

*McParlin (Thos. A.)*

NOTES

ON THE

HISTORY AND CLIMATE

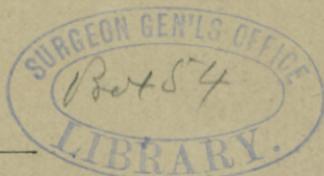
OF

NEW MEXICO.

BY

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Dr. THOS. A. McPARLIN,

SURGEON U. S. ARMY.



FROM THE SMITHSONIAN REPORT FOR 1876.

WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
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## NOTES ON THE HISTORY AND CLIMATE OF NEW MEXICO.

BY DR. THOS. A. MCPARLIN, *Surgeon, United States Army.*

(Communicated by General J. K. Barnes, Surgeon-General, United States Army.)

### HISTORY OF NEW MEXICO.

What is now known as New Mexico has had a varied history. First, the home of nomadic Indians, perhaps as peaceable, loving, and tractable as those first described by Columbus. Gold and silver and the quest of precious jewels, like the Golden Fleece, brought over the Spaniards, and with them Mother Church. In 1540 Francisco Vasquez Coronado came to the country with an expedition. He found some of the Indians nomadic, and others living in settlements, and among them he describes Cicuyé, extending along the river for six miles, and the soil cultivated by the Indians, from the mountains as far west as the present town of Agua Fria. This pueblo and cultivated valley correspond with what was afterward named after the patron saint, San Francisco de Asis de Santa Fé. As it is at least four hundred years old as a town, (how much older it may be there are no means of determining,) it is much older than San Augustine, Fla., founded in 1565, or any other town on this continent.

In 1546, during the empire of Charles V, it was determined to encourage the settlement of the Indians in towns in order to protect the Pueblo Indians. New Mexican Pueblo traditions accredit Montezuma with having gone south from this Territory, and with his people the substantial evidences of gold and precious minerals gave the Mexicans and their conquerors, under Cortez, the information that their gold came from the north, and with precious minerals existed here in great quantities.

The Indians were compelled by the Spaniards of this country to dig the mines in all parts of the Territory, to carry water, and pack ores and fuel on their backs to the furnaces; and in consequence, after the rebellion in 1680, when they drove the Spaniards out, they filled up and carefully concealed all evidences and traces of the mines they had worked so successfully. When in 1704 the Spaniards revisited New Mexico, the Pueblos entered into a compromise "by which the Spaniards were permitted to return, but with the positive and express condition that they should not open the mines or prosecute mining as a pursuit."

Hence it is probable that the richest mines in this country are yet to be discovered; and it is certain that but for the scarcity of water very many now known, but only imperfectly worked, would be very productive. The records of the ancient mine near Abiquia, derived from an

old church near by, show that 10 per cent. in tithes collected from it amounted to \$10,000,000. No mining of any extent has been prosecuted in this mine since 1680. Gold, silver, and coal and turquoise are found near Santa Fé; and from this country an unusually large and valuable turquoise was sent to the Emperor.

Pedro de Reralto was governor in 1600; in 1640 General Arguello was governor and captain-general, resident at Santa Fé as the capital; General Concha, in 1650; Henrique de Abila y Pacheco, in 1656; Juan Francisco Junio, in 1675; Antonio de Otermin, in 1680-'83.

The Indians rebelled first in 1583 and again in 1680, and on the night of the 20th August, 1680, Otermin evacuated the place and marched to El Paso, arriving there October 1.

In 1681 the viceroy at Mexico dispatched General Otermin from El Paso with an army to recapture the capital; but after reaching La Bajada, 21 miles from Santa Fé, he gave up the enterprise, finding the Pueblos concentrated to resist him. In 1692 the viceroy commissioned Diego de Vargas Zapata Lujan Ponce de Leon as governor and captain-general of New Mexico, who fought and overcame the Pueblos September 13 of that year and entered into Santa Fé. After the re-establishment of Spanish supremacy he returned to El Paso, reaching there December 20, 1692, and returned December 16, 1693, to Santa Fé, where his occupation and re-entry was disputed, and a battle was fought on Christmas-day. The next day he took formal possession of Santa Fé, in the name of King Charles II.

After the reconquest by the Spaniards, the Pueblos (twelve towns on the Rio Grande or in the vicinity) made their submission and were subject until 1837, when they rebelled, on account of a tax on tobacco and other articles laid by Governor Albino Perez. After fighting a battle with the Pueblos at Santa Cruz de la Canada, he was beaten, returned to the suburbs of Santa Fé, where he was overtaken and assassinated, August 9, 1837.

In 1838, Manuel Armijo was recognized as governor, and continued so until the capital was taken possession of, in the name of the United States, by General Stephen W. J. Kearney, U. S. A., August 18, 1846. General Kearney occupied the palace, a building now in existence, and which was erected previous to the year 1581, being built then of material of the old Indian town, (Cicuyé.) Since his time it has been occupied successively by Col. John M. Washington, Col. John Monroe and Col. E. V. Sumner, as military governors, until March, 1851, when the existing territorial government was initiated.

The office of the Secretary of State contains several extended documents, in Spanish, upon the history of the conquest, occupation and reconquest of the country. From these and the works written upon New Mexico by Mr. Elias Brevoort, Gov. W. F. N. Army, Mr. D. J. Miller, and General Davis, the student may find ample material for interesting inquiry.

## CLIMATOLOGY.

Formerly a journey across the plains, a distance of 700 miles from the frontier of Missouri, requiring a life in the open air, traveling with a wagon-train, amid hostile Indians, from May to July, was necessary to reach Santa Fé. Many pulmonary invalids came out, living on game and buffalo-meat, gradually ascending day by day to the level of 8,000 feet in the Rocky Mountains. They were undoubtedly in the great majority of cases benefited, while many recovered from threatened consumption.

Two railroads now have advanced to within 220 miles of Santa Fé, at El Moro, near Trinidad, and it is expected that by May 1, 1877, the Denver and Rio Grande Railroad will be completed to Fort Garland, 156 miles from Santa Fé. The line of daily stages now runs from Santa Fé to El Moro in 36 hours.

Now the traveler passes over the plains on the railroad, and at once begins traversing the Raton Mountain chain and then the spurs of the Rocky Mountains. The old-fashioned trip across the plains is deprived of many advantages to the invalid above mentioned; although in some cases it is (especially to the timid valetudinarian) compensated by an earlier and more comfortable transit.

The altitude of Las Animas, (Fort Lyon,) 4,000 feet, and of Trinidad, 5,000 feet above the sea, has been quite beneficial to such as require a gradual approach to a higher level.

They are accessible by railroad, and comfortable accommodations are to be had at both places.

After reaching Fort Garland, nearly 8,000 feet above the sea, or Santa Fé, 6,846 feet, any less degree of elevation can be obtained by going southward down the valley of the Rio Grande toward El Paso, 3,600 feet of altitude; and at every step southward a milder summer climate will be found.

A portion of New Mexico, the Mesilla Valley, acquired in 1848 under the Gadsden treaty, has of late years developed features of unusual interest on account of its mines, minerals, pasturage, fertility and climate. It is between the thirty-third and thirty-first and a half parallels of latitude, is about 70 miles long, from 1 to 6 miles wide, and contains about 280 square miles; embracing the towns of Dona Ana, (population 1,000,) Las Cruces, (2,000,) Mesilla, (2,000,) and others of less size.

The air is mild, snow being very rarely seen, with a bright daily sunshine in about 360 days of the year. Vegetation dries rather than rots; meat is cured without salt in the open air; and it presents to the invalid the advantages of a very moderate altitude, varying from about 4,000 feet near the Rio Grande to about 7,000 feet in the high cattle-ranges of the Guadaloupe and other mountains. The valley is protected by the mountains from the cold winds prevailing from the north.

I know of one asthmatic patient who abandoned the Pacific coast to join a friend in Mesilla, who, similarly affected in every other locality,

had wanted him to join him. His friend had secured the desired climatic relief and taken up his residence there.

The dryness of the air in the Lower Rio Grande and Mesilla I have no doubt is not exaggerated. During the past year I had occasion to see the body of an individual who died on the southern plains (of starvation, it is said) several (perhaps seven) years ago. The body was found some time after death, and had been buried near Fort Craig. It was disinterred for removal to the national cemetery here in 1875, and presented a remarkable preservation by desiccation. The process it had undergone was what I would term mummification, and reminded me of the accounts of what occurs to the bodies of the dead when abandoned in the deserts of Lybia or Arabia.

The Mesilla Valley is said to produce a fine variety of grape, with juices heavier than from the grapes of Madeira and Portugal, as the grapes remain on the vine until they commence to dry before being pressed; and the wort contains as much sugar as the sweetest of Malaga, (Brevoort.) When dried, they make a good raisin. The almond-tree, peach, apple, pear, quince, apricot, are raised there, and all kinds of garden-plants; and probably game is as abundant as elsewhere in the country.

Mesilla may, I think, be considered a very favorable locality for pulmonary invalids. The trip across the plains and to New Mexico may be contrasted and compared with interest to the invalid with that which might be experienced in old Mexico. The journey from Vera Cruz to Mexico is made by rail in fifteen hours. The ascent is 7,459 feet, (to the highest point on the road 8,318 feet,) and is made in ten hours. "Many travelers, though in health, (says Prof. E. R. Peaslee,) experience a decided dyspnœa on reaching these altitudes, especially in making any considerable exertion, on account of the rarefaction of the atmosphere, though no amount of effort produces much sensible perspiration. The consequences in cases of pulmonary emphysema or asthma dependent upon cardiac affections are, as might be expected, not favorable. Asthma depending on derangement of the stomach, however, is sometimes cured. Chronic bronchitis also is not likely to be relieved at this altitude, combined with the dampness I have mentioned.\*

But all these are alleviated by a residence at a lower altitude, the point suitable for such cases being found at Vera Cruz or between that city and the altitude of Cordova or Orizaba, *i. e.* 2,700 to 4,000 feet. (New York Medical Record, No. 286, April 29, 1876, p. 291.)

The situation of the Mexican peninsula between the Atlantic and Pacific Oceans, and the nearness of all its cities to one or other ocean, is very different, however, from that of the inland nature of New Mexico;

\* The present city of Mexico was built upon grounds formerly covered by Lake Tezcuco, and into which it is drained. (See New York Medical Record, April 27, 1876, p. 290.)

and especially in the dryness of the atmosphere of our continent is the patient interested.

With all the dampness found at the city of Mexico, it is stated by Dr. Peaslee that "Phtthisis is not indigenous in that city, and it is not seldom arrested in those who come here from the north. A member of the Mexican Congress assured me that the natives do not die of phtthisis, and that the lives of phtthisical patients from the north are usually much prolonged by a permanent residence here." (*Ibid.*, p. 291.) He thinks, however, it presents no special advantage to phtthisical or bronchitic patients, and he cannot recommend it to such as a winter residence.

But there are other places of lower altitude in this country (Mexico) which he believes to be fully equal, and in some respects even superior, to any of the famous resorts abroad, mentioning "Cordova (altitude 2,715 feet) and Orizaba, (4,030 feet,) both presenting a tropical climate and all its productions and the most grand and picturesque scenery. Cordova has, moreover, sometimes been visited by yellow fever. Jalapa also, now accessible by railroad, is doubtless equal to either of these places as a sanitarium for this class of patients, and as a residence is one of the most beautiful places on earth. Its *great humidity* may, however, render it unsuitable to some cases, and the sudden chill of the northers must also be guarded against in these places. But Cuernavaca, 60 miles south of Mexico and not accessible by railroad, has an altitude of 5,428 feet, and the same climate and productions as Orizaba, and is far more desirable. In addition to these, Tetecala, not far from Cuernavaca; Atlixco, 23 miles from Puebla, and Monterey, are mentioned by Dr. Peaslee, though the latter is only accessible by a tedious journey by diligence."

It may be interesting to compare with the climate of Mexico that of Colorado, Utah, New Mexico, and Texas. Whatever may be lost of the tropical air and productions as we go northward from Mexico may be more than made up by the dryness of the atmosphere, a short wet season, and diminished rain-fall.

In some localities dust-storms are sufficiently prevalent to be prejudicial, on account of the irritation they occasion to the air-passages. In Texas *the heat of summer is extreme*, and the sudden vicissitudes of temperature and moisture and extreme chill produced by northers are worse, perhaps, than in Mexico. In Utah (see Report of Surgeon E. P. Vullum, Circular No. 8, Surgeon-General's Office, May 1, 1875, p. 343) the humidity is marked in the spring months, arising from the winds passing over Great Salt Lake from the northward, bringing the watery vapors not only from that great body of water, but also from the regions beyond, supplied by the southwesterly currents that are seen to pass over at a great altitude most of the winter long. This statement is true as to the climate of Camp Douglas, 2½ miles east of Salt Lake City, and at an altitude of 4,904 feet above the sea.

"Great Salt Lake, with a shore-line, exclusive of offsets, of 291 miles, is vast enough to furnish a horizon in places like the ocean itself."

In Dr. Vollum's special report on the diseases of Utah, (*ibid.*, pp. 341-343,) he regards the altitude and climate of Utah on phthisis as favorable. \* \* "If a case comes here in the incipient stage, and is well situated for comforts, that it will get well spontaneously from the beneficial effects of this altitude and the inland dry character of the atmosphere. It is the boast of the people that this is not a consumptive country, which is my opinion decidedly. On the other hand, it is believed that if a patient comes here in the later stages of the disease, that the atmosphere is too rare to give the proper support, and that the case will be hastened to a termination more speedily than on the sea-coast. \* \* The beneficial influence of this climate on asthma is *decided* and deserves a *prominent mention*. It is also the boast of the people, as well as the physicians, that asthma cannot exist here, excepting under a relieved and modified condition; which I think is the case."

Very many invalids are attracted annually to the mineral-waters of Manitou, Colorado, (6,370 feet above the sea-level, and 8,000 below the summit of Pike's Peak,) where there are several springs containing carbonic acid and carbonate of soda, (as the Navajoe, Manitou, and Ute soda;) purging carbonated soda-waters, modified by the presence of sulphate of soda and potash, as the "Little Chief" and "Shoshone;" and ferruginous carbonated soda-waters containing carbonate of iron, as in the "Iron Ute" and the "Little Chief" mineral springs.

In a memoir (Saint Louis, 1875) on the climate of this region, by S. Edwin Solly, M. R. C. S., (late house surgeon to St. Thomas Hospital, London,) reference is made to the decrease of pressure in a rarefied atmosphere, causing a diminution of the gases of the blood and lymph, and this probably checks the advance of phthisis, as unquestionably beneficial in certain cases. In phthisis, where the weakness is not excessive but there is anæmia and want of assimilation, a high elevation with a moderate supply of stimulants and a course of cold douches is generally beneficial. The greater dryness of mountain air acts beneficially on phthisis, probably for the most part in the manner indicated by Dr. Herman Weber: "We may here mention that although the loss of moisture to the whole organism may not be greater in high than in low elevations, yet the acknowledged *greater loss through the lungs* may be accompanied by local effects in certain morbid conditions of the respiratory organs, as well as by producing a more active circulation in the lungs in order to supply the required moisture, as also by favoring a kind of *drying up of surface*, secreting a morbid amount of mucus and pus, and also of moist exudations within the tissue. Possibly the improvement in many cases of chronic catarrhal pneumonia may be produced by this increased afflux of blood and increased loss of moisture."

"Very highly situated places are adapted for winter treatment (of phthisis) on account of the greater number of clear days." (Braun.) And for another reason they are specially desirable in the winter; because in high elevations there is less moisture during the winter than at

any other season of the year, and therefore the air being dry, the greater actual cold than in lower climates is felt less severely, and if the body is warmly clad the lowness of the temperature exerts only its tonic influence. The air being rarefied, the sun has a much greater influence, being more constantly visible in mountainous districts, and enables the enfeebled invalid to spend several hours almost daily in the sunshine with very great advantage. (Page 32, "Manitou, Colorado, U. S. A.; its mineral-waters and climate." Saint Louis, J. McKittrick & Co., 1875.)

Dr. Solly refers to the fact that oxygen is essential to procure change of substance, and as it diminishes in proportion to the elevation above sea-level, it might be supposed that healthy change of substance would be retarded in mountain air; "but this," he adds, "is practically found to be otherwise, and the reason doubtless is that, as only about 25 per cent. of oxygen is on an average used in respiration, there is probably more than sufficient oxygen at any height that has as yet been attained by man."

The discussion as to the gases of the blood, their ratio to other constituents, condition of the oxygen as free, mechanically dissolved therein, or chemically combined, or both, I have no disposition to continue; but in so far as atmospheric pressure may be considered an important cause of variation, we have the statement of Lehman (Physiological Chemistry, vol. 1, p. 572) that "Liebig is certainly in the right when he advances the proposition that 'a gas can only be considered as mechanically absorbed when its quantity increases and diminishes in proportion to the external pressure.'" We think we are justified in concluding with Liebig that the quantity of oxygen which may be absorbed by the blood is constant in amount, and, to a certain extent, independent of external pressure—an opinion which is based partly on the fact that the respiratory process is carried on nearly the same, both at very great heights and at the level of the sea; and that no more oxygen is absorbed, *even in an air very rich in oxygen*, than in the ordinary atmosphere." A certain amount of mechanical difficulty, labored respiration, on ascending heights rapidly is generally experienced. At the same time, the very great strain put upon the muscles of locomotion causes pain in the limbs. We have no reason to expect the muscles of respiration to bear undue exercise and strain without fatigue, and it very probably contributes largely to what is known as dyspnoea, which is experienced as severely after rapid running any distance upon a plain. The question might be asked to what extent a diminished atmospheric pressure might facilitate the escape of carbonic acid from the lungs? May it not be far more important to free the blood rapidly of its carbonic acid, which is poisonous, than to inhale and accumulate oxygen in excess of the need of the system and the chemical capacity of the blood to utilize?

The extent to which diminished pressure alone may affect respiration can best be determined by the aéronaut, who reaches a height without

physical fatigue. He does so, however, at a very rapid rate, and a quickened respiration is the result. *Dyspnœa* (*besoin de respirer*) results from any change of accustomed relations between the lungs and the air to be respired. It occurs in pregnancy; (in dropsical accumulations, abdominal or thoracic, which obstruct the expansion of the chest and lungs, and limit the free play of the muscles of respiration and fatigue them.) Emotional disturbances, nervous perturbations, and mental anxiety cause it, as well as any undue physical labor or unwonted exertion.

That the respiration of an atmosphere of 8,000 feet above sea-level need not necessarily involve *dyspnœa* in an individual, I know from personal experience. I visited this country, ascending 8,000 feet, in 1849, and lived at an elevation of between 6,700 and 7,000 feet for three years. Again, in the past year (1875) I revisited New Mexico, and I have never detected in myself any disturbance of respiration as the effect of this altitude—not even a quickened respiration. I am not unmindful of the fact, however, that another person may have a different experience, but it may, perhaps, be attributable to other causes than altitude, or as combined with it.

The amount of oxygen present available for respiration may be in some degree dependent upon the stagnation or relative movement of the air. A moveless atmosphere becomes very oppressive, and perhaps is most prevalent in low countries. The movement of the air is, as a rule, greater in the mountains and high altitudes generally. I invite attention in this connection to the Chief Signal-Officer's remarks for October, 1874, (page 285, report for 1875:) "The extreme maximum movements of the wind have been, at Breckenridge, 7,650 miles; at Cape Henry, 9,147; Cape May, 6,907; Cleveland, 7,281; Escanaba, Mich., 7,217; Long Branch, 9,242; Pike's Peak, 14,734; Sandy Hook, 10,917. The extreme minimum movements have been, at Memphis, 1,700, and at Shreveport, 1,886. The calm area is therefore coterminous with that of high pressure."

That high temperature produces oppression in breathing is evidenced in the East Indies both in the periods of calm and during the prevalence of the hot winds, especially when, as happens in midsummer, the thermometer reads higher at night than in the day-time. At Nowshera, in 1867, the condition of the troops is described as "gasping for breath. There was a peculiar feeling of weight on the chest, even in the apparently healthy; and after every 20 inspirations, or thereabout, a strong and convulsive effort was necessary to inflate the lungs. \* \* \* When the cause, viz., prolonged high temperature, was removed, an almost instantaneous return to health (in cases of insolation) was the result." (British Army Med. Dept. Report for 1868, Appendix No. X, pp. 296, 297, by Asst. Surg. Staples, 19th Regt.)

"In the same way that we cannot endure either constant dryness or dampness, so we cannot endure a very constant state of the barometer without suffering in our breathing or nerves. In fact, there is little

doubt that rapid changes of the barometer are more favorable for the more important functions of life than its relative stability; and this probably explains in a measure the value of both mountain and sea air." It also explains the benefit experienced frequently by confirmed invalids in a change from inland to sea-shore, or from mountain to sea-level, or *vice versa*.

Dr. Holland, in his "Medical Notes and Reflections," expresses the opinion "that the action of different degrees of atmospheric pressure in disturbing the bodily functions and general health is rather derived from the frequency of fluctuation than from any state long continued either above or below the average standard; that of the two conditions, suddenly incurred, the human frame is *better capable of withstanding a rarefied* than a condensed atmosphere; and that, in either case, the previous health and proneness to disorder in particular organs are greatly concerned in determining the results on the body."

He supports some of these views from the fact that "there are inhabited places in America, such as the town of Potosi, at an elevation of more than 13,000 feet, the inhabitants of which seem to have tolerable health." (Medical Times and Gazette, London, September 9, 1876, p. 299.)

At all elevated places the diurnal variations, barometric and thermometric, are sufficiently great to meet the demands of the economy for change, and these are augmented agreeably, and changed again, with the months and seasons as they come. At the same time the extremes of temperature are not experienced in high as in low altitudes; certainly the mountains are devoid of the intense heat of other more northern but lower localities.

The annual range of the thermometer at some places otherwise favorable becomes too excessive to be compatible with health in weak constitutions. At some low places the long continuance of summer-heat debilitates so greatly that months pass before normal vigor is regained. Extreme heat of long continuance involves even fatal prostration in a very few hours when the action of the skin is suspended, (insolation;) and this may occur in localities where, in a few months, an almost Arctic rigor is experienced. We fail to find in the mountains such experiences or such results; on the contrary, the air is invigorating and bracing at all seasons under conditions that prevail elsewhere, and not involving extreme exposure.

The contrast is particularly noticeable in India between the low plains and the hill stations.

We find the Savoyard, the Swiss, and the residents of mountains generally, of our time, as hardy as the mountaineers of history. They do not degenerate at home, nor until they migrate to the lowlands. The inhabitants of Georgia, Circassia, and Cashmere, and the hill tribes of India are a superior race. The Arabs and Abyssinians on the elevated lands of the desert and on the sides of the mountains from which the

Nile descends present a striking superiority over the people of lower Egypt. Their fiery life, love of liberty, and warlike genius place them immeasurably above the "Fellahs." The recent war against the Abyssinians has demonstrated anew the vigor and valor of their race.

The human race has not only degenerated by dwelling in low, unhealthy places, but it is again and again decimated by the pestilences generated in them. In the language of Dr. Farr, "it is destroyed now periodically by five pestilences—cholera, remittent fever, yellow fever, glandular plague, and influenza. The origin or chief seat of the first is the Delta of the Ganges. Of the second, the African and other tropical coasts. Of the third, the low west coast around the Gulf of Mexico, or the Delta of the Mississippi, and the West India Islands. Of the fourth, the Delta of the Nile and the low sea-side of cities of the Mediterranean. Of the generating field of influenza nothing certain is known; but \* \* \* the four great pestilential diseases—cholera, yellow fever, remittent fever, and plague—have this property in common: that they begin and are most fatal in low grounds; that their fatality diminishes in ascending the rivers and is inconsiderable around the river sources, except under such peculiar circumstances as are met with at Erzeroum, where the features of a marshy sea-side city are seen at the foot of the mountain chain of Ararat. Safety is found in flight to the hills."

\* \* \* \* \*

In treating upon the "salubrity of high places," he refers to the influence of locality on race, of the sanitary instinct, the effect of the high land, and the sight of the hills on the energies of the sick, the longevity of the inhabitants of various places, the effect of healthy places on the breed of animals, the degeneration of race in unhealthy places, the time required to produce degeneration and degradation of race.

It is, perhaps, well for us, as individuals, to revert to such historic facts as he presents in terms of classic elegance, and it is, I trust, cognate to the subject we have in hand. "As the power of the Egyptians descended from the Thebaid to Memphis, from Memphis to Sais, they gradually degenerated, notwithstanding the elevation of their towns above the high waters of the Nile, their hygienic laws and the hydrographical and other sanitary arrangements which made the country renowned, justly or unjustly, for its salubrity in the days of Heroditus, the poison of the Delta in every time of weakness and successful invasion gradually gained the ascendancy, and as the cities declined the canals and the embalmments of the dead were neglected, the plague gained ground. The people, subjugated by Persians, Greeks, Romans, Turks, Mamelukes, became what they have been for centuries, and what they are in the present day. Every race that settled in the Delta degenerated and was only sustained by immigration. So, likewise, the populations on the sites of all the city-states of antiquity, on the coast of Syria, Asia Minor, Africa, Italy, seated like the people of Rome on low ground under the ruin-clad hills of their ancestors, within reach of

fever and plague, are enervated and debased apparently beyond redemption.

“The history of the nations on the Mediterranean, on the plains of the Euphrates and the Tigris, the deltas of the Indus and Ganges, and the rivers of China, exhibit this great fact: The gradual descent of races from the highlands, their establishment on the coasts in cities sustained and refreshed for a season by immigration from the interior, their degradation in successive generations under the influence of the unhealthy earth, and their final ruin, effacement, or subjugation by new races of conquerors. The causes that destroy individual men lay cities waste, which, in their nature, are immortal, and silently undermine eternal empires.

“On the highlands men feel the loftiest emotions. Every tradition places their origin there. The first nations worshipped there. High on the Indian Caucasus, on Olympus, and on other lofty mountains the Indians and the Greeks imagined the abodes of their highest gods, while they peopled the low underground regions, the grave-land of mortality, with infernal deities. Their myths have a deep signification. Man feels his immortality in the hills.” (Page xciv, Report of William Farr, esq., to the Registrar-General of England. London, 1852.

The climate of Kansas, so far as my experience of it may warrant an opinion—and I have served there in 1849, 1857, 1858, 1873, 1874, 1875—is not favorable to pulmonary invalids. They should go out on the plains and gradually work their way to the mountains. Neither can I recommend Texas, unless it may be the region near San Antonio, which is said to be favorable. San Antonio is, however, liable to choleraic visitations, and, being a limestone region, the fatality is extreme. I have seen pulmonary invalids visit New Orleans and very rapidly decline, I suppose on account of the excessive humidity.

Of Colorado I have no experience. It resembles the climate of New Mexico, but is to the north of it, and may be inclement.

Of New Mexico there are certain features worthy of consideration by invalids and their advisers.

I. The dryness of the atmosphere associated with elevation above sea-level to be found at any elevation desired, in localities ranging from 3,600 to 8,000 feet.

The dryness of all mountain regions is acknowledged. The range of mountains in Colorado has this excellence in common with those of New Mexico.

By reference to the report of the Chief Signal-Officer of the Army for January, 1875, it will be perceived that the percentages of relative humidity for the different districts average as follows: New England, 73 per cent.; Middle Atlantic States, 74; South Atlantic States, 79; Gulf States, 82; Lower Lake region, 79; Upper Lake region, 70; Ohio Valley, Tennessee, and the Northwest, 73. As usual, the mean relative humidity has been lowest at the Rocky Mountain stations, amounting

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to .56 at Denver and .51 at Santa Fé. In the report for July, 1874, p. 271, he remarks: "The relative humidity has averaged on the Gulf and South and East Atlantic States 75; New Jersey coast, 85; in the Lake region, 68; Lower Mississippi Valley, 70; in the Tennessee and the Ohio and Upper Mississippi Valleys, 62; in the Lower Missouri Valley, 58; at the Rocky Mountain stations, 41." I extract from his report as of interest the following data:

### SANTA FÉ, N. MEX.

Maximum, August 2, 1874, 89° F.; minimum, February 24, 1875, 2° F.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Range .....	36	40	45	52	42	55	45	54	63	65	49	50
Monthly means .....	71.1	69.9	60.6	52.3	38.7	29.2	28.1	31.4	34.4	47.4	59.2	67.9
Rain-fall in inches .....	3.92	1.73	1.42	2.47	0.57	2.26	0.67	0.72	1.37	0.33	0.88	0.33

Rain-fall, annual amount, 16.68 inches.

### DENVER, COLO.

Maximum, July 4, 1874, 102° F.; minimum, January 9, 1875, 29° F.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Range .....	51	45.3	57.4	70	64	76	84	67	72	69	52	59
Monthly means .....	76.1	73	59	52.9	42.2	29.7	16.8	32.3	33.4	44.5	60.2	70.4
Rain-fall in inches .....	3.32	0.65	1.34	0.64	0.08	0.17	3.38	0.61	0.39	2.24	1.94	0.43

Rain-fall, annual amount, 15.24 inches.

### COLORADO SPRINGS, COLO.

Maximum, July 11, 1874, 98° F.; minimum, January 13, 1875, 25° F.  
Maximum thermometer broken; rain-fall, annual amount 15.24 inches.

### SALT LAKE CITY, UTAH.

Maximum, July 1, 2, and 3, 1874, 98° F.; minimum, January 16, 1875, 5° F.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Range .....	42	38	49	51	34	43	46	39	51	60	56	56
Monthly means .....	78.2	74.7	62.6	55.6	43.4	33	29.4	33.7	35.2	50.3	60.1	69.1
Rain-fall in inches .....	2.42	1.03	0.20	1.74	2.16	0.73	3.05	0.79	2.81	1.50	2.91	0.90

Rain-fall, annual amount, 20.24 inches.

SAN FRANCISCO, CAL.

Maximum, September 14, 1874, 89° F. Minimum, December 26, 1875, 40° F.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Rain-fall in inches . . . . .	0.00	0.00	0.02	2.69	7.5	0.33	8.01	0.32	1.30	0.14	0.22	1.02

Rain-fall, annual amount, 21.54 inches.

GALVESTON, TEX.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Rain-fall in inches . . . . .	9.31	7.19	6.84	0.12	1.58	6.92	4.31	2.94	3.51	2.55	1.50	0.89

Rain-fall, annual amount, 46.66 inches.

NEW ORLEANS, LA.

	1874.						1875.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Rain-fall in inches . . . . .	12.93	4.82	4.21	.....	1.12	3.27	8.44	13.85	10.84	8.05	2.51	4.92

Rain-fall, annual amount, 74.98 inches.

He remarks for June, 1875, as to relative humidity: "This element averages 80 per cent. for the immediate coast of New Jersey and New England, and 75 per cent. on the South Atlantic coast. Elsewhere, over nearly the entire country east of the western plains, the average is from 65 to 70 per cent. It is, as usual, very low at the Rocky Mountain stations, being 33 per cent. at Cheyenne, 29 at Salt Lake City, and 28 at Denver."

The rain-fall in inches for June, 1875, was, for Santa Fé, 0.33; for Denver, 0.43; Salt Lake City, 0.90; and the annual amount of rain-fall for the same places is reported at 16.68, 15.24, and 20.24, respectively. For San Francisco, Cal., it was 21.54; for Galveston, Tex., 46.66; and for New Orleans, 74.98 inches.

NEW MEXICO.

The dryness of this atmosphere is proverbial. The lands are cultivated entirely by irrigation, and have been so for centuries. The tradition among the Pueblo Indians, as given by Hosti, is that, the rain falling less and less, the people emigrated to the southward long before the Spaniards arrived in the country, (the visit of Coronado was made about 1542,) being led by Montezuma, a powerful man, who was born in

Pecos and had settled with the Pueblos on the Rio San Juan. Montezuma was to return and lead the rest of the Pueblos also to the south, but he failed to come back. \* \* This whole tradition accords well with another held by the Aztecs, in old Mexico, when Cortez entered the country of Anahuac, namely, that their forefathers came (most probably at the end of the twelfth century) from the north. (Dr. Oscar Loew's report on "Ruins in New Mexico.") It is probable that the climate has become progressively more dry as time has elapsed, from evidences of former cultivation which would be now impossible. At Quivira, Dr. Loew says, "when Coronado visited this province it was, as he described it, very fertile; at present it resembles a desert."

At similar elevations in other countries the snow would accumulate and form glaciers upon the mountains, whence an ample river-supply of water would continue all the summer. Nothing like this occurs here, and the extremely rapid evaporation in this dry air may help to account for the difference.

II. Very soon after my arrival in New Mexico, in October, 1875, I became aware of unusual electrical disturbances around me. Severe shocks were experienced on touching garments of wool or cotton that had just been taken off, and if at night, vivid sparks of electricity and a trailing line of light would follow the fingers when passed over them. The shaking of clothing, to free it from dust, or friction with the fingers over a sheet, would have the same effect. Upon inquiry I found others also sensible of a highly electrical condition here. The telegraph was disturbed in its operations by excess of atmospheric electricity, and on inquiry of Mr. Gough, the agent of the Western Union Telegraph Line, he was happily able to confirm my impressions from a very extended experience. The subject became one of almost daily inquiry between us since July 18, 1876; and at my request he has furnished me a written statement, to which I invite special attention.

"OFFICE OF WESTERN UNION TELEGRAPH COMPANY,

"HEADQUARTERS DISTRICT OF NEW MEXICO,

"*Santa Fé, N. Mex., December 12, 1876.*

"To General T. A. MCPARLIN,

"*Surgeon, U. S. A.:*

"DEAR SIR: In reply to your question as to whether I have noticed any unusual electrical disturbances on the telegraph-lines in this region, I would respectfully state that I have noticed such disturbances, and that in character and frequency they are very remarkable, and really astonishing, and such as in a seventeen years' experience I have noticed on no other lines.

"From about the middle of April until about the middle of October, between the hours of 10 a. m. and 5 p. m., these disturbances are most frequent, and render the working of the line almost impossible.

“On my operating-table I have a galvanometer. The regular battery or artificial current on the wire deflects the needle from the north to east  $60^{\circ}$  to  $65^{\circ}$ —a steady, uniform deflection. During these electrical phenomena the needle commences to become unsteady, pointing 10, 30, 50, 70, and 90 degrees east. The flow will increase to such tremendous quantity that I have frequently opened my key an eighth of an inch, (which is equivalent to breaking the wire and separating the two ends by that distance,) when the flow of electricity would pass from point to point with a buzzing sound and an intensely brilliant flame, sometimes of a blue, sometimes of a purplish color, and as large nearly as a candle-flame. At such times I have placed tissue-paper between the points, when it would instantly commence to blaze. Thick, heavy writing-paper would be burned completely through, but would not blaze. These heavy flows will sometimes continue for hours with but little variation, at others in one instant the flow ceases entirely; the needle of the galvanometer drops down to zero; remaining so for an instant, it will fly back to 80 or 90, drop down to 10, 20, 50; the next instant the whole artificial or battery current is neutralized (so to speak) by a tremendous flow of an apparently different polarization, as the needle before deflected to the east now flows round to 70, 80, or 90 degrees to the west; the next 90 to the east, again at zero, and thus never steady for more than a few seconds at any point. I have frequently taken off all the artificial batteries entirely, and no perceptible difference could be noticed; at one moment there would be so much electricity that in trying to work the line it would fuse the platina points of the key, and in the next instant not a particle; and at no time, either with or without the artificial batteries, would the current be steady long enough to obtain intelligible signals over the wire.

“Very respectfully, your obedient servant,

JOSEPH M. GOUGH,

“*Manager Western Union Telegraph Company.*”

Referring to the Signal Service Reports last published, I found in the Monthly Reports of Weather for July, 1874, and August, 1874, electrical phenomena of special interest as connected with the summit of Pike's Peak, and for January, 1875, atmospheric electricity generally commented upon; and a special extract referring to an extraordinary electrical storm observed at Santa Fé, which I have extracted as of special interest in connection with the subject of electrical disturbances and distribution in this and other mountain regions. Facts like these should be collated and fully considered if it be determined by experience that atmospheric electricity exerts an influence upon development of health or disease.

*Extracts from Report of Chief Signal-Officer for 1875.*

#### ELECTRICAL PHENOMENA.

“The local storms previously referred to were in many instances accompanied by vivid displays of lightning. The most remarkable series

of thunder-storms occurred at the summit of Pike's Peak from the 14th to the 25th, during which the electrical effect was so intense as to interrupt telegraphic communication with that station. The observer reports that sharp peculiar sounds were emitted from all pointed objects, and that painful sensations were experienced in the hands and face.

"A brilliant display of ball-lightning was observed at Denver July 21, the ball exploding in full view and the fragments re-exploding as they reached the earth. This phenomenon was also observed at Keokuk, Iowa, on the 16th.

"Ground-currents interfered with the working of the telegraph-line at Sandy Hook on the 4th, 11th, and 16th." (Page 272, Monthly Weather Review, report for July, 1874.)

"In addition to thunder-storms spoken of under previous headings, there were strong ground-currents on the telegraph-line connecting Colorado Springs with the summit of Pike's Peak, Colo., on the evening of the 1st. Frequent lightning was observed on the same line during the month. On the 3d heavy snow accompanied a heavy thunder-storm on Pike's Peak, from which station thunder-storms are reported as having occurred almost daily. Thunder or lightning, or both, were more frequent in the Southern and Western States, especially the latter, than in other stations." (Page 276, Monthly Weather Review, report for August, 1874.)

#### ATMOSPHERIC ELECTRICITY.

"Thunder-storms are reported as having occurred mostly in the Southern States and during the passage of general storms, viz :

"On the 7th in Georgia and Florida; on the 21st in Georgia, North Carolina, Tennessee, Mississippi, and Texas; on the 22d in Georgia, Alabama, Mississippi, Louisiana, and Texas; on the 24th in Alabama, Mississippi, Louisiana, and North Carolina; on the 27th in Louisiana, Indian Territory, and Texas; on the 29th in Georgia and Alabama."

The following extract is made from the observer's report at Santa Fé, New Mexico :

"January 15, extraordinary electrical storm on (telegraph) line; noticed first at 12 m., and lasted until 3 p. m. The current was so strong the line could not be worked. The key was left open, and most of the line was surrounded by a ring of fire. It was during the passage of low barometer that this happened." (Page 301, Monthly Weather Review for January, 1875.)\*

\* By an examination of the appended papers it will be noticed that the military telegraph-line extending from Denver to Santa Fé and thence southward to Silver City was disturbed by atmospheric electricity from July 18 to December 31, 1876—deducting Sundays, when no continuous observations were made—10 times on the northern line, 14 on the southern line, and 22 on both lines out of Santa Fé; 46 days of disturbance out of 147 days' observations. No record was made of disturbances anterior to July 18, 1876.

In the year the wind traveled at a rate amounting to 67,996 miles, being southwest over one-half the time and northeast or north about one-fourth the time. One hundred

The earth is a good conductor, and the "common reservoir" of electricity dry air is a good insulator; but when the air contains moisture it conducts electricity, and this, says Ganot, (page 610, *Elementary Treatise on Physics*, New York, 1869,) is the principal source of the loss of electricity. In the same way that metals do not become electrified by friction on account of their great conductivity, animals do not exhibit this property in a marked degree until comparatively insulated by a dry atmosphere. Animal bodies daily retaining, for any prolonged period, a greater store of electricity, or using up this electricity as a force, may be materially different from what they would be in a humid environment.

The electric tension and density of a metallic sphere is found to be uniform over its surface. On an elongated ellipsoid it accumulates at the most acute points, and the upheaved masses of mountains would appear to us favorable points for a special distribution of electric force.

It is much to be desired that observations as to the amount of ozone, of humidity, and atmospheric electricity be more generally made in the interest of those seeking for climatic relief and to furnish data for our guidance.

I have the impression that a moderate altitude should first be sought, and, as convalescence and vigor are assured, a higher and more bracing air could be borne with benefit.

In this country the statistician is at a disadvantage; there are no boards of health, no registration of diseases.

The rector of the cathedral has been kind enough to give me the statistics of deaths among the Catholic population of the parish of Santa Fé from 1869 to December 14, 1876, amounting to 1,005 deaths in eight years in a parish estimated between 7,000 and 8,000. From this I estimate the average yearly death-rate, 125, being about one death to 60 Catholic population, a mortality of 16 per 1,000 in the parish.

Of the death-rate in the Territory I have no information. Dr. Lewis Kennon, (of Fort Selden,) as quoted by Mr. Brevoort, says: "The lowest death-rate from tubercular diseases is in New Mexico."

"The censuses of 1860 and 1870 give 25 per cent. in New England, 14 in Minnesota, from 5 to 6 in different Southern States, and 3 per cent. in New Mexico." (New Mexico, by Elias Brevoort, 1874, p. 27.)

Dr. Symington informs me that, in a residence of eight years in this Territory, he has seen but two cases of phthisis among natives, and they were young persons.

In Switzerland (according to Dr. Lombard, of Geneva, *Gazette des Hospitaux*, of October 26, 1876; *London Medical Times and Gazette*,

and nine days were moist for a while from rain or snow. It is proper, however, to remark that in the rainy or wet season of the year sunshine and clear skies are noticed every day, the rain coming in showers. The whole amount of humidity was only 15.06 inches for the year; maximum velocity of wind, 38 miles per hour.

I take pleasure in acknowledging the prompt facilities extended to me by the United States signal and military telegraph services in furnishing information and data as to observations made by them.

November 11, 1876, p. 552) the mean mortality resulting from phthisis pulmonalis is 77 per 1,000 deaths, being a much lower proportion than most of the countries of Europe. Thus in Belgium this varies from 168 to 198, and in England is 124. \* \* \* Two influences are brought into view by Dr. Lombard's investigations, viz: The deleterious effects of industrial occupations as compared to agricultural, and the benefit of high altitudes, cases of phthisis being less frequent in proportion to the height attained, so that it entirely disappears in high valleys.

The Medical Statistics United States Army—Abstract of Principal Diseases—show a total of 8 cases (3 deaths) in an average mean strength of 5,873 troops, from phthisis pulmonalis, in the six years from 1849 to 1854. For the same period, in diseases of the respiratory system, "New York, New England, and the region about the great lakes exhibit the largest ratios; and Florida, Texas, and New Mexico the smallest, being, in the ratio of cases per 1,000 of mean strength, New England, 4.8; New York harbor, 5.9; great lakes, 4.5; Atlantic coast of Florida, 2.3; Gulf coast of Florida, 6.9; Texas southern frontier, 4.00; western frontier of Texas, 3.9; New Mexico, 1.3." The conclusions of Dr. R. H. Coolidge, U. S. A., the compiler, (Medical Statistics United States Army,) are, I believe, accepted to-day: "1st. That temperature, considered by itself, does not exert that marked controlling influence upon the development or progress of phthisis which has been attributed to it. \* \* 2d. That the most important atmospherical condition for a consumptive is dryness. \* \* 3d. That next to dryness in importance is an agreeable temperature—a temperature uniform for long periods, and not disturbed by sudden or frequent changes. \* \* A uniformly low temperature is much to be preferred to a uniformly high temperature. The former exerts a tonic and stimulating effect upon the general system, while the latter produces general debility and nervous exhaustion. The worst possible climate for a consumptive is one with a long-continued high temperature and a high dew-point."

Confirmatory of all this, and the fact that "New Mexico is by far the most favorable residence in the United States for those predisposed to or affected with phthisis," may be consulted the testimony and experience of several medical officers of the United States Army. (Quoted in Hammond's Hygiene, p. 280.)

An examination of the sickness and mortality tables of the troops serving in New Mexico from 1861 to 1865, published in the Medical and Surgical History of the War of the Rebellion, Part I, Washington, 1870, pp. 138, 280, 436, and 588, Order V, Diseases of the Respiratory Organs, shows the following cases:

Diseases.	1861-'62.	1862-'63.	1863-'64.	1864-'65.	Total cases.	Deaths.
Asthma.....		4	16	8	28	
Acute bronchitis.....	24	156	139	158	477	
Chronic bronchitis.....	3	5	13	30	51	1
Catarrh.....	353				353	
Hemorrhage from nose.....	1	2	4		7	1
Hemorrhage from lungs.....	3	4	6	6	19	
Dropsy of chest.....			1		1	1
Inflammation of larynx.....	5	12	31	58	106	4
Inflammation of the pleura.....	23	28	61	38	150	3
Inflammation of the lungs.....	39	78	63	106	286	37
Other diseases of respiratory organs.....	9	109	103	39	260	2
Total of respiratory organs.....	461	398	437	443	1,739	49
Total diseases and injuries all kinds.....	6,956	9,144	8,066	7,245	31,411	
Total deaths all kinds.....	72	52	74	90		288
Mean strength.....	3,460	3,762	4,224	3,866		
Aggregate.....					15,312	

CLASS II.—ORDER II.

*Tubercular diseases.*

Consumption.....	10	13	8	10	41	8
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*List of cases of consumption and of diseases of the respiratory organs treated during the ten years from January 1, 1867, to December 31, 1876, at Santa Fé, N. Mex.*

Diseases.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	Total cases.	Deaths.
Asthma.....	1								1		2	
Catarrh.....	4			1	4	15	3	10	34	35	102	
Acute bronchitis.....	3	9							1		13	
Chronic bronchitis.....						1					1	
Inflammation of larynx.....			1								1	
Inflammation of lungs.....						1	1		1	2	5	2
Inflammation of pleura.....						1				1	2	
Total respiratory organs.....	8	9	1	1	4	18	4	10	37	38	126	2
Consumption.....			1		1						2	2
Mean strength.....	88	70	80	71	76	82	75	90	95	94		
Aggregate.....											821	

Many persons do well at home in summer who need in winter a milder climate.

Europeans are wont to seek Naples, Malaga, Egypt, Algiers, Rome, Florence, Mentone, or the West Indies. Recently the west coast of Ireland, made warm by the influence of the Gulf Stream, has been recommended. For patients threatened with phthisis, Mentone, Malaga, and Algiers are preferable. If they go to Jamaica, they should arrive in December and go up at once to the hills. Such as are affected with irritable bronchitis, asthma, and pleuritic tendencies, are recommended to Madeira, and in the spring to Pau. (London Med. Times and Gazette, November 4, 1876, p. 519.)

When the railroad shall have made this region (of New Mexico) of easy access, the invalid may find a genial and proper climate. For the weakest invalids the Mesilla Valley should be first resorted to, and

thence the transit can be made to a northern and more invigorating air. The summer in Mesilla is said to be quite hot.

Proceeding from Santa Fé, between Taos and Fort Garland, the military wagon-road—conducted by Lieutenant Ruffner—winds in the cañon of the Rio Grande and near its margin for miles. The river is narrow and rapid, hemmed in by peaks and precipices, and rushes a foaming flood over rocks and bowlders.

The Denver and Rio Grande Railroad, which will be extended to Garland by May 1, 1877, will probably come down this cañon and open out some magnificent scenery to the tourist. Arriving at Fort Garland, situated in the San Luis Park, (8,000 feet above sea-level,) we have a near view of the Sierra Blanca, one of the highest of the Rocky Mountains—14,404 feet—easier of ascent than Mont Blanc, (15,784 feet,) the Jung Frau, (13,671 feet,) or the Matterhorn, (14,370 feet.) A daily line of stages passes Garland toward the San Juan mines, reaching the Rio Grande River in 26 miles, in 60 miles La Loma and Del Norte, and in about 100 miles the summit of the main divide, “among a mass of snow-peaks, in groups connected by crests more or less high, from which the waters flow radially, and is probably the highest portion of the Rocky Mountains. This region, like that of the Yellowstone Lake, seems to be one of the domes of the continent, as is shown by the fact that the same rivers which eventually flow west flow at first east and south, like Grand River and Lake Fork.” (Reconnaissance in the Ute country by First Lieut. E. H. Ruffner, United States Engineers, Washington, 1874, p. 31.) Among those mountains whose heights have been determined, we have Summit, 13,356 feet; Bristol Head, 11,814 feet; King Solomon, 13,073 feet; Engineer Mountain, 13,270 feet. The highest of all is Mount Chauvenet, altitude unknown to me. King Solomon, in the Sierra La Plata, and Mount Galena (12,978 feet) are in the rich silver and gold mining region, now rapidly filling up by immigration.

From Engineer Mountain “masses of snow-peaks rising a thousand and two thousand feet above timber are seen, with sky-lines marvelously bold and wild. The peaks (says Maj. H. G. Prout) are seen at distances of 10 to 30 miles around. I doubt if any other mountain region in the world displays so extensive a mass of increasing variety of form so wholly grand.” (Page 24, *ibid.*)

The great overland California Railway passes over no country equal to this, as it purposely and economically was located at a lower level. Here, about latitude  $37^{\circ} 45'$  and longitude  $107^{\circ} 28'$ , the Great Sierra Madre rises to its greatest height, and thence flow the fountains of the Rio Grande del Norte.

## APPENDIX No. 1.

SANTA FÉ, *December 14, 1876.*

Dr. McPARLIN :

DEAR SIR: According to your request, I have the honor to send the statistics of deaths occurred among the Catholic population of the parish of Santa Fé since I have been the rector of the said parish.

The parish of Santa Fé, as it is now established, comprises, besides the city, the towns of Agua Fria, Cienega, Tesuque, and Rio Tesuque ; it is to say, a population of seven or eight thousand inhabitants.

Here are now the statistics of deaths :

Years.	Deaths.	Years.	Deaths.
1869 .....	104	1873 .....	120
1870 .....	94	1874 .....	146
1871 .....	145	1875 .....	102
1872 .....	183	1876, up to this date.....	131

As to the principal causes of these deaths I ought to confess my ignorance in the matter. I am not a physician.

Influenza and whooping-cough are sometimes fatal and very mortiferous, especially among children. In last January and February, as you must be aware, we had many fatal cases of pleurisy. I buried 32 corpses, almost all of grown persons.

It would be an error to believe that there is no case of consumption among the natives of this country. On the contrary, asthma, heart and lung diseases are very common among them. I have actually some patients who suffer of such affections.

I think the principal cause must be attributed to the sharpness of the air and scarcity of good clothes.

I am, very respectfully, my dear doctor, your most obedient servant,

J. A. BRUCHARD,

*Parish Priest of the Cathedral.*

A true copy :

T. A. McPARLIN, M. D.

APPENDIX No. 2.  
 Monthly means for 1876, Santa Fé, N. Mex.

Date.	Barometer.				Mean humidity.	Thermometer.				Wind.			Amount of rain or snow.			Number of auroras.	
	Mean.	Range.		Difference.		Mean.	Maximum.	Range.		Difference.	Prevailing direction.	Maximum velocity.	Total miles traveled.	Amount in inches.	Number of days on which fell.		Number of auroras.
		Highest.	Lowest.					Minimum.	Maximum.								
1876.																	
January.....	29.782	30.061	29.377	.684	46.8	29.0	55	5	50	N. E.	28	4,879	.60	7	0		
February.....	29.785	30.091	29.351	.740	38.7	32.8	57	13	44	N. W.	32	5,796	.40	7	0		
March.....	29.636	29.992	29.705	.787	45.1	36.5	60	5	55	N. W.	33	7,664	.64	8	0		
April.....	29.766	30.030	29.369	.661	42.1	50.2	78	13	65	S. S. W.	32	6,123	.46	3	0		
May.....	29.775	30.032	29.387	.645	40.9	55.9	78	28	50	S. W.	35	6,818	.83	8	0		
June.....	29.823	30.017	29.603	.414	46.7	66.0	88	40	48	S. W.	36	6,570	1.62	11	0		
July.....	29.910	30.049	29.691	.358	64.6	69.2	87	50	37	E. W.	24	5,281	5.43	18	0		
August.....	29.894	30.097	29.689	.408	67.9	65.2	80	45	44	S. W.	36	4,909	2.13	18	0		
September.....	29.895	30.057	29.718	.339	55.7	60.2	82	38	44	S. W.	31	5,457	.85	9	0		
October.....	29.818	30.026	29.492	.534	49.3	48.0	78	27	51	N. W.	38	5,471	.75	9	0		
November.....	29.815	30.077	29.479	.598	53.5	33.7	64	10	54	N. N.	35	5,015	.97	6	0		
December.....	29.735	30.055	29.033	1.022	45.9	28.5	52	—	53	N. N.	24	4,553	.38	5	0		
Annual means.....	29.796	30.049	29.450	.599	49.9	48.1	72.3	22.5	49.6	S. W.	.....	67,996	15.06	109	0		

METEOROLOGY OF NEW MEXICO.

Date.	Time.	Barometer.	Thermometer.	Humidity.	Direction of wind.	Velocity of wind.	Amount of clouds.	Rain-fall.	Weather.	Mean daily—			Thermometer.		Remarks.	
										Barometer.	Thermometer.	Humidity.	Maximum.	Minimum.		
1876. July 18	7 a. m.	30.01	69	82	S.W.	2	.....	0	Cloudy.....	{	30.002	64.5	72.7	73	55	{
	2 p. m.	29.97	72	58	S.E.	12	.....	.10	Fair.....							
18	9 p. m.	30.01	65	73	S.E.	12	.....	0	Fair.....	{	29.97	69.2	72.0	76	52	{
19	7 a. m.	29.99	63	78	S.E.	1	3-4	0	Fair.....							
19	9 p. m.	29.95	74	59	S.W.	12	4-4	.18	Light rain.....	{	30.00	62.7	78.0	77	56	{
19	2 p. m.	29.96	69	84	N.	12	4-4	.02	Cloudy.....							
20	7 a. m.	29.97	64	82	N.	5	1-4	.09	Clear.....	{	30.01	63.2	78.7	76	56	{
20	2 p. m.	29.97	67	74	N.	11	4-4	0	Fair.....							
20	9 p. m.	30.01	60	88	S.	3	2-4	0	Fair.....	{	29.967	69.0	70.3	78	56	{
21	7 a. m.	30.04	61	82	S.	1	3-4	0	Fair.....							
21	2 p. m.	30.04	74	72	S.W.	5	3-4	0	Fair.....	{	29.90	72.0	65.7	84	56	{
21	9 p. m.	30.01	59	82	E.	4	3-4	.21	Fair.....							
22	7 a. m.	30.05	66	78	E.	4	3-4	0	Fair.....	{	29.906	68.0	72.5	78	58	{
22	2 p. m.	29.99	75	59	S.	10	2-4	0	Fair.....							
22	9 p. m.	30.05	63	78	E.	6	0	0	Clear.....	{	29.916	71.0	64.3	82	58	{
23	7 a. m.	30.04	67	74	E.	2	1-4	0	Fair.....							
23	2 p. m.	29.97	77	60	S.W.	7	2-4	0	Fair.....	{	29.966	70.2	67.3	83	59	{
23	9 p. m.	29.93	66	78	S.E.	3	0	0	Clear.....							
24	7 a. m.	29.93	68	65	N.	1	2-4	0	Fair.....	{	29.943	74.5	64.0	85	60	{
24	2 p. m.	29.88	82	62	S.W.	7	3-4	0	Fair.....							
24	9 p. m.	29.90	69	70	W.	18	4-4	.....	Light rain.....	{	29.96	76.0	60.0	87	60	{
25	7 a. m.	29.94	63	83	S.	1	1-4	.62	Clear.....							
25	2 a. m.	29.89	77	69	S.W.	2	2-4	0	Fair.....	{	29.906	68.0	72.5	78	58	{
25	9 p. m.	29.89	66	69	N.E.	12	3-4	0	Fair.....							
26	7 a. m.	29.91	65	78	N.	18	0	0	Clear.....	{	29.916	71.0	64.3	82	58	{
26	2 p. m.	29.90	79	54	S.W.	14	3-4	0	Fair.....							
26	9 p. m.	29.92	70	61	E.	12	0	0	Clear.....	{	29.966	70.2	67.3	83	59	{
27	7 a. m.	29.99	71	62	N.E.	1	3-4	0	Fair.....							
27	2 p. m.	29.97	68	79	N.E.	20	0	.01	Fair.....	{	29.966	70.2	67.3	83	59	{
27	9 p. m.	29.95	70	67	S.E.	4	0	0	Clear.....							
28	7 a. m.	29.93	72	61	E.	4	1-4	0	Clear.....	{	29.943	74.5	64.0	85	60	{
28	2 p. m.	29.93	80	63	N.E.	1	3-4	0	Fair.....							
28	9 p. m.	29.93	73	63	S.E.	6	3-4	0	Fair.....	{	29.96	76.0	60.0	87	60	{
29	7 a. m.	30.00	73	63	E.	1	0	0	Clear.....							
29	2 p. m.	29.94	85	54	S.W.	1	2-4	0	Fair.....	{	29.96	76.0	60.0	87	60	{
29	9 p. m.	29.95	73	63	S.E.	2	0	0	Clear.....							

24 NOTES ON THE HISTORY AND CLIMATE OF NEW MEXICO.

METEOROLOGY OF NEW MEXICO—Continued.

Date.	Time.	Barometer.	Thermometer.	Humidity.	Direction of wind.	Velocity of wind.	Amount of clouds.	Rain-fall.	Weather.	Mean daily—		Thermometer.		Remarks.	
										Barometer.	Thermometer.	Humidity.	Maximum.		Minimum.
1876. July	30	30.00	74	63	E.	1	0	0	Clear	29.93	75.5	63	86	Sunday. No observation made as to working of line.	
	30	29.92	72	50	S.W.	6	2-4	0	Fair					{ Line worked well yesterday; a little disturbance on the southern line in the afternoon, but not material.	
	30	29.91	84	62	E.	6	0	0	Fair					{ The northern line worked badly all the afternoon. The southern line worked well, except when there was a break somewhere about 5 or 6 o'clock p. m.	
	31	29.94	73	63	E.	1	1-4	0	Fair	29.91	71.0	61	87	{ A great deal of trouble with the line all afternoon. On the northern line, trouble in the forenoon. Storm near Trinidad yesterday.	
	31	29.91	85	57	S.W.	10	2-4	0	Fair					{ Considerable trouble in working the line all the afternoon. More on the southern, but still enough on both.	
	31	29.90	69	65	S.	2	2-4	0	Fair	29.94	73.7	63	89	{ There was trouble in working all the afternoon, more or less.	
	Aug.	1	29.97	69	70	N.W.	4	2-4	0	Fair	29.903	70.5	61	88	No trouble.
		1	29.93	86	65	S.	3	2-4	0	Fair					No observation. (Sunday.)
		2	29.97	67	69	E.	1	2-4	0	Fair	29.90	70.0	56	84	{ The southern line worked badly, but worked as far down as Seiden. The northern line worked badly, the worst for some time.
		2	29.90	79	73	N.	4	1-4	.11	Fair	29.81	68.0	54	85	{ Very little trouble.
		2	29.87	68	79	N.	4	1-4	0	Fair					{ A good deal of trouble all the afternoon on northern line.
		3	29.91	69	70	Caln.	0	0	0	Clear					{ Southern line did not work at all; the line was probably grounded somewhere. Northern line worked well all day.
		3	29.88	77	77	N.E.	4	4-4	0	Cloudy	29.71	64.0	54	80	{ Very little trouble.
		3	29.86	67	84	N.E.	2	4-4	0	Cloudy					{ No remarks.
		4	29.86	68	69	E.	1	2-4	0	Fair	29.81	66.7	52	81	{ No observations. (Sunday.)
4		29.81	76	64	N.	3	4-4	.01	Cloudy					{ No remarks.	
4		29.80	64	72	N.	3	3-4	0	Fair					{ Some, but very little, trouble experienced in working the line.	
5															
6															
7		7 a. m.	30.06	69	75	S.E.	3	3-4	0	Fair					
7		2 p. m.	30.03	64	89	N.W.	12	4-4	.08	Light rain	30.03	63.7	56	81	
7	9 p. m.	30.02	61	94	S.E.	3	4-4	.02	Light rain						
8															
9	7 a. m.	29.77	67	74	N.	2	2-4	0	Fair						
9	2 p. m.	29.71	67	84	N.W.	16	4-4	.02	Light rain	29.71	64.0	54	80		
9	9 p. m.	29.69	61	88	N.	6	0	.05	Clear						
10	7 a. m.	29.80	64	78	N.E.	5	0	0	Clear						
10	2 p. m.	29.81	79	58	S.	8	1-4	0	Fair	29.81	66.7	52	81		
10	9 p. m.	29.83	62	83	S.E.	16	0	0	Clear						
11															
12															
13															
14	7 a. m.	29.90	61	94	Caln.	0	2-4	0	Fair						
15	2 p. m.	29.86	70	79	S.W.	4	4-4	.03	Cloudy	29.88	65.7	55	81		
15	9 p. m.	29.88	66	78	E.	6	2-4	.02	Fair						



METEOROLOGY OF NEW MEXICO—Continued.

Date.	Time.	Barometer.	Thermometer.	Humidity.	Direction of wind.	Velocity of wind.	Amount of clouds.	Rain-fall.	Weather.	Mean daily—		Thermometer.		Remarks.
										Barometer.	Thermometer.	Humidity.	Maximum.	
1876, Sept. 10														No trouble.
11														Do.
12														Do.
13	7 a. m.	29.99	55	50	N.W.	3	0	0	Clear					{ No trouble on northern line; on southern, late at night, a heavy storm south produced electrical disturbance.
13	2 p. m.	29.95	70	32	S.	12	2-4	0	Fair			72	43	{ Some lightning on northern line; considerable disturbance from lightning all the afternoon on southern line; storm principally south of Craig, but disturbance general, even north of Craig; rain at Silver City after 6 p. m.
13	9 p. m.	29.96	63	33	E.	16	2-4	0	Fair					{ A good deal of trouble during day on northern line on account of lightning; on southern line, from 4.30 to 7.30 p. m., there was also trouble.
14	7 a. m.	30.00	60	49	N.W.	2	4	0	Fair			68	50	{ On southern line, between 2 and 4.30 p. m., there was disturbance from lightning south of Fort Selden; some trouble on northern line also in afternoon.
14	2 p. m.	29.96	63	53	S.	14	2-4	0	Fair					{ Northern line had trouble between 5 and 6 p. m.; heavy storm north of Colorado Springs.
14	9 p. m.	30.00	57	63	E.	13	2-4	0	Fair					{ A great deal of trouble from lightning on northern line, particularly in the afternoon; southern line, no trouble.
15	7 a. m.	29.94	56	71	Calm.	0	2-4	0	Fair					No trouble.
15	2 p. m.	29.84	73	42	S.W.	9	3-4	0	Fair			77	49	Do.
15	9 p. m.	29.85	54	79	Calm.	0	2-4	.01	Fair					Do.
16	7 a. m.	29.81	53	79	0	0	4-4	0	Cloudy					Do.
16	2 p. m.	29.76	67	48	S.W.	20	3-4	0	Fair			69	47	Do.
16	9 p. m.	29.76	53	72	W.	1	1-4	0	Clear					Do.
17	7 a. m.	29.75	48	85	Calm.	0	3-4	0	Fair					Do.
17	2 p. m.	29.75	69	47	S.	8	2-4	0	Fair					Do.
17	9 p. m.	29.73	58	53	N.E.	10	2-4	0	Fair					Do.
18	7 a. m.	29.74	46	100	N.W.	3	4-4	0	Cloudy			62	43	Do.
18	2 p. m.	29.73	51	78	S.E.	8	3-4	.13	Fair					Do.
18	9 p. m.	29.73	58	70	N.	5	2-4	0	Fair					Do.
19														Do.
20														Do.
21														Do.
22														Do.
23														Do.
24														Do.
25														Do.
26														Do.
27	7 a. m.	29.99	55	74	S.E.	5	4-4	0	Cloudy					{ Southern line, some trouble caused by storm at Selden and south from 10 a. m. until 6.30 p. m.; no trouble from lightning on northern line.
27	2 p. m.	29.96	56	62	E.	13	4-4	0	Cloudy			60	53	No trouble.
27	9 p. m.	29.96	53	73	E.	5	4-4	0	Cloudy					{ Northern line, no trouble during day; some trouble at night, due to a heavy storm northward. No trouble on southern line.
28														
29	7 a. m.	30.03	50	78	E.	4	0	0	Clear					
29	2 p. m.	29.93	65	63	W.	6	2-4	0	Fair			67	41	
29	9 p. m.	29.92	56	78	S.	3	3-4	0	Fair					

30	7 a.m.	29.96	42	79	N. E.	2	2-4	0	Fair	29.946	48.2	71.0	63	38	{ Southern line, slightly disturbed by lightning from 7 to 8 p. m. Northern line, no trouble.
30	2 p.m.	29.90	61	58	S. E.	6	2-4	0	Fair						No trouble.
30	9 p.m.	29.96	45	76	S. E.	5	4-4	0	Cloudy						{ Northern line, no trouble. Southern line, slight electrical disturbance by storm at Bayard and Silver City.
1															No trouble.
2	7 a.m.	29.92	46	83	N. E.	2	1-4	0	Clear	29.872	53.7	53.3	66	39	Do.
2	2 p.m.	29.86	65	22	N. W.	15	0	0	Clear						Do.
2	9 p.m.	29.86	52	53	N. E.	4	0	0	Clear						Do.
3															Do.
4															Do.
5															Do.
6															Do.
7															Do.
8															Do.
9	7 a.m.	29.95	48	77	S. E.	2	sm/ke	0	Clear	29.88	57.0	51.7	73	42	{ Northern line, great electrical disturbance; at times the atmospheric current overcame the artificial current and deflected the needle from north to east about 30° or 40°.
9	2 p.m.	29.85	70	28	N. W.	8	3-4	0	Fair						Southern line, slight electrical disturbance between 2.30 and 7.30 p. m. Storm near Mesilla and Fort Selden.
9	9 p.m.	29.88	55	50	S. E.	6	0	0	Clear						{ Northern line, slight electrical disturbance from local storm about 3 p. m. Southern line, slight electrical disturbance during the afternoon.
10	7 a.m.	29.89	51	59	E.	1	0	0	Clear	29.892	55.0	49.0	74	43	{ Northern line, good deal of trouble (electrical disturbance) during the afternoon from 3 p. m. Southern, line no trouble.
10	2 p.m.	29.86	67	29	S. E.	20	3-4	0	Fair						Do.
10	9 p.m.	29.91	51	39	N. E.	3	2-4	.02	Fair						{ Southern line, slight disturbance from 2 p. m. till 8 p. m., (electrical.) Northern line, no trouble.
11	7 a.m.	29.93	53	66	S. E.	8	0	0	Clear	29.901	56.0	48.7	68	43	No trouble.
11	2 p.m.	29.87	65	26	S.	14	3-4	0	Fair						Do.
11	9 p.m.	29.90	53	54	S. E.	10	1-4	0	Fair						Do.
12															Do.
13															Do.
14	7 a.m.	29.90	46	76	E.	2	3-4	0	Fair	29.938	48.5	61.7	65	41	{ Southern line, slight disturbance from 2 p. m. till 8 p. m., (electrical.) Northern line, no trouble.
14	2 p.m.	29.89	58	41	E.	18	2-4	0	Fair						Do.
14	9 p.m.	29.98	45	68	N.	6	1-4	0	Clear						Do.
15															Do.
16															Do.
17															Do.
18															Do.
19															Do.
20															Do.
21															Do.
22															Do.
23															Do.
24															Do.
25															Do.
26															Do.
27															Do.
28															Do.
29															Do.
30															Do.
31	7 a.m.	29.76	40	56	S. E.	8	4-4	0	Threatening	29.690	38.2	65.0	53	32	{ Northern line, had a good deal of trouble from 2 p. m. to 4 p. m. due to electricity; southern line, couldn't work from 1 p. m. to 4.30 p. m., on account of electrical disturbances, seemingly the entire length of the line; began raining at 2.15 p. m., and snowing at 2.45 p. m.; continued all day and night at intervals.
31	2 p.m.	29.65	49	50	S. E.	11	4-4	.52	Cloudy						No trouble.
31	9 p.m.	29.68	32	89	N.	4	4-4		Cloudy						No trouble.

Oct.

Nov. 1

METEOROLOGY OF NEW MEXICO—Continued.

Date.	Time.	Barometer.	Thermometer.	Humidity.	Direction of wind.	Velocity of wind.	Amount of clouds.	Rain-fall.	Weather.	Mean daily—		Thermometer.		Remarks.
										Barometer.	Thermometer.	Humidity.	Maximum.	
1876.														
Nov. 2														No trouble.
3														Do.
4														Do.
5														Do.
6														Do.
7														Do.
8														Do.
9														Do.
10														Do.
11														
12	7 a. m.	29.61	39	91	E.	6	4-4	.20	Threatening					
13	2 p. m.	29.55	42	74	S. E.	11	4-4	.07	Light rain.			45	38	
14	9 p. m.	29.58	37	50	N. E.	12	4-4	.16	Light rain.					
15														No trouble.
16														Do.
17														Do.
18														Do.
19														Do.
20														Do.
21														Do.
22	7 a. m.	29.73	29	89	N. E.	2	4-4	.02	Light snow.					
23	2 p. m.	29.75	31	60	N. W.	6	4-4	.03	Cloudy.					
24	9 p. m.	29.90	22	72	W.	2	3-4	0	Fair.					
25														No trouble.
26	7 a. m.	29.74	38	46	N.	27	1-4	0	Clear.					Do.
27	2 p. m.	29.67	50	23	N.	18	2-4	0	Fair.					
28	9 p. m.	29.67	39	47	N.	7	2-4	0	Fair.					No trouble.
29														Do.
30														Do.
31*														Do.

\* Inclusive.

Remarks.

No trouble.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

{ Northern line, no trouble; southern line, very slight electrical disturbance at 2 p. m.

No trouble.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

{ Northern line, no trouble; southern line, slight electrical disturbance, caused by storm at Mesilla and vicinity.

No trouble.

Do.

Do.

{ Northern line, some disturbance from electrical causes and during high wind; southern line, no disturbance.

No trouble.

Do.

Do.

Do.

Do.

Do.







