

Passo, and that he must have traveled south of that ridge, in an almost due west course to the Rio Colorado.

I use the word "Sierra Madre" in the sense attached to it by the Mexicans, viz: that ridge which separates the waters that fall into the Atlantic from the rivers which empty into the Pacific ocean, without any regard to its elevation.

I pray you to accept the assurances of my distinguished consideration and personal regard.

Your most obedient and faithful servant,

ALBERT GALLATIN.

To Lieutenant W. H. EMORY,
U. S. Topographical Engineers, Washington.

WASHINGTON, October 8, 1847.

DEAR SIR: In answer to your letter of the 1st instant, I have the pleasure to send you, with the permission of the chief of my department, a table of twenty-three geographical positions determined by myself, which you are at liberty to use; and, should you think the information of sufficient importance, I should feel much flattered that you should, as you propose, communicate them to the Ethnological Society of New York for publication.

No astronomical observations that I am aware of have ever before been made on the same grounds, if we except the observations of Dr. Coulter at the mouth of the Gila, which have never yet been published.

You will see that the position of the Gila is very much changed, as well as that of Santa Fé, in New Mexico.

The observations were made with an $8\frac{1}{2}$ inch sextant, constructed by the celebrated Gambey, of Paris. In most cases, the determinations of the places in latitude are the mean of the results obtained by many observations on north and south stars, of nearly equal altitudes, by which the errors of eccentricity, &c., in the instrument were avoided.

The longitudes are derived from a combination of the results from the chronometers, and measurement of distances between the moon and stars, nearly equi-distant on either side of it.

The chronometers used were two very good box chronometers, by Parkinson & Frodsham, (Nos. 783 and 2,075.)

The observations themselves, including those between Santa Fé and Fort Leavenworth, (our point of departure,) in number 2,500 or 3,000, were all computed in the field, and are now undergoing verification by Professor Hubbard, a very accurate young computer, attached to the observatory at Washington.

The computations for all the points embraced in the table sent you, have been verified.

The objects of our expedition being purely military, the subjects of interest to scientific men were only pursued so far as they were incidental to the expedition, and did not interfere with its great ob-

ject. The instruments with which I was furnished were not those, perhaps, which I would have selected; at the same time there was nothing for me to regret, except the absence of a good portable telescope, with which occultations of the fixed stars by the moon, and the immersion of Jupiter's satellites, could have been observed, and a few pocket chronometers.

We left Washington on twenty-four hours' notice, and time was not allowed to procure either the telescope or pocket chronometers.

1st. We struck the Gila, as the table will show, in latitude $32^{\circ} 44' 52''$ and longitude $108^{\circ} 45'$ west from Greenwich; thence its course is very nearly west. As well as we could judge from the course of the mountains, its course from that point to its source was not very far from northeast or southwest.

No tributaries to the Gila were crossed before reaching it, except one named by me Night creek, a very insignificant stream. The Sierra Mimbres, 6,000 feet above the sea at the highest point where we crossed it, falls gradually and almost imperceptibly to the Gila.

2d. Your second interrogatory is answered principally by the table of geographical positions.

The Rio Salinas comes in from the *northeast*, a little west and north of camp 97, of November 12. (See table.) This camp, the astronomical position of which is given in the table, is about midway between the villages of the Pimos and Coyo Marricopas Indians.

3d. The table will show you that the junction of the Gila and Colorado is on the parallel of $32^{\circ} 43'$ or $4'$; and, in the absence of more specific information, I would advise you to place the mouth of the Colorado on the parallel of $31^{\circ} 51'$, which is the latitude given it by Lieutenant Hardy, of the royal navy, whose little book of travels in Mexico you have no doubt seen.

4th. Specimens of the seed of the cotton grown by the Pimos were obtained, but they have not yet reached me. Overcoming space was the great object we had in view when we passed the Pimos, and our investigations and collections were necessarily hasty and superficial. We passed with them only the part of a day, whereas, if exploration alone had been the object of our party, I should have considered a week as little enough to have devoted to this interesting people. When I left California, it was as a special envoy to the government, and on so short a notice that many of my collections and notes were left behind, with my assistants. Among the things so left, were the seed of the cotton.

Most of the plants collected, however, were brought home. These will show a very complete history of the botany of the country. They are in the hands of Doctor Torrey, who is preparing an elaborate catalogue and drawings of those plants, heretofore unknown. This catalogue I should be very glad to place at the disposal of your society.

The Coyo Marricopas Indians come from the west. So late as 1826, Mr. Kit Carson, one of our guides, met these people at the mouth of the Colorado. Subsequently to that period, they were

visited by Dr. Anderson (whom we met in Santa Fé) at a point about half way between their present village and the mouth of the Gila river.

They are taller and more athletic than the Pimos, and what struck me as very remarkable, the men had generally aquiline noses, whilst those of the women were retroussés.

They occupy thatched cottages, thirty or forty feet in diameter, made of the twigs of cotton wood trees, interwoven with the straw of wheat, corn stalks and cane.

Cotton, wheat, maize, beans, pumpkins and water melons are the chief agricultural products of these people. Their fields are laid off in squares, and watered, by the Zequias, from the Gila river. Their implements of husbandry are the wooden plough, the harrow and the cast-steel axe, (procured probably from Sonora.) They have but few cattle, and not many horses. I observed, domesticated amongst them, ducks, chickens and pigs. They had many ornaments of sea-shells, showing, in my opinion, their recent migration from the gulf. From the character given of them by Carson, when he saw them in 1826, although they were then an agricultural people, I should think they had learned much by their proximity to their neighbors, the Pimos, whom they acknowledge as politically their superiors, and with whom they live on terms of intimate and cordial friendship.

The Marricopas impressed me as a more sprightly race than the Pimos; the interpreters of the Pimos were all natives of the Marricopas band.

The dress of both nations or bands was the same. That of the men a breech cloth and a cotton serape of domestic manufacture; that of the women the same kind of serape pinned around the waist and falling below the knees, leaving the breast and arms bare.

Both nations cherished an aversion to war, and a profound attachment to all the peaceful pursuits of life. This predilection arose from no incapacity for war, for they were at all times able and willing to keep the Apaches, whose hands are raised against all other people, at a respectful distance, and prevent depredations by those mountain robbers, who hold Chihuahua, Sonora, and a part of Durango in a condition approaching almost to tributary provinces.

They have a high regard for morality, and punish transgressions more by public opinion than by fines or corporeal punishments. Polygamy is unknown amongst them, and the crime of adultery, punished with such fearful penalties amongst Indian nations generally, is here almost unknown, and is punished by the contempt of the relatives and associates of the guilty parties.

The Indians we met between the Del Norte and the Pimos settlement were mostly wild Indians of the great Apache nation, which inhabits all the country north and south of the Gila, and both sides of the Del Norte, about the parallel of the Jornada and Dead Man's lakes.

They have no fixed habits, and the only vestiges of their abodes which we saw were temporary sheds, a few feet high, made of the

twigs of trees. They live principally by plundering the Mexicans of New Mexico, Chihuahua, Sonora, and Durango.

No vocabulary of their language was procured. I am inclined to think they extend up to the head waters of the Gila.

Beyond them to the north is the warlike nation of the Navajoes, who, Mr. Fitzpatrick thinks, are allied to the Crow Indians.

Near the head waters of the Salinas, which runs in a course, it is said, nearly northeast and southwest, is a band of Indians called the Soones, who, in manners, habits, and pursuits, are said to resemble the Pimos, except that they live in houses scooped from the solid rock. Many of them are Albinos, which may be the consequence of their cavernous dwellings. Surrounded by the warlike Navajoe, and the thieving Apache, they nevertheless till their soil in peace and security.

Coming farther east, we reach the San José, a tributary to the Puerco, which is a tributary to the Rio del Norte from the west, not the Rio Puerco represented on the map to flow into the Del Norte south of El Passo.

Here is an Indian race living in four story houses, built upon rocky promontories inaccessible to a savage foe, cultivating the soil and answering the description of the seven cities of Vasquez Coronado, except in their present insignificance in size and population, and the fact that the towns, though near each other, are not in "a (continuous) valley six leagues long," but on different branches of the same stream. The names of these towns are Cibolleta, Moquino, Bojuato, Covero, Acona, Laguna, Poblacion; the last a ruin.

I did not visit these towns in person; but I hope to get a minute description from one who did, and, should I succeed, it will be sent to you.

The work you mention, of Castenada, has never been seen by me. My own impression, and it is so stated in my journal, is that the many ruins we saw on the Gila might well be attributed to Indians of the races we saw in New Mexico, and on the Gila itself. I mean by the last, the Pimos, who might easily have lost the art of building adobe or mud houses. In all respects, except their dwellings, they appeared to be of the same race as the builders of the numberless houses now level with the ground on the Gila river.

The implement for grinding corn, and the broken pottery, were the only vestiges of the mechanical arts which we saw amongst the ruins, with the exception of a few ornaments, principally immense well turned beads, the size of a hen's egg.

The same corn grinder and pottery are now in use among the Pimos. The corn grinder is merely a large stone, well worn, slightly concave, and another of different shape, convex, intended to fit the first and crush the corn between by the pressure of the hand.

The ruins on the Gila were first seen at camp 81, the position of which is shown in the table, from thence to the Pimos' village. Wherever the mountains did not impinge too close on the river and shut out the valley, they were seen in great abundance, enough, I should think, to indicate a former population of at least one hun-

dred thousand; and in one place, between camps 91 and 97, there is a long wide valley, twenty miles in length, much of which is covered with the ruins of buildings and broken pottery.

These ruins are uniformly of the same kind; not one stone now remains on the top of the other; and they are only discoverable by the broken pottery around them, and stone laid in regular order, showing the trace of the foundation of a house.

Most of these outlines are rectangular, and vary from 40 x 50 to 200 and 400 feet front. The stone are unhewn, and are most of an amygdaloid, rounded by attrition.

Now of the tributaries which come into the Gila from the north, there are several besides the Salinas, which, at their mouths, are insignificant in size and can be stepped across; but in this whole region no legitimate inference can be drawn of the size of a river, throughout its course, from that at any one point.

It may be large near its source, and after traversing deserts of sand, through arid regions, unwatered by rains, become very small, and even disappear altogether.

Therefore, except the Salinas, of which we have oral accounts, nothing is known or can be inferred of the magnitude of these tributaries from their appearance at the junction. These tributaries come in near camp 81, where the mountains are so precipitous and bold no conjecture can be formed of their course.

The Salinas must have been the branch by which the expedition of Coronado ascended and crossed into New Mexico. Its general direction is not far from a line drawn from its mouth to Santa Fé, and nearly in this line are the seven towns mentioned as being on the head waters of the San José. Indians now pass from the Pimos village to New Mexico on this route.

I omitted to mention in its proper place, that we were informed by an intelligent Marricopas Indian that, about fifty miles from the mouth of the Salinas, was now standing, in a perfect state of preservation, the walls of a large three story building of mud, with its interior sides glazed and finely polished, and about it was to be seen many traces of large acequias, and broken pottery in great abundance.

There is another tribe of Indians called the Moquis, who, like the Pimos and Soones, cultivate the soil and live in peace with their neighbors; but the exact locality of this tribe I do not know, beyond the fact that it is on or near the head waters of some of the tributaries of the Gila.

I am, with great respect, your obedient servant,

W. H. EMORY.

APPENDIX No. 2.

COLLEGE OF PHYSICIANS AND SURGEONS,
New York, February 10, 1848.

MY DEAR SIR: I have examined the interesting collection of plants which you kindly placed at my disposal, and herewith send you a list of them, as complete as my numerous engagements permit me to make at present. The route which you passed over is exceedingly rich in botanical treasures, as is evident from the number of new species and genera which you were enabled to make under great disadvantages, and in an expedition which was almost wholly military in its character. Most of the new plants which you found are only indicated, or, at most, very briefly described in the following list. A more full account of them will be given hereafter.

I am, my dear sir, very respectfully, yours,

JOHN TORREY.

To Lieutenant Colonel W. H. EMORY.

JULY 22, 1847.

MY DEAR SIR: I give you the following written sketch of the route, not being able, as you request, to get a trace made from my map.

From the 27th June to July 11th, we were traversing the country between Fort Leavenworth and the bend of the Arkansas, a rich rolling prairie embraced between the 39th and 38th parallels of latitude, and the 94th and 98th meridians of longitude.

From July 11th to July 13th, followed the Arkansas to Pawnee fork, in longitude about 99. At this point the fertile soil ceases, except on the immediate margin of the streams.

From the 14th July to August 1st, we were in the valley of the Arkansas, occasionally crossing the spurs of low hills which interrupt the direct course of the Arkansas. This part lies in latitude 38°, and between longitude 99° and 103° 1'.

From the 1st August to the 8th, crossing the plain in a southerly direction and mounting the Raton mountain, about 7,000 feet above the sea, between latitudes 38 and 36.

From the 8th August to the 14th, in the valleys of the tributaries to the Canadian, and crossing the extensive plains between these valleys.

From the 14th August to the 18th, ascending the great ridge between the head of the Canadian and the waters of the Del Norte,