

we attached the two oxen to the tongue and started. After a march of seven miles we reached "Ash creek" and there encamped.

I now resolved to let some of my men go on as rapidly as they could, and get mules at West Port, Mo., with which they could meet me at Council grove. I therefore sent for Pilka, Dobson, and Wiseman, and having given them all necessary letters, they prepared to set off by sunrise the next morning.

February 15.—To-day the sky was cloudy, and threatened us with a storm; the air was very cold. After marching six miles we reached "Pawnee rock;" here we stopped a few minutes and kindled a fire; again continuing our route, we marched sixteen miles further, and encamped on Walnut creek. Here we overtook the express party, and we had a hearty laugh at our having overtaken them; but Pilka was a good woodsman, and would not leave the timber when the sky looked so threatening, otherwise they would have gone on, and have slept in the open prairie.

February 16.—Just as we were about starting this morning, a fine mule came trotting into camp. We tried to catch it, but it had become so wild that it would not let us approach sufficiently near. This mule had a blind bridle on its head, the rein hung dangling upon the ground. As soon as we crossed Walnut creek, we came in sight of herds of buffalo. These animals were continually running across our road as we advanced. Sometimes they would stop just in the road a few hundred yards in front of us, and kneeling down, toss the dust into the air with their horns, or else take a roll over on their backs, then springing up, dash off again with their long beards and manes waving in the wind.

After a march of fourteen miles we encamped at "Plum buttes." We got water from some neighboring pools, and the plum bushes answered for fuel.

In the afternoon a band of buffaloes started for the river; they came directly towards our camp; we all secreted ourselves in the bushes at the top of the butte. We had "the wind" of the buffalo, and they came on without discovering us; they walked slowly along; having suffered the old bulls to pass on, we selected a fine buffalo and fired down upon him; he only ran a short distance before he laid himself down. We approached warily, for we were all on foot, and fired a second gun, which caused the buffalo to lay flat upon his side. We were instantly upon him with our knives and tomahawks. Laing gave a mortal wound to a fine fat cow, but as she would get up and walk off every time he tried to approach, and as night was drawing on us apace, he deemed it more prudent to leave his victim to the wolves than risk the loss of his own life by Indians.

We cut out all the marrow bones and all the choice pieces, and spent the best part of the night in cooking and eating, and during the night the wolves eat up everything we had left.

We would have been very glad if we could have carried some of this meat with us, but our packs felt heavy enough without any addition.

February 17.—I had intended to march to Chavez creek, about

19 miles distant, but the poor fellows who were with me complained so much of the soreness of their feet, that I determined to encamp at "Cow creek," which is only 11 miles from "Plum butte." Here we found a good ox-yoke, a thing we greatly needed. There was also a wagon and several muskets, which must have been left by the party of teamsters who had preceded us. It was evident that the express I had sent on had encamped here last night; their fires were still burning.

About 2 o'clock we saw some persons approaching; they proved to be Mr. Miller and Mr. Hoffman, of Baltimore. They were nearly out of provisions, and their mules almost broken down. From them we learnt everything with reference to the fiendish massacre that had been perpetrated at "Taos." Nothing I had undergone had caused me more unpleasant sensations than the news of the horrid massacre of Governor Bent and his compatriots.

I had been acquainted with Governor Bent ever since my first arrival in New Mexico. I esteemed and admired him greatly, and every one in that country looked upon Charles Bent as one in a thousand.

When the fiends were breaking through the roof of his house, even after he had been wounded, his wife brought him his arms, and told him to fight, to avenge himself; he could easily have killed some of the mob, who were entirely exposed to his aim, from the hole they were making.

"No," said he, "I will not kill any one of them, for the sake of you, my wife, and of you, my children. At present, my death is all these people wish." The murderers rush in, they kill him, they scalp him, and, horrible to relate, they parade the bloody scalp through the streets of "Taos."

Mr. Hoffman and his party continued their journey. In a little while afterwards we descried another body of men approaching; they proved to be a party under the command of Mr. James Brown; he had kindly picked up the men whom I had left at Pawnee Fork, and had also raised my "cache," which he had brought along for me. Mr. Brown agreed to carry the baggage belonging to my men, and we now felt as if all our troubles were ended.

February 18.—We were up before the sun rose, and in a few minutes commenced our march. In the evening we encamped on the "Little Arkansas," which is 20 miles distant from our point of departure this morning. We had started with the intention of marching 10 miles further, but this evening it looked stormy and threatening, so we determined to encamp in the timber of the Little Arkansas.

February 19.—This morning, before we had proceeded more than 5 miles, we met J. Dobson, whom I had sent on the express; he told me that there was a team belonging to the government at "Cotton Wood fork," in charge of the wagon master, Mr. Smith, who said that he would carry every thing that I had on to Fort Leavenworth; fearing a storm he had set out to reach "Cotton Wood fork," where he would await my arrival. We encamped in

the evening at "Turkey creek," here there is no wood to be found and besides this, all the grass around us had been burnt up.

February 20.—Last night we had an awful storm, it still continued. Several mules have been frozen to death. We have been obliged to lay abed all day, in order to keep warm. The snow is still drifting about furiously.

February 21—This morning is the first time for thirty-six hours that any one has ventured out of bed. My men had their provisions ready cooked, and shared them with Mr. Brown's party; of all the tents that had been pitched Friday night, mine was the only one which still remained. The snow had heaped up around the rest so that the inmates were obliged to desert them, and take refuge in the wagons. About mine, the wind had swept in such a way as to keep open a path around it, although the snow was on a level with the ridge pole of the tent. We now broke up some boards that were in the wagons, and kindled a little fire. Soon the sun rose; but, instead of one sun, we had three; all seemed of equal brilliancy, but, as they continued to rise, the middle one only retained its circular form, while the others shot into huge columns of fire, which blended with the air near their summits. The breadth of the columns was that of the sun's apparent diameter, and their height about twelve times the same diameter; they were between twenty and thirty degrees distant from the sun. Before the sun had risen more than ten degrees, this phenomena entirely disappeared. Some of the men called my attention to this strange appearance, but so engrossed were they with their own calamities, that they hardly seemed to be in the least astonished at what they saw.

After some little while we missed Preston and the sick man; we inquired, but no one knew anything about them. It was now evident that they had been buried beneath the snow drift, which, for some distance around had filled up the nook in which we had encamped to the level of the prairie; as the drift was of considerable extent, much time would be wasted in examining it, unless we could find where they had pitched their tent. At last, I noticed one poor fellow digging away to find his boots; he showed me where the sick man had been. I called the men, and immediately set to work. The snow was six feet deep, and we had only a little piece of board to dig with, and the cold was so great that no one could work very long before his hands became perfectly rigid. After a good deal of hard digging, we found a pair of boots, which were recognized by the men as Preston's property. This urged us to renewed exertions; at length we cleared the snow from a portion of his buffalo robe, and lifting it up, we got sight of the poor fellow's face; he cried out in a weak voice, begging us for God's sake not to leave him to die. We assured him that we would not forsake him, and again covered his face until we could remove more of the snow; having dug as far as his waist, five men caught hold of him to drag him out, but the snow had been moist and was packed very hard, and he was held tight by the tent which had been broken down by the pressure of the snow; however, we dug

a little more until we could get at the ridge pole of the tent, which we cut in two with our axes. We now drew Preston out of the drift, which had like to have proved his grave. His bed-fellow, who had been much weakened by sickness, was already dead; he was the man whom we had dragged from Jackson's grove to "Pawnee fork;" where he had been picked up by Mr. Brown; since which time he had been recovering fast. Poor fellow! it was his destiny to leave his bones on the desert prairies, where wolves howl his requiem. I caused the men to dig him also out of the drift, and to put his body into a wagon, in order that we might bury him at the Cotton Wood fork.

Preston complained bitterly of the cold; the sudden chill which he experienced when we dragged him forth (for he seemed at first to be in a perspiration) instantly stiffened his limbs. He begged, he prayed, that we would bring him near the fire; but we put him into a wagon, and, wrapping him in buffalo robes, we started on our march.

Several mules had already been frozen to death. As we proceeded, mules, that had started off in apparently good condition, would drop down in the harness, and their limbs would become perfectly rigid. Even one of the oxen fell down benumbed with cold. In a few hours we lost six mules and one ox, so that our road was marked out with dying animals. As we approached our destined camp ground, we saw a wolf that was so badly frozen as to be unable to move. One of the men put an end to its sufferings by a bullet from his rifle.

The snow on the general surface of the prairie was not more than three or four inches in depth, so that I accomplished the march without any great difficulty by twilight; but none of the teams arrived until 11 o'clock that night.

February 22.—I now made all my arrangements for going on with Mr. Smith, leaving my men to await the movements of Mr. Brown, who had agreed to transport their provision and bedding as far as Independence, Missouri.

During the day, we dug a grave for the unfortunate man who was suffocated beneath the snow. On a high bluff point, that overhangs a deep pool of quiet water, close to the spot where the road crosses Cotton Wood fork, is the last resting place of poor Pilcher.

Mr. Brown was in great embarrassment all day about the safety of his teams. Several of them had not yet arrived; the poor animals had been out another night upon the prairie, where they could not get a morsel to eat.

In the evening, Preston came into camp; he had been put into a wagon that remained last night upon the prairie, about 8 miles distant. This morning he started and walked to camp. He looked as if he had been sick for a long time, so great was the shock his constitution had sustained. He told us that when he first awoke, he felt very comfortable, and had no difficulty in breathing. At length he perceived his companion was dying. He now made efforts to escape from his perilous situation, and found

he was hemmed in on all sides by the snow. He redoubled his exertions, but his struggles served only to exhaust his strength, and he found great difficulty in breathing. The full conception of his awful situation now burst upon him; he struggled violently, but not a limb could he move, and he had sunk into the depth of despair, when we fortunately rescued him from his icy tomb.

Once more an air of happiness seemed to diffuse itself over the faces of the men. Preston's story awakened us to a lively perception of the fearful vicissitudes through which we had passed. Our hearts acknowledged how futile would have been all our efforts, unless assisted by the Great Being who rules the winter storm. The men seemed to vie with each other in reciprocating acts of attention and kindness, and it seemed as if there were no bounds to the generous impulses which actuated their conduct towards myself.

February 23.—My pedestrian exercises were now terminated, after having accomplished 179 miles of the 352 miles which lie between Jackson's grove and Fort Leavenworth. Although I was perfectly willing to walk, and had now become so accustomed to do so, that I felt no inconvenience from the exercise, still I was not permitted to choose; Mr. Smith made me mount his horse, while he journeyed on foot. We found Mr. Hoffman and Mr. Miller, who had started yesterday morning at the same camp with ourselves. They had been obliged to leave their wagon, and pack all their camp furniture on their mules. We halted within three miles of the Diamond spring, where we found plenty of green elm, for fuel for our fires.

February 24.—The day was stormy and cold, but we heeded not the weather, and pressed on until we reached "Council grove." Here we found grateful shelter in that noble grove whose huge walnut trees raise their limbs aloft, as if to battle with the clouds in our defence, while their lower boughs were stretched over us to shield us from the pitiless pelting of the storm. Paroquettes were sweeping rapidly in large circuits among the topmost branches of the ancient denizens of the forest, and their screams shrill and grating echoed through the lofty arches of boughs, now shorn of their summer glory. During our day's march, flocks of the pretty snow lark were continually taking wing as we advanced, and warbled forth their sweet notes as they flew. As soon as darkness shrouded us, some large screech owls commenced a serenade, and the forest rang with a concert of their doleful music.

Here, as well as at "Cotton Wood fork," we saw a great many prairie hens, but the snow on the ground caused us to be instantly perceived by these watchful birds, which take flight the moment we endeavor to approach them.

February 25.—It is again cloudy and very cold; a high wind is blowing from the northeast, and now and then a fog of snow arises and the small icy particles, driven by the fierce winds, make one's face feel as if raked with briar brushes. We encamped at one of the Beaver creeks. Here one of Mr. Hoffman's men killed a racoon, which was divided among his party, being the only meat they had

to eat. While sitting by camp fire, I noticed some beautiful forms which were assumed by the particles of snow which fell on my blanket. They resemble stars with six radii; each of these radii was ornamented with beautiful aborescent shapes resembling the cross of "Santo Domingo."

I noticed that all the icy fibres of these flakes made angles of 60° with each other; this was invariably the case with all those that I saw. The annexed sketch is an exact figure of these curious crystals.



The storm which produced these flakes bore a greater resemblance to the "snow fogs" than to a regular storm; only a few flakes were falling, so that they did not inconvenience us in the least, and we paid no attention to them except to examine their beauty.

February 26.—When we awoke, the ground was covered with snow, and it was stormy all day; the wind of the north blew hard, the snow fell fast, the ground became soft and slippery, and the ravines were filled with water. It was bad travelling for the wagon, and much worse for the men who were plodding along on foot. We, notwithstanding, made a long march, encamping in the evening at "110 creek," which is 26 miles from the preceding camp. We built huge fires, and soon made ourselves quite comfortable, although the fine particles of hail which had pelted us all day still continued to fall. The woods had been full of prairie chickens; in all directions we noticed their foot prints in the snow.

February 27.—We determined to make a long march, and in spite of the continuance of the storm we started at a very early hour. The mist of mixed snow and hail fell almost uninterruptedly throughout the day. Clouds after clouds were chasing each other across the gray sky. Once the sun shone forth with sufficient brightness to cast a shadow, but its brightness was in the next moment obscured. Under foot it was wet and slippery; the road was full of pools of snow and mud. We marched twenty-five miles to "Willow spring," where the road to Fort Leavenworth turns off towards the north; continuing our journey two miles further, we encamped on a stream which adds its tribute to the waters of the river Wakarusa. Here we found a plenty of hickory wood, a fine spring, and as good grass as the season affords; during the day we saw flocks of snow larks and several prairie chickens. The ravens have given place to the crows; the latter birds seem to confine their wandering to the precincts of American corn fields.

February 28.—We had now but thirteen miles to march before reaching the Kansas river. I rode on rapidly, and soon overtook

Mr. Hoffman's party; they had been almost starving for the last two days, and were travelling rapidly, in hopes of soon reaching some Indian hamlets where they might procure food; they soon reached a house, the first they had seen for a long while, and they then asked for food for themselves, and fodder for their animals. The Indians who lived here told them that it would be wrong to sell anything, as it was Sunday. But they soon found other Indians who were not so scrupulous.

When we reached the Kansas river, we found it full of ice, which was so packed together that it stood up edgewise, and seemed to offer an impenetrable barrier to our progress. We halloed to the Indian ferrymen who were on the opposite side of the river; they jumped into a flat boat and started to reach us; but, finding they could not get through the ice, they returned; we were, however, determined to cross if it were possible; and, getting into a flat boat which happened to be on this side of the river, we pushed off from the shore; soon our boat became wedged in the ice; we then pushed it back far enough to acquire impetus to rush forward; by innumerable repetitions of this manœuvre, we forced our way clear into the rapid current of the stream; the long poles that we were using could not touch the river bottom. But we fortunately had "sweeps" on board; with them we rowed our boat, and managed to land on the opposite side. Our men now jumped ashore and "cordelled" our craft up the stream to the proper landing place. Our successful passage over was entirely due to the perseverance and good management of the wagonmaster, Mr. Smith.

We encamped on the river bank, where there is no scarcity of all the varieties of timber that the heart of man can desire.

March 1.—At the dawn of day we prepared our frugal repast. We now felt at home, and as the sun rose there seemed to be a cheering brightness in his rays which is not to be seen in "New Mexico," nor on the prairies.

There was a majesty in the lofty groves which now surrounded us, and a music in the plash of the wild duck as it lit upon the bosom of the river; there was music even in the scream of the parrotette that swept over our heads; there was a charm in everything, for we now really felt that our trials were at an end.

At a rapid pace I started off for the fort. As I passed through the bottom lands of the Kansas, the prairie chickens were constantly flying up with a loud whirring sound.

At an early hour in the afternoon I reached fort Leavenworth, where I was most kindly received by Colonel Wharton, the commander of this post.

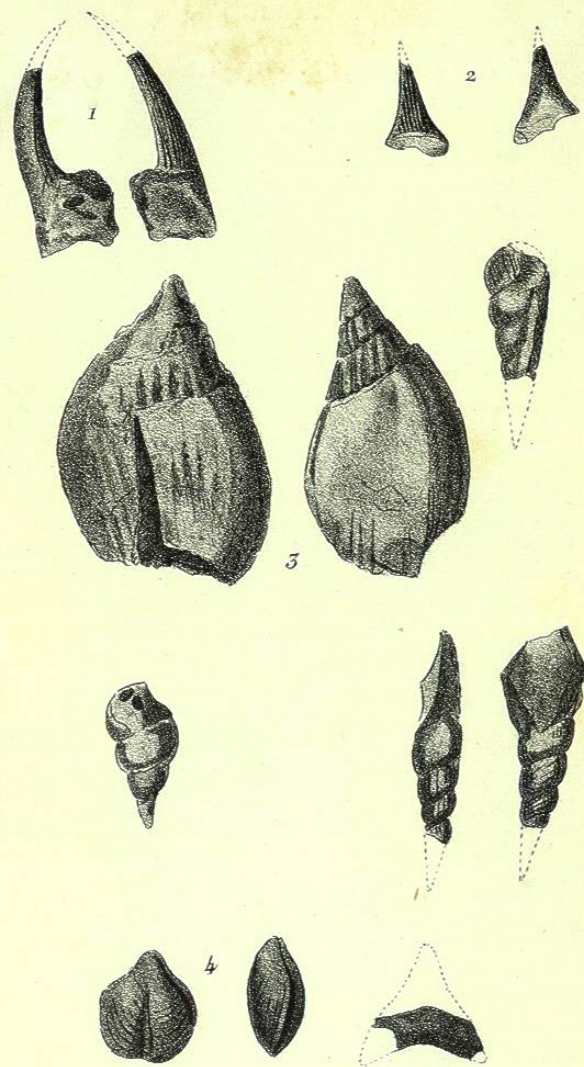
Very respectfully, your obedient servant,

J. W. ABERT,

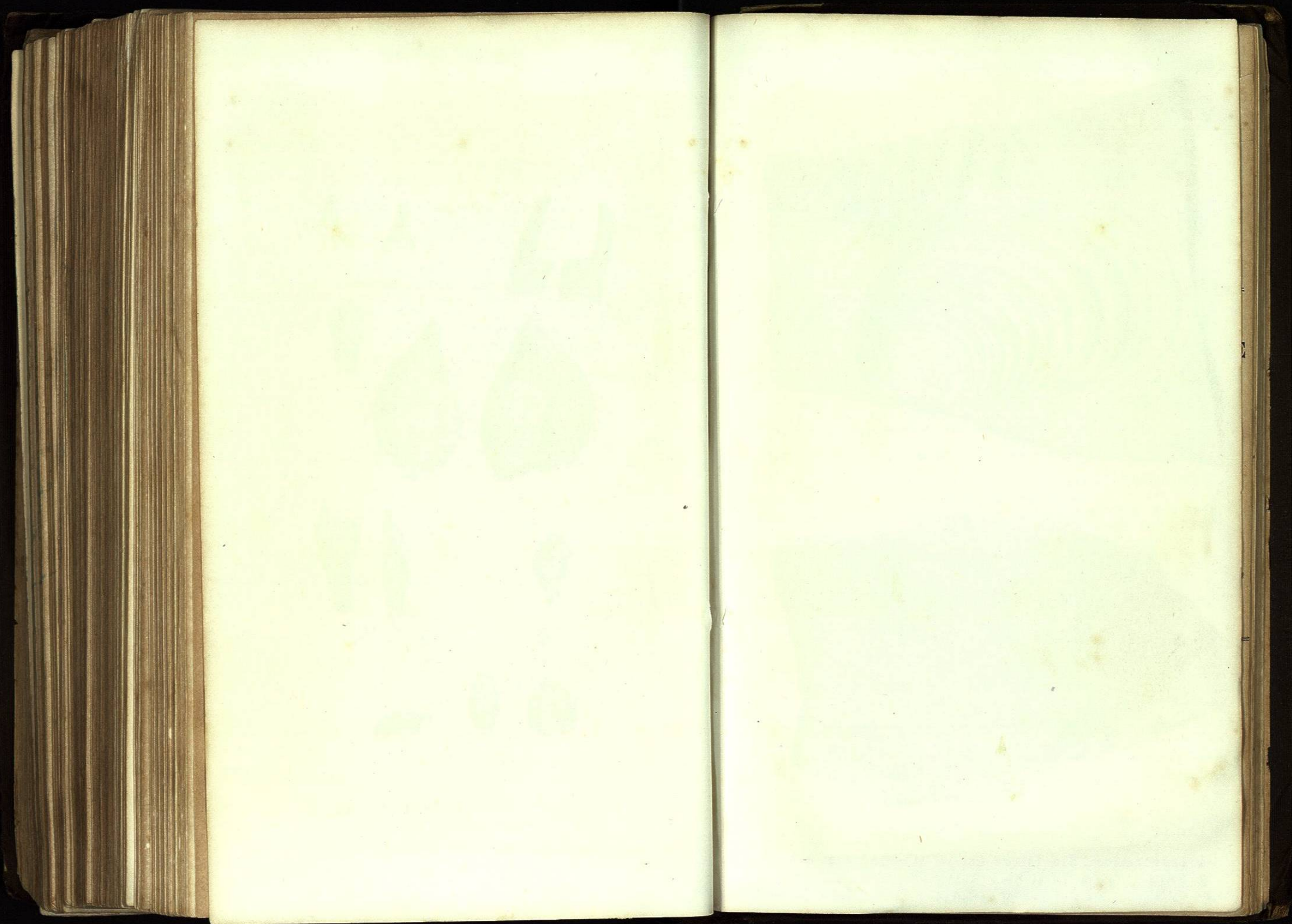
Lieut. Corps Topographical Engineers.

To Colonel J. J. ABERT,

Chief Corps Top. Engineers.



- 1 & 2. Shark's Teeth. Poblazon.
 3. Fossils from Poblazon
 4. Fossils from Lead mine. Tuerto



Notes concerning the minerals and fossils, collected by Lieutenant J. W. Abert, while engaged in the geographical examination of New Mexico, by J. W. Bailey, professor of chemistry, mineralogy, and geology, at the United States Military Academy.

Cretaceous fossils from Poblazon, west of the Rocky mountains, latitude $35^{\circ} 13'$, longitude $107^{\circ} 02'$, strata dipping west.

The fossils from Poblazon consist of gigantic hippurites,* casts from the cells of several species of ammonites, valves of inoceramus, identical with a species figured in Frémont's report, plate IV., fig. 2,† casts of small univalves and bivalves too imperfect for determination; and teeth of sharks.

These fossils prove that the strata from which they were taken, belong to the cretaceous formation. The existence of vast beds of this formation on the east side of the Rocky mountains, and extending from the Upper Missouri to Texas, is well known. The occurrence of the same formation on the western side of the primary axis of the Rocky mountains is quite interesting.

The dip of the rocks at Poblazon is to the west, or from the Rocky mountains; and this proves that these mountains have been elevated since the deposit of the cretaceous beds. It is, therefore, probable that the cretaceous beds on both sides of the Rocky mountains were made by the same ocean.

Bituminous coal, and coal fossils.

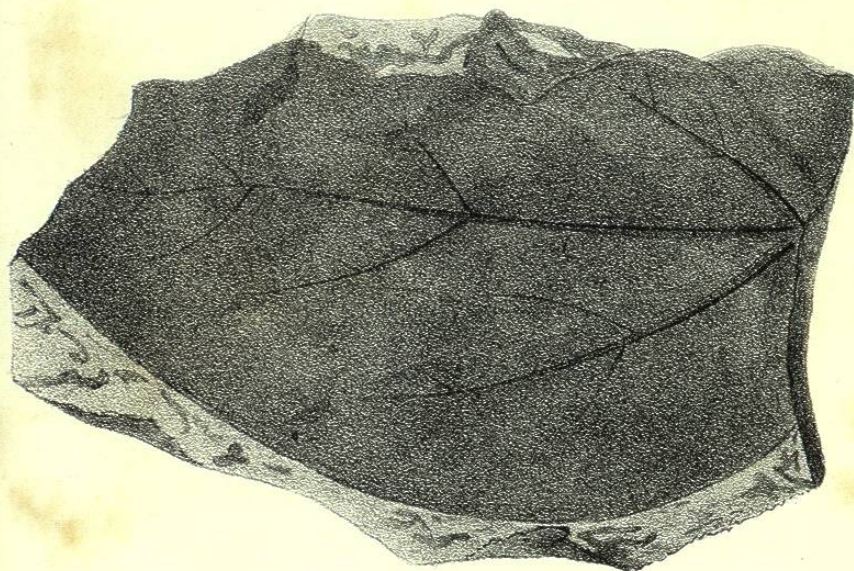
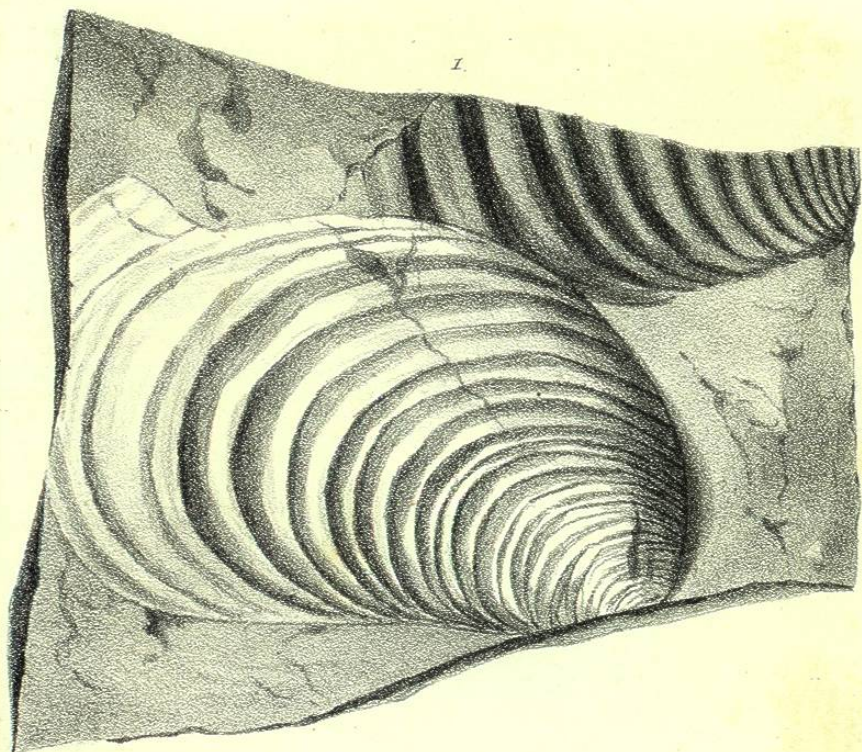
From the Raton, east of the Rocky mountains, latitude $37^{\circ} 15'$, longitude $104^{\circ} 35'$, from the strata dipping east.

The fossils accompanying the well characterized bituminous coal from the Raton, consists chiefly of large ovoid leaves, with very distinct branching veins, which consequently must have belonged to decotyledonous plants of comparatively modern origin. It is an interesting fact that no ferns, or other of the common coal fossils were found. It is thus established beyond a doubt, that the deposit of coal at the Raton is not the equivalent of the great coal formation of the United States, but is of a much more recent date, perhaps corresponding to the "Brora" coal.

The existence of coal on the eastern flank of the Rocky mountains has been noticed before, and some have supposed that it indicated the western outcrop of the great carboniferous formations of the western States; this view, however, is not confirmed by the deposit at the Raton, which is decidedly a far more recent formation.

* These are the remarkable specimens composed of parallel plates covered with hexagonal reticulations.

† Frémont's specimens were found on the east side of the Rocky mountains, latitude 39° , longitude 105° .



1. Inoceramus. Rio Timpa. Lat. $37^{\circ} 41'$ Long. $104^{\circ} 07'$
2. Fossil from Coal bed Raton.
(See Map 1845.)

Fossil Woods.

There are two specimens of these; one a semi-opalised fragment from Wett mountain, near the Spanish peaks, the other a silicious pebble from St. Ana. Neither of them retain the original structure in sufficient perfection for determination of its character by the microscope.

Non-fossiliferous rocks.

The most interesting specimens of rocks were the following:

1st. From the cañon of Vegas: A fragment of well characterized granite, and another of mica slate.

2d. San Miguel: A reddish decomposing granite.

3d. Purgatory valley: A black slate.

4th. Cañon Inferno: A compact hornblendic mass, with red specks, probably a trap rock.

5th. West of the Rio Puerco: "A white clay, used for white-washing."

This is a calcareous, rather coarse grained mass, with occasional grains of silicious sand and pebbles; it effervesces briskly with acids, and tastes strongly of lime after being heated by the blow-pipe. It contains no polythalamia.

6th. Top of little knools near "Rio Vermejo:" In a state of decomposition, but resembles an indurated sand stone.

Minerals.

The minerals are mostly of little interest. The ores are not rich in themselves, nor can they be relied upon to determine the value of the mines. The gold ores from "Viejo Real," "Tuerto," &c., consist chiefly of cellular quartz, discolored by oxide of iron, and rarely showing any particles of gold. The copper ores are chiefly chrysalla and green carbonate of copper. Below are given the true names of some specimens, to which were attached the labels copied in the first column.

1st. Smoky quartz from Padillas: A nodule of obeidian; fuses easily by the blow-pipe.

2d. Salt from the Laguna near Chilile: Two layers, one of chloride of sodium, the other of sulphate of magnesia.

3d. Blossom of the gold, Tuerto: Quartz in small elongated prisms.

4th. From between Rito and Rio Puerco: A nodule of white compact gypsum.

5th. From between Poblazon and Ciboletta: Small plates of selenite.

6th. Belen abundant in all the sierras: Handsome plates of silinite.

7th. Fossil moss from the gold mine at "Viejo Real:" Dendritic infiltrations of oxide of iron.

