bends S. W. till it is joined by the Paraguay, while the conjunct rivers are still called the Parana by the natives, and the Rio de la Plata by the Spaniards. Yet the length of the Paraguay, according to the map of La Cruz, does not yield half a degree to that of Parana; and the straightness of its course gives it the appearance of the principal river. The grand cataract of the Parana is in latitude 24° , not far from the city of Cirayra; but it is rather a series of rapids, for a space of 12 leagues, amidst rocks of tremendous and singular forms. This noble river

is also studded with numerous islands, and Spanish vessels navigate to the town of Assumption, about 40 leagues from the sea. On the shores are often found goods enclosing crystals, but the natural history of the Parana is nearly as obscure as that of the Ucaial. The breadth of the estuary is such, that the land cannot be discovered from a ship in the middle of the stream.

The third great river in South America is the Oronoko, of a most singular and perplexed course. According to La Cruz, it rises in the small lake of Ipava, north latitude $5^{\circ} 5'$; and thence winds almost in a spiral form, first passing to the southeast it enters the lake of Parima; and issues by two outlets on the north and south of that lake towards the west; but after receiving the Guaviari, it bends north, then northeast, till it enters the Atlantic ocean by an extended delta, opposite to the isle of Trinidad; but the chief estuary is considerably to the southeast of that island. Many rivers of great size flow into the Oronoko; and in addition to its singular form, there are other remarkable peculiarities. From the southeast of the lake of Parima, which seems to be a kind of inundation formed by the Oronoko, the White river, called also that of Parima, joins the Black river, and thence the great flood of the Maranon. Another stream, the Siaba, flows from the southwest of the lake into the Black river, and joins another stream, which directly connects the Maranon with the Oronoko. There is always a communication between the Black river and the Maranon, by the Joa Parana.

Hence there are three communications between these great rivers ; a circumstance so uncommon, that when one only was asserted by Spanish authors, it was rejected by geographical theorists as contrary to the usual course of nature ; and Condamine was obliged to enter into a formal disquisition, in order to reestablish it. A route laid down by La Cruz, that of Solano the governor of Caraccas seems to confirm the authenticity of his intelligence concerning the environs of the lake of Parima ; and little doubt can remain concerning these wonderful inland navigations, thus prepared by the hand of nature, and which, in the possession of an industrious people, would render Guiana, or new Andalusia, one of the most flourishing countries in the world.

PINKERTON.

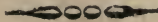
We shall only mention one more river, or at least a considerable stream of water, remarkable for its subterraneous passage. This is in the western parts of Tucuman, a province of Paraguay, where it seems there is a very large and lofty mountain, which from its glittering when the sun shines upon it, is called the Crystal mountain. Under this is extended a frightful cavern, through which runs a river with so many windings and turnings that the water is 24 or 30 hours in its passage from one side of the mountain to the other, according to the computation of some Portuguese, who were rash enough to make the experiment, by hazarding their persons on a rafter made of canes. *Wonders of Nature and Art.*

LAKES.

NO part of the globe displays so great a number of lakes as North America ; and the southern part of the continent is perhaps equally remarkable by their rarity. Many supposed lakes, as that of Zarayos, or Sharayos, in the course of the river Paraguay, only exist during the annual inundations, which are on a far grander scale than those of the Ganges, and may be said to deluge whole provinces. The celebrated lake Parima, called also Paranapintinca or the White sea, is represented by La Cruz as more than 100 British miles in length, by 50 in breadth. This size, and even its existence, have been doubted, as was the noted city El Dorado, the streets of which were paved with gold, a fable which seems to have arisen from a rock of talc, reflecting, like a mirror, the golden rays of the sun. According to La Cruz, this lake receives the Oronoko on the northwest, which afterward emerges, and pursues a westerly course, till it finally bends north and east. The Parima also gives source to the great river of the same name, likewise called the Rio Blanco, which joins the river Negro, and great river of Amazons. In this part of South America, there is, as it were, a contest betwixt land and water ; and so level and mutable is the soil, that the rivers seem dubious which course to pursue, as they flow in every direction, and branches of the Oronoko communicate with the tributary

rivers of the immense Marañon. The natural history of the celebrated lake of Painna would not be a little interesting, but a deep obscurity pervades these regions.

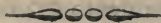
The lake of Titicaca, nearly in the same parallel and in the kingdom of Peru, may be regarded as the most important in South America. Ulloa says that it is of an oval figure, the circumference about 240 miles; and the depth 70 or 80 fathoms. It receives 10 or 12 rivers, and several rivulets; but the water, though not saline, is nauseous, being probably tainted with sulphur or bitumen. It contains two kinds of fish, and is frequented by geese and wild fowl. In an isle of this lake, Mango Capac, the founder of the Peruvian monarchy, reported that the sun, his father, had placed him, with his sister and consort Oello; and here a temple was dedicated to the sun, the most splendid in the kingdom, and profusely decorated with plates of gold and silver. On the Spanish invasion, these treasures are said to have been thrown into the lake. PINK-
ETON.



CATARACTS.

AMONG the numerous cataracts that serve to heighten the effects of this grand alpine scenery, that strikes the eye in every direction, in these wild regions, Bouguer mentions that of the river Bo-

gata, which passes the city of the same name, also called Santa Fe, about eight leagues before it joins the Magdalena, said to be a vertical fall of more than 1200 feet. However this be, the various scenes among the Andes must be variegated with every feature of sublimity.



MINERAL SPRINGS.

IN the sandy plains near the coast of Peru, there are very few springs ; but a great variety in that part which is remote from the sea ; amongst which there is one near Oropesa, whose water is very hot ; and after running a little way it petrifies and forms a rock. It is said the natives use this stone in building their houses, it being soft, light, easily wrought, and yet very durable. Travellers also tell us of springs of liquid matter much resembling tar, and put to the same uses by seafaring people. *Wonders of Nature and Art.*

At the baths of the Incas, (an appellation given to the ancient kings of Peru) there is a spring of water that issues out hot and boiling, and another near it as cold as ice, which used to be tempered and mingled together for those princes to bathe in.

Near Cusco there is said to be a fountain, whose waters, after a short course, turn into salt.

From the top of the mountain Balconotta, by some reckoned the highest in Peru, there rise two

springs, which run different ways, and soon form two considerable streams. Their waters, when they first issue from the rocks, are of ash colour, hot and smoking, and smell like burning coals ; which smell they retain a great way from their source, till they mingle with other streams, and become cool. To these we may add another fountain in Peru, which sends forth a stream almost as red as blood, from whence it has received the name of the Red river. *Wonders of Nature and Art.*



MINES.

EVERY part of South America affords mines of gold and silver, but those rich metals are most abundantly found in Chili and Peru, as well as large quantities of copper, tin, lead, and quicksilver. It is observed, that gold is most frequently found native of all the metals, being rarely met with in a state of ore, and then intermixed with the ores of other metals : but though native gold be free from the penetrating sulphurs which reduce other metals to ores, it is very seldom found pure, but almost constantly a mixture of silver with it, and frequently of copper. If it have any considerable quantity of copper in it, it is easily discovered by its hardness ; but the silver is not so readily detected. Sometimes native gold is found in the mines in pure masses, so large as to weigh 12, 14, or 16

ounces ; but those are very rare. Its more common appearance in its loose state, is in form of what is called gold dust ; that is, small particles mixed among the sand of rivers, which is very frequent in Guinea, and many other parts of the world. But native gold is also found in a middle state, as to size, between the two kinds just mentioned, in the cliffs or perpendicular fissures of the solid strata in the mountains of Chili. These fissures are usually filled with a reddish earth, the native gold being either loose amongst it, or immersed in a debased crystalline stone of a bluish hue, and generally in flattish pieces, from the size of a small pea, to that of a horse bean.

When they have dug out this red marle, it is carried on mules to the lavaderos, as they call them, a sort of basons of water, where it undergoes several repeated lotions in different waters, till the earthy and impure parts are all separated and carried away by the stream, and the gold left at the bottom. In these forms gold frequently appears in those parts of the world where it abounds ; but still the greatest quantities of it are found bedded in masses of hard stone, which lie at vast depths, being often dug at 150 fathoms. There is no peculiar stone in which it is immersed, but it is met with indiscriminately in several kinds, some softer ; some harder, and even in earths. The richest masses are usually a whitish but opaque stone, which is a debased crystal, containing a great deal of white earth, often tinged likewise with black, and sometimes with other colours. In this stone the gold lies in a

great variety of figures, sometimes like small branches, at other times interwoven in narrower or broader veins, or in little flat spangles intermixed with specks of black. But besides this sort, there are many coarser stones in the mines of Peru, which contain considerable quantities of gold, visible in large or small spots, and these are of all colours, but generally white or reddish. In these stones the gold is commonly in small spangles.

In order to separate the gold when dug out of the mines, they first break the ore with iron mallets, and then carry it to the mills, where it is ground to a very fine powder, which is afterward passed through several brass wire sieves. The powder thus prepared, is laid in wooden troughs, with a proper quantity of mercury and water, where it is worked together, and there left to saturate in the sun and air for 48 hours. During this time the mercury imbibes all the gold, without cohering with the coarser earth or sand, which upon inclining the trough, is easily washed away with the water. The mass which then remains is nothing but gold, mercury, and some fine earth, which last they disengage from the mass by repeated effusions of hot water; and the mercury they separate by distillations in large alembics. The gold in this state, though not yet perfectly pure, is called virgin gold, as well as that found in the sand of rivers, or that in grains in the mines, as none of them have passed the fire. After this they usually fuse it in crucibles, and cast it into plates or ingots.

The next metal we shall proceed to consider, is silver, and of this the mines of Peru, and some other parts of America, afford the greatest quantities of any in the world. This metal, as well as gold, is found native more frequently than in a state of ore; what are commonly called silver ores, being no other than stones of various kinds, in which are bedded large quantities of native silver. Sometimes it is also found in the softer fossils, as earths; sometimes it is found loose among strata of sand. That which is lodged in stone is usually deposited in flat masses variously streaked, ridged, and often resembling silver lace; that in earths is frequently branched, and that among sand, in small roundish or oblong granules. However, though silver is thus native and pure, it is frequently met with in a state of ore, and sometimes embodied in the ores of other metals. The proper and peculiar ores of silver are also very various in their appearance; but its most usual ore is a singular and remarkable body, being naturally malleable. The colour of this is a blackish blue, and it so nearly resembles lead, that many have mistaken it for that metal, in its native state. It is found in large irregular masses, sometimes of a laminated structure, extremely heavy, and very rich in metal, containing often three fourths of pure silver; but among these are usually found some of a more debased nature, containing much less silver, and distinguished from the rest by their not being malleable, and of a paler colour. Another appearance of silver in the state of ore, is in brownish masses, obscurely transparent, and somewhat re-

sembling the coarser sorts of amber. These are usually of an irregular shape, often in the form of common pebbles, but sometimes flatted and with rugged edges. This sort of ore breaks with a slight blow, and is also very rich in silver, usually containing near two thirds of its weight in metal. But there is yet another appearance of silver ore, superior to all other ores in beauty, being a compact substance, of a regular texture, of a very bright red, a smooth even surface, and considerably pellucid. This very much resembles the native sandarach,* and is sometimes exactly of the same fine florid red of that body, but more frequently approaches to a crimson. These are the more usual appearances of silver in a state of ore, but it is found with numberless accidental variations; and there are stones of all colours and consistences wrought in different places, for the silver they contain.

In the mines of Peru, some of the ores, as they are called, are grey spotted with blue and red; others have various shades of red, with mixtures of yellow or brown; and others are black, green, or yellow. Some of these are of the nature of one or other of the ores above described, only debased by adventitious mixtures; the others are stones wherein native silver is lodged, which are commonly confounded with the rest under the name of silver ores.

* This is a preparation of orpiment, and is the same with what is otherwise called red arsenic; but there is also a white gum named sandarach, obtained from the trunk and thick branches of the great juniper tree, by incisions made in the heats of summer.

The black ores are the richest and most easily wrought, and the silver they yield is of the best quality. The veins of silver are usually richer in the middle than towards the extremities ; but the richest places are those where the veins intersect.

The most celebrated mines of Peru, are those of Potosi, which have now been opened nearly 260 years, and yet continue to be wrought with equal advantage, as when first discovered ; only with this difference, that the veins, which were then almost on the surface of the mountain, are now sunk to prodigious depths, some of the pits, or wells, being 200 fathoms deep, and yet not incommoded with water. What renders the working of the mines exceedingly dangerous, are the exhalations arising from them, which are even felt on the outside, and affect animals that graze in the neighbourhood : but within, they stupify the miners, none of whom can bear so noxious an air, above a day together. Sometimes, it is so fatal as to kill on the spot, and oblige them to stop up the veins from whence it exhales. The mines of Potosi are the least subject to these vapours, and yet without the herb paraguay, the infusion whereof is drank by the miners, as we do tea, these mines must soon be abandoned. Some millions of Indians have perished in them, and prodigious numbers continue to be destroyed every year.

The mountain of Potosi, which is famous for the immense quantity of silver it has produced, was first discovered to contain that metal, by a mere accident. An Indian, named Gualca, pursuing some

wild goats upon this mountain, and coming to a very steep part, laid hold of a shrub, in order to ascend with the greater celerity ; but, it being unable to support his weight, came up by the roots, and discovered a mass of fine silver ; and, at the same time, he found some lumps of the same metal, among the clods, which adhered to the roots. The Indian, who lived at Porco, hastened home, washed the silver, and made use of it, repairing, when his stock was exhausted, to his perpetual fund. At length, an intimate friend, perceiving the happy change in his circumstances, eagerly inquired the cause ; and repeated his questions with such earnestness, that Gualca, confiding in his friendship, revealed the secret. For sometime, they resorted to the mountain for fresh supplies, till, Gualca refusing to discover his method of purifying the metal, the other, in revenge, revealed the secret to his master, who went, in April 1545, to view this fortunate breach in the mountain ; and the mine was instantly worked with immense advantage.

The first mine had the name of The Discoverer, from its occasioning the discovery of other sources of wealth, enclosed in the bowels of this mountain ; for, in a few days, another was found, no less rich, and was named the Tin mine ; afterward, another was found, and distinguished by the name of Rica, or Rich, as exceeding all the rest. At length, another was discovered, which was called the Mendicita. These are the principal mines of this celebrated mountain ; but there are several smaller, crossing it in all directions.

The importance of these discoveries induced people to flock to Potosi from all parts, particularly from the city of Plata, which stands about 75 miles from the mountain, whence the town of Potosi is at present, near six miles in circuit, and inhabited by many noble families, particularly those concerned in the mines. The air, at the mountains, is, indeed, so cold, as to render all the adjacent country remarkably barren; for it produces neither corn, fruit, nor herbs; and yet the town is so plentifully supplied, as to be in want of nothing, the trade for provisions being greater there than in any other place, Lima excepted. Some provinces sent the best of their corn and fruit, others, their cattle, others, their manufactures; while others resort thither with European goods, as to a sure market. A Spanish author declares, on the best authority, that before the year 1633, it appeared by the public accounts, that the silver, produced by this mountain, amounted to 395,619,000 dollars; which, in 93 years, the time since it had then been discovered, amounted to 41,255,043 dollars per annum. Hence an idea may be formed of the immense trade, that has, for many years, been carried on in this town, which consists entirely of silver, extracted from this mountain, and is still very considerable, though some diminution has been perceived in its produce. In the province of Carangus, which is remarkably cold, there are many silver mines, constantly worked; among which, one called Turko, is remarkable for the ore named by miners machacado, the fibres of the silver forming an admirable intermix-

ture with the stones, in which they are contained. Beside, in the barren, sandy deserts, extending towards the coast of the South sea, are found, by digging in the sand, detached lumps of silver, unmixed with any ore or stone, but what adheres to the metal, they having all the appearance of melted silver, with black terrene particles on the outside. The size and figure of these lumps are very different, some weighing about two marks, or 16 ounces, and some above 100 marks. These lumps of silver are found in different parts of the same ground, though seldom near each other.

The manner of separating silver from its ore, is nearly the same as in gold. They break the ore in the stamping mill, till it is reduced to powder, and then mix it up with mercury into a sort of paste, which they knead in the troughs, till the water has by degrees, washed away all the earthy particles. After this, they strain off part of the mercury from it through a woollen bag, to serve again, and the rest is made to evaporate by the fire. The silver that remains behind, is, last of all, perfectly refined from all heterogeneous matter, by a solution of lead, which, exhaling from it, carries off in fumes, the copper, or other alloy.

Another part of the riches of Peru, are its mines of quicksilver ; those of Guancavelica, or Oropesa, are more famous than the rich mines of Carniola, in Europe. Chili also abounds with mines of copper, but we shall not enlarge upon this subject. *Wonders of Nature and Art.*

ANTIQUITIES.

THE reader will not expect any thing very extraordinary under this head, in a part of the world, whose inhabitants have been generally supposed unpolished and barbarous : but as the Incas of Peru are famous in history, it may not be amiss to give a short account of some of the noble structures, which the Spaniards found, when they first invaded the country. At that time, Cusco was the capital of the kingdom, and there was a castle built in such a surprising manner, that many people who saw it, imagined it could not have been raised, without the assistance of enchantment. This fortress stood on the top of a hill, and on the edge of a precipice, which, towards the town, was perfectly perpendicular. Towards the country, it was defended by triple semicircular walls, of such height and thickness, that they were proof against all the force that could be brought against them. Some of the stones were of such a prodigious size, that it was inconceivable how they were hewn out of the quarry, or brought to the place, the natives having no iron tools, no beasts to draw them, nor engines to raise them to such a height. They were dragged, however, by the strength of men, 12 or 15 leagues, over hills and vallies, and along the most difficult roads ; and there is one stone in particular, to which the Indians gave the name of Syacusa, or “ the Weary,” because it never arrived at the place for which

it was designed. This rock is said to have been drawn 15 leagues by 20,000 Indians, over very rugged and uneven roads ; but, notwithstanding all their care and strength, it got the better of them, and tumbling down the hill, killed several hundred men, who were endeavouring to poise the weight. They raised it, however, once again, and, with incredible pains, dragged it to the plain in the neighbourhood of Cusco, where they were obliged to leave it, being unable to get it up the hill on which the castle was situated. Between each wall of the castle, there was a space of 25 or 30 feet, which was filled up with earth, and every wall had a breastwork on the top of it.

Beyond these walls were three large towers, standing in a triangle, answerable to the bending of the walls. The principal of these three towers had a fountain of excellent water, brought to it by a subterraneous aqueduct, the source of which was only known to the Inca and his council, lest an enemy should discover the stream, and cut it off in case of a siege. This tower was round, and in it, the Inca had an apartment, nobly furnished, like the rest of his palaces. The other two were square, and contained rooms for the garrison, who were all of the royal blood. Underneath these towers were apartments as large as those above, and they had a communication with each other, by a subterraneous labyrinth, through which, it was difficult for a stranger to find his way without a guide. It is said, that part of the new city of Cusco, was built with the stones found in the ruins of this fortress.

The palaces of the Incas in Cusco, beside the castle just mentioned, were very spacious and magnificent, some of the halls being 200 paces in length, and 50 or 60 in breadth ; insomuch that the Spaniards converted one of them into a cathedral church. The stones of these buildings were so well joined together, that they needed no cement ; but sometimes, for the sake of ornament, they closed up the seams of their structures with melted gold and silver, which occasioned the total destruction of most of them, the Spaniards subverting the very foundations in hopes of finding treasure. Most of the apartments were decorated with figures of men, beasts, birds, and other animals, cast in gold ; and on the walls, instead of tapestry, were plants and flowers of the same metal, intermixed with serpents, butterflies, and other reptiles and insects. It seems there were no chairs in these palaces, but the Inca himself sat on a stool made of gold, without arms or back, having a pedestal of the same metal. They had also cisterns of gold in their bagnios, and the utensils of their kitchens, used in the meanest offices, were likewise of gold : but they neither purchased houses nor lands with this metal, as we do ; but used it as an ornament when living, and buried it with them when they died. The royal gardens were not only planted with great variety of trees, flowers, &c. but the figures of those, and all sorts of animals were made of gold, and placed in the walks to adorn them.

These magnificent palaces, however, were greatly inferior to the temple of the sun, which was en-

riched with the greatest treasures that the world ever beheld. It was built of freestone, and lined with gold, the ceiling being also of the same metal, though the roof itself was no better than common thatch. It was divided into several cloisters, or apartments, in the principal whereof, towards the east, was placed the image of the sun, consisting of one gold plate, that covered the whole breadth of the chapel, and twice as thick as the plates that covered the other walls. This image was of a circular form, representing the sun, with his rays darting from him, much in the same manner as he is drawn by European painters; and, on each side of it, were placed the bodies of the deceased Incas, so embalmed, that they seemed to be alive. These were placed on thrones of gold; but on the arrival of the Spaniards, they were concealed by the Indians, with most of the treasures of the temple. This temple had several gates, covered with gold; and round the top of it, on the outside, was a cornice three feet deep, consisting of gold plate.

Beside the chapel of the sun, there were five others of a pyramidal form, the first of which was dedicated to the moon, deemed the sister and wife of the sun; and the doors and walls of this structure were covered with silver. Here was the image of the moon, of a round form, with a woman's face in the middle of it; and on each side of the image were placed the bodies of the deceased empresses, ranged in order.

Next to this chapel was that of Venus, by the Peruvians called Chasea, who was much esteemed as

an attendant on the sun, as the rest of the stars were deemed maids of honour to the moon ; and this chapel was likewise plated with silver.

The third chapel was dedicated to thunder and lightning, which they looked upon as servants of the sun ; and this was ceiled and wainscoted with plates of gold.

The fourth was dedicated to the rainbow, as owing its original to the sun ; and this was also covered with gold, and had on one side of it, a representation of the rainbow.

The fifth chapel was an apartment for the use of the high priest, and others, who officiated in the temple, who were all of the royal blood ; and this, like the chapel of the sun, was adorned with gold.

There was no other image worshipped in the temple, but that of the sun, but they had the figures of men, women, and children, and of various birds, beasts, and other animals, of wrought gold, placed in it for ornament ; and all the vessels and utensils were of the same precious metal. We likewise read of a sort of nunnery, wherein were kept a thousand or fifteen hundred virgins, all of the blood of the emperors, who were intended only for the service of the temple. Nor was it only in the city of Cusco that a temple was erected, but almost every large town in the country had one adorned in the like sumptuous manner.

The Mexicans and Peruvians being far advanced before the rest of the aborigines in civilization, some account of them, together with their different systems of government, will not be uninteresting.

When compared with other parts of the new world, Mexico and Peru may be considered as polished states ; but if the comparisons be made with people of the ancient continent, the inferiority of America, in improvement, will be conspicuous, and neither the Mexicans nor Peruvians, will be entitled to rank with those nations, which merit the name of civilized. They, like the rude tribes around them, were totally unacquainted with the useful metals, and the progress they had made in extending their dominion over the animal creation, was inconsiderable. Mexico was first subjected to Spain ; but our acquaintance with its laws and manners, is not, from that circumstance, more complete. Cortez, and the rapacious adventurers who followed him, had not leisure or capacity, to enrich either civil or natural history with new observations. It is rather from incidents which they relate occasionally, than from their own deductions and remarks, that we are enabled to form some idea of the genius and manners of the people. The obscurity in which the ignorance of its conquerors involved the annals of Mexico, was augmented by the superstition of those who succeeded them. As the memory of past events was preserved among them, by figures painted on skins, cloth, &c. the early missionaries, unable to comprehend their meaning, and struck with their uncouth forms, conceived them to be monuments of idolatry, which ought to be destroyed. In consequence of this fanatical zeal of the monks who first visited New Spain, and which their successors soon began to lament, what-

ever knowledge of remote events such rude monuments contained, was entirely lost, and no information remained concerning the ancient revolutions and policy of the empire, but what was derived from tradition, or from some fragments of their historical paintings that escaped the barbarous researches of these monks.

Their country, as the Mexicans relate, was originally possessed by small independent tribes, whose mode of life and manners, resembled those of the rudest savages. But about a period corresponding to the beginning of the 10th century, several tribes moved from unknown regions towards the north and northwest, and settled in different provinces of Anabac (New Spain.) These, more civilized than the originals, began to form them to the arts of social life. At length, near the beginning of the 13th century, the Mexicans, more polished than any of the former, advanced from the gulf of California, and took possession of the plains adjacent to the great lake. In about 50 years they founded a town, since called Mexico. The Mexicans, long after their new establishment, continued, like other martial tribes, unacquainted with regal dominion, and were governed in peace, and conducted in war by such as were preeminent either for wisdom or valour. But as their power and territories increased, the 'supreme authority centred at last in a single person; and when Cortez invaded the country, Montezuma was the ninth monarch who had swayed the Mexican sceptre, not by hereditary right but by election. According to this; the du-

ration of their empire was very short. From the first migration of their tribe, they can reckon little more than 300 years. From the establishment of their government, not above 130 years by one account, or 197 by another. If we suppose the Mexican state to have been of higher antiquity, as the Spanish accounts would lead us to suppose, it is difficult to conceive how, among a people, possessing the art of recording by pictures, and who considered it essential to teach their children to repeat the historical songs which celebrated the exploits of their ancestors, the knowledge of past transactions should be so limited. If we adopt their own system, it is no less difficult to account either for that improved state of society, or for the extensive dominion, to which their empire had attained, when visited by the Spaniards.

But it is not by theory that history decides ; it produces facts. In collecting these, in the present inquiry, some occur that suggest an idea of considerable improvement, while others seem to indicate the reverse. Both shall be laid before the reader, that, from comparing them, he may determine on which side the evidence lies. The right of private property was perfectly understood. Among savage tribes, an idea of a title to exclusive possession was hardly known. But in Mexico, the distinction between real and moveable possessions, between property in lands, and goods, had taken place. Every person denominated a freeman, had land held by various tenures. Some held it in right, and it descended to their heirs. The title of others, was

derived from the office or dignity they enjoyed ; and when deprived of the latter, they lost the former. Both these modes were deemed noble, and peculiar to the highest class. The body of the people held their property by a different tenure. In each district a portion of land was measured out, according to the number of families. This was cultivated by the whole ; its produce was deposited in a common warehouse, and divided according to their respective exigences.

The number and greatness of the cities of Mexico, is one of the most striking circumstances that distinguish it from its neighbours. The Spaniards in their travels, accustomed to see the natives in a savage state, were astonished, on entering New Spain, to find them residing in extensive towns. In the fervour of admiration, they compared Zempoalla, though a town only of the second size, to cities of note in their own country. When, afterward, they visited Tlascala, Cholula, Tacuba, Tezeuco, and Mexico itself, their amazement increased so much, that it led them to convey ideas of their magnitude and populousness, bordering on what is incredible. Some abatement, therefore, ought to be made from their calculation of the inhabitants of the Mexican cities, and we may fix the standard of their population less than they have done ; but still they will appear of such consequence, as are not to be found but among people who have made considerable progress in the arts of social life.

The separation of professions among the Mexicans, is another symptom of improvement. Arts,

in the early ages of society, are so few and simple, that each man is sufficiently master of them all, to gratify every demand of his desires. But in proportion as refinement spreads, the distinction of professions becomes more necessary, and consequently they branch out into numerous divisions. Among the Mexicans this separation had taken place to a considerable extent. The functions of the mason, weaver, goldsmith, painter, and of several other crafts, were carried on by different persons. To one object alone each confined his industry. Their various productions were brought into commerce, and by the exchange of them in the markets held in the cities, their mutual wants were supplied.

The distinction of ranks was also established in Mexico. Among the savage tribes, strangers to the idea of property, the difference in condition resulting from it is unknown. But among the Mexicans, the body of the people were in a most humiliating state. Those called *Mayeques*, resembled in condition those peasants, who, under the feudal system, were considered as instruments of labour. The *Mayeques* were conveyed, together with the lands on which they were settled, from one proprietor to another. Others were reduced to the lowest form of subjection, that of domestic servitude. Their condition was held to be so vile, that a person who killed one of them, received no kind of punishment. The nobles holding large territories, were divided into various classes; to each of which, titles of honour belonged. The monarch, exalted

above all, enjoyed extensive power and supreme dignity. Thus the distinction of ranks was completely established. Each knew what he could claim, and what he owed. The people in the presence of their sovereign, durst not lift their eyes from the ground. The nobles themselves, when admitted to an ordinance, entered barefooted in mean garments, and as his slaves, paid him homage approaching to adoration. This respect, from inferiors to those above them, was established with such accuracy, that it incorporated with their language, and influenced its genius and idiom.

The spirit of the Mexicans, thus familiarized to subordination, was prepared for submitting to monarchical government. But the description of their policy and laws by the Spaniards, is so inaccurate, that it is difficult to delineate their constitution with precision. Sometimes they represent the monarch as absolute, deciding according to his will. On other occasions, we discover traces of established customs and laws, framed to circumscribe the power of the crown; and we meet with rights and privileges of the nobles, which seem opposed against its encroachments. This inconsistency has arisen from inattention to the innovations of Montezuma. His aspiring ambition subverted the ancient system, and introduced a pure despotism. The chiefs of the first rank, submitted to the yoke with such reluctance, that from impatience to shake it off, many of them courted the protection of Cortez. It is not then under the reign of Montezuma, but under those of his predecessors, that we can discover the

original form and genius of Mexican policy. That body of citizens who formed the nobility, were the most respectable order in the state. Their number was great. It appears there were in the empire 30 of this order, each of whom had in his territories, about 100,000 people, and subordinate to these there were about 3000 nobles of a lower class. The territories belonging to the chiefs of Tezeuco and Tacuba were hardly inferior in extent to those of the Mexican monarch. Each possessed complete territorial jurisdiction, and levied taxes from their own vassals. But all followed the standard of Mexico in war.

In tracing these outlines of the constitution, an image of feudal policy in its most rigid form presents itself, and we discern a nobility possessing almost independent authority, a people depressed into the lowest state of subjection, and a king entrusted with the executive power. Its spirit and principles seem to have operated in the same manner in the new world. The jurisdiction of the crown was very limited. All real and effective power was retained by the nobles, in their own hands. Jealous of their rights, they guarded with anxiety the encroachments of their sovereigns. By a law of the empire, it was provided, that the king should not determine concerning any point of importance without the approbation of the council composed of the nobility. The nobles did not permit the crown to descend by inheritance, but election. The right of election was originally vested in the whole body of nobles, but was afterward committed to six elec-

tors. From respect to their kings, the choice generally fell upon some of the family. But as activity and valour were more prized by a people perpetually engaged in war, than a strict adherence to birth, collaterals of mature age or distinguished merit, were often preferred to those who were nearer the throne in direct descent. To this maxim the Mexicans appear to have been indebted for such a succession of able and warlike princes. While the jurisdiction of their monarchs continued to be limited, it is probable it was exercised with little ostentation. But as their authority increased, their splendour increased. It was in this state the Spaniards beheld it, and struck with the appearance of the court, they describe its pomp at great length. But it was not in mere parade the potentates exhibited their power, they manifested more beneficially in the regularity with which they conducted their internal administration. Judges were appointed for each department, and if we may rely on the Spanish writers, justice was administered in the Mexican empire with a degree of order and equity, resembling what takes place in societies highly civilized. Their attention in providing for the government was not less sagacious. Taxes were laid upon land, upon the produce of industry, and upon commodities of every kind exposed for sale. As the use of money was unknown, all the taxes were paid in kind, and thus not only the natural productions of all the provinces, but every species of manufacture, and every work of ingenuity and art, were collected in the public storehouses.

Their improved state is likewise visible in their police. The institution of public couriers to convey intelligence from one part of the empire to the other, was a refinement not introduced into any kingdom of Europe at that time. The structure of the capital in a lake, with artificial dykes, and causeways, which seemed as avenues to it, erected in the water with no less ingenuity than labour, seems an idea that could only occur to civilized people.

Their progress in the arts is considered as the most decisive proof of their refinement. They represented men, animals, and other objects, by such a disposition of coloured feathers, as produced all the effects of light and shade. Their ornaments of gold and silver have been described to be of a fabric no less curious. Whether any of their works with feathers, in imitation of painting, be still extant in Spain, we have not learned ; but many of their ornaments in gold and silver, as well as utensils employed in common life, are deposited in the cabinet lately opened by the king of Spain ; and we are informed that these boasted efforts of their art, are uncouth representations of common objects, or coarse images of human or some animal forms, destitute of propriety. But however these may be ranked, when viewed as works of art, a different station belongs to them, when considered as records of their country. The noblest invention of man is that of writing. But the first essays of this art were very rude, and it advanced very slowly. When the warrior wished to transmit some knowledge of his exploits to distant ages ; when the grat-

itude of a people, to their king, prompted them to hand down an account of his deeds to posterity ; the first method that seems to have occurred to them, was to delineate, in the best manner they could, figures representing the action they wished to preserve. Of this, properly called picture painting, we find many traces among the savage tribes. When a leader returns, he strips a tree of its bark, and with red paint scratches on it some figures, which represent the order of his march, the number of his followers, the enemy whom he attacked, the scalps and captives brought home. Compared with these essays, the works of the Mexicans may be considered as far superior. They were not acquainted, it is true, with any other method, but that of delineating objects which they wished to represent. But they could exhibit a more complex series of events, and describe, by a proper disposition of the figures, the occurrences of a king's reign ; the progress of an infant's education, from its birth to maturity ; the different distinctions and recompenses conferred upon warriors, in proportion to their deserts. Nevertheless, the style of these paintings is the same. They represent *things*, not *words*. They may, therefore, be considered as the earliest essay of men, in their progress in the art of writing. The defect in this mode must have been early felt. To paint every occurrence was a tedious operation ; and as affairs became more complicated, its annals must have swelled to an enormous bulk. Besides, no object could be delineated but those of sense, the conceptions of the mind had no corporeal

form, and as long as picture writing could not convey an idea of these, it must have been defective. But it is only in the notation of numbers, that we discern any attempt to exhibit ideas which had no corporeal form. They had invented artificial marks, or signs of convention, for this purpose. By means of these, they computed the years of the kings' reigns, as well as the tribute to be paid into the treasury. The figure of a circle represented unit, and in small numbers, the computation was made by repeating it. Larger numbers were expressed by a peculiar mark, and they had all such as denoted all integral numbers, from 20 to 8000. The short duration of their empire prevented them from advancing farther in that course which conducts men from the labours of delineating real objects, to the simplicity of alphabetical writing. Their mode of computing time, may be considered as more decisive of improvement. They divided their year into 18 months, each consisting of 26 days, amounting in all to 360. But observing that the course of the sun was not completed in that time, they added five days in the year. These they termed supernumerary or waste ; on these no work was done, or sacred rite performed. They were devoted to festivity and pastime.

Such are the most striking particulars, which exhibit them considerably refined. Other circumstances exhibit them in a different view. Like the rude tribes, they were incessantly engaged in war, and their motives seem to have been the same. They fought, to gratify their vengeance, by shed-

ding the blood of their enemies. In battle, they were chiefly intent on taking prisoners. No captive was ever ransomed or saved. All were sacrificed, and their flesh devoured with the same barbarous joy, as among the fiercest savages. This ferocity prevailed among all the nations of New Spain. In proportion as mankind combine, and live under the influence of equal laws and regular policy, their manners soften, and sentiments of humanity arise. But to these sentiments the Mexicans seem to have been perfect strangers ; among them war was carried on with such barbarity, that we cannot but suspect their degree of civilization very imperfect.

Their funeral rites were bloody. When any person of distinction died, a number of his attendants were chosen to accompany him to the other world.

Though their agriculture was more extensive than the roving tribes, it seems not to have supplied them with such subsistence as men require, when engaged in efforts of active industry.

The idea of the extent of the Mexican empire, which has been considered, and with justice, as the most decisive proof of a considerable progress in regular government and police, seems admitted without due examination. The Spanish writers, to magnify the valour of their countrymen, represent the dominions of Montezuma, as stretching over all the provinces of New Spain, from the north to the southern ocean. But a greater part of the mountainous country was possessed by the Oto-

mies, a fierce, uncivilized nation, who seem to have been the residue of the original inhabitants. The provinces towards the north and west of Mexico, were occupied by the Chichemicas, and other tribes of hunters. None of these bowed to the Mexican king. Even in the interior country, many cities and provinces had not submitted. Tlascalala, though only 21 leagues distant from the capital, was an independent republic. Cholula, though still nearer, had been subjected only a short time before the arrival of the Spaniards. Tepeaca, distant 30 leagues, seems to have been a separate state, governed by its own laws. Mechoacan, whose frontier extended within 40 leagues of Mexico, was a powerful kingdom, the enemies of the Mexicans. From hence it seems, that the high ideas we are taught to entertain of this empire, ought to be diminished. In consequence of this independence of several states in New Spain, there was not any considerable intercourse in its various provinces. Even in the interior, far distant from the capital, there seems to have been no roads to facilitate the communication of one district with another; and when the Spaniards attempted to penetrate into it, they had to open their way through forests and marshes.

Another striking proof of this imperfection in their intercourse, is their want of money, or a standard to estimate the value of commodities. Until this discovery has been made, all their transactions must be so awkward, so operose, and so limited, that we may pronounce they have advanced but little in their career. All their commercial intercourse

was carried on by barter. But even in the new world, this inconvenience began to be felt, and some efforts were made towards supplying that defect. The Mexicans had begun to employ a common standard of value, which rendered smaller transactions more easy. As chocolate was the favourite drink, the nuts or almonds of cocoa, of which it is composed, were of such universal consumption, that, in their markets, these were willingly received for small commodities. Thus they came to be the instruments of commerce, and the value of what one wished to dispose of, was estimated by the number of the nuts of the cocoa, which he might expect to exchange for it. This seems to be the utmost length to which they had advanced towards the discovery of an expedient for money.

In such a rude state were many of their provinces when visited by the Spaniards, that even their cities seemed rather to be the habitations of men just emerging from obscurity, than the residence of a polished people. And the temple of Mexico, the most famous of New Spain, which has been represented as a magnificent building, raised to such a height, that the ascent to it was by a staircase of 114 steps, was a solid mass of earth of a square form, faced partly with stone. Its base on each side extended 90 feet, and decreasing gradually as it advanced in height, it terminated in a quadrangle of about 30 feet, where were placed a shrine of the deity, and two altars on which the victims were sacrificed. All the other temples were constructed on the same plan. Greater ingenuity

was displayed in the houses of the king, and those of the nobility. There some elegance was visible, and a commodious arrangement of apartments attended to. But if buildings corresponding to such descriptions had existed, it is probable that some remains would still be visible ; as only two centuries and a half have elapsed since the conquest of New Spain.

From these facts, it seems to be evident, that the state of society in Mexico, was considerably advanced beyond that of the savage tribes around them. But it is no less manifest, that, with respect to many particulars, the Spanish accounts of their progress appear highly embellished.

On one particular, however, our guides have represented the Mexicans to be more barbarous, perhaps, than they really were. Their religious tenets, and the rites of their worship, are described as wild and cruel in an extreme degree. Religion, among the Mexicans, was formed into a regular system, with its complete train of priests, temples, victims, and festivals. But from the extravagance of their notions, or the barbarity of their rites, no certain conclusion can be drawn concerning the degree of their civilization. For nations, long after their ideas begin to enlarge, and their manners to refine, adhere to their ancient superstitions. The aspect of their superstition was gloomy and atrocious. Its divinities were clothed with terror, and delighted in vengeance. The figures of serpents, of tigers, and of other destructive animals, decorated their temples. Fear was the only principle

that inspired their votaries. Fasts, mortifications, and penances, were the means which they employed to appease their wrath, and they never approached their altars, without sprinkling them with their own blood. But human sacrifices were deemed most acceptable. To what circumstances it was owing that superstition assumed such a dreadful form among the Mexicans, we have not sufficient knowledge of their history to determine; but its influence is visible, and produced an effect that is singular in the history of the human species.

Peru boasts of higher antiquity than Mexico. By accounts collected by the Spaniards, it had subsisted 400 years under 12 successive monarchs. But the knowledge of their history, which the Peruvians could communicate, must have been very imperfect. Like the other aborigines, they were totally unacquainted with the art of writing, and destitute of the only means, by which past transactions could be preserved. The quipos, or knots on cords of different colours, imperfectly supplied the place of writing. The quipos seem to have been a device for rendering calculation more accurate. By the various colours, different objects were denoted, and by each knot, a distinct number. Thus an account was taken of the inhabitants in each province, or of the productions collected for public use. But, as by these knots, no abstract idea, or operation of the mind could be represented, they contributed little towards preserving the memory of ancient events. We can rest upon nothing, therefore, in their story, as authentic, but a few

facts, so interwoven in the system of their religion and policy, as preserved them from being lost ; and upon the description of such customs and institutions as continued in force at the time of the conquest. The Peruvians had not advanced beyond the savage state, when Manco Capac, and his consort Mama Ocollo, appeared, to instruct and civilize them. Who these personages were, whether they imported their system of legislation, and knowledge of arts, from some country more improved, or, if natives of Peru, how they acquired ideas so far superior to those of the people, their traditions convey no information. Manco Capac, and his consort, taking advantage of their superstitions, pretended to be children of the sun, and delivered their instructions in his name. The authority of the first Inca did not reach many leagues from Cusco ; but in process of time, his successors extended their dominion over all the regions west of the Andes, from Chili to Quito. The most striking circumstance in the Peruvian government, is the influence of religion upon its genius and laws. The Inca appeared, not only a legislator, but as the messenger of heaven. His precepts were received not merely as the injunctions of a superior, but as the mandates of a deity. His race was held sacred, and in order to preserve it distinct, the sons of Manco Capac married their own sisters, and no person was ever admitted to the throne who could not claim it by such a pure descent.

The children of the sun were deemed to be under the immediate protection of the deity from whom

they issued, and by him every order of the reigning Inca was supposed to be dictated. Whenever the decrees of a prince are considered as commands of the deity, it is not only an act of rebellion, but of impiety, to dispute, or oppose his will. Obedience then becomes a duty of religion. Another consequence of this establishment was, that all crimes were punished capitally. They were not considered as transgressions of human laws, but those of the Deity. Each, without distinction, called for vengeance, and could only be expiated by the blood of the offender. Among a people of corrupt morals, maxims so severe, would be more apt to multiply crimes, than restrain them. But the Peruvians of simple manners, were held in such awe by this rigid deception, that the number of offenders was small. Manco Capac turned the veneration of his followers towards natural objects. The sun, as the great source of joy and fertility, attracted their principal homage. The moon and stars, as cooperating with him, were entitled to secondary honours. Wherever the propensity in the human mind to acknowledge and adore some superior power, takes this direction, and is employed in contemplating the order and beneficence in nature, the spirit of superstition is mild. Wherever imaginary beings, created by the fancy and the fears of men, are supposed to preside in nature, and become the objects of worship, superstition always assumes a more atrocious form. Of the latter, we have an example among the Mexicans ; of the former, among the people of Peru. They had not, indeed, made such progress in obser-

vation, as to have attained just conceptions of the Deity ; nor was there in their language any proper name of the Supreme Power, which intimated that they had formed any idea of him as governor of the world. But, by directing their veneration towards that glorious luminary, which, by its vivifying energy, is the best emblem of beneficence, the rites which they deemed acceptable to him, were innocent and humane. They offered to the sun a part of those productions, which his genial warmth had produced. They sacrificed, as an oblation of gratitude, some of those animals who were indebted to his influence for nourishment. They presented to his choice, specimens of those works of ingenuity, which his light had guided the hand of man in forming.

The influence of this religion operated upon their civil institutions, and tended to correct any thing that was averse to gentleness of character. The sovereign, conscious that the submission of his people, flowed from their belief of his heavenly descent, was continually reminded of a distinction, which prompted him to imitate that beneficent power he was supposed to represent. Hence, there hardly occurs in the history of Peru, any instance of rebellion against the reigning prince, and among twelve successive monarchs, there was not one tyrant. Even their wars were carried on with a spirit very different from that of other nations. They fought not like the Mexicans, to glut blood thirsty divinities with human sacrifices. They conquered in order to reclaim, and civilize the vanquished,

and to diffuse the knowledge of their own institutions and arts. The Incas admitted the people whom they subdued, to a participation of all the advantages enjoyed by their subjects. This practice, resembling the humanity of the most polished nations, must be ascribed like other peculiarities, observed in the Peruvian manners, to the genius of their religion.

The state of property in Peru, contributed to give a mild turn of character to the people. All the lands capable of cultivation were divided into three shares. One was consecrated to the sun, and whatever it produced was applied towards celebrating the rites of religion. The other belonged to the Inca, and was set apart for government. The third and largest share, was reserved for the people. No person had an exclusive right to his share. He possessed it only for a year, at the expiration of which, a new division was made, in proportion to the rank, number, and exigences of each family. These lands were cultivated by the community. The people, summoned by an officer, repaired in a body to the fields, and performed their common task; while songs, and musical instruments, cheered them in their labours. By this distribution of territory, the idea of a common interest, and of mutual subserviency was continually inculcated. Though the institutions of the Incas were so framed as to strengthen the bonds of union among their subjects, there was great inequality in condition. A great body of the people called Yanaconas, were in servitude. Their garb and houses were different

from those of freemen. Next to them were such of the people as were free, but distinguished by no honours. Above them were raised those whom the Spaniards called Orejones. They formed the order of nobles, and held every office of power or trust. At the head of all were the children of the sun, who were as much exalted above the Orejones, as they were elevated beyond the people.

Such a form of society was favourable to the progress in the arts. In Peru, agriculture was carried on with greater skill than in other parts of America. The quantity of soil under cultivation, was in proportion to the exigences of the state. The evil of a bad season was but little felt; for the product of the lands consecrated to the sun, and those set apart for the Inca, being deposited in the warehouses, it remained there as provision for times of scarcity. As the extent of cultivation was determined with attention, their invention and industry were called forth to extraordinary exertions by certain defects peculiar to their soil, and climate. The use of the plough was unknown; they tilled the earth with a kind of mattock of hard wood. Both sexes joined in the labours of agriculture. The children of the sun set the example, by cultivating a field near Cusco, and dignified this function by denominating it their triumph over the earth. The ingenuity of the Peruvians is obvious likewise in the construction of their houses and public buildings. Their houses were generally of a square form, the walls about eight feet high, built with bricks hardened in the sun, the door low and

strait, and without any windows. Simple as these structures were, yet they were so durable, that many of them still subsist. But it was in the temples of the sun, and in the buildings for the residence of their kings, that the Peruvians displayed all their art. These ruins of royal buildings are found in every province, and by their frequency, demonstrate that they are monuments of a powerful people. The temple of Pachacamac, together with a palace of the Inca, and a fortress, were so connected together as to form one structure, above half a league in circuit. In this prodigious pile, the same taste is conspicuous as in the other works of the Peruvians. These, however, were not the noblest or most useful works of the Incas. The two great roads from Cusco to Quito, extending above 500 leagues, are entitled to still higher praise. The one was conducted through the interior country, the other through the plains on the sea coast. These roads were 15 feet in breadth. In the country, little more seems to have been done than to plant trees, or to fix posts at certain intervals, in order to mark the route to travellers. To open a path through the mountainous country was more arduous. Eminences were levelled, and hollows filled up; and it was fenced with a bank of turf. At proper distances, storehouses were erected for the accommodation of the Inca, and his attendants, in his progress through his dominions. From the manner in which the road was formed, in this higher and more impervious region, it has proved more durable; and though nothing has been done to keep

it in repair, its course may be still traced. Such was the celebrated road of the Incas ; and it must be considered as a striking proof of great progress in improvement. The formation of these roads introduced another improvement. In its course from north to south, the road was intersected by the torrents which roll from the Andes toward the western ocean. These were unnavigable. The Peruvians, unacquainted with the use of arches, or the manner of working in wood, suggested a device which supplied the defect. They formed strong cables, by twisting together some pliable withs or osiers, six of which they stretched across the stream parallel to each other. These they bound together, by interweaving smaller ropes so close, as to form a compact piece of net work, which being covered with branches of trees and earth, they passed over with security. In the level country, where the rivers became broad and still, they are passed in balsas, or floats, in the construction of which they excelled all the aborigines.

They had made some progress, also, in the elegant arts. They possessed the precious metals in abundance. They obtained gold by searching the channels of rivers, or washing the earth in which particles were contained. But to procure silver, more skill was requisite. To obtain this metal, they hollowed caverns on the banks of rivers, and the sides of mountains, and emptied such veins as did not dip suddenly beyond their reach. They had discovered the manner of smelting and refining this, by a simple operation. Hence, the ores were

melted with such facility, that the quantity of silver in Peru, was so considerable, that many of the utensils employed in common, were made of it. In ornamental works, their ingenuity has been highly celebrated. Many of these have been dug out of the guacas, or mounds of earth raised over their dead. Among these are mirrors of hard shining stones well polished; vessels of earthen ware, hatchets, and other instruments, some destined for war, others for labour. Some of flint, some of copper, hardened to such a degree, as to supply the place of iron on several occasions; but its use had not become general. Either the metal was so rare, or the operation by which it was hardened so tedious, that their instruments of copper were few and small. But even to this imperfect metal they were indebted for their superiority to the other people of America in various arts.

But, notwithstanding the circumstances, which seem to indicate an high degree of improvement, others occur, that suggest the idea of a society, still in its first stages of civilization. Cusco was the only place entitled to the name of a city. Every where else, the people lived mostly in detached habitations, dispersed over the country, or, at most, settled in small villages. But until men are brought to assemble in numerous bodies, and are incorporated in such close union, as to enjoy frequent intercourse, and to feel mutual dependence, they never can imbibe perfectly the spirit, or assume the manners of social life. In consequence of this imperfect union,

the separation of professions in Peru, was not so complete as among the Mexicans.

From the want of cities, another consequence followed. There was little commercial intercourse among them. The activity of commerce is coeval with the foundations of cities ; and from the moment that the members of any community settle in considerable numbers in one place, its operations become vigorous. But in Peru, from the singular mode of dividing property, and the manner in which the people were settled, there was scarcely any species of commerce carried on between the provinces. But the unwarlike spirit of the Peruvians, was the most fatal defect of their characters. The Mexicans maintained the struggle in defence of their liberties, with such persevering fortitude, that with difficulty the Spaniards triumphed over them. Peru was subdued at once, and almost without resistance. Though the traditional history of the Peruvians represents all their princes frequently at the head of armies, which they led to victory : few symptoms of such martial spirit appear in any of their operations subsequent to the invasion of the Spaniards. The influence, perhaps, of these institutions, which rendered their manners gentle, gave their minds this unmanly softness ; perhaps the constant serenity of the climate may have enervated the vigour of their frame ; perhaps, some principle in their government, unknown to us, was the occasion of this political debility. Whatever was the cause, the fact is certain, and there is not an instance in history, of any people so

little advanced in refinement, so totally destitute of military talents and enterprise. This character has descended to their posterity. But, beside these capital defects in the political state of Peru, some detached circumstances and facts occur in the Spanish writers, which discover a considerable remainder of barbarity in their manners. On the death of the Incas, and of other eminent persons, a considerable number of their attendants were put to death, and interred around their guaca, that they might appear in the next world with their former dignity, and be served with the same respect. On the death of Huana Capac, the most powerful of their monarchs, above a thousand victims were doomed to accompany him. In one particular, their manners appear to have been more barbarous than those of most rude tribes. Though acquainted with the use of fire in preparing maize, and other vegetables for food, they devoured both flesh and fish perfectly raw, and astonished the Spaniards with a practice so repugnant to the ideas of all civilized people. *Abridged from Dr. ROBERTSON.*

As a knowledge from whence came the original, or first settlers of this vast continent, must be highly interesting to every inquisitive mind, that wishes to form clear ideas on this subject, as far as they can be ascertained, we shall gratify the curiosity of our readers, by laying before them the observations and remarks of the most classical writers, from the commencement of the first epochs in the annals of history, to the present period.

Most of the writers who have taken up the pen on this subject, differ greatly in their sentiments. This country is supposed to have been known to many of the ancients. Plato has asserted in his *Timæus*, that beyond the island *Atalantis*, which, according to his description, was in the Western ocean, there were a large number of other islands, and behind those, a vast continent.

Oviedo, a Spanish author, affirms, that the *Antilles* are the *Hesperides* of the poets ; at length restored to the kings of Spain, the descendants of king *Hesperus*, who lived upwards of 3000 years ago.

Father *Gregorio Garcia*, a Spaniard, employed in the missions of Mexico and Peru, endeavoured to prove from the traditions of the Mexicans, Peruvians, and others ; and from the variety of characters, customs, and languages observable, that a variety of nations must have peopled the new world.

Father *Acosta*, a Spanish author, discredits the conclusions of those who have supposed the aborigines of America to have found a passage by sea, because no ancient author has described the compass ; and concludes, that it must be either by the north of Asia and Europe, which adjoin to each other, or by those regions lying southward of the straits of *Magellan*.

De Laet, a Flemish writer, controverts these opinions and many others. His hypothesis is, that America was peopled by the *Scythians*, or *Tartars* ; and that the transmigration of these people, happened soon after the dispersion of the grandsons of *Noah*.

He declares, that the most northern Americans have a greater resemblance to the Scythians, Tartars, and Samœides, than to any other nations. In answer to Grotius, that some of the Norwegians passed into America by the way of Greenland, and over a vast continent, he says, that Greenland was not discovered till the year 964 ; and both Gomera and Herrera inform us, that the Chichimques were settled on the lake of Mexico, in 721 ; that these savages, according to the traditions of the Mexicans, who dispossessed them, came from New Mexico, and the neighbourhood of California ; consequently, North America must have been inhabited many ages before it could receive any inhabitants from Norway, by way of Greenland. De Laet adds, that it is related by Pliny, and some other writers, that on many of the islands near the western coast of Africa, particularly the Canaries, some ancient edifices were seen ; it is probable, from their being now deserted, that the inhabitants have passed to America. This migration, he says, must have happened more than 2000 years ago, at a time when the Spaniards were much troubled by the Carthaginians, from whom, having obtained a knowledge of navigation, they might have retired to the Antilles, by the way of the western isles. He thinks, also, that Great Britain, Ireland, and the Orcades, were extremely convenient places for the purpose of migration. As a proof, he quotes a passage from the History of Wales, written in 1170, by Dr. D. Powel. That Madoc, a son of prince Owen Gwynnith, being disgusted at the wars which broke

out between his brothers, after their father's death, fitted out several vessels, and having furnished them with necessaries for a long voyage, went in quest of new lands to the westward of Ireland ; there he discovered fertile countries, but destitute of inhabitants ; landing part of his people, he returned home, raised new levies, and afterward transported them to his colony.

Emanuel de Morez, a Portuguese, asserts, that America has been peopled by the Carthaginians and Israelites : as proofs, he brings the discoveries made by the former, far beyond the coast of Africa ; the progress of which being stopped by the senate of Carthage, those who were in the newly discovered countries, cut off from all communication with their countrymen, and destitute of the necessaries of life, fell into a state of barbarism. He thinks there is a perfect resemblance between the Israelites and the Brazilians, in every thing, except circumcision.

De Hornn, a learned Dutchman, declares, he does not believe America could have been peopled before the flood, considering the short space of time between the creation of the world, and that event. After the deluge, men and animals penetrated into that country by sea and land, some through accident, others from design. The birds flew thither, by resting on the rocks and islands, scattered in the ocean. He supposes the country began to be peopled by the north, and that the primitive colonies spread themselves, by means of the isthmus of Panama, through the whole continent.

It is his opinion, that the founders of the Indian colonies, were Scythians. That the Phœnicians and Carthaginians afterward got footing across the Atlantic ocean, and the Chinese by the Pacific ; and that other nations might, from time to time, have landed there by one or other of these ways, or have been thrown on the coast by tempests ; since through the whole continent we meet with undoubted marks of a mixture of the northern nations, with those who have come from other places. That some Jews and Christians might have been carried there by similar events, but at a time when the whole of the new world was already peopled. He supposes, also another migration of the Phœnicians to have taken place : this was during the three years voyage, made by the Tyrian fleet in the service of king Solomon. He asserts, on the authority of Josephus, that the port at which this embarkation was made, lay in the Mediterranean. The fleet, according to him, went in quest of elephant's teeth, and peacocks, to the western coast of Africa, which is Tarshish ; then to Ophir for gold, which is Hayti, or the island of Hispaniola ; in this opinion he is supported by Columbus, who, when he discovered that island, thought he could trace the furnaces for refining gold.

Pierre de Charlevoix, a Frenchman, who visited North America, in 1720, has also written on the subject. He seems to think its first settlers were from Tartary and Scythia. This he confirms, by observing, that the lions and tigers found in America, must have come from those countries ; for, al-

though many of these animals are found near the tropics, yet they might have come there, by gradually advancing southward, till they met with climates more congenial to their natures. He quotes Solinus and Pliny, to prove that the Scythian Anthropophagi, once depopulated the country, as far as the promontory of Tabin; and also Mark Pol, a Venetian, who says, that to the northeast of China and Tartary, there are vast uninhabited countries; which tends to confirm any conjectures concerning the retreat of numbers of Scythians into America. He adds, we find in the ancients, the names of some of these nations. Pliny speaks of the Tabians; Solinus mentions the Apuleans, who had for neighbours the Massagetes, who, Pliny since assures us, have disappeared. Ammianus Marcellinus tells us, that the fear of the Anthropophagi, obliged many of the inhabitants to take refuge elsewhere. From these authorities, he concludes, that more than one nation in America, had a Scythian or Tartarian original.

James Adair, Esq. who published a history of the Indians in 1772, declares, without hesitation, that they are the descendants of the Israelites, either whilst they were a maritime power, or soon after their general captivity. This he endeavours to prove from their religious rites, their civil and martial customs, their marriages, their funeral ceremonies, their manners, traditions, language, and from a variety of other particulars: and he fancies he finds a full and indisputable proof in each. He observes that, though some have supposed the A-

mericans to be the descendants of the Chinese, yet neither their religion, laws, nor customs, agree in the smallest particular. Besides, China, he says, is about 8000 miles distant from the American continent; and we are not informed, by any ancient author, of their use of the compass, their maritime skill, or so much as any inclination that way, beside small coasting voyages. The winds blow, likewise, with little variation, from east to west, within the latitudes 30 and odd, north and south, these could not then, drive them on the American coast, it lying in a contrary direction. Neither could persons come to America from the north, by the way of Tartary or ancient Scythia; which, from its situation, never having been, or can be, a maritime power; and it is impracticable for any to come to America by sea, from that quarter. Besides, the remaining traces of their religious ceremonies, and civil and martial customs, are quite opposite to the like vestiges of the old Scythians. Even in the moderate northern climates there is not to be seen the least trace of any ancient stately buildings, or any thick settlements, as still remain in the less healthy regions of Mexico and Peru: and several Indian nations assure us, they crossed the Mississippi, before they made their present northern settlements; which, connected with the former arguments, he concludes will sufficiently explode the opinion that the Americans are descended from the Tartars, or ancient Scythians.

Dr. Robertson, in his history of America, having recapitulated and canvassed the most plausible

opinions on this subject, comes to the following conclusions. That America was not peopled by any nation from the ancient continent, who had made any considerable progress in civilization; because when America was first discovered, its inhabitants were unacquainted with the necessary arts of life; and if they had ever been acquainted with them, their utility would have been so great, that it is impossible they should have been lost. Therefore the ancestors of the first settlers in America were uncivilized, and unacquainted with the arts of life.

America could not have been peopled by any colony from the more southern nations of the ancient continent; because none of these tribes possessed enterprize, ingenuity, or power to undertake such a distant voyage; but more especially, because, that in America there is not an animal, which belongs to the temperate countries of the eastern continent. The first care of the Spaniards, when they settled in America, was to stock it with domestic animals. The first settlers of Virginia and New England, brought over with them horses, cattle, sheep, &c. Hence the people who first settled in America, did not originate from those countries where these animals abound, otherwise they would have brought numbers with them.

Since the animals, in the northern regions of America, correspond with those found in Europe, in the same latitudes; while those in the tropical regions are indigenous, and widely different from those which inhabit the corresponding regions on

the eastern continent, it is probable, that all the original American animals were of those kinds which inhabit northern regions only, and that the two continents, towards the northern extremity, are so nearly united, as that these animals might pass from one to the other.

It having been established by the last voyage of Capt. Cook, that at Kamtschatka, in latitude 66° north, the continents of Asia and America are separated by a strait only 18 miles wide, and that the inhabitants on each continent are similar, and frequently pass and repass in canoes from one to the other; from these and other circumstances, it is rendered highly probable that America was peopled from the northeast parts of Asia. But since the Esquimaux Indians are distinct from all the nations in America, in language, in disposition, and in habits of life; and in all these respects bear a near resemblance to the northern Europeans, it is believed that the Esquimaux Indians emigrated from the northwest parts of Europe.

Several circumstances tend to confirm this belief. As early as the ninth century, the Norwegians discovered Greenland, and planted colonies there. The communication with that country was renewed in the last century. Some Lutheran and Moravian missionaries, prompted by zeal for propagating Christianity, have ventured to settle in this frozen region. From them we learn, that the northwest coast of Greenland is separated from America, but by a narrow strait, if separated at all; that the Esquimaux of America perfectly resemble the Green-

landers, in their aspect, mode of living, dress, and probably language. By these facts, not only the consanguinity of the Esquimaux and Greenlanders is established ; but the possibility of peopling America from the northwest parts of Europe. On the whole, it appears rational to conclude, that the progenitors of all the American nations, from Cape Horn to the southern limits of Labrador, from the similarity of their aspect, colour, &c. migrated from the northeast parts of Asia ; and that the nations which inhabit Labrador, Esquimaux, and the parts adjacent, from their unlikeness to the American nations, and their resemblance to the northern Europeans, came over from the northwest parts of Europe.

The Abbe Clavigero, a native of America, and a later writer than Dr. Robertson, thus sums up his opinion on the subject. The Americans are descended from different nations dispersed after the confusion of tongues. No person will doubt this who has any knowledge of the multitude and diversity of the American languages. In Mexico alone 35 have been discovered. In South America still more are known. Between some of these languages there is a great affinity ; but others are as different from each other as English or Hebrew. No living or dead languages can differ more than those of the Mexicans, Otomies, Tarascas, Mayas, and Miztecas, languages prevailing in the provinces of Mexico. It would, therefore, be absurd to say, that languages so different, were different dialects of one original.

The Americans do not derive their origin from any people now existing as a nation on the eastern continent. This inference is founded on the same argument with the preceding ; since, if the Americans were descendants from any of these nations, it would be possible to trace their origin, by some marks in their languages, in spite of the antiquity of their separation : but any such traces have not yet been discovered, although diligent search has been made. We have, says Clavigero, compared the Mexican and other American languages with many others which are now living, and with those which are dead, but have not been able to discover any affinity among them. If the Americans are descended from different nations, dispersed soon after the confusion of tongues, and have since been separated from those others who peopled the countries on the eastern continent, authors will labour in vain, to seek in the language or customs of the Asiatics, for the origin of the Americans.

The Abbe Clavigero has, also, some interesting remarks on the manner in which the inhabitants and animals originally passed to America. The men and animals passed there from the old continent. This is confirmed by the sacred writings. Moses, who declares Noah the father of all men who survived the flood, says that in that general inundation of the earth, all its quadrupeds, birds, and reptiles perished, except a few of the several species which were saved in the ark, to replenish the earth with their kinds. The different quarters of the world, therefore, must have been supplied from this source.

The first settlers might either pass to America in vessels designedly, or be carried on it accidentally, by adverse winds. They might pass by land, if there is a union of the continents ; or make their passage over some frozen arm of the sea. The nations who first peopled Anahuac, now New Spain, might pass from the northern countries of Europe, into the northern parts of America, or from the most eastern parts of Asia, to the most western parts of America. This conclusion is founded on the general tradition of those nations, which unanimously say, that their ancestors came into Anahuac from the countries of the north and northwest. This tradition is confirmed by the remains of many ancient edifices, built by those people in their migrations. A party of Spaniards, in 1606, going from New Mexico to the river which they called Tizon, 600 miles from that province towards the N. W. they found some large edifices, and met with some Indians who spoke the Mexican language, and who told them, that a few days journey from that river, towards the north, was the kingdom of Tollan, Aztlan, Copalla, and several others with Mexican names. Boourini says, that in the paintings of the Toltecas was represented the migration of their ancestors through Asia and the northern countries of America, until they established themselves in the country of Tollan. As to the other nations of America, as they have no tradition concerning the way by which their ancestors came to the new world, we can say nothing certain. It is possible, they passed the same way in which the ancestors of

the Mexicans passed ; but it is more probable they passed by a different route. The ancestors of the nations of South America, might pass there by the way in which the animals of hot countries passed ; and the ancestors of the nations of Esquimaux and Labrador, and the countries adjacent, might pass there from the northwest parts of Europe.

It is probable, that the quadrupeds and reptiles passed to America by land. St. Augustine solves the difficulty of peopling the islands with animals, by supposing either that the angels transported them thither, (a solution, which, though it cuts off every difficulty in the passage of animals to the new world, would not be satisfactory in the present age) that they might swim to the islands, or have been carried there by men for the sake of hunting, or formed there by the Creator in the beginning : others have supposed that beasts might pass over some frozen strait, or arm of the sea. But as neither of these opinions can be supported, as Clavigero shews in his history, the probability is, that the quadrupeds and reptiles passed to America by land, and that the two continents were once united. This was the opinion of Buffon, Grotius, Acosta, and other great men. That this earth has experienced great changes since the flood, is evident. Earthquakes have swallowed up large tracts of land ; subterraneous fires have thrown up others ; the sea, in some places, has been forced to retreat many miles from the shore ; in others, it has made encroachments, and, in many instances, separated territories which were formerly united. Large

tracts of land have been also formed at the mouths of rivers. We have many examples of these revolutions. Sicily was formerly united to the continent. The straits of Gibraltar, as Diodorus, Strabo, and other ancient authors affirm, were formed by a violent irruption of the ocean, upon the land, between Abyla and Calpe. The people of Ceylon have a tradition, that a similar irruption separated their island from the peninsula of India. The same is believed by the inhabitants of Malabar, with respect to the isles of Maldivia, and by the Malayans with respect to Sumatra. Ceylon has lost 30 or 40 leagues of land, by the sea; and Tongres, a place in the low countries, has gained 30 leagues; and Florida, and the southern American states, have gained as much from the bay of Mexico, and the islands between North and South America. The northern part of Egypt owes its existence to the inundations of the Nile; and the province of Yellow river, in China, and part of Louisiana, in America, have both been formed by the mud of rivers. The peninsula of Yucatan has the appearance of having once formed part of the bed of the sea. In the strait between America and Asia, many islands are found, that were probably the mountains on that part of the land, which we suppose to have been swallowed up by earthquakes; this is rendered more probable by the number of volcanoes, which have been discovered in Kamtschatka. The sinking of that land, and the separation of the continents, was, probably, occasioned by those earthquakes, mentioned in the histories of the

Americans, forming an æra as memorable as that of the deluge.

The quadrupeds and reptiles, probably, passed by different routes. Among the American beasts, many are averse to cold; such as the apes, dantes, crocodiles, &c. Others, formed to inhabit cold countries: such as martins, reindeer, and gluttons. The former could not go there through any country in the frigid zone; they would have perished in their passage. What inducement could they have to quit a climate congenial to their natures, and go they knew not whither, through a cold region they could not endure? The apes in New Spain, passed there from South America. Once they did not inhabit that country, and it is known they came from the south. The centre of their population is the country under the equator, and 14° or 15° each side of it. It decreases, as you depart from this tract on each side, till you arrive at the tropics, where none are found, except in a few districts, which, from their peculiar situation, are as hot as the equinoctial country. None can imagine that the apes travelled to America through the regions of the north, nor that they were transported thither by men; for some are of a ferocious disposition, and unlikely to be selected as companions on a long voyage, to people a new country. Beside, there is a greater difficulty to surmount: as they could not have been conducted over the seas and countries of the north on account of the cold, they must have been transported from the warm countries of the old, to the warm countries of the new world, over a

sea, subject to a clime not dissimilar to the native country of those quadrupeds ; that is, by the countries of the southern parts of Asia, to about the same latitudes in America, over the Indian and Pacific oceans ; or from the western countries of Africa, to the eastern countries of America, over the Atlantic ocean. If men, then, transported these animals from one world to the other, they did it across those seas. But was this accidental or designed ? If the former, how and why did they carry so many animals with them ? If the latter, if they were determined to pass from the old to the new continent, who informed them of the new world ? Who shewed them the situation of those countries ? How did they venture to cross such vast seas without a compass ? In what vessels did they pass ? If landed there happily, why does there not remain among them, some memory of their constructions ? Why—but it is needless to start more objections ; those already mentioned, can never be answered.

There remains no other solution but that of admitting an ancient union between the equinoctial countries of America, and those of Africa ; and a connection of the northern countries of America, with Europe on the east, and Asia on the west ; so that there has probably been a period since the flood, when there was but ONE CONTINENT.

The beasts of cold climates passed over northern isthmuses, which, probably connected Europe, America, and Asia ; and the animals and reptiles, peculiar to hot countries, passed over the isthmus that connected South America with Africa. For

the reasons already mentioned induce us to believe that there was formerly a tract of land, which united the most eastern part of Brazil, to the most western part of Africa ; and that all the space of land may have been sunk by violent earthquakes, leaving only some traces of it in that chain of islands, of which Cape de Verd, Fernando de Norona, Ascension, and St. Matthew's islands, make a part ; and also in those many sand banks discovered by de Bauche, and other navigators. These islands and sand banks may probably have been the highest parts of that sunken isthmus. In like manner, it is probable, the northwestern part of America was united to the northeastern part of Asia, by a neck of land, which has been sunk, or washed away, and the northeastern parts of America to the northwestern parts of Europe, by Greenland, Iceland, &c.

On the whole, we cannot but believe, that the quadrupeds and reptiles passed from the old to the new world by land, and by different routes. All other suppositions are subject to great difficulties ; and this is not without some, which, however, are not insurmountable. The greatest, is the improbability of an earthquake so great as to sink a space of land for more than 1500 miles in length, which we suppose, united Africa and South America. But we do not ascribe this stupendous revolution to a single shock : it may have been effected by a succession of earthquakes. They are common in the climates where we suppose the isthmus to have been. It is not improbable that such an effect should be produced by earthquakes, nor is history

destitute of examples to our purpose. The earthquake felt in Canada, in 1663, overwhelmed a chain of mountains of freestone more than 300 miles long, and the whole of that immense tract was changed into a plain. How great, then, must have been the convulsion, which was occasioned by those extraordinary earthquakes, mentioned in the histories of America, when the world was thought to be coming to an end !

It may be farther objected to this system, that if beasts passed by land from one continent to the other, it is not easy to assign the cause, why some species passed there without leaving a single individual in the old continent ; and, on the contrary, that some entire species should remain in the old continent, and not a single individual of them pass to America. But this objection operates with equal force against all other opinions, except that which employs angels in the transportation of beasts. But suppose it did not, we have a satisfactory answer to it. As all the quadrupeds of the earth are not yet known, we cannot, therefore, say how many are in the one, and not in the other continent. The knowledge of the best informed zoologists is very imperfect. Buffon numbers but 200 species of quadrupeds. Bomare makes them 265 ; but to say how many more there may be, and of what kinds, until we have examined the interior regions of Africa, of part of Tartary, the country of the Amazons, and the territory west of the Mississippi, and various other unexplored countries, which

form a great part of the globe, would be mere conjecture.

We shall hazard no remarks upon these inquiries, having dwelt thus long on the subject, and introduced many interesting arguments, in order that the readers themselves may form their own opinions, when, and by whom this country was first settled ; conceiving, that that opinion, which is most *probable*, must be adhered to ; as nothing *certain*, it is presumed, can be expected, on a subject so long buried in the oblivion of ages.

END OF THE FIRST VOLUME.



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