CHAPTER XVIII.[1]

GEOGRAPHICAL FEATURES.

Territorial limits— "Basins"— "Sinks"— "Flats"—Rain and evaporation—Elemental action and reaction—Potamology—Jordan—Kay's Creek—Weber—Bear River Cache Valley Timber—Blue Creek—Promontory—Great Desert—Utah Lake—Spanish Fork—Salt Creek—Timpanogos—Sevier River—Colorado System—Fish—Thermal and Chemical Springs—Healing waters—Hotwater plants—Analysis by Dr. Gale—Mineral Springs—Salt beds—Alkali flats—Native salts—GREAT SALT LAKE—First accounts—FREMONT—STANSBURY—Amount of salt—Valleys—Rise of the Lake—Islands—Bear Lake— "Ginasticutis"—Utah Lake—Climate—Increase of rain—Singular phenomena—Fine air—Relief for pulmonary complaints.

UTAH is included between the 37th and 42d parallels of North latitude, and meridians 109 and 114 west from Greenwich; deducting, however, from the northeast corner a section of one degree of latitude by two of longitude, lately attached to Wyoming. Its greatest length is thus, from north to south, five full degrees, and its width from east to west, five of the shorter meridional degrees; the whole area divided nearly equally between two geographical sections, viz.: the valley and drainage of the Colorado and its affluents, the Green and Grand rivers, and the district known as the Great or Interior Basin. This remarkable section, containing the western half of Utah, all of Nevada, and a part of southeastern California, includes all that portion of the continent extending north and south between the parallels 37 and 42, and from east to west from near the meridian 111, Greenwich, to the Sierra Nevadas, which tend northwesterly from the meridian of 116, to that of 121; an irregular parallelogram four hundred miles in extent, from north to south, and five hundred miles from east to west. The term "basin," is only applicable to the whole tract, in view of the fact, that its waters have no outlet to the ocean, for the general level of the lower tracts is as high as average mountain rang-

[1] Original chapter page numbers: 435-459.

es, and the so-called valleys are little more than mountain flats; the entire section is thus composed of a succession of heights, basins, and mountain plateaus. A "succession of basins," because many of the traverse ranges are of equal height with those on the borders; dotted also in the most level portions with detached hills and knobs, relieved at rare intervals by fertile vales, spotted again by vast deserts of sand and alkali or brackish lakes—a region

> "Now of frozen, now of fiery alps,
> Rocks, fens, bogs, dens and shades of death."

Wherever the mountains are high enough to furnish melting snow throughout the the [*sic*] summer, large streams flow down their sides, and fertile tracts are found along their base, caused by the percolation of moisture from above; but in general at any great distance from the foot of the mountains we find barrenness, and throughout the Great Basin a large tract without mountains is invariably a desert. Most of the mountain streams sink before connecting with any other body of water, in many places among the foot-hills before reaching the plain; others spread out and supply natural irrigation to a mile or two of land, producing broad savannas of coarse, rank grass, little oases, quite attractive in themselves and delightful in comparison with the sterility beyond. Along the foot of some ranges the traveler, every mile or so, crosses a considerable stream, rushing clear and strong from the mountain hollows, but two or three miles down the plain not a channel or trace of water is to be found, the thirsty soil, warm sun, and drying air, having exhausted the scant liquid; and it is only in very wet seasons that any of these streams form lakes. In other localities a more plentiful supply and the cool shadow of long ranges give rise to streams of sufficient size to be called rivers, of which the best known in Utah are the Jordan, Bear River, Sevier, Ogden and Weber; and bordering these larger streams are valleys of great fertility, comprising the agricultural wealth of the Territory. Many of the smaller streams form long, shallow lagoons or marshes near the centers or at the points of lowest depression in the basins, generally called "sinks," in which term is embodied an empirical explanation of the disappearance of the water, by those ignorant of the fact, that in nature's laboratory action and reaction are equal, and that the fall of rain and snow in

an enclosed basin must be exactly counterbalanced by evaporation. In most cases the water supply is so scant that these "sinks" become entirely dry in summer, and are then known as "mud flats," of which, the most extensive are in Western Nevada. A smaller number contain some water all the year, of which a few rise to the dignity of lakes. With no outlets, and receiving all the chemical material brought down by the wash of their "feeders," they are of necessity either very saline in character, or brackish and impregnated with iron.

Throughout the Great Basin certain general features are observable; the mountain ranges mostly run north and south, and the longer valleys lie in the same direction. But in this particular man has not been able to accommodate himself to nature, and the course of civilization as well as empire has made it necessary for the roads to run east and west. One may go from Montana to Arizona, and travel in valleys nearly all the way, seldom crossing anything more than a low "divide," but from east to west each range must be crossed at certain points, for which cause the old road south of the Lake was a perfect zig-zag, selecting the most feasible valleys, avoiding the mountains wherever possible, or "canyoning" up one side and down the other, diverging great distances from the direct line, and running to almost every point of the compass.

The "rim of the Basin" is uncontinuous, [*sic*] formed by various ranges. On the north are the broken chains of the Oregon system, from 8,000 to 10,000 feet high, sending out many spurs and traverse ridges. On the western border the Sierra Nevadas average 10,000 feet, and some peaks tower far above that altitude. On the south are the lower sub-ranges of the Rocky Mountains, mere "divides," separating the waters of the Basin from those of the Colorado; and on the east is the main Uintah range, known by various names, with several portions rising to 9,000 or 10,000 feet. Thus the surface configuration of Utah is a great depression in a mountain land, a trough, so to speak, elevated 4,000 or 5,000 feet above sea level; subtended on all sides by mountain ranges 8,000 to 10,000 feet high, and subdivided by transverse ranges; in the geologic age, a sweet water inland sea, in aboriginal times, the home of the most abject savages—long a region of misconception

and fable—then the chosen home of a strange religion, and but yesterday found to be of use and interest to the civilized world. Leaving the mountain ranges which bound the great basin, there is a general breaking down, so to speak, towards the interior; most of the transverse ranges run north and south, terminating in bold headlands towards the south, though none are of sufficient length and continuous height to constitute a well defined system. Few of these ridges present regular slopes, but are formed of acute and angular cappings, superimposed upon flatter prisons; and frequently after ascending two-thirds from the base, the upper part becomes wall-like and insurmountable. Of these interior peaks, or terminal headlands, the most noted are the Twin Peaks, southeast of Salt Lake City, ascertained by Orson Pratt and Albert Carrington to be 11,660 feet in height; Mount Nebo, 8,000 feet; the Wasatch spur, near Salt Lake City, averaging 6,000 feet, and the Oquirrh range, which terminates in a bold headland at the south end of the Lake, locally known as the West Mountain, lying twenty miles west of Salt Lake City.

The Salt Lake Basin, including many adjacent and connecting valleys, was evidently an inland sea, as shown by the "bench formation," a system of watermarks along the mountains, points of successive subsidence of the waters; while many of the detached mountain peaks were as evidently islands, similar to those now rising above the surface of the Lake. According to some, the dry land was formed by successive upheavals; according to others, by ages of evaporation. If the latter theory be correct, it must have been through a "dry cycle" of many thousand years, and if, as many suppose, the "dry cycle" has ended and the rain zones are changing so as to again include this section, we may look for a still greater rise in the Lake surface than that of the last dozen years.

The river system of Utah is curious, but unimportant as to navigation. The noted Jordan, an exact counterpart of its Eastern namesake, has its origin in Utah Lake, and by a course of fifty miles, a little west of north, discharges the surplus waters of that body into Great Salt Lake. It is quite evident, however, from mere inspection, that a much greater quantity of water is poured into Utah Lake from its many mountain affluents than flows out

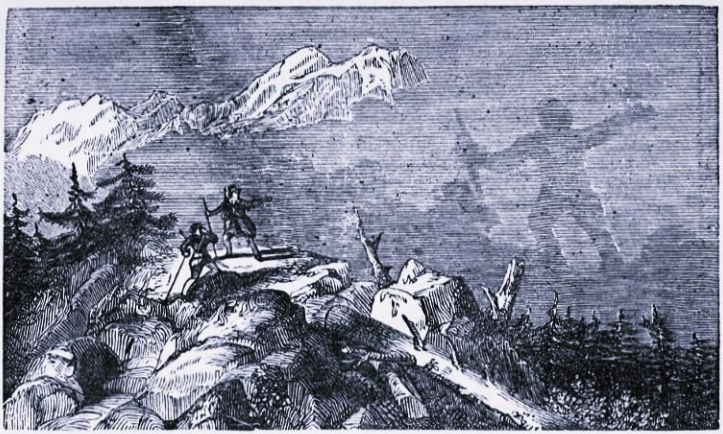
through the Jordan; a small portion may escape by percolation, but at that elevation and in that drying air more is accounted for by evaporation. This stream has an average width of eight or ten rods; through the upper part of its course and in Jordan Cañon it is swift and shallow, in the lower valley and near the City more sluggish, with a depth of ten feet or more.

Passing around the Lake eastwardly, the next stream of any note is Kay's Creek, furnishing plentiful irrigation to the farms of Kay's Ward, besides which, there are numerous streams of smaller size which break out of the Wasatch range, are diverted into irrigating canals, and by a thousand rills through the farms find their way to the marshy lands near the Lake.

The main stream from the east is the Weber, which has its rise some sixty miles east of Salt Lake City, in the highest valley of Summit County; thence, flowing to the north, is swelled by the waters of East Branch, Silver, White, Clay and Echo Creeks, then turning northwest breaks through the Wasatch range, gives form and name to Weber Cañon, enters the valley thirty-three miles north of Salt Lake City, and forming a large U, with the bend sharply to the north, enters the Lake. Bear River rises in the same county, and but a little east and north of the Weber, and running nearly two hundred miles down a northern slope, between two spurs of the Uintah Mountains, forms a great U in Idaho, then turning southwest, "canyons" through another spur of the Uintah, into Cache Valley, the northeastern section of the Territory and home of 12,000 Mormons; then "canyons" downward three miles, with a fall of 1000 feet, out of Cache into Bear River Valley, through which it runs to the head of Bear River Bay, the last twenty miles of its course the only navigable river in Utah.

From the mouth of Bear River Cañon to the head of the Bay is about thirty-five miles in a direct line, the valley maintaining an average width of fifteen miles down to Corinne, where it widens imperceptibly into Salt Lake Valley.

Bear River runs through the finest lumber region in Utah, of which it is the natural outlet, and many thousand logs have already been sent down to Corinne, where a saw-mill and sash factory are now in operation.



MIRAGE SEEN ON THE PROMONTORY NORTH OF GREAT SALT LAKE.

The Malad joins Bear River a few miles above Corinne, between which place and the promontory there are a few springs breaking out of the mountains, constituting but one stream large enough to have a name, Blue Creek. West of the promontory a few springs run together in the midst of a horrible desert and form Indian Creek, which sometimes reaches the lake in wet seasons. Thence, around the head of the lake and down the entire western shore, for one hundred miles, there is no stream large enough to have a name, and but one furnishing running water in all seasons.

On the southwest a small creek from Tooelle [*sic*] valley reaches the Lake, completing the list of affluents to that body. Next in importance are the feeders of Utah Lake, of which the principal are, Salt Creek from the south, Spanish Fork from the east, and Timpanogas [*sic*] from the northeast, which, with the addition of several smaller streams, furnish at least twice as much water to that "gem of the desert," as the Jordan carries off. The only other stream of any importance is the Sevier River, which rises near the southern boundary of Utah, in Fish Lake, runs a hundred and fifty miles to the north, then bends to the west around the point of Iron Mountain, receiving the small supplies of Salt Creek, San Pete, Chicken Creek, and Meadow Creek, then taking a southwest course, is lost in the "big sink" of Sevier Lake

Desert. West of the Iron Mountain range are a score of "sinking creeks," among them Pioneer, Chalk, Cove and Corn Creeks, which are fed by the melting snows of the mountains, furnish scant irrigation to a small strip of land, and are "lost" in the Great Desert of southwestern Utah.

Below the "divide," the only streams of note are the Rio Virgen and its affluents, which belong to the Colorado system. Most of the larger streams abound in fish, among which mountain trout are particularly worthy of note; their waters, on issuing from hills, are of great clearness and purity, and it is only where small streams have run some distance across the plain that they are, in local phrase, "alkalied."

The rivers depend for their existence upon the mountains, and without those gorges, which supply melted snow during the spring and summer, there would be no running water.

Next to the "sinking" rivers of Utah, the thermal and chemical springs constitute a remarkable feature. They are found in almost every part of the Territory, but principally along the road from Salt Lake City northward. All along the foothills of the Promontory range, in the mountains southwest of Utah Lake, and between the city and Bear River, are fountains of strong brine, discharging in many instances large volumes of water; there are sulphurous pools at the southern extremity of Salt Lake Valley; in one of the islands in the lake are springs of every character, and in places along the Wasatch, hot, cold and chalybeate, are found side by side.

First in fame, and probably in medical value, are the Warm Springs in Salt Lake City. Issuing in large volume from the mountain side, the water is conveyed in pipes to a regular bathing house on one side, and to a plunge pool on the other, constituting, in my opinion, the most praiseworthy of Mormon institutions.

The following analysis is by Dr. Gale, assistant of Captain Stanbury, in 1850. One hundred parts of the water, whose specific gravity was 7.0112, gave solid contents of 1.068,087, divided as follows:

Sulphuretted hydrogen	0.038,182
Carbonate of lime	0.075,000
" magnesia	0.022,770
Chloride of calcium	0.005,700
Sulphate of soda	0.064,835
Chloride of sodium	0.861,600
	1,068,087

The usual temperature is 102°.

Three miles north of the city the Hot Springs boil out from a rock at the foot of the mountain, forming a hot pool two or three rods in circumference, whence the branch runs westward and forms the Hot Spring Lake, a body of sulphurous water some two miles long, and about half as wide, having an outlet into the Jordan. At several places around the margin of this singular lake, small jets of hot water boil up with great force; the air in the neighborhood is loaded with the vapors, and immediately over the spring is almost stifling. Gazing into the small pool, formed by the spring, the eye is charmed by the variety of fanciful growths, the *confervae* on the rocky bottom. Every conceivable form of vegetation is to be seen; leaves, plants, flowers and fern-like stems, all of the purest emerald. But all are deceptions, mere imitations of plants formed by the chemical material on the points of stone. The temperature of this spring is 128°; its specific gravity 1.0130, and one hundred parts yield solid contents 1.0602, divided, according to Dr. Gale, as follows:

Chloride of sodium	0.8052
" magnesia	0.0288
" calcium	0.1096
Sulphate of lime	0.0806
Carbonate of lime	0.0180
Silica	0.0180
	1.0602

The most noted mineral springs are seventy miles north of Salt Lake City, near the north crossing of Bear River; they are hot and cold, impregnated with iron or with sulphur, some twenty in number, and all rising within a few feet of each other. Three springs, the first very hot and sulphurous, the second moderately warm and tasting of iron, the third of cold, pure water, rise within a space of three feet. The waters, all flowing into the same

channel, do not mix at once, but run apparently in separate strata for several hundred yards, the hot metal[l]ic water often running under the clear, cold water; nor is it until the sudden bends in the channel have thrown the streams violently from side to side, that they mingle in a fluid of uniform temperature. South of Salt Lake City, along the Jordan, are found hot pools which send out very little water, and in other places are chalybeate springs, coating the earth and rocks with oxide of iron. There are also chemical springs on one or two of the islands in the lake.

The great salt beds of the Basin are in Nevada, but in southern Utah is a peak known as the "Salt Mountain," from which that mineral can be cut in solid blocks, in its pure crystalized state.

Of the mud flats, impregnated with soda, and the alkali deposits, there is a decided surplus, particularly as man has been unable to devise any use for such a quantity of those chemicals in that shape. It is thought the presence of alkali increases the cold, nor does it seem possible to eradicate it from the soil. A slight admixture is thought to be beneficial to vegetation, but wherever there is enough to "flower out" upon the surface, it is death to all vegetation—even the hardy sage brush. Saltpetre is found, though rarely; sulphur is rather too common; borax is found in moderate amount; petroleum has lately been discovered "in paying quantities," and the native alum was analyzed and pronounced good by Dr. Gale. From his report a hundred grammes of the freshly crystalized salt gave:

Water	70.3
Protoxide of manganese	08.9
Alumina	04.0
Sulphuric acid	18.0

Of the vast chemical wealth of the Territory but little is known, and next to nothing has been utilized, but in a general view the entire Basin seems a vast laboratory of nature, where all the primitive processes have been carried out on a scale so extensive as to make man's dominion, at first sight, seem forever impossible.

First in interest among the large bodies of water, is the Great Salt Lake, the "Dead Sea of America," which lies toward the northwest corner of Utah Territory, 4,200 feet above sea-level,

and twelve miles, at the nearest point from Salt Lake City. It is in the form of an irregular parallelogram, of which the major axis, running N.W. by N., is seventy miles in length, and the minor axis forty miles; the different projections, however, greatly increase the area, which is laid down by Captain Stansbury at 90 by 40 miles, in round numbers. The first mention in history of this wonderful Lake is by Baron Hontan, French Governor of Newfoundland, who made a voyage west of the Mississippi, in the year 1690, and sailed for six weeks up a river, probably the Missouri, according to his description. Here he found a nation of Indians called the "Gnacsitares," probably one of the now extinct Mandan tribes. These Indians brought to him four captives of a "nation, far to the west, whom they called Mozeemleks," of whom the Baron says:

"The Mozeemlek nation is numerous and puissant. These four captives informed me that at a distance of one hundred and fifty leagues from where I then was, their principal river *empties itself into a salt lake* of three hundred leagues in circumference, the mouth of which is two leagues broad; that there are a hundred towns, great and small, around that sort of sea, and upon it they navigate with such boats as you see drawn on the map, which map the Mozeemlek people drew me on the bark of trees; that the people of that country made stuffs, copper axes, and several other manufactures, which the Outagamis and other interpreters could not give me to understand as being altogether unacquainted with such things," etc., etc., etc.

These captives may have been of the Ute nation, or more probably, the semi-civilized races of Mexico had colonies there at that time, as indicated by the ruins found south of the Lake. The next mention of the Lake is in a work published in America in 1772 [1727], entitled "A description of the Province of Carolana, by the Spaniards called Florida, and by the French called Louisiane,"[2] in which are recited the native accounts of "a lake many leagues west of the mountains, in which there is no living creature, but

[2] Daniel Coxe, *A Description of the English Province of Carolana by the Spaniards Call'd Florida, and by the French la Louisiane* (Symon, 1727).

around its shore the spirits inhabit in great vapors, and *out of that lake a great river disembogues into the South Sea.*"

The "spirits" will be readily recognized in the Hot Springs, but it is singular that both accounts should give the Lake an outlet. Not long afterwards the Lake became well known to hunters and trappers, and in 1845 Colonel Fremont, then on his second expedition, made a sort of flying survey, which was scientifically completed in 1849-50, by Captain Howard Stansbury. In geologic ages the Lake was doubtless an inland sea, which has declined to its present limits; but it is singular that since Stansbury's survey the lake surface has risen at least twelve feet, of which eight feet were gained in the years 1865-66 and '67. The natural result has been to greatly weaken the saline character of the water. There is a widespread misapprehension on this subject, it being customary for Eastern lecturers to state that "three gallons of the water will make one of salt" The highest estimate, however, that by Fremont, only gave twenty-four per cent, of salt, and the water was taken from, the northwest corner, the most saline portion of the lake. Dr. Gale found one hundred parts of the water to contain solid contents 22.282, distributed as follows:

Chloride of sodium, (common salt).....	20.196
Sulphate of soda.....	1.834
Chloride of magnesium.....	0.252
Chloride of calcium.....	a trace
	22.282

But it is quite evident that an analysis at this time would show much less, probably not more than 18 per cent, of solid matter, perhaps even less in the Eastern part, and not over 12 or 14 per cent, in Bear River Bay, the least saline arm of the Lake. Those engaged in making salt on Spring Bay, certainly the most saline, state that in 1869 it required six gallons of water to make one of salt. Even with this reduction, it has no superior but the Dead Sea water, of which one hundred parts give solid contents 24.580, while the Atlantic ocean only averages three and a half per cent, of its weight, or about half an ounce to the pound. At the spring floods the Lake often rises several feet, and retiring in the summer, leaves vast deposits of crystalized salt. In places, large bayous could easily be filled during the summer by wind-mills upon

the Lake shore, making millions of tons of salt at a trifling outlay. Considering the area of the Lake, 90 by 40 miles, and its average depth ten feet, this would give a little over a thousand billion solid feet of water, or at the rate above mentioned, 4,800,000,000 tons of salt! Estimating the population of the earth at 1200 millions, this would be enough to supply them all, as well as domestic animals, for a thousand years. All through the slopes northwest of the lake and down the western shore, are a number of springs running pure brine, and east of the Promontory, all the wells dug within five miles of the Lake have yielded salt water at a short depth.

If any one doubts the statement that the waters of the Lake are taken up by evaporation, and inclines to the hypothesis of an underground outlet, he can easily convince himself by dipping a basin of the water and exposing it for a few moments to the action of sun and wind; the drying air and the direct rays of the sun will evaporate it in an incredibly short space of time.

Very beautiful effects are produced by taking shrubs of dwarf oak or pine, and dashing the salt water over them at intervals of a few minutes, allowing the salt to form on the leaves in thin filmy crystals. The ingenuity of man seems in a fair way to utilize even the immense saline deposits in and near the Lake. The newly discovered process of reducing native ore, in which salt is extensively used, bids fair to be generally adopted, and, as there is valuable ore all over Nevada and three-fourths of Utah, the day may not be distant when we will need all of this useful preservative, which is poured out here in such profusion as to seem a waste on the part of nature. Whence comes this salt? The mountain rains and melting snows carry the washings of the "salt mountains" of southern Utah to Utah Lake, where they are imperceptible to the taste, but are carried down by the Jordan; united with the contributions of Bear River and the brine springs of Promontory, they are subjected to the condensing process of nature in Great Salt Lake. If there were an underground outlet, a few months' discharge, with the constant reception of fresh water, would make it as fresh as Utah Lake. Standing on the shore of Great Salt Lake, one may observe the whole process of nature in rain formation, he may see the mist from the lake rise to a certain height, then

form in light fleecy clouds which sail away to the mountains, where they are caught by projecting peaks and higher currents of air, and forced into denser masses, and at times he may observe them pouring upon the heights, the water which will run back and mingle with the mass at his feet, completing thus the cycle of moisture which Solomon remarked in the exactly similar phenomena of the Dead Sea: "All the rivers run into the sea, yet the sea is not full; to the place whence they came, thither the waters return."[3]

The country bordering Great Salt Lake presents almost every possible variety of soil, but little or no change in climate.

First to the south lies Jordan Valley, which is generally meant when the people speak of Salt Lake Valley, forty miles long by about twelve in breadth; all the eastern half is valuable for agriculture, and most of the western for grazing. Proceeding northward a strip of salt marsh and low pasture land, near the Lake, is bounded on the east by a strip of fertile land from one to five miles wide, back of which are considerable pastures, even some distance up the mountain side. The same is true of Bear River Valley and the eastern slope of the Promontory, the former consisting of a fertile tract from ten to fifteen miles in width; but crossing Promontory to the west the change is sudden, and we find at the northwest corner of the Lake a valley of alkali flats and salt-beds of indescribable barrenness. The entire western shore is a perfect desert; a salt and arid waste of clay and sand, of the consistency of mortar in wet weather and a bed of stifling dust in dry; not even the sage brush and greasewood find life in the poisonous soil, and near the Lake thousands of acres lie glistening in the sun, bare white with salt and alkali. Running water is found in but one place, and even the scant springs are separated by journeys of fifty miles. It is comfortable to reflect that a further rise of five feet in the Lake surface would bring it upon this desert, with an area of seventy miles square to cover, and requiring at least ten times as much water for a rise of one foot as it did ten years ago. Along the shore the atmosphere is bluish and hazy, and Captain Stansbury observes that "it is a labor to use tele-

[3] *The Authorized King James Version Bible.* Ecclesiastes 1:7.

scopes for geodetic purposes, and astronomical observations are very imperfect." In the body of the Lake are several islands and projecting rocks, designated in the order of their size, as follows:

1. Antelope, also called Church or Mormon Island, having been appropriated by the corporation or Church of Latter-day Saints, for their stock, a sort of consecrated cattle-*corral* "for the Lord and Bro. Brigham."

At the nearest point it is about twenty miles northwest of Salt Lake City; for many years the channel between it and the eastern shore was fordable, and is still occasionally; it contains a number of green valleys, and some springs of pure water.

In the shape of an irregular diamond, with a sharp western projection from the northern point, it is sixteen miles long with an extreme width of seven miles; it contains many ridges and detached peaks, the highest 3,000 feet above the lake, and consequently 7,200 above sea-level. Near the northeastern coast is a rock called Egg Island, and on the most eastern cliff, "they say" there is a cave, with remarkable blue grottoes, of which "monstrous stories" have been told.

2. Stansbury Island is the second largest in the Lake, lying southwest of Antelope, near the western shore, with which it is connected at rare intervals of low water by a sand-spit. It is about half the size of Antelope Island, and consists of a single ridge, twelve miles in length, and rising three thousand feet above the lake. It is of some use for grazing purposes, and is frequented by ducks, geese, plover, gulls and pelicans.

3. Carrington Island, so named from the Mormon engineer, Albert Carrington, who assisted Captain Stansbury in his survey, is an irregular circle with a single central peak; it contains no springs, but abounds in a great variety of plants and flowers. It lies a little northwest of Stansbury, and west of the north point of Antelope Island, near the western shore.

4. Fremont Island lies between Antelope and Promontory Point, nearer the last, and just below the point where Bear River Bay opens into the central part of the lake. It is shaped somewhat like a half moon—abounds in plants, particularly the wild onion, but is destitute of wood and water. Colonel Fremont named it Disappointment Island, having been led to believe, before visiting

it, that it abounded in "trees and shrubbery, teeming with game of every description;" Stansbury gave its present name, and it is sometimes locally known as "Castle Island," suggested probably by the turreted formation of its principal peak.

5. Dolphin Island lies far up towards the northwestern corner, a mere rocky knoll.

6. Hat Island, southeast of Gunnison, and another small island in the vicinity are probably part of the same reef. The deepest sounding in the Lake, forty feet, is found between Stansbury and Antelope Islands. The latter is also rich in minerals, marble of the finest quality and roofing slate, being readily obtained in large quantities. Boats could run directly alongside of the quarries and load with the greatest convenience. A considerable boating interest will yet be built up on the Lake, in which these islands will play an important part. On the eastern shores of the Lake are cultivated farms, populous towns, mines of all valuable metals; on the island are valuable tracts for pasturage, and at the foot of the surrounding mountains are medicinal springs, hot and cold, sulphur, iron and soda. The summer air of the Lake is light, saline and health-inspiring; the scenery unsurpassed, and abounding in views of memorable beauty. The romance of this *Mare Mortuum* has survived the investigations of science, and from a region of misconception and fable, the vicinity of the Great Salt Lake has become the Switzerland of America.

Besides the noted "Dead Sea," the Great Basin is well provided with lakes, such as they are, of which those in Utah constitute an irregular chain from north to south.

Bear Lake, a mere "tarn" among the mountains, extending from Cache Valley into Idaho, is chiefly notable as the home of the "Bear Lake Monster," a nondescript with a body half seal, half serpent, and a head somewhat like a sea lion, which has often been seen and described by Indians and Mormons, but never by white Christians, that I have heard of. It has never been properly classified or named, as it is invisible when scientific observers are at hand, but from the descriptions current "among the latter-day Philosophers, I judge it to be a relic of that extinct species generally denominated the "Ginasticutis."

The sweetwater reservoir, Utah Lake, is fed by large streams from the western slopes of the Uintah range, its circumference, exclusive of offsets, being estimated at eighty miles. This singular analogue of the Sea of Galilee receives the waters from the southern mountains, containing a few grains of salt to the gallon, and after furnishing space for considerable evaporation, discharges them by way of Jordan into Great Salt Lake. Sevier, Preuss, Nicollet, and Little Salt Lake in like manner receive and furnish "sinks" for the waters from the Iron Mountain range, and the southern branch of the Wasatch, none of these lakes communicating with any other, but each dependent on a distinct water system. Only the larger streams form lakes, the smaller are either evaporated or sink in ponds and puddles of black mire; the waters in places reappear or pass underground to feed the larger lakes.

The deserts of Utah consist of alkali flats, barren sand or red earth, resulting, in most instances, merely from the lack of water, for where this can be supplied in sufficient abundance, the alkali is, in no long time, washed away; and many of the sandy districts, once thought to be irreclaimably barren, have been proved quite fertile by irrigation. It is quite evident, also, that a change has been going on for many years, reclaiming large tracts in the vicinity of the mountains. Tracts, entirely barren a score of years ago, after receiving the wash of higher lands, present a scant growth of grease-wood, which is succeeded in time by white[ ]sage[-]brush, and that in turn by the ranker growth of blue sage-brush, each step marking an increase of fertility in the soil. Large tracts are found entirely barren of vegetation, others that have advanced to the grease-wood stage, still others to the growth of sage-brush. In many places the transition is evident, and from the testimony of early explorers, certain tracts have completed the entire circuit of increasing fertility within the memory of man.

Utah is in the parallel of the Mediterranean, but the elevation renders it more bleak, though not liable to sudden vicissitudes of temperature; the changes in any one winter are quite moderate, but the difference between successive winters is often much greater than in any other part of the United States. Cattle have been wintered in Cache Valley, Ogden Hole, and other sections, entirely upon the range and without shelter; on the other hand,

there have been winters in which all the settlements were isolated, when snow fell almost every day, with a high westerly wind, sometimes so high that spray was carried from the lake into the city.

The first two winters the Mormons spent in the valley were unusually mild, cattle living along the streams without feed; the third winter, and that of 1854-55, were exceedingly harsh, and the people being unused to make provisions therefor, many hundred cattle perished in the snow.

Twenty years ago, rain very seldom fell between May and October; in 1860 it continued quite showery, even to the first of July, and, at present, some rain may be counted on with certainty every month in the season. The change is attributed by one class of philosophers to a gradual change of the rain zones; by the Mormons to their prayers and piety, and the favor of Heaven, but is probably due to cultivation and planting. The same phenomenon is observed in western Nebraska and Kansas, and in upper Egypt. The Indians say, "the pale face brings his rain with him." The summer, as marked by the thermometer, is hot, but the great elevation, the lightness and dryness of the air, the cool winds from the cañons and the complete absence of malaria, render it delightful and wholesome.

At the north end of the lake they have the sea-breeze, the mountain air and the refreshing zephyrs from the plains. During the last summer the thermometer usually rose eight or ten degrees from sun-rise till noon; the greatest mid-day heat was not oppressive, and the mornings and evenings, cooled by the mountain airs, were deliciously soft and pure.

The most disagreeable feature of this section is the dust-storms and thunder-storms, which, during the last season, though not frequent, were severe. Showers are expected when the clouds come from the west and southwest; from the east they will cling to the hills. Cultivation and irrigation giving greater facilities for evaporation, the process of nature in the cycle of moisture is quickened, the particles of water make the circuit oftener, and more frequent showers are the result. It is evident this climate of cool, dry air in the winter, moderate dryness and extreme tenuity in the summer, and stimulating rarity at all seasons, is suited to

all healthy and most sickly constitutions. Paralysis is rare, consumption almost unknown—the climate lacks that humidity which develops the predisposition—asthma and phthisis meet with immediate relief, and from my personal experience, it is evident the air tends to expand, strengthen and give tonic force to the lungs. But rheumatism and neuralgia are by no means uncommon; as in other bracing climates, they effect the poor, and those from any cause, insufficiently fed, housed or clothed during the winter. For all who would avoid humidity, either in soil or air; who seek relief from pulmonary diseases or dyspepsia, the climate is unsurpassed; but for inflammatory diseases the good effects of this climate are still open to debate.