

"The thermometer, immersed in the water of the river, fell <sup>from</sup> 80°, ~~the~~ the temperature of the atmosphere, to 75°. Observations had been made daily to ascertain the temperature of the water of the Platte.\*

\*\*The results of several observations are as follows:

Temperature of Water.	Temperature of the air.
June 27, 68°	85°
28, 70°	79°
29, 74°	82°
30, 75°	80°
July 1, 71°	60°

At eleven A.M.

"Before sunrise the mercury fell usually as low as 60°."

Notwithstanding there were only about five degrees of difference between the temperature of the air and that of the water, it was remarked by several of the party, that a sensation of extreme cold was felt on passing from the one to the other.

"It is possible that, at the elevation we had now attained, the rapidity of evaporation, on account of the diminished pressure of the atmosphere, might be something greater than we had been accustomed to. For several days the sky had been clear, and in the morning we had observed an unusual degree of transparency in every part of the atmosphere. As the day advanced, and the heat of the sun began to be felt, such quantities of vapour were seen to ascend from every part of the plain, that all objects, at a little distance, appeared magnified, and variously distorted. An undulating or tremulous motion in ascending lines was manifest over every part of the surface. Commencing soon after sunrise, it continued to increase in quantity until the afternoon, when it diminished gradually, keeping an even pace with the intensity of the sun's heat. The density of the vapour was often such as to produce the perfect image of a pool of water in every valley upon which we could look down at an angle of about ten degrees. This effect was several times seen so perfect and beautiful as to deceive almost every one of our party. A herd of bisons, at ~~the~~ <sup>the</sup> distance of a mile, seemed to be standing in a pool of water; and what appeared to us the reflected image, was as distinctly seen as the animal itself. Illusions of this kind are common in the African and Asiatic deserts, as we learn from travellers, and from the language of poets. They are called by the Persians sirraub, 'water of the desert'; and in the Sanscrit language Mriga trichna, 'the desire or thirst of the antelope'. Elphistone relates,\* that at Moujgur, in the kingdom of Caubul, towards

\*"Mission to Caubul, p. 179. 4to. Lond.

evening, many persons were astonished at the appearance of a long lake

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# Mirage

# Phenomenon

"I have seen the mirage, too, painting lakes and fires and groves on the grassy ridges near the bounds of Missouri, in the still autumn afternoon, and cheating the traveller by its splendid deceptions." [A. Pike, Pr. Sk., 15.]

(See also descrip. of mirages of Jan-Jan Valley, in Major's Mo. Yrs.)

enclosing several little islands. Notwithstanding the well known nature of the country, which was a sandy desert, many were positive that it was a lake, and one of the surveyors took the bearings of it. 'I had imagined,' says he, 'this phenomenon to be occasioned by a thin vapour which is spread over the ground in hot weather in India; but this appearance was entirely different, and on looking along the ground no vapour whatever could be perceived. The ground was quite level and smooth, and the weather very hot. It is only found in level, smooth, and dry places; the position of the sun, and the degree of heat, are not material, for it was afterwards seen in Damaun when the weather was not hotter than in England.' On the frontier of Cabul, Elphinstone saw what he calls a most magnificent mirage, which looked like an extensive lake, or a very wide river. The water seemed clear and beautiful, and the figures of two gentlemen, who rode along it, were reflected as distinctly as in real water. It is common in our <sup>own</sup> country,' says the London Monthly Review, 'for ground-mists to assume the appearance of water, to make a meadow seem inundated, and to change a valley into a lake; but these mists never reflect the surrounding trees and hills. Hence the mirage must consist of a peculiar gas, of which the particles are combined by a stronger attraction of cohesion than the vapours of real water; the liquor silicum of the alchemists is described as exhibiting, in some circumstances, this glassy surface, yet as being equally evanescent.'\* It is afterwards sug-

*Footnote* \*See M. Review for May, 1817, p. 3.

gested, in the same paper, that the gas which occasioned these extraordinary reflections, may probably be the substance of the pernicious wind called Simoom. The explanation here offered will not probably be thought satisfactory. It seems to belong to the epoch of great and brilliant discoveries in pneumatic chemistry, when 'a peculiar gas' was thought the agent of every phenomenon.

"The images of pools of water, which we saw in the deserts ~~near~~ of the Platte, appeared to us similar to those mentioned by Elphinstone, likewise to those observed by Nieburgh in Arabia, where inverted images were seen."\*

*Footnote* \*Such mirages on the western plains are <sup>not</sup> confined to ~~the~~ the latitudes of what Dr. James calls the "desolate regions" or the "deserts of the Platte". In 1859 or thereabout, the writer saw one in southeastern Kansas, (Crawford-Cherokee county region, then known as ~~the~~ "the Neutral lands"), where the rainfall is something like 40 inches per annum; ~~the~~ a small village ~~was~~ <sup>was</sup> ~~seen~~ <sup>seen</sup> ~~inverted~~ <sup>inverted</sup> in the air, ~~and~~ <sup>and</sup> seen from a point a few miles distant, whence it was not ordi-  
narily visible. — F.W.C.

"To the more common effects of light passing through a medium charged with vapours, we had become familiar. We had for many days seen the low bluffs of the valley of the Platte, suspended over the verge of our apparent horizon, as distant capes are suspended over the sea; but in viewing these perfect images of lakes we could scarcely believe they were occasioned by refraction, to which the phenomena of mirage have usually been attributed.\* The circumstance that these pools

*Footnote* \*\*See Humb. Pers. Mar., vol. 2. p. 196; vol. 3, pp. 358, 542."

*Footnote* could only be seen when we looked down at a considerable angle upon some valley; the perfect manner in which the image of the sky was returned, from the surface; and the inverted position of the objects seen, induced us to inquire whether the effect might not be produced by reflection from the lower stratum of watery vapour.\* These appear-

*Footnote* \*\*Rays of light, falling with any degree of obliquity upon the particles of that portion of watery vapour which lies near the surface of the earth, may be reflected, and pass off at an equal corresponding angle, so that ~~passages~~ if the eye be raised a few feet above the reflecting surface, an image of the corresponding arc of the sky is produced, as in the case of ~~the~~ a sheet of water where the image, seen by reflected light, is not that of the water, but the sky. Hence any object which obstructs the rays of light in their passage from the parts of the atmosphere beyond the reflecting surface to that surface, is returned to the eye in a darkened image as from water."

ances are sufficient to justify the conclusion that the quantity of evaporation is much greater here than in less elevated districts of country, where such things are not.\*

*Footnote* \*Overland travellers are familiar with the remarkable and beautiful examples of mirage frequently to be seen in the extremely dry territory between the Rocky Mountains and the Sierra Nevadas; but many perhaps are not acquainted with the Jim-Jam Valley, and the following description of it is therefore introduced, from Majors' Seventy Years on the Frontier, while the subject of mirages is before us:

"In the secluded Jim-Jam Valley of the San Bernardino Mountains there are the most marvelous mirages known to the world. The wonderful mirages of the Mojave desert have been talked about a great deal, and they are entitled to all the prominence they have had. But those of the Jim-Jam Valley are far more wonderful than these.

"It is called Jim-Jam Valley because of the strange things seen there, and I defy any man, however sound of mind he may be, to go in there and not think he has 'got 'em' before he gets out.

"This valley is about twenty-five miles long by fifteen miles wide. It is uninhabited. It is bordered by the main San Bernardino range on the east, and by a spur of the Sierra Magdalenas on the west. There is no well-defined trail through the heart of it. The valley is a desert. The surrounding mountains are terribly serrated and cut up. The peaks are jagged. Altogether the surroundings are weird and forbidding.

"Leaving Fisk's ranch on the trail at the foot of the Sierra Magdalenas, you climb an easy grade to Dead Man's Pass, the entrance to the valley.

"Go in, and pretty soon you see lakes, and running rivers, and green borders, and ~~water~~ flying water-fowl. Willows spring

up here and there, and in the distance you see water-lilies.

"What you behold contrasts finely with the rugged mountains, and you are charmed with it, and go on thinking you have struck an earthly paradise. Indian camps appear in view, and little oarsmen propel fantastic crafts upon the waters. Advancing still farther, dimly outlined forms may be seen, and the pantomime reminds you of a strange hobgoblin dance.

"Sometimes a storm brews in the valley, and then the scene is all the more terrible. Forked lightning blazes about, and strange uncouth animals, differing from any you have ever read about, are <sup>seen</sup> there.

"These phenomena are seen for a stretch of about fifteen miles, up and down the middle of the valley principally, and they have been viewed by a great many people. They can not understand why the forms of the mirage, if such it may be called, are so much more strange there than on the Mojave desert.

"Everybody is in awe of the valley, and there are mighty few men, however nervy they may <sup>be</sup> ordinarily, who care to go there a second time."

"Towards evening the air became more clear, and our view of the mountains was more satisfactory, though as yet we could only distinguish their grand outline, imprinted in bold indentations upon the luminous margin of the sky. We soon remarked a particular part of the

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range divided into three conic summits, --- apparently of nearly equal altitude. This we [erroneously] concluded to be the point designated by Pike as the Highest Peak. Its bearing was taken a short time before we halted for the evening, and found to be south,  $73^{\circ}$  west."

Thus in the closing part of the last day of June, 1820, Major Long and his party discovered (so far as recorded discoveries go), not the already discovered "Highest Peak", Pike's Peak, but the higher one to which Dr. James ~~subsequently gave~~ <sup>subsequently gave</sup> its present name of "Long's Peak".\*

	Feet.		Feet.
Massive Mountain.....	14,424	Gray's Peak.....	14,341
Elbert Peak.....	14,421	Torrey Peak.....	14,338
Blanco Peak.....	14,390	Mount Lincoln.....	14,297
Mount Harvard.....	14,375	Buckskin Mountain...	14,296
Laplata Peak.....	14,342	Uncompahgre Peak...	14,289

These figures are, however, in several instances, based on barometric determinations, and subject to some future modification.—P.W.C.

No attempt was made by Major Long and Lieut. Swift, who represented the astronomical and engineering talent of the ~~planning~~ expedition, to determine the elevation of Long's Peak; yet, after ~~they~~ had seen both mountains, the party correctly inferred it to be greater than that of Pike's Peak (which Long called James' Peak), as the following subsequent statement shows:

"Although that point which we have denominated James' Peak has been represented as higher than any other part of the mountains within one hundred and fifty miles, we are inclined to believe it falls much below several other peaks, and particularly that which was for many days observed by the party when ascending the Platte."

Twenty-seven miles' travel on July 1st, brought the mountains apparently, but little nearer, and shifted the bearing of Long's Peak two degrees further to the west. During this day's travel, as the

just before the party encamped for the night some of them "went up" out of a herd of bisons, one of which they killed.

*Footnote* Bijou creek (legended in the Atlas shows, "Bijou's creek") was crossed. As this creek is given neither name nor mention in Dr. James' narrative, it was, probably named by Major Long, <sup>in the Atlas</sup> as a merited recognition of the services of his efficient and esteemed guide, Joseph Bijou.\* The name of this creek has now been corrupted to "Bijou", <sup>Sketches</sup> accented on the first syllable, as if spelled Bee-shoo. See notes on Bijou in the chapter of Biographical

Twenty-seven miles' travel on July 1st, brought the mountains apparently but little nearer, and shifted the bearing of Long's Peak two degrees further to the west. The expedition had now followed <sup>up</sup> the more easterly flowing segment of the river nearly to its limit; it was Saturday evening, and it encamped until the morning of Monday, the 3rd, opposite a point between Crow creek and the Cache à la Poudre river, <sup>represented</sup> both of which streams are ~~represented~~ but neither of them named, in Long's Atlas. Of the 2nd, <sup>now</sup> writes Doctor James:

"The ensuing day being Sabbath, was devoted to rest. About our camp, which was in the most fertile spot we could select in a ride of several miles, there was but a very insufficient supply of grass for our horses. A species of cone flower (Rudbeckia columnaris, N.) was

*Footnote* \*Now referred to the genus Lepachys <sup>of</sup> Rafinesque. —F.W.C.

here beginning to expand. The showy R. purpurea, very common on the Missouri and the lower part of the Platte, does not extend into the desolate regions. The common purslane (Portulaca oleracea) is one of the most frequent plants about the base of the Rocky Mountains\*.

*Footnote* \*An interesting observation for so early a date in the far western wilderness, since this enterprising weed is a plant naturalized from Europe, and had here got ahead of the white man literally, as in general it does figuratively speaking. —F.W.C.

particularly in places much frequented as licks, by the bisons and other animals.

"From this encampment, we had a plain but still distant view of the mountains. No inequality occurs in the surface of the subjacent country on the east of the mountains, so that our view was wholly unobstructed. They stretched from north to south, like an immense wall occupying all that portion of the horizon lying to the northwest, west, and southwest. We could now see the surface of the plain, extending almost  $\neq$  unvaried to the base of the first ridge, which rises by an abrupt ascent above the commencement of the snow.

"A set of observations for longitude was commenced in the morning, but the weather becoming cloudy, we were prevented from completing them. In the afternoon a storm came on from the north, which continued during the night. Much rain fell, accompanied with thunder

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