

feet below the common level of the plain.

"This plain consists of a bed of coarse pebbles, gravel and sand, and its surface is thinly covered with prickly pears and a scanty growth of starved and rigid grasses. Among these, the hygrometric stipas ~~Hygrometric stipas~~ (S. juncea, S. barbata) are extremely troublesome, their barbed and pointed seeds adhering and penetrating like the quills of ^{the} porcupine into every part of the dress with which they come in contact. The long and rigid awn is contorted or straight in proportion to the humidity or dryness of the atmosphere, indicating the changes in this respect with the precision of the nicest hygrometer.

"The detached party extended their walk about eight miles, without finding the apparent distance to the base of the mountain had very considerably diminished. They had unluckily forgotten to make any provision for dinner, and now found themselves fatigued and hungry at the distance of eight miles from the encampment of the main body, and so far from the mountains that it was evidently impossible to reach them and return on the same day. They therefore determined to relinquish the attempt, and Mr. Peale was fortunate enough to kill a couple of curlews, which were roasted and eaten without loss of time.

[which the alleged distance makes near the mouth of Ralston creek.]
"Near the place of this halt, they observed some small sandstone ridges similar to those on the Platte below, and collected among other plants, the species of currant* (Ribes aureum?) so often mentioned by Lewis and Clark, the fruit of which ~~they found~~ formed an important article of the subsistence of their party while crossing the Rocky Mountains.

"They also saw about the shelvings of the sandstone rocks, which formed for some distance the banks of the stream, innumerable nests of the cliff swallow, similar to those seen on the Missouri. In returning to the camp by a different route, they were much annoyed by the prickly pears, covering the ground so closely that their feet were frequently wounded by the thorns, against which their moccasins presented but a very inadequate protection.

"Having killed a young antelope, they re-crossed the Platte, which was here about three feet deep, clear and rapid, and arrived at camp. ~~The ripened fruit of this widely distributed shrub is variable in colour.~~ In dry and exposed situations about the higher parts of the mountains, we have met with the berries of a deep purple, while in the low grounds, they are fulvous or nearly white. On the Cannon-ball creek we saw also the common virgin's bower, Clematis virginica, Ph., Lycopus europeus?, Liatris gramineifolia, Sium latifolium, Oenothera biennis, and other plants, common in the east, with the more rare Linum lewisii, Ph. and Eriogonum sericeum, &c."

Footnote

after sunset.

"Here a complete set of observations, for latitude, longitude, &c., had been taken; Major Long and Lieutenant Swift having preceded the party in the morning, and arrived before seven o'clock, for that purpose. In the evening, observations were attempted, but without success, as the sky soon became cloudy.*

Footnote

*The results of the observations taken by Major Long and Lieutenant Swift at this camp of July 5, 1820, ~~made~~ on the South Platte near Clear creek, were, for the latitude, 39° 50' 40", which seems to have been substantially correct; for the longitude, 105° 20' 45", which would be several miles west of the meridian of Golden, or, as usual, considerably too far west, — this time, something over a third of a degree. — F.W.C.

"Robins (Turdus migratorius), which we had not seen since we left the Missouri, here occurred in great numbers.

"On the following morning [July 6th], soon after ~~Xleaving~~^{the Clear creek} encampment, we crossed Vermillion creek [Cherry creek, little dreaming they were traversing the site of the future metropolis of the Interior West, with whose earlier years ~~some of them were to~~ live to be contemporaneous*], a con-

Footnote

*The beginnings of Denver were in 1858. Of the more prominent members of Long's expedition, two died long before that year, — these being Capt. Bell in 1825 and Thomas Say in 1834; but Dr. James lived till 1861; Major Long till 1864; ~~and~~ Lieut. Swift till 1879; — F.W.C.

and John R. Cooper who in 1888 in company of the naturalists of the Smithsonian Institution, 1888-1889.

siderable tributary from the south. In some part of its course, its valley is bounded by precipitous cliffs of a red sand-rock, whence the name of the creek.

"Our guide informed us that the Indians, a few years since, destroyed every individual of a large herd of bisons, by driving them over the brink of one of these precipices.

"Opposite the mouth of Vermillion creek, is a much larger stream, ~~from~~ from the northwest, which is called Medicine-lodge creek, from an old Indian medicine lodge which formerly stood near its mouth*. A few

Footnote

*As to the identity of Dr. James' Medicine-lodge creek, and other mountain tributaries of the northerly-running segment of the Platte, see footnote to paragraph that names Grape creek and Defile creek. — F. W. C.

miles further, on the same side, is Grand-camp creek, heading also in the mountains. About four years previous to the time of our visit, there had been a large encampment of Indians and hunters on this creek. On that occasion three nations of Indians, namely, the Kiawas, Arrapahoes, and Kaskaias or Bad-hearts,* had been assembled together, with forty-five French hunters in the employ of Mr. Choteau and Demun of St.

*Katakas, Kiowa-Spachas.

Louis. They had assembled for the purpose of holding a trading council with a band of Shiennes, whose country is cold and barren.

"The British traders supply the Minnetarees or Gros Ventres of the Missouri with goods; from these they pass to the Shiennes and Crow Indians, who, in their turn, barter ~~with~~ ^{then with} remoter tribes: in this manner the Indians who wander near the mountains, receive their supplies of goods, and they give a decided and well founded preference to those which reach them by this circuitous channel, over those which they receive from any other source.

"Two miles beyond Grand Camp creek [Bear Creek], is the mouth of Grape creek [Lilley Gulch], and a little above on the opposite side, that of Defile creek [Plum Creek], a tributary to the Platte, from the south, which has its course in a narrow defile, lying along the base of the mountains."*

to note

*Major Long's Atlas shows eight independent mountain branches of the South Platte River, from the position of Cache à la Poudre River to that of Clear Creek, inclusive; which suggests that the guide, Bijou, may have furnished the Major with a list of mountain branches, on which this part of the latter's map was based. But if so, it would seem that the Frenchman enumerated not merely the streams that entered the Platte independently from the west, ~~but~~ (as Long seems to have understood when preparing his map) but the mountain branches as he knew them ~~immediately~~ immediately at the foot of the mountains; so that the Major was led to chart as independent branches of the South Platte, besides some that are so, several that reach that ~~river~~ river indirectly. Of the eight mountain branches which the Atlas indicates as entering this part of the South Platte directly, the first, (for which no legend appears,) is easily recognized as the Cache à la Poudre, by its relative size, position, and branches, and, although it was not visited by the expedition, it must have been well known to Bijou and Ledoux, and fairly well described by them to the Major, as indicated by his portrayal of its two chief branches in essentially their true position; its name, which originated in 1814, must have been known to them; the second and third, (also unlegended), probably represent Big Thompson and Little Thompson creeks, and should therefore have been made to unite before entering the river; the fourth (unlegended), fifth (legended "Póteras cr."), sixth (legended "Elk cr."), and seventh (unlegended), may have been intended for North St. Vrain, Middle St. Vrain (or perhaps St. Vrain's lower or trunk stream), Left Hand, and Boulder (James' "Cannon-ball creek"); but the Major's ignoring of their confluent relations, makes their precise identification perhaps scarcely possible; while the eighth (unlegended by Long, but called "Medicine-lodge creek" by James), is evidently the later "Rio Vasquez" of the Mexicans, which we now know as Clear Creek.

The expedition reached the mountains, at the lower end of Platte Cañon, before ~~*****~~ noon of the 6th of July, and

explored in this region during the remainder of that day and the day following. Their arrival is chronicled as follows:

"At eleven o'clock we arrived at the boundary of that vast plain, across which we had journeyed for a distance of near one thousand miles; and encamped at the base of the mountain. The woodless plain is terminated by a range of naked and almost perpendicular rocks, visible at a distance of several miles, and resembling a vast wall parallel to the base of the mountain. These rocks are sandstone, similar in composition and character to that on the Cannon-ball creek. They emerge at a great angle of inclination from beneath the alluvial of the plain, and rise abruptly to an elevation of one hundred and fifty or two hundred feet. Passing within this first range, we found a narrow valley separating it from a second ridge of sandstone, of nearly equal elevation, and apparently resting against the base of a ~~high~~ high primitive hill beyond. At the foot of the first range, the party encamped at noon, and were soon scattered in various directions, being eager to commence the examination of that interesting region."

Of the geology of the belt of upturned sedimentary rocks ^{observed} ~~near this~~ ^{near this encampment,} at the base of the Rocky Mountains, Doctor James wrote further as follows:

"The inclined ~~sandstone~~ sandstone at the base of the Rocky Mountains, we found much wider, and its summits incomparably ^{higher} more elevated than our previous opinions or a distant view had led us to expect. This ^{extensive} ~~range~~ range, rising abruptly from the plain, skirts the base of the mountain like a vast rampart, and from a person standing near it, intercepts the view of the still more grand and imposing features of the granite ~~ridge~~ beyond. It consists of rocks in which the comminuted fragments of primitive aggregates are intermixed with the reliques of the animals of a former world, known to us only by the monuments which these remains exhibit. The stratifications, with which this rugged and precipitous wall of sandstone is distinctly seamed, penetrate the mass with various degrees of obliquity; not unfrequently the laminae are entirely vertical, as if the whole had receded from its original position, and these immense rocky masses had, by the operation of some powerful agent, been broken off from their former continuity with the strata now found in a horizontal position in the plains.

"It is difficult, when contemplating the present appearance and situation of these rocks, to prevent the imagination from wandering back to that remote unascertained period when the billows of the

(Continued on 14 a a)

primeval ocean lashed the base of the Rocky Mountains, and deposited, during a succession of ages, that vast accumulation of rounded fragments of rocks alternating with beds of animal remains, which now extend without interruption from the base of this range to the summits of the Alleghanies; and endeavouring to form some conception of that subsequent catastrophe which has so changed the relative elevation of the two great formations that the margin of the secondary has been broken off and thrown into an inclined or vertical position.*

Footnote *Geologists generally now believe that the movements which produce mountains have been, for the most part, not catastrophic, but comparatively gradual, or ~~incremental~~ incremental. — F. W. C.

"The valley between this parapet of sand-rock and the first granitic ridge, is near a mile wide. It is ornamented with numerous isolated columnar rocks, often of a snowy whiteness, standing like pyramids and obelisks, interspersed among mounds and hillocks which seem to have resulted from the disintegration of similar masses.

"The range of sandstone appears to have been originally of uniform elevation and uninterrupted continuity, stretching along the base of the mountains from north to south, but it has been divided transversely by the bed of the Platte and all the larger rivers in their descent to the plains.*

Footnote *During the probably slow process of their upturning, these strata (especially those forming the Cretaceous "hogbacks") have in some places, as well shown northwest of Colorado City, been not only broken into segments, but have had these segments, as shown by their baset edges, laterally displaced and ~~displaced~~ and their contiguous extremities even thrust past each other, so as to present a considerable overlap. — F. W. C.

"From our camp ~~at~~ [of ~~a~~ noon of July 6th], we had expected to be able to ascend the most distant summits then in sight, and return the same evening; but night overtook us and we found ourselves scarcely arrived at the base of the mountain. The lowest part of the sandstone stratum exposed at the western declivity¹⁰⁵ of the hills, and in the points nearest the granite, contains extensive beds of ^{coarse} [Carboniferous] conglomerate or pudding-stone, often of a reddish colour. The more compact parts of the rock present remains of terebratulæ and other submarine animals. Among these, few are entire or in good preservation."

Amongst the natural history observations made in the

(Continued on 14aaa

~~following~~

~~Amongst other natural history~~

observations made in the vicinity of this camp, there were discovered several singular, scorpion-like animals, inhabiting under stones and dried bison's dung. They have a formidable appearance and run actively. They belong to the class Arachnida, Genus Galeodes, which has been heretofore observed only in warm climates; not one was known to inhabit this continent." In a footnote, Say describes these as new species: Galeodes pallipes and G. subulata.

"About the sandstone ledges we collected a geranium* intermediate

*G. caespitosa, sub-erect, pubescent, sparingly branched above. Radical leaves reniform, deeply 5-7 cleft. The flower is a little larger than that of G. robertianum, and similarly coloured, having whitish lines toward the base of the corolla." [The species is now known as Geranium caespitosum, James, and includes, according to Coulter's Manual, many of the forms which have been called G. fremontii. — F.W.C.] "We also saw here the Campanula decipiens, Pers., Lysimachia ciliata, Ph. [referred now to Steironema — F.W.C.], Troximon glaucum, H., with two or three [plants] belonging to genera with which we were unacquainted." [The Campanula observed was probably C. — F.W.C.]

between the crane's bill and herb robert, the beautiful calochortus (C. elegans, Ph.), and a few other valuable plants.

"The Platte at the foot of the mountains is twenty-five yards wide, having an average depth of about three feet; its water ^{clear and} cool, and its current rapid. Its descent for twenty miles below cannot be less than eight feet per mile. Its valley is narrow and serpentine, bounded by steep and elevated hills, embosoming innumerable little lawns often of a semicircular form, ornamented by the narrow margin of shrubbery along the Platte.

"The narrow valley, which intervenes between the ridges of sandstone before mentioned, is a little more fertile than the plains along the river. It is covered with fine and short grasses, and varied with

[Continued on 14b]

here and there a copse of small oaks or hazles. There are also some columnar masses of white sandstone, twenty or thirty feet high, standing remote from each other, having the debris around their bases covered with shrubby oaks.

"We observed here the obscure wren, a bird more closely related to

Footnote ~~A~~ footnote here describes it as Troglodytes obsoleta Say. It is now generally known as the Rock Wren: Salpinctes obsoletus Say. — F. W. C.

the great Carolina wren of Wilson than any other we have seen;..... It frequents the arid country in the vicinity of the mountains, and is often seen hopping about upon the branches and singularly compressed semi-procumbent trunks of a species of juniper."

From this camp, the mountains were examined on both sides of the Platte: on the south side by a party of two, and on the north side by ~~one of four persons.~~ ~~a party consisting of Doctor James, Mr. Peale, and two riflemen, who crossed the river at sunrise of the 7th, a good swimmer having first stretched a rope across the swift and unfordable current, for the benefit of those who could not swim.~~ On both sides of the river, the explorers observed the foothills to include a zone of variably inclined and sometimes almost vertical and wall-like sandstones and conglomerates, which was separated by a valley from the mountains proper. They found the mountains themselves to consist of igneous or "primitive" rocks, ~~hardly differing from the sandstones and which largely consist of granite, but some of them they compared to " sienite " and " gneiss ".~~ This confirmed the inference they had already drawn from feldspar and other pebbles observed in their journey up the Platte, ~~and which~~ was contrary to what their perusal of authors had led them to expect as to the nature of the Rocky Mountains.

In detail, the mountain explorations made from this camp, ~~and which~~ are related by Doctor James as follows:

"On the morning of the 7th of July, the party remaining in the encampment of the preceding day, Dr. James and Mr. Peale, accompanied by two riflemen, were sent out to examine the mountains. These appeared most accessible on the north side of the river, which was opposite our encampment. The river was here about four feet deep, and the strength of the current such as to render it impossible for a man to keep on his feet, in the deepest part of the ~~rapid~~ stream. As some of the party destined for the mountains, could not swim, it was thought hazardous for them to attempt to cross by fording. To obviate this difficulty, two men were sent with a long rope, which they were directed to stretch across the river, making the ends fast on either shore. This was readily accomplished, one of the men swim-