

REPORT

OF A

GEOLOGICAL RECONNOISSANCE

MADE IN 1835,

FROM THE SEAT OF GOVERNMENT,

BY THE WAY OF

GREEN BAY AND THE WISCONSIN TERRITORY,

TO THE

COTEAU DE PRAIRIE.

AN ELEVATED RIDGE DIVIDING THE MISSOURI FROM THE ST. PETER'S RIVER.

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if I had seen any one to impart the information to, I should have informed them would have greatly improved their scanty crops, if they had thought proper to dress their lands with it.

Intending to strike the Mississippi by the way of the Wisconsin river, I proceeded from this point to the mouth of Fox river, at the bottom of Green bay of Lake Michigan, where Fort Howard is situated, and where a flourishing village, named Navarino, is rapidly growing up. I had no opportunity of landing at any of the islands in Lake Michigan, but passed sufficiently near to the fine sections exhibited in the lofty banks of the southernmost of the Wagooshugamessun, or Fox islands, to perceive they were a white incoherent sandstone, such as I subsequently met extensive beds of further to the southwest. On examining the country as rapidly as my time permitted, I found a ledge of strong horizontal beds of carboniferous limestone, about eight miles from Navarino on the east, and distant about two miles from the lake; these contained orthocera, together with the characteristic fossils. Between this ledge and the shore other indisputable evidences present themselves of the recession of the waters of the lake. The soil about Navarino is a rich siliceo-calcareous loam, of the greatest fertility.

At this place that singular phenomenon which was observed by the old French discoverers, and which is mentioned by Charlevoix, still attracts the attention of the traveller. I had observed in the neighborhood of Fort Gratiot, on Lake Huron, evidences of a varying level of the waters; but as it did not differ from that of all large bodies of fresh water, I attributed it to the influence of the winds on the surface; but here is a perfect representation of a tidal shore. I had put rods down to form some estimate of this movement, and ascertained, soon after my arrival, that from 6 P. M. to 11 A. M. of the succeeding day, the water had ebbed twenty-four feet, and one foot perpendicular. Subsequently I found the flux and reflux to be quite irregular as to periods, although the phe-

nomenon is of daily occurrence; and this was confirmed to me by an intelligent resident of the place, who was in the habit of observing it both winter and summer. In the winter, he informed me the ice forms in a solid mass to the bottom near to the shores, whilst in the centre of the river, the water at the flow lifts up the ice, which, when the reflux takes place, cracks, and is swayed down again. The observations which Governor Cass made near the mouth of Fox river in 1828,* show an extreme irregularity in the periods of this rise and fall, and which is totally inconsistent with the regular recurrences of lunar influence. In the paper referred to, which is from the able pen of Major Whiting, U. S. A., there is a letter from Governor Cass, which explains the phenomenon by a reference to causes as constant and irregular as the phenomenon itself. Green bay is an arm of Lake Michigan, running nearly parallel to it, and about one-fourth of its length. Lake Michigan is about three hundred miles long and fifty broad, holding a straight course somewhat east of north, (parallel to all the characteristic mineral directions of this continent.) Governor Cass supposes that when the northerly winds are packing up the waters at the mouth of Fox river, the wind-tide continues still driving on towards Chicago, at the southern end of Lake Michigan; the effect of which, by lowering the level at the mouth of Green bay, will cause an ebb from the bay into the lake, which will equally prevail at Fox river, and this even during the existence of the wind that had caused the flow there. This would explain the reason of Charlevoix's surprise at seeing his canoe floating off in the face of the wind. A series of observations made in the neighborhood of Fort Gratiot, at Saginaw bay, at Chicago, and Green bay, noting accurately the contemporaneous state of the winds, and any change of level at Michilimackinac, where the same wind

* "Remarks on the supposed tides." Silliman, vol. 20, p. 205.

would act upon Lake Huron, would probably confirm the very judicious opinion of Governor Cass.

From this place there is canoe and flat-boat navigation up Lower Fox river to Lake Winnebago. At a distance of about forty miles, the banks of the river are quite remarkable for the beauty of their slopes; and the general fertility of the soil, composed of siliceo-calcareous earth, mixed up with vegetable matter, will soon bring a great population into this part of the country. On approaching the rapids of Kabkawning, called Cocolo by the Canadians, the well-wooded banks of the river slope in such a uniform and graceful manner, that the broad stream seems to be gliding through an amphitheatre. There is a large flat area at these falls, which seem to have a descent of about twenty feet to the mile, across which is a portage, served by the drunken Winnebagoes of this place. The water falls over horizontal beds of the carboniferous limestone. Twelve miles further the river falls about six feet over another ledge of the same formation, at a place called La Grande Chute. Coasting the west shore of the lake, which lies low, and is crowded with fine forest trees springing from the richest soil, I reached the Pawaygun, or Wolf river, in about twenty miles. The shores of all the waters here produce great quantities of *zizania aquatica*, or wild rice, from which the Menomones, or rice-eaters, receive their name. From this place, for about one hundred miles, the country lies very low, the elevations of land being trifling, and principally composed of the sand resulting from the disintegration of ancient beds of sandstone; it may be considered, with this exception, a great rice-swamp. At a place called Apackquay, or Rush lake, I saw several thousand acres of *zizania* together, two miles in one direction and five or six in another, resembling an immense field of wheat, with the heads just formed and waving about. At other places the channel went for great distances through dense areas of wild-rice stalks, ten feet high, mixed up with rushes and other aquatic plants, so as to exclude every object

but the sky. At times the water was so shallow it was with difficulty the canoe could be forced through it. Often it was necessary to trust altogether to the compass, and the immediate approach to Fort Winnebago was so tortuous, the channel so often turned back upon itself, that the compass was quite useless. Whatever the direction, the country is covered with these tall plants, and the grasses on the land, when you succeed in getting there, are so rank (now that the buffalo has left this part of the country) that it is difficult to advance. It is in fact the summit-level of this part of the country, the Fox river draining it towards the north, and Rock river and the Wisconsin draining it towards the south. Before the retreat of the waters, which has been before spoken of, which perhaps was contemporaneous with the disintegration of the sandstone, these extensive rice-swamps have been lakes, and it is only since their subsidence that the zizania has begun to grow.

In the neighborhood of Fort Winnebago the country begins to rise, and the beds of carboniferous limestone observed in Lower Fox river, are overlain by beds of quartzose sandstone, having occasional siliceo-calcareous seams amongst them. The sandstone beds are horizontal, disintegrate easily, and are often variegated in color, having red, orange, and dark tints. I was taken to a locality in the neighborhood of the fort where this stone had been quarried, and became immediately aware that I was in the vicinity of a galeniferous district, for I was well acquainted with the analogous formation in the State of Missouri, and which is spoken of in my report of last year.*

From Fort Winnebago there is a portage to the Wisconsin river of about two thousand five hundred yards. This is a dead flat of black mud and sand, occasionally overflowed so as to admit of canoes passing to Fox river, and from which the waters have retreated. The Wisconsin is an ample stream,

* Page 43.

with numerous islands and sandbars. The low alluvial banks are sand, with seams of red oxyde, showing that they are derived from the old sandstone beds. These banks are always well wooded, and pine, as in all sandy countries, is of frequent occurrence. The sandstone strata soon occur after getting upon the swift current of this river, in banks about sixty feet high, which become loftier as the stream deepens its bed. One of these localities, where the escarpment is near two hundred feet high, is an isolated ridge, a little in the rear of the left bank, with a crest resembling, in an obscure manner, walls and batteries, and has obtained the appellation of Fortification rock. Great quantities of the valves of unios and anodontas are found all the way from Green bay to the mouth of the Wisconsin, at the edge of the stream, left there by the muskrats and otters. About forty-five miles from the portage, another picturesque mass of horizontal sandstone presents itself, called *Petit rocher*. There is a remarkably fine view from a lofty hill at a place called Helena, where a shot-tower has been sunk near two hundred feet in the sandstone: the river is seen for a great distance winding through the rich flat lands of the valley, which is bordered on both sides by high rounded hills, with occasional escarpments, separated by well-wooded coves or vales, called by the French *coulées*. Boulders and fragments of limestone are found in the vicinity, resembling the Missouri galeniferous limestone, with occasional narrow seams of sulphate of barytes in it. A little lower down, the river has undermined the strata, and a mass of sandstone, about thirty feet high and two hundred feet long, has scaled off from the body of the rocks, leaving a smooth face. This place is called the Fallen rocks. The nature of the scenery is much the same to the mouth of the Wisconsin: rich flat lands are of frequent occurrence, the slopes, somewhat more sparsely wooded, are covered with high grass, except where broad spaces of escarpment (so soft that the swallows in great numbers have been able to pick holes in it and

build their nests) peep out and give the general line of the river a castellated appearance. Upon the face of these white sandstone beds, figures of deer, men, and horses, have been painted in red, after their manner, by the Indians. The islands in the river are very numerous, as well as the sandbars, which sometimes scarcely admit of the passage of a canoe in a low state of the water, and several extensive prairies are passed. Below Pine river, which comes in west of Helena, on the right bank, limestone is found in place on the sandstone, and increases in thickness towards the Mississippi. Mineral blossom, as it is called, or mamillary quartz, siliceous matter coating the cherty limestone in chalcedonic layers, barytes, and other indications, announce the vicinity of the galeniferous rocks. Frequent indications also of carbonate of copper are found, of which the veins show themselves on the south side of the Wisconsin, in the neighborhood of Mineral point.

On reaching the mouth of the Wisconsin, and reviewing the appearances presented by the country left behind, it becomes apparent that evidences of a great aqueous movement are constant along the whole line from Michilimackinac to the Mississippi, the extent and direction of which cannot be reasoned upon until the whole area lying between the Wisconsin and Lake Superior is examined. At Michilimackinac the calcareous strata, which are analagous to those on the Wisconsin, are broken up into brecciated masses. The islands in the vicinity of Green bay are the remains of sandstone beds once continuous through the country, and overlying the beds of carboniferous limestone near Navarino and at Kakhawning. On rising the country to the Apackquay lake, the incoherent sandstone appears to have been broken down to form the present loose sandy soil of the adjacent country. There is, upon the whole, reason to believe that the denuding forces which acted when the general water-level was lowered, and which probably brought the primary boulders from the northwest, (found all the way from Beaver river on the Ohio,)

have carried away a vast extent of mineral surface, and that all the great sand deposits from Lake Winnebago, as well as those in the valley of the Wisconsin, the valley of the Wisconsin itself, the coves and dells and coulées between the sandhills, which now so much diversify the face of the country, are the result of the same denuding force. The very great extent of the arenaceous deposits can only have been caused by an ancient breaking up of these incoherent sandstone rocks.

On approaching the mouth of the Wisconsin, west-by-south, the right bank of the Mississippi appears, about 450 feet high, and the river perhaps 900 yards wide, its water somewhat clearer than that of the Wisconsin, and the zizania continuing along its banks. Four or five miles N. N. W. from this point. Prairie du Chien is seen, a fine flat, where Fort Crawford is built. East of the garrison and on the edge of the prairie there is a fine continuous escarpment of calcareous rocks, from three to four hundred feet high, alternating with sandstone. This limestone very much resembles that in Missouri before alluded to; the beds are horizontal, of a grayish buff color, some of them compact, others with cavities containing crystals of carbonate of lime. These bluffs are cherty towards the top, and where this commences I observed the beds to be occasionally made up of concentric circles. I found one mass, nine feet long and six feet wide, entirely made up of such circles, some of which were two feet diameter. It was sufficiently curious to make a drawing of, of which diagram No. 16 is a representation. I also brought a fragment of it away with me. This is a sort of oolitic structure upon a great scale.

From Prairie du Chien I commenced ascending the Upper Mississippi, which flows the whole distance (about 260 miles) from this place to Fort Snelling, near the mouth of the Minnaya Sotor or St. Peter's river, through the same formations that prevail on the Wisconsin, the calcareous rock, however, predominating on this upper line. It would not be consistent with

the nature of this report to enlarge it with repeated relations of the great beauty and amenity of the scenery of the upper portion of this often-described river; the formation being the same along the whole line, the geologist has to limit his observations to incidents connected with geological causes, and reserve what belongs to descriptive geography, and the manners and customs of the Indian nations he passes amongst, as I shall do upon this occasion, to a work of appropriate character. It is one of the great advantages of geological science, that where interesting minerals and metals and fossils are wanting, there is always instruction to be received in the study of the causes which have modified the surface of the earth in whatever direction we move. This is particularly true as it regards the bed of the Mississippi and the surrounding country, the physical geography of which is remarkable. The valley through which the stream flows is generally, below Lake Pepin, from one and a half to two miles wide. There has at some time been a continuous alluvial deposit through its entire breadth, and over which the water has flowed in a stream, as it does now in the Lower Mississippi, uninterrupted by islands. Since the reduction of the general water-level, the river, often divided into more than one channel, now cuts its way through the ancient deposit, sometimes the main channel being on one side, sometimes on another, and separating the old bottom into innumerable islands, some of them, at times, being several miles long, and all of them having a level of from six to twelve feet above the streams. This state of things makes the navigation difficult to strangers, who, believing themselves in the channel, get into bays from which there is no egress. Whenever the current slackens there is always reason to doubt the channel. These islands are extremely well wooded, and afford generally excellent situations to "camp out" at night, as it is called, the soil being dry, the situation sheltered, and dry wood abundant. The banks of the valley (for they can scarcely be called the banks of the river, since where the stream runs close to one

shore (the other side of the valley can seldom be seen on account of the intervening islands, or bluffs, as they are more generally called) are from 300 to 400 feet high, consisting of horizontal strata of alternating cherty limestone and sandstone, the principal ledges of which mark, for great distances, the continuity of beds, giving thus a particular character to the bluffs; these are frequently prolonged into extended escarpments, and at other times are broken and rounded off by the weather into sharp peaks and grotesque castellated appearances, at the termination of the small vales, or coulées, from 500 to 1,000 yards wide, which come in at right angles to the river, but do not usually extend far into the land. Sometimes other coulées, parallel to the valley, come into these last again, for the distance of 800 yards from the valley. Beyond them the land is generally level, forming a very extensive plateau of country. The soil, from the admixture of lime, sand, and vegetable matter, is of a superior kind, as is proved by the rank vegetation, and the luxuriant growth of trees on the pleasing slopes and vales of this very beautiful country. These various modifications of the surface are to be attributed to the denuding power of the ancient floods which have passed over the face of the country, and the agency of the weather acting upon them during long periods of time. Among the most remarkable of these peaks is a sort of truncated cone, on the right bank, called *Cap à l'Aisle* by the old French settlers, on account of the wild onions which grow in the bottom of the adjoining valley, which appears to extend far up into the country. The first stream of any importance on the right bank, beyond this cape, is the Upper Ioway,* then Root river; on the left bank the Bad-axe river flows through a very beautiful valley; between this stream and Racoon river is a small prairie, but a more extensive strip of low land of this character is found a

* I found the rivers very erroneously put down, and Lake Pepin disproportionately long on the maps. In the chart of the Indian country east and west of the Mississippi, which accompanies this report, I have endeavored to adjust these mistakes.

little higher up, at Prairie la Crosse, or Ball-game river, where the Indians formerly used to convene to play at their favorite game. The bluffs are about two miles inland, and before the reduction of the water-level, this, like all the other prairies similarly situated, must have been a lake. There are three remarkable capes at the south end of this prairie, with singular mural escarpments, the most northerly one separated from the rest by a coulée. Beyond this point all the Indians are Nacotahs, or of the Sioux nations.*

Beyond Ball-game river, on the left bank, is an important stream, named Black river, down which stream a great deal of fine pine timber is floated. The country all around here is remarkable for its fertility and beauty. The most conspicuous locality on this portion of the upper Mississippi, is a place called by the French *La Montagne qui trempe à l'eau*, or the mountain which is steeped in the water. I ascended to the top of this peak, which has a steep ascent of about 500 feet; the crest at the top runs about north and south for 200 yards, and is not more than three or four yards wide, falling off in a precipice to the west, and having a sharp slope of rich soil to the east, well covered with trees and shrubs. From the top there is an extensive view of the course of the Mississippi and the country in the interior beyond its banks. The same constant character of the valley is observed here: a rich bottom, two or three miles wide, broken into islands and swamps and ponds, and the main channel of the river flowing down between *Trempe à l'eau* and the right bank, about 1,200 yards wide. This curious peak has been represented as "a rocky island, separated from the left bank of the river," and to be "very near the east bank of the river."† This error was no doubt occasioned by the writer's looking at it from the right bank, and not stopping to examine it. It is, in fact, an isolated bluff, about a mile and a quarter in circumference, separated from

* Sioux is an abbreviation of Nablouessiou, Men of the Woods.

† Keating's Narrative of an Expedition, &c. vol. 1, p. 271.

the right bank, and not from the east, the intervening space being occupied by the present main channel. From the top of *Trempe à Peau*, its whole history is seen at a glance: the eastern bluffs are distant at least five miles from it, and in one part recede still more; an extensive prairie, having few or no trees, extending east and west about twenty-five miles, and from five to six miles wide, north-by-east, by compass, separating this out-lier from those bluffs to the east. It is evident that the Mississippi has once passed north of this out-lier, has covered the prairie, then a lake, and has coasted the distant eastern bluffs. This affords another incontrovertible instance of that remarkable reduction of the fresh-water level of this continent, before alluded to, at which period the contracted channel left the then lake, and cut off the *Trempe à Peau* from the right bank. Ompedo Wakeen, brother to Wabeshah, a celebrated chief of a neighboring band of Nacotahs, told me, on the evening of the day I visited the place, that the Indians called it Minnay Choukahāb, or Bluff in the water, and that they resorted to it at the beginning of the wild-geese season, to make offerings to Wakon, or the deity, for success in hunting.

A few miles higher up, there is another prairie on the right bank, where Wabeshah's band have their lodges; and about half way from this place to Lake Pepin, is another, on the same side of the river, still more extensive, and bordered with cedar trees. Having a copy of Carver's Travels with me, and having always found his descriptions deserving of very great confidence, I had been anxious to discover a remarkable locality he speaks of,* and which, from the doubts expressed by other

* "One day, having landed on the shore of the Mississippi, some miles below Lake Pepin, whilst my attendants were preparing my dinner, I walked out to take a view of the adjacent country. I had not proceeded far before I came to a fine, level, open plain, on which I perceived, at a little distance, a partial elevation, that had the appearance of an intrenchment. On a nearer inspection I had greater reason to suppose that it had really been intended for this many centuries ago. Notwithstanding it was now covered with grass, I could plainly discern that it had

travellers,* they evidently had never seen. The passage in Carver is so minutely descriptive, and the existence of the remains of a work capacious enough to hold 5,000 men was something so remarkable, that I was solicitous not to miss the place, however troublesome the search, since he does not say on which bank of the river it is, and merely speaks of it as "some miles below Lake Pepin."

On climbing the bank where these evergreen trees were, which is the right bank of the Mississippi, about eight miles S. E. of Roque's† trading-house, near the entrance of Lake

once been a breastwork of about four feet in height, extending the best part of a mile, and sufficiently capacious to cover five thousand men. Its form was somewhat circular, and its flanks reached to the river. Though much defaced by time, every angle was distinguishable, and appeared as regular, and fashioned with as much military skill, as if planned by Vauban himself. The ditch was not visible, but I thought, on examining more curiously, that I could perceive there certainly had been one. From its situation, also, I am convinced that it must have been designed for this purpose. It fronted the country, and the rear was covered by the river, nor was there any rising ground for a considerable way that commanded it; a few straggling oaks were alone to be seen near it. In many places small tracks were worn across it by the feet of the elks and deer, and from the depth of the bed of earth by which it was covered, I was able to draw certain conclusions of its great antiquity. I examined all the angles and every part with great attention, and have often blamed myself since for not encamping on the spot, and drawing an exact plan of it. To show that this description is not the offspring of a heated imagination, or the chimerical tale of a mistaken traveller, I find on inquiry since my return, that Mons. St. Pierre and several traders have, at different times, taken notice of similar appearances, on which they have formed the same conjectures, but without examining them so minutely as I did. How a work of this kind could exist in a country that has hitherto (according to the generally received opinion) been the seat of war to untutored Indians alone, whose whole stock of military knowledge has only, till within two centuries, amounted to drawing the bow, and whose only breastwork even at present is the thicket, I know not. I have given as exact an account as possible of this singular appearance, and leave to future explorers of these distant regions to discover whether it is a production of nature or art."—*Travels through the interior parts of North America, in the years 1766, 1767, 1768, by J. Carver, Esq. Page 57, 58. London, 1776.*

* Keating's Narrative, &c. vol. I, page 276.

† A half-breed known in the Indian country by the name of Wahjustahcley or Strawberry.

Pepin, I found myself on an extensive and beautifully smooth prairie. At a distance not exceeding two miles, I saw some unusual elevations to the south; and, hoping I had had the good fortune to find, at length, the true place, I walked to them, and, on reaching them, was at once persuaded that I had found the locality described by Carver, and which was sufficiently remarkable to justify the description he had given of it. The elevation had the appearance of an ancient military work in ruins; externally there was the appearance of a ditch, in places filled up with the blowing sand, and having a slope coming down from what might be supposed the walls of the work to the ditch, of about twenty yards. Inside was a great cavity, with irregular salient angles; and at three different parts were the more regular remains of something like bastions; the cavity was seventy yards in diameter, N. W. and S. E., including the ruins of several terraces; the circumference of this singular place, including the angles, was four hundred and twenty-four yards. Seven hundred yards S. S. E. of this was another, resembling it in form and size; and at an equal distance, E. S. E. from this last, was a larger one, eleven hundred yards round, with similar remains of bastions; this cavity would easily contain one thousand people; its walls, if the word may be applied to them, are lofty, and there is a deep ditch on the south side. In the area to the south I counted six more of these elevations, each having a rude resemblance to the other, with what also appeared to be a line of defence, connecting these works with each other. At the northern end of this singular assemblage of elevations, every thing bears the appearance of rude artificial construction; at the southern end, however, and not far from the river, the works pass gradually into an irregular surface, a confused intermixing of cavities and knolls, that might be satisfactorily attributed to the blowing of sand.* There is a growth of oak timber, as Carver observes, upon all this part of the elevations.

* It is a sand prairie, covered with a foot or two of vegetable matter.

All the angles and bastions are very much rounded by the weather, and some of the slopes outside consist of sand brought there by the wind. It is undoubtedly true that all the appearances I have described may have been produced by the action of the wind; but those who think so, after personal inspection, are bound to account to themselves why other parts of this prairie, and of other prairies similarly situated, are not blown up, and why the ground covered by these elevations is blown up in such a manner as to resemble artificial works so closely. If, when this curious place becomes more known and investigated, Indian antiquities should be discovered commensurate with the extent of the work, such as the stone instruments and weapons of offence usually found about Indian encampments, it would decide with me the question. If any thing of that kind is there, it is probably buried beneath the sands too deep for passing travellers to find. I brought nothing away with me but a plan of the general appearance of the locality, and one or two of the principal elevations.

At the southernmost end of Lake Pepin, Chippeway river comes in on the left bank, a stream of considerable magnitude, from four to five hundred yards wide where it joins the Mississippi; the volume of water is said to be great for sixty miles.* Having passed its mouth the scenery becomes changed, and, instead of a valley two or three miles wide, full of low wooded islands, Lake Pepin presents itself, a sheet of water about twenty miles long and nearly three miles wide upon an average, perhaps. This is nothing but a continuation of the Mississippi valley without any islands, with this difference, that the river occupies all the space between the banks, whilst the bluffs and coulées present themselves with the same general character as below. Why there are no islands in this part of the valley, and why it is a lake, deserve an inquiry. It

* At the falls of this river, which are very extensive, there is an indefinite quantity of water-power. The tracts of fine pine timber will, if preserved by order of Government, be extremely valuable. It will be indispensable for building purposes when settlers get into that country.

will occur to every observer, that the entrance of a stream of such magnitude as the Chippeway river, coming in at right angles to the Mississippi, must necessarily dam up the water above it. Thus, at the general subsidence of the water-level, when the alluvial bottom of the other part of the valley would be left dry and plants begin to grow, it would here be covered up to the northwest for a certain distance, whilst the wind and high waves to which this lake is now so much exposed as often to make the passage a dangerous one, would keep the alluvial matter in a state of suspension, and, finally wearing it away, the whole breadth of this part of the valley would be necessarily covered by water. This is the way in which I would account for the origin of this lake, the only one in the whole course of the river.

The strata towards the N. W. end of the lake on the north side are very cherty, and agates are frequently found amongst them. Opposite to a small stream called Marchessau, on the south side, an intelligent trader, well acquainted with this part of the country, told me he had picked up pieces of galena. There are two channels at the head of the lake; the southwest one passes between the right bank of the river and a low narrow island, called Twelve-mile island, edged by lofty and beautiful trees. Up this channel, and near a lofty out-lier about three hundred feet high, called La Grange, is the village of the Indian chief Machpayah Muzah, or the Iron cloud, Dootoh, or Redwing, the celebrated old chief, being now dead. Two streams, the Vermilion and Cannon river, fall into the Mississippi a few miles higher up. Between them and at a distance not exceeding thirty miles from the mouth of the St. Peter's, there is a singular out-lier of sandstone, which shows how the continuity of the strata has once existed, and how much the general mineral level has been reduced. Diagram No. 20 represents this curious pillar, to which the name of Castle Rock has been given. It is situated on what is called the Big Prairie, and can be seen for a distance of twenty

miles, appearing like the remains of a castle, or a church with a cupola. The total height is ninety feet, the lower part being about sixty feet high and twenty-five feet in diameter; the upper part is thirty feet high and varies from two and a half feet to fifteen feet diameter. I had these particulars from a gentleman who had visited the place and taken a drawing of it, of which he presented me a copy.

The banks of the river now gradually lose their escarped character, the left bank especially being low and rolling, having generally a gentle slope of grass and trees to the water side, and rarely exceeding one hundred feet high. About forty miles from Lake Pepin, St. Croix river comes in from the left bank, about 120 yards wide. This stream, after following it north about two miles, expands into a small lake of nearly the same breadth. Beyond the St. Croix the Mississippi becomes narrow, and at one place, where the limestone beds on the right side come to the waters edge, is only about one hundred yards wide, and winds very much. From this place I could hear distinctly the noise of the falls of St. Anthony. Four or five miles before reaching the village of Tchaypehahmonee, or Little Crow, the limestone on the left bank becomes very tenacious and twisted; the beds become cavernous, are wavy, and large concentric masses are formed resembling those at Prairie du Chien; the whole mineral substance appears to have had a tendency to resolve itself into globular forms. The river is very beautiful about here: an open stream, without islands, about 300 yards wide, flowing between banks covered with handsome trees, vines, and grass; the soil is exceedingly rich, being composed of decomposed limestone, sand, and vegetable matter, black and deep. A short distance beyond the village there is a bluff of soft sandstone, in which the Indians say there is a cave, but the rock from above has fallen down with hundreds of tons of sandstone, and has concealed the entrance. Somewhat higher up, and only a few miles from Fort Snelling, is another sand-