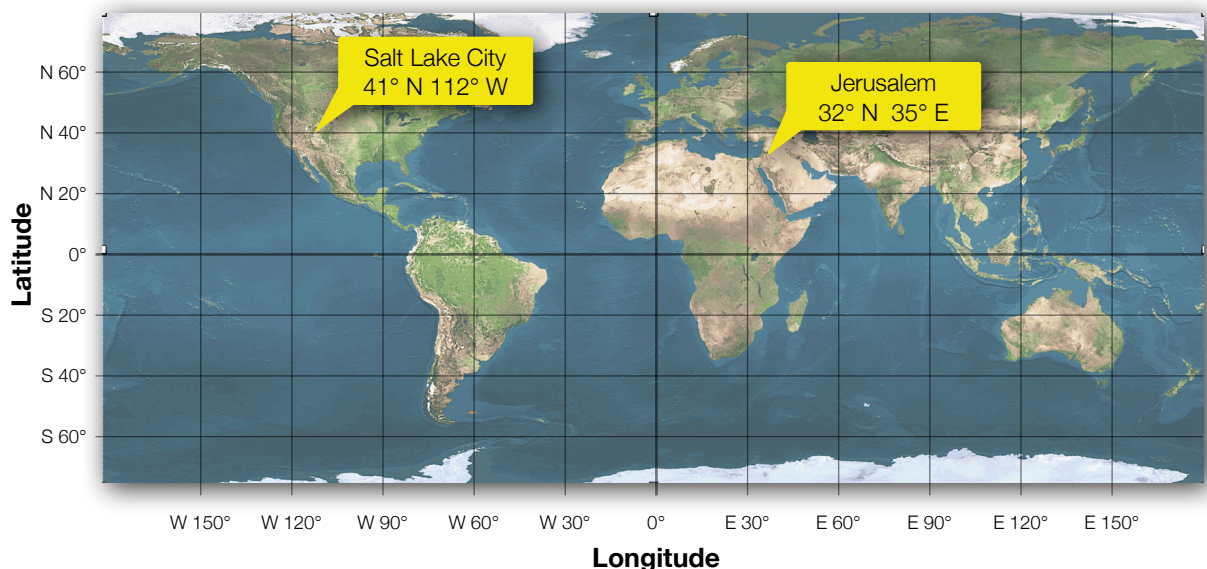


Environmental Evidences

Confirming “Fingerprints” for Locating Book of Mormon Lands

Lynn and David Rosenvall, December 2012

Jerusalem’s location is 32 degrees north of the Equator and 35 degrees east of Greenwich, and the location of Salt Lake City is 41 degrees north and 112 degrees west. If we only knew the latitude and longitude coordinates for the city of Zarahemla it would be rather effortless to locate the Book of Mormon lands. But we don’t. The Book of Mormon account, however, provides numerous pieces of environmental information that serve as surrogate markers for global positioning. This trove of geographical signposts are like *fingerprints* or clues leading to the scene of the Book of Mormon lands and confirming their location on the earth’s surface—and this geographical evidence has latitude and longitude perimeters attached to it. Thus by using climate descriptions, the habitats of plants and animals, and the locations of mineral deposits, seacoasts and mountainous terrain we can establish environmental patterns or fingerprints that, in turn, can be matched to locations on the earth. And, hopefully, through this process a single geographical region would surface that matched *all* the patterns of the various pieces of evidence. This region, by induction, would then be the scene for the Book of Mormon lands of the record keepers—such as Nephi, Alma, Mormon and Ether.



In previous articles we matched the larger and more extensive landform features mentioned in the Book of Mormon record, such as the sea east and the sea west, the river Sidon, the narrow neck of land and the narrow strip of wilderness. The results of these studies are like *footprints* leading to the location of the Book of Mormon lands in Baja California (see our topic articles, *“From the Sea West to the Sea East”*; *The Narrow Strip of Wilderness*; *The River Sidon*; *The Narrow Neck of Land*; and *Jared, his Brother and their Friends*; see also, *“Mormon’s Description of Book of Mormon Lands”* in, *A New Approach to Book of Mormon Geography*). As a complement, this article focuses on the seemingly less significant geographic statements that serve as *fingerprints* or distinctive identifying characteristics to confirm the peninsula of Baja California as the location of the Book of Mormon lands. These fingerprints are just as powerful as the footprints for sleuthing out and confirming a geographical location. These matching confirmations may come as a surprise to some, but misperceptions are often the enemy of truth.



A fingerprint can uniquely identify a person.

We have identified several hundred “environmental fingerprints” scattered throughout the Book of Mormon text that relate to the climate; the animals, plants and minerals; and the latitude, longitude and elevation of the Book of Mormon lands. These numerous fingerprints or evidences are arranged and analyzed within five sections:

Climate: The Most Significant Evidence

Elevation of Villages, Towns and Cities

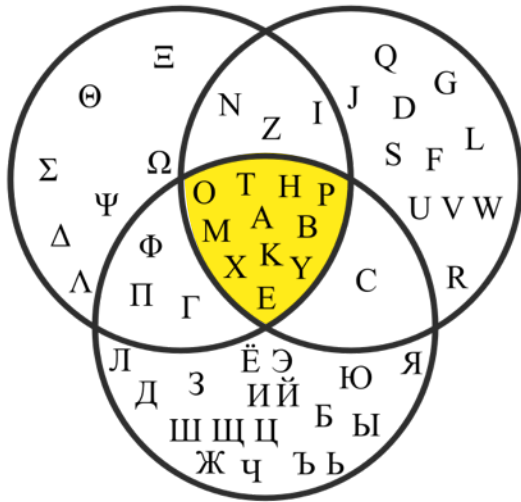
Animals on the Land and in the Sea and Air

Plants on the Land

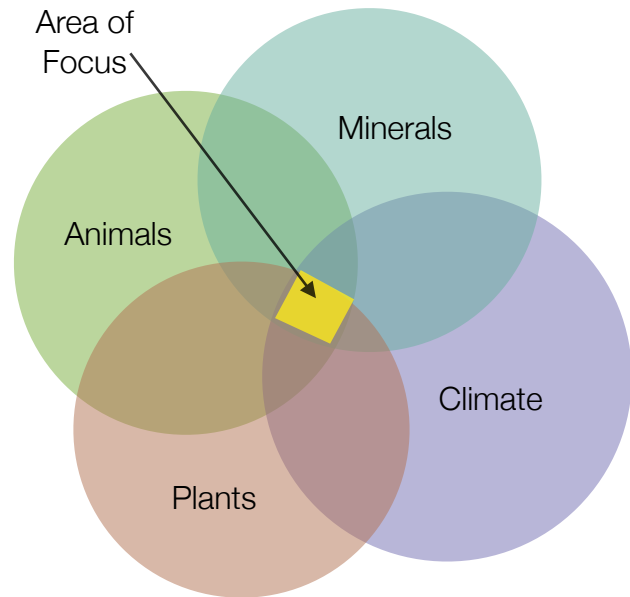
Minerals in the Earth

Our matching of patterns of evidence (fingerprint marks) from the Book of Mormon text is similar to the showing of a logical relationship between a finite collection of sets

(aggregation of things) with *Venn diagrams*. These diagrams are helpful to illustrate simple set relationships in probability, logic, statistics, linguistics and computer science (see *Wikipedia*, Venn Diagram). For example, this Venn diagram shows the intersection of the Greek, Latin and Russian alphabets. The alphabet letters in the center appear in all three languages.



A Venn diagram showing common letters in the Greek, Latin and Russian alphabets. The letters in the center appear in all three languages.



Identifying a common environment for animals, minerals, plants and climate mentioned in the Book of Mormon text helps to narrow the possible locations on the earth's surface.

Our intent is to confirm that the intersection, or the one place on a Venn diagram, that includes or matches all the environmental evidence from the Book of Mormon text is the peninsula of Baja California. Other world areas, understandably, may be included in some environmental patterns, but not within all the patterns.

Climate: The Most Significant Evidence

One of our initial goals was to establish and match climate patterns. Because of its significance, we spent one-quarter of the narrative in our first and introductory article explaining the role of climate in finding and verifying the Book of Mormon lands (see our topic article, *A New Approach to Book of Mormon Geography*). We noted that the peninsula of Baja California has the same basic climate as the Biblical lands and matches the descriptions in the Book of Mormon account bearing on climate. To emphasize the importance of these climate concepts, this article expands upon several principles outlined in our earlier work.

“A Choice Land”

A “choice land” is a “chosen land”—a land chosen by the Lord (Ether 13:2). The Lord told the Book of Mormon people they occupied a “choice land” prepared and chosen by Him (1 Nephi 2:20; 2 Nephi 1:5; Jacob 5:43; Ether 1:38, 42). Thus the Jaredites were led into a land which is “choice above all other lands of the earth,” and, the Nephites were “led to a land of promise; yea, even a land which I have prepared for you; yea, a land which is choice above all other lands.” The Lord also said the Nephites would be planted in a “good spot of ground; yea, even that which was choice unto me above all other parts of the land of my vineyard.” Understandably, the Jaredites and the Nephites would need to be led to the same geographical area if both were to occupy the “most choice” land. And, indeed, they did settle in the same general geographic area but at different times, with a short overlap of space and with a short overlap of time. (See “*Arriving in the Promised Land*” in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*)

In older English, a “choice” thing, such as a land, was one “selected with care and judgement,” and one



Flowers and other plants flourish in Baja California.

that was “fit and appropriate,” a thing of “special value.” A spot on the face of the earth that we judge to be “choice,” may not be deemed by the Lord to be challenging enough to give his sons and daughters appropriate experiences. For example, the children of Israel entered their promised land with complaint, and many pioneers considered the Salt Lake Valley inferior to California. A “choice” entity is also something



Oasis at San Ignacio, in central Baja California.

with “abundance and variety to choose from.” Baja California is a land with a wide-range of impressive physical environments and habitats, like few places on earth—from seacoasts to plains to mountains—but also affords ample challenges for colonization.

The climate of a region is the most significant physical factor influencing soil fertility, agriculture potential, the kinds of native plants and animals,

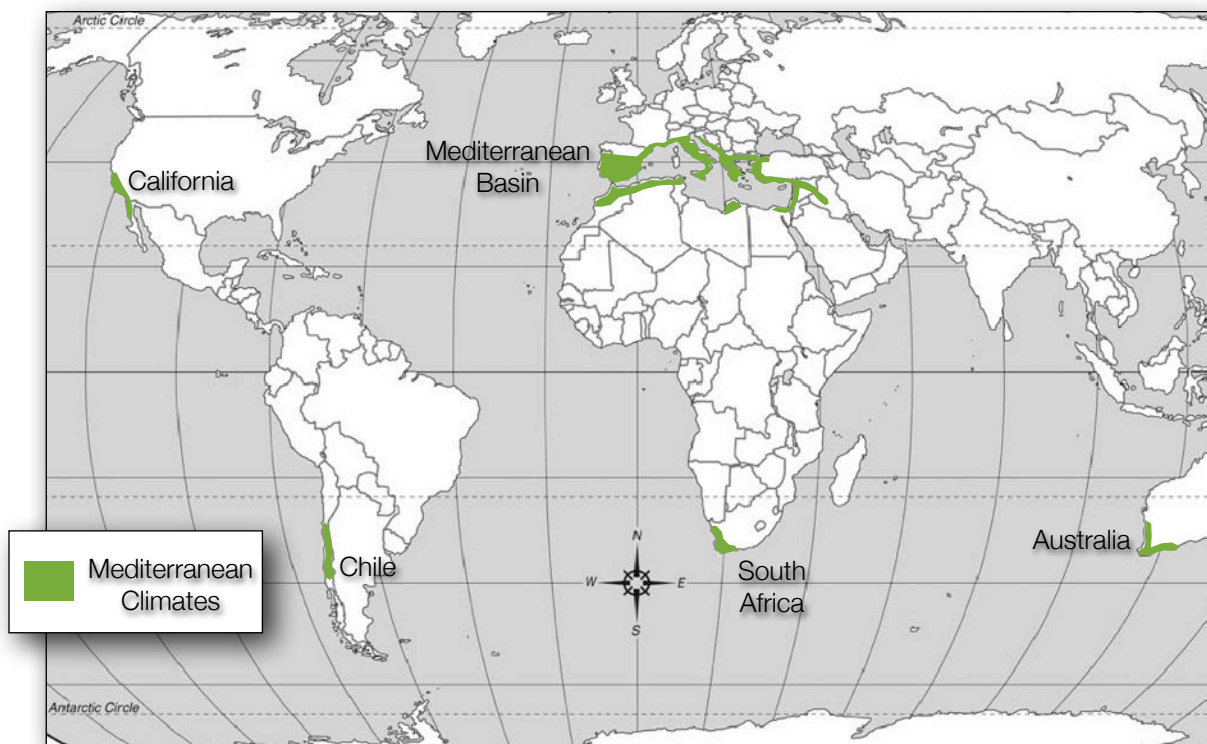
the extent and wealth of minerals and other resources, and ultimately its population carrying capacity. Climate is based on the average and variations of weather in a part of the earth’s surface over long periods of time. The climate of a location is greatly affected by its latitude and topography, as well as nearby oceans and their currents and winds. Climates can be classified, using primarily temperature and rainfall, into some 20 or more climate types. For example, some areas are hot and wet, others are hot and dry, some are cool and wet, and still others are warm and dry.

The Mediterranean Climate

In our introductory article we also explained the nature of climates classified as “Mediterranean,” and that these climates are generally acknowledged by climatologists as the “most choice” areas of the world’s surface for human habitation and agriculture. A Mediterranean climate (*Dry Summer Subtropical* or *Csa* and *Csb* in the Köppen climate classification) is differentiated by a moderate annual temperature range and a distinct wet winter season and a distinct dry summer season. These two moderate temperature seasons, with alternating wet and dry periods, allow dissimilar and complementary types of agriculture over the course of the entire year and, therefore,

support an expanded variety of cultivated crops and domesticated animals, and a significant number of wild animals and native plants.

A dry summer and a wet winter are best—far superior to the reverse sequence, a wet summer and a dry winter. There are some areas of Mesoamerica and other tropical lands with a wet summer and a dry winter, but the characteristics of these seasons are the exact opposite of Mediterranean climates. This sequence of a wet and very humid summer and a dryer winter season does not produce pleasant atmospheric conditions at sea level locations. The extremely hot and humid summers are not as agreeable as the dry cooler summers of the Mediterranean lands and thus are not as conducive to human activity, animal life and plant growth—and cannot sustain their expanding populations. As a result, people migrate to the Mediterranean climate areas of the world, while at the same time others are fleeing (when they can) from areas such as Guatemala in Mesoamerica, and similar areas of Africa, literally by the hundreds of thousands because of poor economic conditions and the low population carrying capacities of their lands (see *Wikipedia*, Guatemala; and Emigration from Africa).

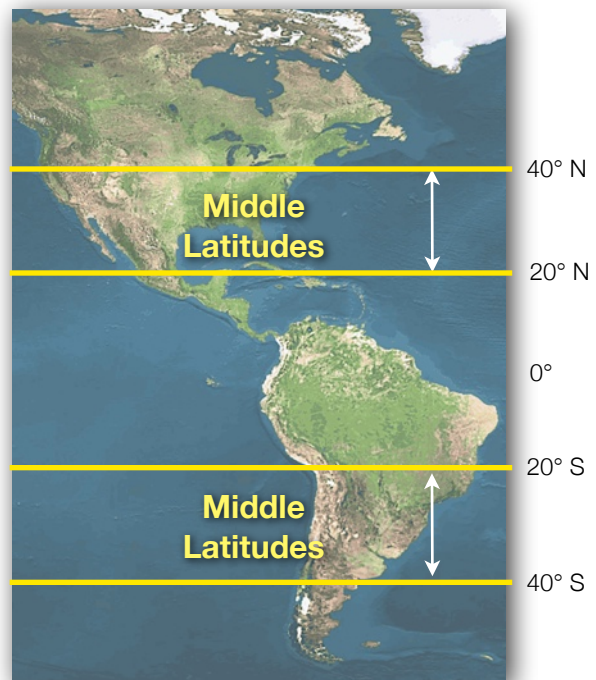


Mediterranean Climates throughout the World.

The Mediterranean climate occurs in only a few spots of the earth's surface. All are located in the middle latitudes and then only on the west side of continents because of the earth's atmospheric circulation of high pressure cells that controls the temperature and precipitation patterns of Mediterranean climates. The largest area of Mediterranean climate is located around its namesake the Mediterranean Sea, the ancestral home of the Book of Mormon peoples, and an area they knew firsthand. The large water area of the Mediterranean Sea influences the surrounding land areas and increases the extent of Mediterranean climate in southern Europe and parts of northern Africa. The southern half of the state of California and northern Baja California in Mexico are the only areas of Mediterranean climate in North America. In the southern hemisphere there is a small area of Mediterranean climate centered on the city of Santiago, Chile, and in limited areas around the cities of Perth and Adelaide, Australia, and on the southern tip of South Africa.

Prodigious amounts, and an exceptional variety of agricultural products, are produced in these relatively small Mediterranean climate areas during all months of the year, including the dry and wet seasons. Substantial quantities of these products are exported around the world, and the population levels, understandably, are often rather high in Mediterranean climates, because of their exceptional agricultural output.

For example, if necessary, California's agricultural areas could produce enough food to support the entire population of the United States and Canada, and, not unexpectedly, the population of California exceeds any other state and is even greater than that of Canada. The small area of southern California, centered on Los Angeles and San Diego, and the adjacent area of northern Baja California, currently have a combined population exceeding 23 million. Mediterranean climates, because of their moderate temperatures and limited rainfall, are often the most-visited tourist destinations in the world.

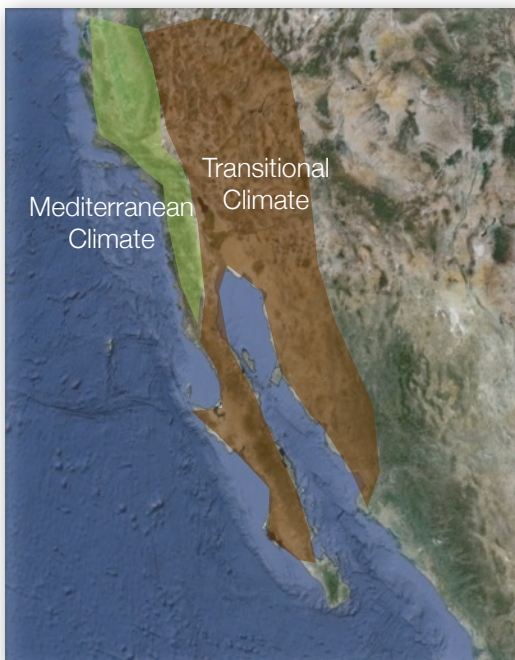


The Middle Latitudes of North and South America are between 20 and 40 degrees north and south of the equator.

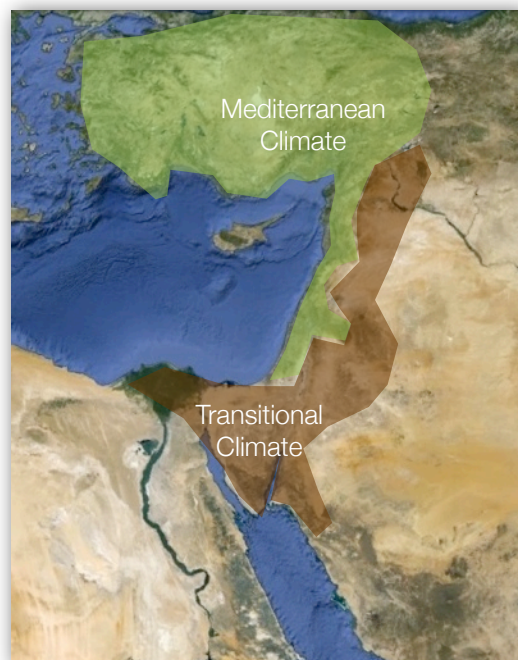
Numerous statements and terms throughout the Book of Mormon text favor a middle latitude setting, especially a Mediterranean-like climate. This parallel between the Biblical lands and the Book of Mormon lands provides an important premise and solution for several geographical features and challenges noted in the Book of Mormon text.

Transitional Climates

The world's climates, like all natural phenomena, transition or merge into adjacent climates. The classification of climates and the boundaries between are determined by man not nature and are not exact environmental dividing lines. These transitional climate areas, both north and south of Mediterranean climates, are also well suited for settlement and agricultural production. Thus on their southern reaches, the Mediterranean climates of the northern hemisphere transition into drier semiarid and arid climates (*BSh* and *BWh* in the Köppen climate classification scheme). This is true



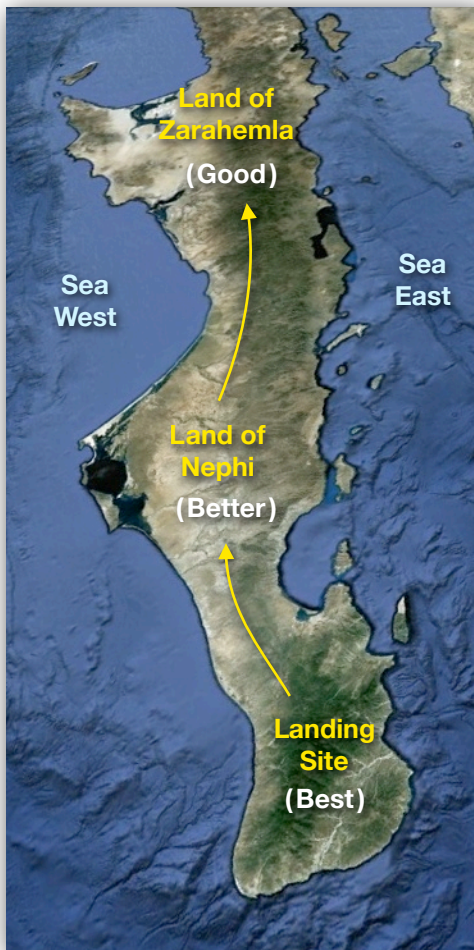
Mediterranean Climate and semiarid transitional climates around Baja California.



Mediterranean Climate and semiarid transitional climates around the Holy Land.

for the Biblical lands where the Mediterranean climate area of Galilee becomes progressive more arid toward the land of Judea on the south and continuing beyond. Jerusalem is located in this drier semiarid area of Judea. In Baja California the Mediterranean climates are located in the northern third of the peninsula where we

place the Jaredites (and the last lands the Nephites occupied before their demise) and in the far south of the peninsula where Lehi's family landed. This landing location, because of its remote southern location is not technically classified as a pure Mediterranean climate, but as a distinctive transitional climate that possesses the same temperature and precipitation characteristics and growing potential. The climate is not dissimilar to Jerusalem. The drier lands between the northern third and the southern end of the peninsula are classified as semiarid, the same as many areas of the Biblical lands.



Relative agricultural potential of the southern half of the Baja California peninsula.

Shortly after their arrival in the far south of the Baja California peninsula, Nephi and his followers were forced to move north to the city of Nephi at the southern end of the narrow strip of wilderness. And then some 400 years later their descendants migrated farther north to the land of Zarahemla (the location of the river Sidon) where they merged with the people of Zarahemla (the Mulekites). These last two lands were in semiarid areas with drier agricultural conditions and the Nephite's second and third choices for settlement, with their southern landing site being their first and best choice. (See "Historic Setting of River Sidon Area" in our topic article, *The River Sidon: A Key to Unlocking Book of Mormon Lands*) Thus both the southern reaches of Israel (the Bible lands) and the peninsula of Baja California transition to dryer and more semiarid environments but still manifest the favorable characteristics of Mediterranean climates, including the ability to produce abundant crops. They simply require careful management of water sources to achieve comparable agricultural yields.

The Ecology of Planting Seeds

In our initial article we presented the concept of the ecology of planting seeds and noted the seeds brought by Lehi's family to "grow exceedingly" had to have been

planted in an area of the world with a climate analogous to Jerusalem, the source region of the seeds.

And it came to pass that we did begin to till the earth, and we began to **plant seeds**; yea, we did put all our seeds into the earth, which **we had brought from the land of Jerusalem**.

And it came to pass that **they did grow exceedingly**; wherefore, we were blessed in abundance. (1 Ne. 18:24; bolded words added here and in other references)

The successful planting and harvesting of transported seeds provides a little-noticed but powerful and significant clue leading to the location of the Book of Mormon lands. Seeds cannot just be gathered in one location and then planted anywhere in the world and be expected to “grow exceedingly.” The seeds might germinate in many locations, but only when the seeds are planted in an analogous location in terms of climate, length of daylight and soil condition (and climate is a major determiner of soil fertility) will they “grow exceedingly.”

Plants and seeds today are classified according to climate zones and then sold according to the buyer’s planting and climate region. Examples of this agricultural challenge can be provided from the first European settlers in New England, Australia and other world locations. These early settlers faced famine and privation for years until they could determine by trial and error what would best grow in the climate and soil of their new land, and where best to acquire suitable seeds and plants. To prevent starvation, food from elsewhere was transported long distances and at great expense. Lehi’s family did not have the benefit of trial and error or imported food. Their seeds either grew with the first planting or they didn’t. There was no second chance or a secondary source of food.



Seeds are categorized by climate zones around world.

In the late 1800s, when the first European settlers in Alberta, Canada, planted wheat they had brought from warmer climates, it did not grow properly. Success with wheat production came only after one wheat farmer wrote to his brother in Russia and asked him to send a small quantity of wheat seed from the Moscow area. These imported Russian seeds grew exceedingly and became the seed stock for much of the wheat

Nephite Seeds “Grow Exceedingly”

All Manner of Seeds Gathered

And it came to pass that we had **gathered together all manner of seeds of every kind**, both of grain of every kind, and also of the **seeds** of fruit of every kind. (1 Ne. 8:1)

Seeds Loaded on Ship

And it came to pass that on the morrow, after we had prepared all things, much fruits and meat from the wilderness, and honey in abundance, and provisions according to that which the Lord had commanded us, **we did go down into the ship, with all our loading and our seeds**, and whatsoever thing we had brought with us, every one according to his age; wherefore, we did all go down into the ship, with our wives and our children. (1 Ne. 18:6)

Seeds Planted and Grow Exceedingly

And it came to pass that we did begin to till the earth, and **we began to plant seeds**; yea, we did put all our seeds into the earth, which we had brought from the land of Jerusalem. And it came to pass that **they did grow exceedingly**; wherefore, we were blessed in abundance. (1 Ne. 18:24)

They Reap Again in Abundance

And the Lord was with us; and we did prosper exceedingly; for **we did sow seed, and we did reap again in abundance**. And we began to raise flocks, and herds, and animals of every kind. (2 Ne. 5:11)

grown in Alberta today. The climate of the Moscow region, of course, is an analog to the climate of the wheat growing area of Alberta. The critical story behind the mutiny on the *Bounty* saga was not the mutiny of the crew, but the aborted mission of transporting *bread fruit* plants (and their seeds) on the ship *Bounty* from tropical South Pacific island climates to areas of the same climate in the Caribbean islands. The crops of the introduced bread fruit plants were intended by the British to help eliminate widespread starvation. Commercial production of *Kiwi* fruit and *Granny Smith* apples started in New Zealand decades ago in growing areas classified by climatologists as Marine West Coast climates. Now seeds of these southern hemisphere plants produce these commercial fruit products in the identical Marine West Coast climate of the state of Washington. Even today, groups espousing the theory of global warming, and fearing its consequences, are stockpiling seeds from around the world in cold storage

locations in Norway, at the cost of tens of millions of dollars. By this means they hope to protect the world’s seed stock and then redistribute seeds to world areas when climate change prevents the successful planting from a local inventory of seeds.

Again, it is significant to note that the climate of Baja California provides a close match to the climate of the land of Jerusalem. Thus the seeds brought by Lehi's family from the land of Jerusalem would have been planted in an equivalent environment where they could "grow exceedingly." If grapes, figs and barley grew well in the land of Jerusalem, they potentially would grow just as abundantly and successfully in the Nephite's new homeland of Baja California. Predictably, there are situations and statements scattered throughout the Book of Mormon record that provide more evidence to support semiarid and seasonal Mediterranean-type climates for the Book of Mormon story rather than a humid tropical or semitropical climate of Central America or even the cooler and more humid climates of northern Europe and the northeast of the United States. Here are examples from the Book of Mormon record, based on our work in climatology:

Jerusalem to Bountiful: Planting Crops and Gathering Seeds

The journey of Lehi's family from Jerusalem to Bountiful on the shores of the Arabian Sea was some 2,300 miles, the distance from San Francisco, California, to Pensacola, Florida. This indeed was a long, tedious eight-year journey, but at a speed of some 15 miles per day (the average rate of Mormon pioneers coming to the Salt Lake Valley), and traveling five days per week, this journey could be accomplished in some 150 days of travel over seven months. At half this rate of travel it would have taken about a year. And even if this journey were completed in several segments, extending over the full eight years, there would have remained a total of seven years out of the eight for camping at various locations, including their stay at Bountiful. What did Lehi's family do in these lengthy intervening periods when they were not traveling? The Book of Mormon account says they "did tarry" and they "did sojourn." In older English, "to tarry" and "to sojourn" meant "to make a temporary

Dictionary Definitions

In our studies of the Book of Mormon text, we have found it helpful to search for word definitions that were acceptable and appropriate before the Book of Mormon was first printed in 1830. These older definitions have been selected, with that date as a benchmark, from the *Oxford English Dictionary*, the accepted authority on the evolution of the English language over the last millennium. Current definitions often obscure the original meanings of scripture text. We have found these older definitions often parallel the pattern of word usage in the *King James* translation of the Bible, begun in 1604 and completed in 1611. Where appropriate, these older definitions are provided in our analysis of the Book of Mormon text. Examples are: tarry, waters, fevers, fruits, by times, dearth and serpents.

stay in a place; to remain or reside for a time.” The word “tarry” also conveyed the meaning of, “to delay, procrastinate or lose time; to put off or prolong an action.” Alma confirmed that Lehi’s family “tarried in the wilderness, or did not travel a direct course, and were afflicted with hunger and thirst, because of their transgressions [mainly murmuring]” (Alma 37:42). Alma also stated that the Liahona “was prepared to show unto our fathers the course which they should travel in the wilderness” (Alma 37: 39). The pointers of the Liahona, however, worked “according to the faith and diligence and heed which [they] did give unto them” (1 Ne. 16:28). In other words, when Lehi’s family was “tarrying” they were at times not progressing along their journey in a manner the Lord expected, and their progress was hindered (see, 1 Ne. 5:4; 8:2; 16:33).

In contrast, Nephi records favorable travel results when keeping the commandments:

And if it so be that the children of men **keep the commandments of God** he doth nourish them, and strengthen them, and provide means whereby they can accomplish the thing which he has commanded them; wherefore, **he did provide means for us while we did sojourn in the wilderness.** And **we did sojourn for the space of many years,** yea, even eight years in the wilderness. (1 Ne. 17:3–4)

During these welcome “sojourns,” or temporary respites, the Lord “did provide means” while Lehi’s family camped for extended periods. But where were they when they paused their journey to “sojourn”? And what did they do at these interim locations, and by what “means” did the Lord “provide” for them?

The Book of Mormon record indicates that the Lord through the “directions of the ball [the Liahona]” led them to “the more fertile parts of the wilderness” (1 Ne. 16:16). The “most fertile parts of the wilderness,” were “in the borders near the Red Sea” (1 Ne. 16:14). Numerous such fertile areas are still cultivated in this western area of Arabia near present-day Mecca (*Makkah*), Medina (*al-Madinah*) and Jeddah (*Jidda*), a



Along the west coast of the Arabian peninsula, near the Red Sea, are “fertile parts” that could have been planted and harvested during Lehi’s eight-year journey.

region “near the Red Sea” with a population today of over 5 million. This region at the time of Lehi’s journey would have been sparsely populated, if at all, otherwise there would have been no need for the Liahona to point them to fertile areas if these fertile areas were already being cultivated by others. An area that is “fertile,” by definition, is one where the “soil” has the ability of “bearing or producing in abundance,” and a test of fertility is the successful planting and harvesting of crops. We suggest these considerable “fertile parts” of southwestern Arabia, “in the borders near the Red Sea,” are where Lehi’s family camped or “sojourned” for months or even years and took advantage of the fertile areas the Liahona led them to. Keep in mind, they had some seven years when they would not have been traveling. We suggest they planted seeds they “had brought from Jerusalem” in these “fertile parts” and harvested the food they grew (1 Ne. 18:24). This could have been the “means” (the method) the Lord “provided,” as they “did sojourn in the wilderness” (1 Ne. 17:3). Even a six-months stay in a fertile location could yield a harvest from cultivated plants, a welcome supplement to their food supply. Why would the Lord direct them to fertile areas if they were to exist solely on wild game? He could have continually led them to wild game habitats, however, it is difficult, if not impossible, for a people to subsist exclusively on meat from animals for an eight-year period, especially wild animals, even though the meat was deemed desirable and essential.

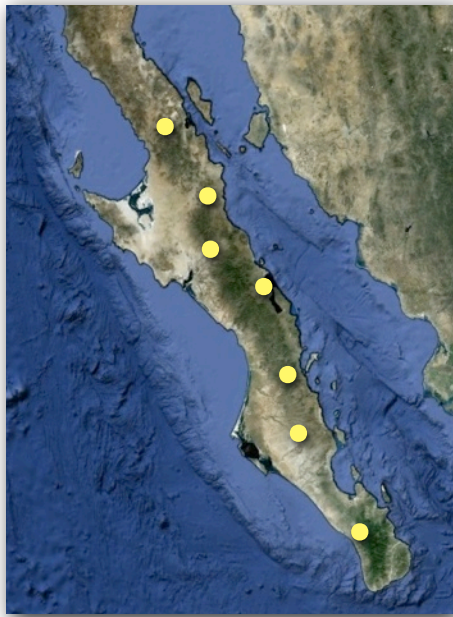
We also suggest that Lehi and his fellow travelers collected the seeds from these crops for subsequent plantings, just like all agrarian people do. In Bountiful, the text says, they found “much fruit and also wild honey” (1 Ne. 17:5–6; 1 Ne. 18:6). In older English the term “fruit” included fruit as we interpret the word today but also vegetables and nuts. This “fruit” could have been a source of additional seeds. It stands to reason that seeds from all possible sources—in Bountiful as well as the places where they “sojourned”—would have been gathered to replenish and complement the seed stock from Jerusalem and



Date palms found along the southern coast of Oman on the Arabian peninsula.

to assure a fresh supply (and variety) of seeds for planting in their new homeland. The text says they “did go down into the ship, with all [their] loading and [their] seeds” before they sailed from southeastern Arabia in present-day Oman (1 Ne. 18:6).

We note the latitude of the fertile areas of western Arabia—some 23 degrees north—is the same as the latitude of the southern tip of Baja California where we propose Lehi’s family landed. Both locations are close to the parallel of the *Tropic of Cancer* (23.5 degrees north). A recent study, “Desert oases as genetic refugia of heritage crops: Persistence of forgotten fruits in the mission orchards of Baja California, Mexico” (Gary



Baja California oases with *heritage orchards*. These oases match Book of Mormon settlement locations.

Paul Nabhan, Jesus Garcia, Rafael Routson, Kanin Routson and Micheline Cariño-Olivera) in the *International Journal of Biodiversity and Conservation*, vol. 2(4), pp. 56–69, April 2010, reported that, “curiously, the perennial crop species composition of the Baja California oases [heritage orchards] exhibits overlap with that of oases [heritage orchards] surveyed in Egypt and Oman.” And just as curious, the locations of the nine heritage orchards the authors identify in Baja California match the locations where we place major settlements of father Lehi’s descendants, including their place of landing. The eastern borders of Egypt were skirted by Lehi’s family during their journey from Jerusalem, and within the country of Oman, of course, is where we and many Book of Mormon scholars locate Bountiful.

Insolation (solar radiation or energy) is a fundamental physical factor affecting the metabolism of plants and the behavior of animals. The length of daylight (solar energy) required for plant growth is directly related to latitude, and matching the *length of daylight* is an essential factor in assuring the success of seeds transferred from one location and planted in another. As we have noted, Nephi recorded that their transported seeds “did grow exceedingly; wherefore, we were blessed in abundance” (1 Ne. 18:24). We are attempting to confirm this recently discovered “overlap” of “crop species” between the two distant “heritage orchards” as a possible explanation (a fingerprint) for understanding the Book of Mormon story that starts in

Jerusalem and wends its way through the deserts and fertile areas of Arabia before beginning a thousand-year history in Baja California.

Two Seasons—A Season of Fruit and a Season of Grain

The Book of Mormon account states that the people lived in an environment with two prominent and contrasting seasons: a “season of her grain” and a “season of her fruit.” This two-season climatic regime is identical to that of the Biblical lands. The two seasons and their influence on the agriculture and culture of the people in Bible times, including satisfying the requirements of the Mosaic law, are outlined on this web site: www.bible-history.com/geography/seasons_months_israel.html.



Climatic “seasons” are mentioned in the account of Alma teaching and baptizing in the borders of the land of Nephi:

And it came to pass that as many as did believe him did go forth to **a place which was called Mormon**, having received its name from the king, being in the borders of the land having been **infested, by times or at seasons, by wild beasts**. Now, there was in Mormon a fountain of pure water, and Alma resorted thither, **there being near the water a thicket of small trees**, where he did hide himself in the daytime from the searches of the king. (Mosiah 18:4–5)

The changing environmental conditions of “seasons,” in the “place which was called Mormon,” appear to have affected the migration patterns and behaviors of wild beasts. In older English, “by times,” meant “time after time,” as, for example, the annual sequence of seasons. We note in older English beasts referred to four-legged animals, either wild or domestic.

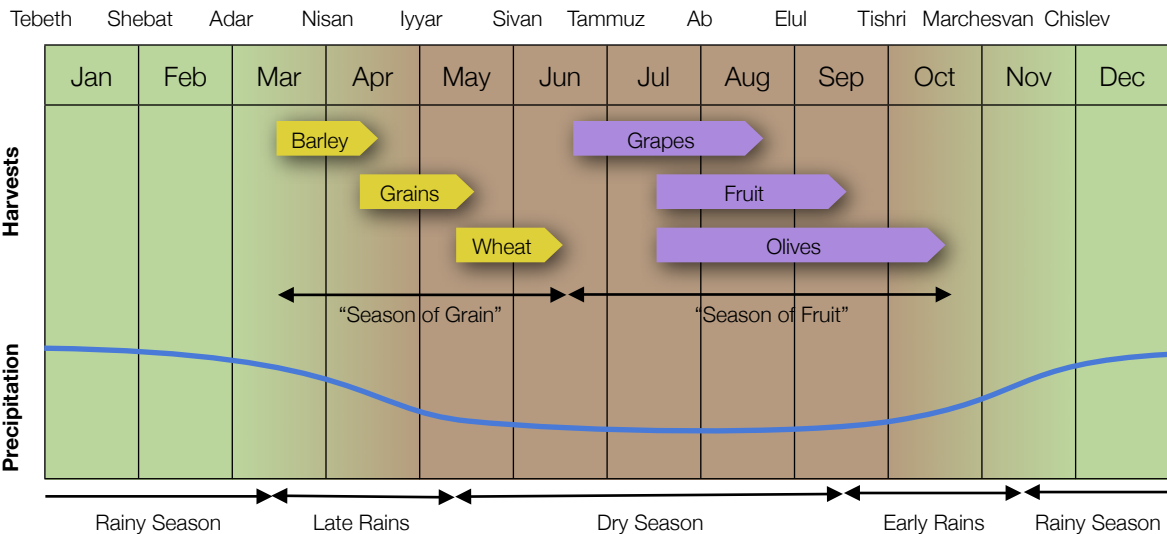
During a time of drought (no rain) leading to famine in the land of Zarahemla, Mormon mentions two distinct and dissimilar seasons:

And this work of destruction [famine] did also continue in the seventy and fifth year. For the earth was smitten that it was dry, and did not yield forth **grain in the season of grain**; and the whole earth was smitten, even among the Lamanites as well as among the Nephites, so that they were smitten that they did perish by thousands in the more wicked parts of the land.

O Lord, wilt thou hearken unto me, and cause that it may be done according to my words, and send forth rain upon the face of the earth, that she may bring forth her fruit, and her **grain in the season of grain**.

And it came to pass that in the seventy and sixth year the Lord did turn away his anger from the people, and caused that rain should fall upon the earth, insomuch that it did bring forth her **fruit in the season of her fruit**.

And it came to pass that it did bring forth her **grain in the season of her grain**.
(Hel. 11:6, 13, 17)



The Old Testament harvest cycle was based on two seasons, one for grain between March and June and the other for fruit between June and October.

The descriptions in these verses support the pattern of two distinct and contrasting seasons that significantly affected the agricultural cycles of crop production—a “season of her grain” and a “season of her fruit.” As we have noted, in older English the word “fruit” referred to not only fruit as we use the word today but also included vegetables and nuts. The Nephite record states they planted seeds of *neas* and *sheum* (Mosiah

9:9). These unknown seeds, with untranslated names, may have been vegetable seeds.

Fevers in Some Seasons of the Year

Mormon records that fevers were a problem for the people “at some seasons of the year,” and these deadly fevers in the land were controlled by “plants and roots”:

And there were some who **died with fevers**, which **at some seasons of the year** were very frequent in the land—but not so much so with fevers, because of the excellent qualities of the many **plants and roots** which God had prepared to remove the cause of diseases, to which men were subject **by the nature of the climate**.(Alma 46:40)

Some have quoted this verse as supportive evidence of a Mesoamerica setting for the Book of Mormon lands. They equate “fevers” with malaria and mention its presence in the tropical lands of Central America. They note the discovery of quinine as a means to “remove the cause of diseases” such as malaria. This statement by Mormon, however, does not mention the symptoms of the “fevers” nor the “nature of the climate” where the fevers occurred—only that it was a seasonal climate and some “died with fevers.”



Mosquitos are one of the most common carriers of dengue fever throughout the world.

We considered the topic of seasonal fevers in this Book of Mormon account when we began our project in Baja California. Here is a synopsis of our findings:

- ❑ In older English the word “fever” occurred in the plural form as “fevers,” but with a singular meaning. This is the pattern in the Book of Mormon.
- ❑ Fevers are “a morbid condition of the [body] system, characterized by undue elevation of the temperature, and excessive change and destruction of the tissues.”

- ❑ Fevers are found in many places around the world, especially in warmer climates, and not solely in Mesoamerica. Examples are: dengue, malaria, scarlet, typhoid and yellow.
- ❑ Fevers other than malaria can lead to severe consequences such as death.
- ❑ Malaria is not the only fever that can be cured, controlled or ameliorated by "plants and roots."
- ❑ Dengue fever appears to be more widespread than malaria, and occurs in tropical and semitropical climates and in more moderate middle latitude climate areas such as Baja California. It is endemic in 110 countries. Dengue, like malaria, is borne by mosquitoes and can be controlled by the products of "plants and roots." (See *Wikipedia*, Dengue Fever.)
- ❑ Baja California has an intermittent problem with dengue fever—in the past as well as today. See these web pages: Dengue Fever in Baja – The Facts (www.bajainsider.com/baja-life/health/denguefever.htm); Hemorrhagic dengue alert in Baja California Sur, Mexico (www.nowpublic.com/health/hemorrhagic-dengue-alert-baja-california-sur-mexico); and Viva La Baja! Blog (vivalabaja.blogspot.ca/2008/09/dengue-fever-in-baja.html).
- ❑ Moreover, the statement of Mormon in Alma 46:40, "fevers, which at some seasons of the year were very frequent in the land," fully matches the climate setting in Baja California. The prevailing climate of Baja California, with two seasons (wet and dry), affects the time of year when fevers would occur, whereas many tropical areas of the world have only one unvarying humid or wet season throughout the year. This uniform climate leads to a situation where the coolest temperatures are during the nighttime hours and not during any specific months of the year. This monotonous annual temperature pattern leads to the well known statement of biologists that, "the night is the winter of the tropics," that is, there is a greater temperature range between day and night than between the months of the year. Clearly the Book of Mormon account mentions seasons and changing climatic conditions for the cyclical or seasonal development of fevers.

The occurrence of seasonal fevers in Baja California, such as dengue, matches the statement in the book of Alma, and, therefore, that peninsula can't be excluded as a potential Book of Mormon land based on an argument that appears to favor only areas

of malaria. This is a brief appraisal of a significant topic. As with other statements in the Book of Mormon, one's preconceptions can often get in the way of a correct or alternative understanding.

Suffering from Thirst in the Wilderness

Some have noted statements in the Book of Mormon account that indicate a dryer climate rather than a humid climate for the environment of Lehi's children (see Hugh Nibley, *"The Nature of Book of Mormon Society"* published in his work, *An Approach to the Book of Mormon*). For example, dry conditions are noted in the account of king Mosiah (the second) sending 16 strong men, led by Ammon, a descendent of Zarahemla, to go to the land of Lehi-Nephi to inquire concerning the welfare of their brethren, the people of Zeniff, who had gone back to resettle that land some 80 years earlier.



Reduced precipitation in semiarid environments can cause great stress on all forms of life.

And now, they knew not the course they should travel in the wilderness to go up to the land of Lehi-Nephi; therefore **they wandered many days in the wilderness, even forty days** did they wander. And when they had wandered forty days they came to a hill, which is north of the land of Shilom, and there they pitched their tents. (Mosiah 7:4–5)

In the land of Lehi-Nephi, Ammon and his brethren were taken prisoner by king Limhi, "the son of Noah, who was the son of Zeniff" (Mosiah 7:9).

And now, king Limhi commanded his guards that they should no more bind Ammon nor his brethren, but caused that they should go to the hill which was north of Shilom, and bring their brethren into the city, that thereby they might eat, and drink, and rest themselves from the labors of their journey; for they had suffered many things; **they had suffered hunger, thirst, and fatigue.** (Mosiah 7:16)

Note that during their 40-day journey from the land of Zarahemla south through the narrow strip of wilderness to the land of Lehi-Nephi (also called the land of Nephi in the Book of Mormon text) the members of Ammon’s expedition had “suffered hunger, thirst, and fatigue.” If the 16 strong men had been traveling for 40 days through a humid or well-watered climate area, such as a tropical area or an area of northern Europe or the northeast of the United States, the chances are slight they would have suffered from thirst through the lack of water, or possibly even from hunger. Clearly, the



The Narrow Strip of Wilderness extending between the land of Nephi and the land of Zarahemla and from the sea west to the sea east.

environment of the narrow strip of wilderness was a dry or semiarid area with few places to obtain water or long distances between sources of water, the same as in some drier climate areas of the Biblical lands. And certainly the sources of water, if any, were farther apart than their ability to carry water allowed. We should note, however, that this was an unfamiliar wilderness area, and “they knew not the course they should travel” (Mosiah 7:4; see also our topic article, *The Narrow Strip of Wilderness: Spatial Features, Orientation and Recorded Journeys*).

Some 30 years later, the four sons of Mosiah (Ammon, Aaron, Omner and Himni) and the others with them also reported they had suffered “hunger, thirst and fatigue” in their journeyings through this same wilderness area, while traveling from the land of Zarahemla to the land of Nephi:

Now these are the circumstances which attended them **in their journeyings**, for they had many afflictions; **they did suffer much**, both in body and in mind, **such as hunger, thirst and fatigue**, and also much labor in the spirit. Now **these were their journeyings**: Having taken leave of their father, Mosiah, in the first year of the judges; having refused the kingdom which their father was desirous to confer upon them, and also this was the minds of the people; Nevertheless **they departed out of the land of Zarahemla**, and took their swords, and their spears, and their bows, and their arrows, and their slings; and this they did that they might provide food for themselves while in the wilderness. And thus **they departed into the wilderness**

with their numbers which they had selected, to go up to the land of Nephi, to preach the word of God unto the Lamanites. (Alma 17: 5–8)

In the 1960s and 70s Harry W. Crosby, an avid adventurer, photographer and writer, traveled twice by mule back along the entire 200 mile length of this “narrow strip of wilderness” in Baja California. In his travels—totaling some 600 miles—he encountered the identical challenges of “hunger, thirst and fatigue,” but with modern survival equipment and appropriate maps he was able to complete his journeys with far less difficulty (see Crosby’s books, *The King’s Highway in Baja California*, Copley Books, 1974; *The Cave Paintings of Baja California: Discovering the Great Murals of an Unknown People*, Sunbelt Publications, 1998; and *Antigua California*, University of New Mexico Press, 2000). Based on our observations, these same environmental challenges would be faced today in this semiarid narrow wilderness strip with its limited sources of water.



Harry Crosby traveling on mules through the central mountains of Baja California.

Ammon later stated to the Lamanite king in the land of Nephi that their ancestors, Lehi and his family and others who came with them, suffered “hunger and thirst” in the wilderness when they departed from the land of Jerusalem (Alma 18:37; see also, 1 Ne. 16:35). Alma makes the same parallel observation to his son Helaman when relating that Lehi’s family was “afflicted with hunger and thirst” as they “tarried” in the wilderness near Jerusalem. This dire situation was the result of transgression and their not heeding the directions indicated by the Liahona, which would have led them on a direct course (Alma 37:38–42). We suggest the wilderness south of Jerusalem was a similar environment to the one Lehi’s family encountered in the wilderness areas of their new homeland, such as the narrow strip of wilderness between the land of Nephi and the land of Zarahemla. And as we have emphasized, all the wilderness and other environmental areas of Baja California are analogous to the natural settings of the land

of Israel (for comparisons of these two lands, see our topic article, *Prophesied Cursing and Blessing of Book of Mormon Lands*).

Flocks at the Waters of Sebus

Mormon describes a disruptive situation in the land of Nephi that occurred while Ammon, one of the sons of Mosiah, was attempting to perform his missionary labors. The incident provides clues to the nature of the environment Ammon found when he arrived in the land of Nephi, the land the Nephites occupied for some 400 years before they merged with the people of Zarahemla in the land of Zarahemla (see the section, “*Historic Setting of River Sidon Area*,” in our topic article, *The River Sidon: A Key to Unlocking Book of Mormon Lands*). The descriptions of this event provide another inference of a dry or semiarid climate environment:



Ammon at the waters of Sebus. Artist: Arnold Friberg.

And after he had been in the service of the king three days, as he was with the **Lamanitish servants going forth with their flocks to the place of water, which was called the water of Sebus, and all the Lamanites drive their flocks hither, that they may have water—**Therefore, as **Ammon and the servants of the king were driving forth their flocks to this place of water,** behold, a certain number of the Lamanites, who had been with their flocks to water, stood and scattered the flocks of Ammon and the servants of the king, and they scattered them insomuch that they fled many ways. Now the servants of the king began to murmur, saying: **Now the king will slay us, as he has our brethren because their flocks were scattered** by the wickedness of these men. And they began to weep exceedingly, saying: Behold, our flocks are scattered already. (Alma 17:26–28)

And the record also states:

For he had **slain many of them because their brethren had scattered their flocks at the place of water;** and thus, because they had had their flocks scattered they were slain. Now it was the **practice of these Lamanites to stand by the waters of Sebus to scatter the flocks of the people, that thereby they might drive away many that were scattered unto their own land,** it being a practice of plunder among them. (Alma 18:6–7)

And the record continues:

But others rebuked them, saying: The king hath brought this evil upon his house, because **he slew his servants who had had their flocks scattered at the waters of Sebus**. And they were also rebuked by those **men who had stood at the waters of Sebus and scattered the flocks** which belonged to the king, for they were angry with Ammon because of **the number which he had slain of their brethren at the waters of Sebus**, while defending the flocks of the king. (Alma 19:20–21)

In older English the word “water,” when referring to springs or flowing water, appeared in the plural form as “waters,” but with a singular sense. Except for one instance (Alma 17:26), the Book of Mormon text follows the same pattern. The “waters of Sebus” was the one place, like a spring, where there was sufficient water for the flocks of numerous Lamanite herdsman, and the prolonging of their own lives (not being slain) depended on maintaining access to this one water location for the flocks under their care (Alma 17:31; 19:20). Mormon states that, “all the Lamanites [drove] their flocks hither, that they may have water” (Alma 17:26). Ammon “stood to contend with those which stood by the waters of Sebus; and they were in number not a few” (Alma 17:34). And “now it was the practice of the [wicked] Lamanites to stand by the waters of Sebus to scatter the flocks of the people” (Alma 18:7). A single community waterhole serving many from a surrounding area is more characteristic of a dry climate than a more humid climate, and certainly matches the water sources of Baja California and the Biblical lands. We note the historical importance of Jacob’s well at Shechem, the benefits of the waters of Bethesda and the essential role of the spring of Gihon at Jerusalem (including the necessity to build Hezekiah’s tunnel for transporting water from this single source).

Three and a Half Years of No Rain

Creating the environmental conditions that lead to a famine is a common way for the Lord to humble a people, devastate a population and curse a land. A famine is a condition of “extreme scarcity of food with its accompanying privations.” The shortage of food is most often the result of lack of rain or reduced rainfall upon a land, and a shortage of food from lack of rain for a prolonged period can keep a land from being resettled by the former inhabitants or by others. Famine can also be described as a “dearth” in older English, that is, a “shortage and dearthness of food.” In the *King James* version of the Bible, the words “dearth” and “famine” are translations rendered from the

same Hebrew root word (Gen. 41:54; Isa. 51:19). The concept of famine or dearth being caused by the lack of rain is illustrated in the words of Moroni concerning the Jaredites:

And it came to pass that there **began to be a great dearth upon the land**, and the inhabitants began to be destroyed exceedingly fast because of the dearth, **for there was no rain upon the face of the earth**. (Ether 9:30)

In another example, Nephi, the son of Helaman, faced a serious problem of “wickedness” among his people (19 B.C.) and asked the Lord to humble them by causing a “famine in the land to stir them up in remembrance of the Lord their God, and perhaps they will repent and turn unto [Him]” (He. 11:4). The Lord had earlier told Nephi:

Behold, thou art Nephi, and I am God. Behold, I declare it unto thee in the presence of mine angels, that ye shall have power over this people, and **shall smite the earth with famine, and with pestilence, and destruction**, according to the wickedness of this people. (Hel. 10:6)

The conditions surrounding the withdrawal of rain by the Lord and the resultant famine are described by Mormon:

And so it was done, according to the words of Nephi. And **there was a great famine upon the land**, among all the people of Nephi. And thus in the seventy and fourth year the **famine did continue**, and the work of destruction did cease by the sword but **became sore by famine**. And this work of destruction did also continue in the seventy and fifth year. For the **earth was smitten that it was dry, and did not yield forth grain in the season of grain**; and the whole earth was smitten, even among the Lamanites as well as among the Nephites, so that they were smitten that they did perish by thousands in the more wicked parts of the land.

And it came to pass that the people saw that **they were about to perish by famine**, and they began to remember the Lord their God; and they began to remember the words of Nephi. And the people began to plead with their chief judges and their leaders, that they would say unto Nephi: Behold, we know that thou art a man of God, and therefore **cry unto the Lord our God that he turn away from us this famine**, lest all the words which thou hast spoken concerning our destruction be fulfilled.

And it came to pass that in the seventy and sixth year **the Lord did turn away his anger from the people, and caused that rain should fall upon the earth, insomuch that it did bring forth her fruit in the season of her fruit.**

And it came to pass that it did bring forth her grain in the season of her grain.

And behold, the people did rejoice and glorify God, and the whole face of the land was filled with rejoicing; and they did no more seek to destroy Nephi, but they did esteem him as a great prophet, and a man of God, having great power and authority given unto him from God. (Hel. 11:5–8, 17–18)

This famine at the time of Nephi, the son of Helaman, was caused by a three and a half-year drought (no rain) upon the land. This span of time with no rain is calculated by noting the sequence of a six-month season of fruit (normally a dry season) with the six-month season of grain (normally a wet season) during this period of prolonged drought (see, Hel. 11:13). Mormon in his recording of this famine observed:

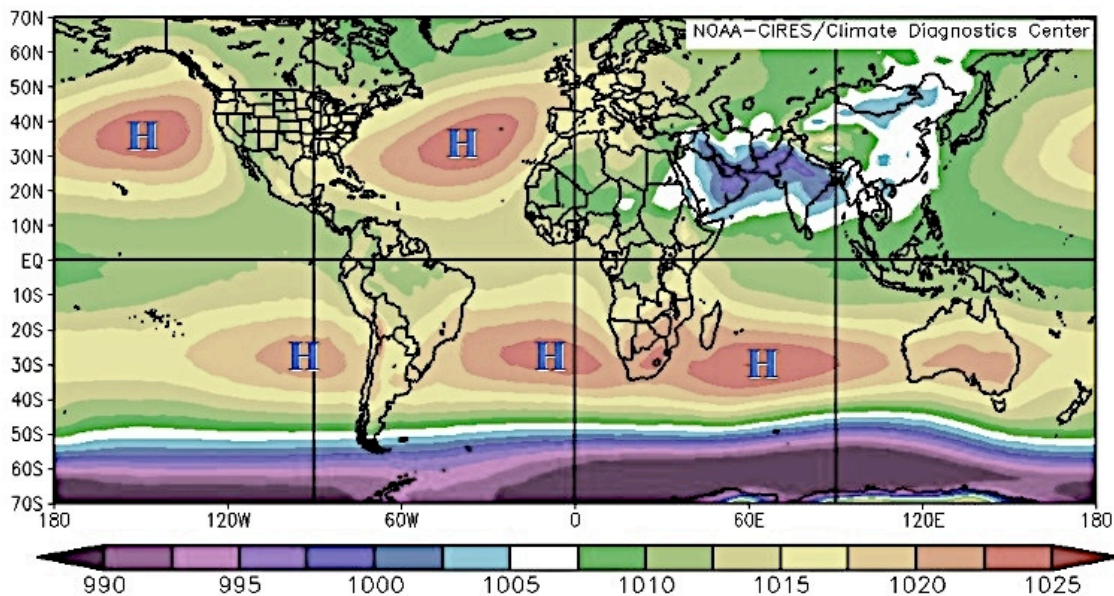
And thus we see that except the Lord doth chasten his people with many afflictions, yea, except he doth visit them with death and with terror, and **with famine and with all manner of pestilence**, they will not remember him. (Hel. 12:3)

As expected, there are numerous references in the Book of Mormon describing famine, caused by reduced rainfall, because of the transgression of the people, not only during their long one-thousand year history but especially describing the prophesied conditions at the end when they are swept off the land (see, 2 Ne. 6:15; 2 Ne. 7:2; 2 Ne. 15:6; 2 Ne. 15:13; Mosiah 12:4; Alma 10:22–23; Alma 45:11; and Hel. 13:9; also see *“The Nature of a Land Cursed by the Lord”* in our topic article, *Prophesied Cursing and Blessing of Book of Mormon Lands*).



Prolonged droughts, lasting for several years, are common in semiarid environments.

Climatologically it is not difficult to anticipate a situation of reduced rainfall for a three and a half-year period, or even a single year, in a Mediterranean or semiarid climate like in Baja California where during the *summer* months of the year the normal pattern of dry air with little or no rain already exists. The orographic and cyclonic winds bringing moisture-laden clouds to the land during the wet *winter* months could be easily nudged to a drier condition by slightly altering the locations of the subtropical high pressure cells over the nearby oceans to the West. This irregular reduction of rainfall in the normally wet winter season already happens from time to time bringing temporary draught conditions upon the land. And these meteorological mechanisms that often bring a short-term draught could be readily extended to three and a half years or more without substantially upsetting the general pattern of global wind circulation, or as the Lord said to Isaiah, “I will also command the clouds that they rain no rain upon it” (2



Subtropical high pressure cells (H) located to the west of the five Mediterranean climate areas.

Ne. 15:6 and Isa. 5:6). On the other hand, in tropical and subtropical climate areas of the world the primary source of rainfall is convective precipitation caused by air rising from the heated surface of the earth. This form of precipitation is difficult to change from a normally very high rainfall amount to an acute dry condition without somehow altering the tilt of the earth and changing the locations of the earth’s poles and the equatorial zone, and in the process modifying climate regimes throughout the earth. Recorded famines in the drier climate areas of the Biblical lands are legendary: Haran, Abraham’s brother, died because of famine in Ur; Lot left Ur with Abraham and Sarah and travelled with them to Canaan to escape famine; Abraham and later Joseph were

led to Egypt to save their families from famine; Elimelech and Naomi took their family to Moab to avoid famine; and in New Testament times there was a famine during the reign of Claudius, A.D. 47.

More Climate Fingerprints

East Winds

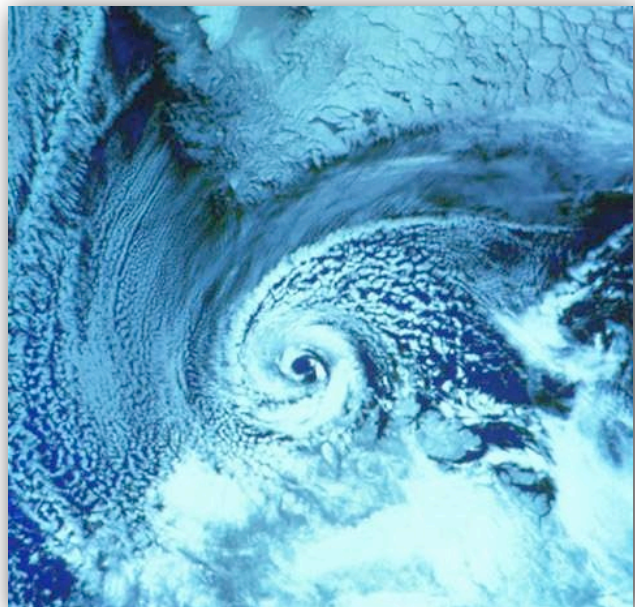
Because of the rotation of the earth on its axis and the wind circulation around the subtropical high pressure cells, the prevailing winds in the middle latitudes are *westerlies*. In contrast, winds from an easterly direction are infrequent and are often the result of exceptional atmospheric disturbances such as hurricanes and tornadoes. We note that in the lower latitudes (tropical areas), the prevailing winds are *easterlies*.

The Book of Mormon account mentions the “immediate destruction” brought by the “east wind,” when king Limhi quotes this warning of the Lord to his people:

And again [the Lord] saith: If my people shall sow filthiness **they shall reap the east wind, which bringeth immediate destruction.** (Mosiah 7:31)

Then king Limhi reminds the people that, “behold, the promise of the Lord is fulfilled, and ye are smitten and afflicted” (Mosiah 7:32). The prophet Abinadi also quotes a prophecy of the Lord to his people which warns of being “smitten with the east wind” because of “their iniquities and abominations” (Mosiah 12:7):

And it shall come to pass that I [the Lord] will send forth hail among them, and it shall smite them; and **they shall also be smitten with the east wind;** and insects shall pester their land also, and devour their grain. (Mosiah 12:6)



Satellite view of a hurricane to the west of Baja California.

Baja California, like several areas of the middle latitudes in both the southern and northern hemispheres, is “smitten” by devastating hurricanes (tropical cyclones) from time to time. Hurricanes form over unusually warm ocean surfaces on both sides of the North American continent, not just in the Gulf of Mexico and Florida. and strike either coast of the Baja California peninsula as devastating “east winds.” To be declared a hurricane, winds need to exceed 74 miles per hour. Hurricanes, as a rule, cause more damage from coastal flooding than from excessive wind speeds. In the northern hemisphere, hurricanes normally form between 10 and 30 degrees north of the equator, well within the latitudinal location of Baja California. Rotating counterclockwise around a center “eye,” these hurricanes migrate northward, sometimes moving up the Sea of Cortez.



Paths of hurricanes (tropical cyclones) around the Baja Peninsula over the past 10 years. Hurricanes generally originate to the south of the peninsula and travel northward.

Here is a recent example: On September 1, 2006, Hurricane John made landfall on the southeastern coast of Baja California with winds of 110 miles per hour. As John moved northwestward across the peninsula, tens of thousands of people were evacuated and hundreds of homes were destroyed, and with some loss of life.

Tempests and Whirlwinds

The terms “whirlwinds” and “tempests” occur several times in the Book of Mormon text (see, 2 Ne. 26:5; Mosiah 7:30; Alma 26:6; Hel. 5:12; 3 Ne. 8:12, 16; 10:13–14). A

whirlwind is “a whirling or rotating wind; an atmospheric eddy or vortex; a body of air moving rapidly in a circular or upward spiral course around a vertical or slightly inclined axis which has also a progressive motion over the surface of land or water.” Today we general call such an atmospheric disturbance a cyclone or tornado, a dark, funnel-shaped formation with destructive winds, generally occurring over land. A tempest, on the other hand, is “a violent storm of wind, usually accompanied by a downfall of rain or hail, and by thunder and lightning.” Because of the startling sound of thunder, these violent storms or “tempests” are often referred to as thunderstorms. Tornadoes and thunderstorms occur in many areas of the middle latitudes and are triggered by excessive heating of the earth’s surface at a specific location.



An ominous tornado touches down on the ground in Baja California.

Here is Mormon’s description of some of the “terrible destruction” that took place in the Book of Mormon lands at the time of the Savior’s crucifixion:

But behold, there was a more great and terrible destruction in the land northward; for behold, the whole face of the land was changed, because of the **tempest and the whirlwinds**, and the thunderings and the lightnings, and the exceedingly great quaking of the whole earth;

And there were **some who were carried away in the whirlwind**; and whither they went no man knoweth, save they know that they were carried away. (3 Ne. 8:12, 16)

And then,

And [some] were spared and were not sunk and buried up in the earth; and they were not drowned in the depths of the sea; and they were not burned by fire, neither were they fallen upon and crushed to death; **and they were not carried away in the whirlwind;** neither were they overpowered by the vapor of smoke and of darkness. And now, whoso readeth, let him understand; he that hath the scriptures, let him search them, and see and behold if all these **deaths and destructions** by fire, and by smoke, and **by tempests, and by whirlwinds,** and by the opening of the earth to receive them, and all these things are not unto the fulfilling of the prophecies of many of the holy prophets. (3 Ne. 10:13–14)

Baja California, like other middle latitude locations, is subject to the formation and violent outcomes of tornados and thunderstorms.

Hail

In the Book of Mormon account, Abinadi declares a warning from the Lord to the people in the land of Nephi concerning hail:

And it shall come to pass that I **will send forth hail** among them, and it shall smite them; (Mosiah 12:6)

And Helaman speaking in the land of Zarahemla reminds his sons, Nephi and Lehi, that their “Redeemer, who is the Christ, the Son of God,” can protect them, even from effects of “hail.”



Hail damage can have a devastating effect on crops.

And now, my sons, remember, remember that it is upon the rock of our Redeemer, who is Christ, the Son of God, that ye must build your foundation; that when the devil shall send forth his mighty winds, yea, his shafts in the whirlwind, yea, **when all his hail and his mighty storm shall beat upon you, it shall have no power over you** to drag you down to the gulf of misery and endless wo, because of the

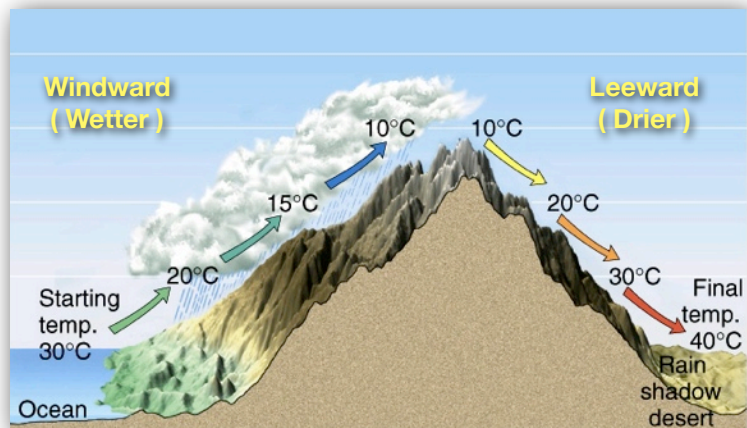
rock upon which ye are built, which is a sure foundation, a foundation whereon if men build they cannot fall. (Hel. 5:12).

Hail is “frozen vapor falling in pellets or masses in a shower from the atmosphere (cumulonimbus clouds).” Hail is most frequent in the warmer summer months and accompanies thunderstorms. Hail, like tornados and thunderstorms, is initiated by excess heating of the earth’s surface at a specific location. It is more common in the middle latitudes than in the tropics where it tends to be confined to high elevations. Hail occurs in Baja California from time to time, but less frequently than interior continental locations.

Leeward and Windward

In the Book of Mormon record there appears to be more cities placed on the western borders of their lands than on the eastern side. Various explanations have been offered to explain this imbalance, but we suggest the disparity is caused by the rainfall

differences between *leeward* and *windward* environments where there is a mountain divide on a peninsula or an island. These terms were coined by early seamen to distinguish the different sides of an island. The windward side is that side of an island subject to the prevailing wind, and is thus the wetter side because of orographic precipitation



Atmospheric effects and contrasting precipitation pattern of the windward (wetter) and leeward (drier) sides of mountain divides.

produced with the ascending air. The leeward side is the side protected by the elevation of the island from the prevailing wind, and is typically the drier side of an island because of adiabatic warming of the descending air. Thus, leeward or windward siting is an important weather and climate factor on oceanic islands, and peninsulas (Latin for “almost an island”) which share similar narrow landforms.

This windward and leeward precipitation pattern occurs on the peninsula of Baja California, with the drier side on the eastern coast along the Sea of Cortez. The prevailing winds are the westerlies coming on land from the Pacific Ocean on the West.

The mountain range that extends the length of the peninsula varies in elevation from 7,000 feet in the South to over 10,000 feet in the North, with the center portion rising to some 5,000 feet.

The Book of Mormon record mentions the Nephites “began the foundation” of the cities of Moroni, Lehi, Nephiah, Morianton, Omner, Gid and Mulek, “all of which were on the east border by the seashore” (Alma 50:13–14; 51:26). According to Mormon’s account, these cities were intended as military strongholds to prevent the Lamanite armies from advancing up the eastern coasts of the land of Zarahemla—beyond the Nephite defenses in the narrow neck of land—to reach freedom in the land Northward. Without this military exigency, these protective eastern cities might never have been established by the Nephites in these drier coastal areas. (We discuss the political geography of the Nephite defenses in our topic article, *The Narrow Neck of Land: A Touchstone of Book of Mormon Geography*.)



The city of Zarahemla and the associated land of Zarahemla lie to the west of the watershed divide.

When reporting the spatial pattern of the people in approximately 99 to 77 B.C., Mormon describes the Lamanite locations as follows:

Now, the more idle part of the Lamanites lived in the wilderness, and dwelt in tents; and they were **spread through the wilderness on the west, in the land of Nephi**; yea, and **also on the west of the land of Zarahemla, in the borders by the seashore, and on the west in the land of Nephi**, in the place of their fathers' first inheritance, and thus bordering along by the seashore. And also there were **many Lamanites on the east by the seashore, whither the Nephites had driven them.** (Alma 22: 28–29)

Notice the “many Lamanites on the east by the seashore” were there because “the Nephites had driven them.” All the others are “on the west.”

The city of Zarahemla and the many smaller settlements in the land of Zarahemla were situated on the western side of a mountainous wilderness divide (see our topic article, *The River Sidon: A Key to Unlocking Book of Mormon Lands*). The river Sidon, the only river named in the Book of Mormon record, flowed through the land of Zarahemla in a westerly direction. In our topic article we outline the conditions that support this direction of flow which mirrors the flow of rivers in Mediterranean climates. We suggest that indeed the Lamanites and the Nephites established more settlements on the western side of their homeland, but the motivation was to seek *windward* lands with more rain.

Heat of the Day

Mormon provides a tidbit of climatic information, which some cite to support a tropical setting for the Book of Mormon lands:

And it came to pass that when the night had come, Teancum and his servant stole forth and went out by night, and went into the camp of Amalickiah; and behold, sleep had overpowered them because of their **much fatigue, which was caused by the labors and heat of the day.** (Alma 51:33)

And there are other verses inferring warm temperature conditions:

And I bear record that the people of Nephi did seek diligently to restore the **Lamanites** unto the true faith in God. But our labors were vain; their hatred was fixed, and they were led by their evil nature that they became wild, and ferocious, and a blood-thirsty people, full of idolatry and filthiness; feeding upon beasts of prey; dwelling in tents, and **wandering about in the wilderness with a short skin girdle about their loins** and their heads shaven; and their skill was in the bow, and

in the cimeter, and the ax. And many of them did eat nothing save it was raw meat; and they were continually seeking to destroy us. (Enos 1:20)

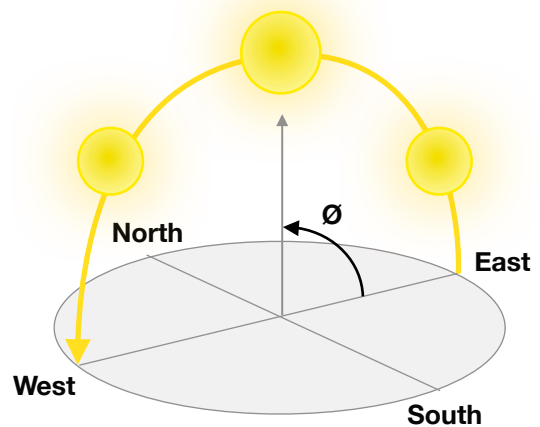
And this:

And when the armies of the Lamanites saw that the people of Nephi, or that Moroni, had prepared his people with breastplates and with arm-shields, yea, and also shields to defend their heads, and also they were dressed with thick clothing— Now **the [Lamanite] army of Zerahemnah** was not prepared with any such thing; they had only their swords and their cimeters, their bows and their arrows, their stones and their slings; and they **were naked, save it were a skin which was girded about their loins; yea, all were naked, save it were the Zoramites and the Amalekites.** (Alma 43:19–20)

When the Jesuit fathers first encountered the indigenous people of Baja California, they reported they were wearing few, if any, clothes, especially the men, in that delightfully warm and often dry climate. In contrast, people living in exceptionally hot temperature regions often wear more clothes for protection from the heat, not less.

The “heat of the day” is a common occurrence in most climates. The maximum solar insolation (energy) the earth receives each day at a given location occurs at the time of the sun’s zenith, its highest position in the sky (solar noon). The hottest temperatures, however, are generally recorded some two to three hours later (and sometimes even in the late afternoon) because of the delay in the buildup of heat at the earth’s surface. These maximum afternoon temperatures (the “heat of the day”) can happen in Baja California and many places and, we suggest, should not be referenced to uniquely support a tropical location for Book of Mormon lands.

In the Book of Mormon account we have not found any conclusive evidence that the location of the record keepers was in a tropical environment, even though jungle vegetation and animal life are often depicted in artist paintings of the Book of Mormon landscape or inferred in models of Book of

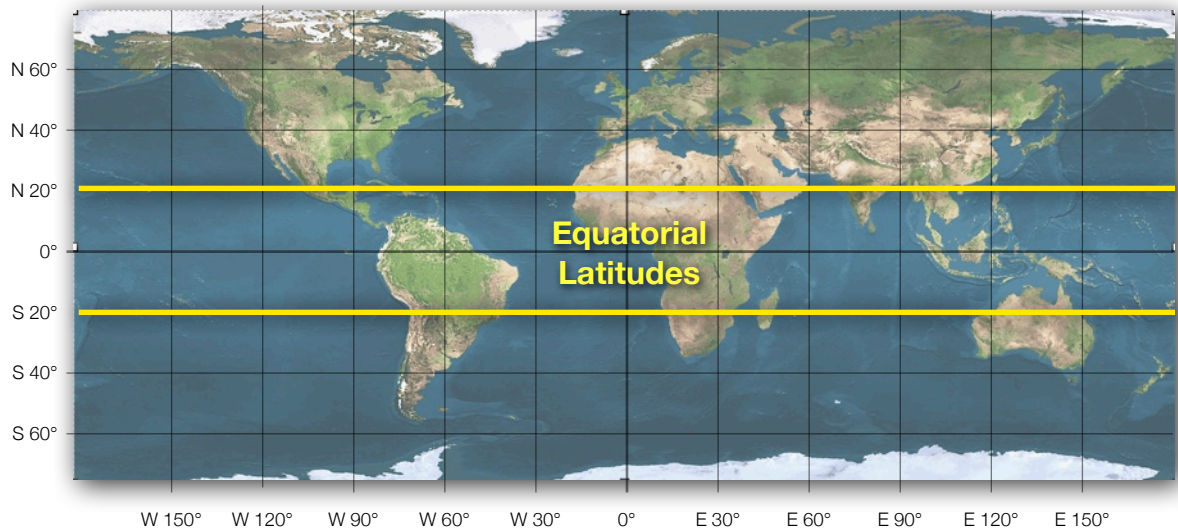


The sun’s zenith (solar noon) occurs when it reaches its highest position in the sky.

Mormon geography. Nor have we found conclusive hints of snow, ice or any cold conditions; hail formed in the cooler upper atmosphere is an obvious exception. We are quite aware that the lack of evidence is not proof of evidence, but, nonetheless, the absence of these tropical and colder climate features and the consistent mention of items and situations found in middle latitude locations can be a compelling argument to focus on the more moderate climate regions of the world, environments that are similar to the climate areas of the Biblical homelands of Lehi's family. This we are attempting to do.

Elevation of Villages, Towns and Cities

Most of the world's population live at or near sea level and not too far inland. Only a small percentage live at higher elevations and at greater distances from a seacoast. This is especially true for the middle and higher latitudes of all the continents. The exception would be the tropical lands of Central America, South America and the African continent. In these hotter equatorial regions nearly all cities and areas with substantial populations are at higher inland locations. Examples are, Guatemala City, Guatemala (4900 feet); Mexico City, Mexico (7940 feet); Quito, Ecuador (9350 feet); Bogota, Columbia (8610 feet); Sao Paulo, Brazil (2490 feet); and in Africa: Nairobi, Kenya (5450 feet); Lusaka, Zambia (4260 feet) and Lubumbasi, Democratic Republic of the Congo (3960 feet). Because of decreasing temperatures with increasing altitude, these exceptionally high inland elevations provide a means of escaping the otherwise unbearable heat that occurs near sea level locations in humid equatorial zones.



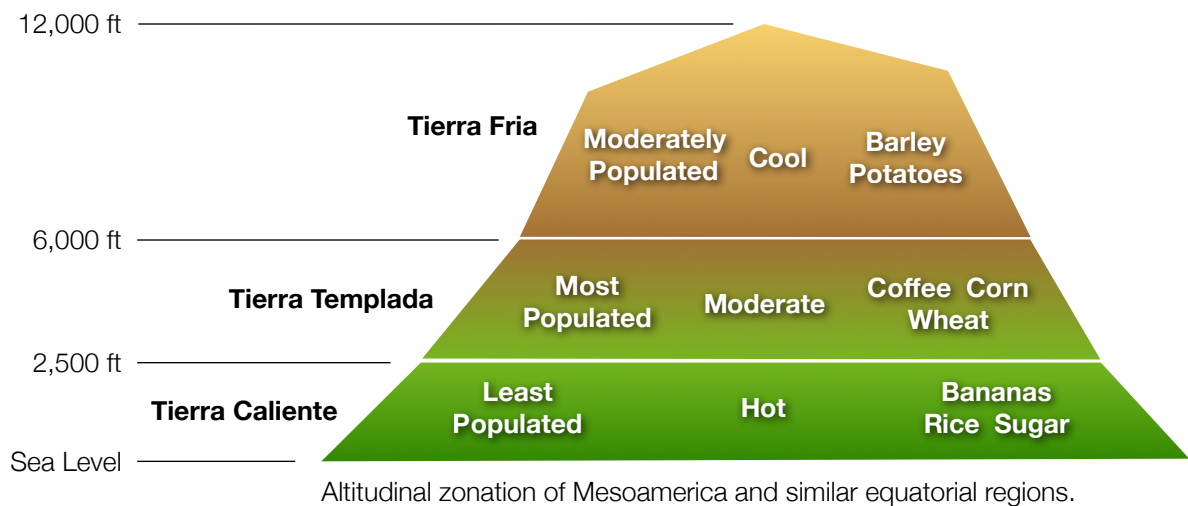
Environmental Lapse Rate

On the earth's surface, temperatures decrease as one goes up in elevation at an average rate of 3.6 degrees (Fahrenheit) per every 1,000 feet. This is known as the *Environmental Lapse Rate*—the rate of decrease of temperate with altitude in a stationary atmosphere at a given time and location (see *Wikipedia*, Lapse Rate). As a result, a high elevation inland location such as Guatemala City has a balmy average daily high temperature of 77.7 degrees and an average daily mean of 67.3. These average temperatures are some 18 degrees cooler—3.6 degrees (the environmental

lapse rate) times 4.9 (reflecting a 4900 foot elevation)—than a sea level location at this latitude. Thus it is to be expected that Guatemala City, with its exceptionally high inland location, has the greatest population in the country at over two million people. The delightful cooler climate of Guatemala City contributes to its being known as, “the land of Eternal Spring,” and an altitudinal zone with a more diversified agriculture than sea level regions of the country. But such a significant population at a high inland location is an exception within the world’s population pattern which overwhelmingly favors lower sea level elevations.

Altitudinal Zonation

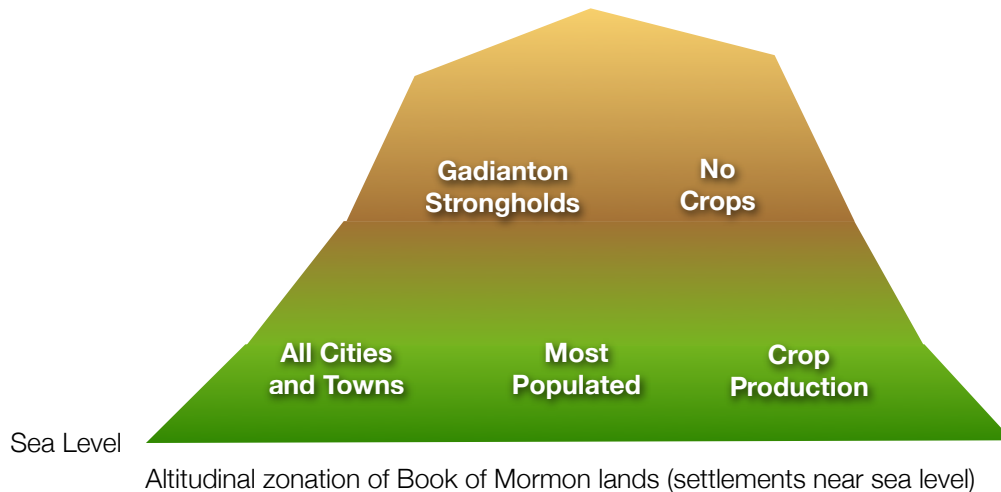
The principle of decreasing temperatures with increasing altitude, and in turn the changes in patterns of human activity and the habitats of plants and animals, is what geographers call “Altitudinal Zonation.” An understanding of this climatic and elevational phenomenon is crucial in understanding the settlement pattern of not only Mesoamerica but also other tropical and semitropical population locations such as equatorial Africa (see *Wikipedia*, Altitudinal Zonation).



An “altitudinal zonation” pattern of human activity is clearly evident in the Book of Mormon account, but, not surprisingly, the pattern follows the example of middle latitude settlements at near sea level locations, such as in the Biblical lands and in Baja California, and not the model of settlement in high mountainous valleys and high altitude locations we have noted for tropical areas such as Guatemala City or Lusaka, Zambia.

Mountainous terrain, of course, is mentioned by the Book of Mormon record keepers as part of the physical environment of their lands, but not as the locations for their cities, towns or villages (see Jacob 4:6; Alma 12:14; Hel. 10:9; 12:9, 17; 14:23; 3 Ne. 8:10; Morm. 8:24). We scoured the Book of Mormon record and found only one occurrence of settlement in a mountainous region at a higher elevation. This single incidence involves the notorious and sizable group designated by Mormon as “Gadianton’s robbers and murderers” (Hel. 6:18). At one time in their nefarious history this body of dissenters sought “strongholds” and “secret places” in the mountainous wilderness areas surrounding the city of Zarahemla.

And it came to pass that in the latter end of the eighteenth year those **armies of robbers had prepared for battle, and began to come down and to sally forth from the hills, and out of the mountains, and the wilderness, and their strongholds, and their secret places,** and began to take possession of the lands, both which were in the land south and which were in the land north, and began to take possession of all the lands which had been deserted by the Nephites, and the cities which had been left desolate. (3 Ne. 4:1)



These mountainous areas were temporary forced retreats, and the “robbers” and their many supporters could not survive at these higher locations (for the setting of the Gadianton robbers and murderers in mountain terrain, see Hel. 11:25, 28, 31; 3 Ne. 1:27; 2:17; 3:20; 4:1). Instead they resorted to plundering the Nephite crops at the lower elevations near sea level to support their survival within a mountainous environment at a greater height. The Nephites responded by destroying their own

crops to prevent the plundering which sustained their numerous adversaries, and moved their flocks and herds to a central location for protection (3 Ne. 3:1–26). This forced the Gadianton robbers and murderers, after seven disastrous years, to evacuate their higher mountainous stronghold locations where they faced starvation (3 Ne. 4:1–33, especially vs. 3–4). The environmental carrying capacity of these higher retreats could not sustain their significant numbers (Hel. 11:26–31); see also, “*The Pictographs and Petroglyphs of Baja California*,” in our topic article, *Searching for Book of Mormon Ruins: What should we expect to find?*).



Mountainous area northwest of San Ignacio (where we place the city of Zarahemla), in central Baja California.

In contrast to this one solitary episode of short-lived mountain dwelling, there are numerous accounts of Book of Mormon people living at or near sea level locations and preferring and choosing such locations for their cities. Here are examples:

Arrival of Lehi's Family

The account of Lehi's family arriving in their new land is revealing:

And it came to pass that after we had sailed for the space of many days *we did arrive at the promised land; and **we went forth upon the land**, and did pitch our tents; and we did call it the promised land.

And it came to pass that **we did begin to till the earth, and we began to plant seeds**; yea, we did put all our seeds into the earth, which we had brought from the land of Jerusalem.

And it came to pass that they did grow exceedingly; wherefore, we were blessed in abundance.

And it came to pass that **we did find upon the land of promise, as we journeyed in the wilderness**, that there were beasts in the forests of every kind, both the cow and the ox, and the ass and the horse, and the goat and the wild goat, and all

manner of wild animals, which were for the use of men. And we did find all manner of ore, both of gold, and of silver, and of copper. (1 Ne. 18:23–25)

After landing their ship Lehi's family immediately "tilled" the earth (preparing ground for planting) and planted "all" their seeds. There is no mention of the need to clear the land, travel inland or seek a higher elevation. The seeds grew "exceedingly" at this landing location, and they "were blessed in abundance." They found upon the land as they "journeyed in the wilderness," beasts, cows, oxen, asses, horses, goats and wild goats "and all manner of wild animals, which were for the use of men." The term "wilderness," by definition, implies areas of wild animals and not necessarily high mountainous regions. They found "all manner of ore, both of gold, and of silver, and of copper." All of this wonderful trove of resources was found, it appears, with no need to travel far from their place of landing. After the death of father Lehi, Nephi is warned by the Lord to depart from his adversarial brothers and "flee into the wilderness" (2 Ne. 5:5). Nephi, and all those who came with him, journeyed "in the wilderness for the space of many days" to a place they called "Nephi." Here they planted their seeds, and they "did reap again in abundance" and raised "flocks, and herds, and animals of every kind." From all we know in the record, the city of Nephi seems to be an inland location, but there is no mention of a high elevation siting of the city or any surrounding settlements. Mormon records that, "the land of Nephi did run in a straight course from the east sea to the west" (Alma 50:8), and it "was bordering even to the sea, on the east and on the west" (Alma 22:27). Certainly sea level locations were part of the land of Nephi. More telling of their elevation, they were able to raise their flocks and herds and "prosper exceedingly and multiply in the land" and their seeds produced "in abundance," the same as in their landing location (2 Ne.5:1–13).



Fresh water source on the seashore at Todos Santos in southern Baja California. Lehi's family landed near here.

Settlements near the Seashore

The Book of Mormon text places numerous cities and towns and other lands and settlements on or near a seashore—in what the text often refers to as the “borders by the seashore.” In contrast, no locational descriptions in the text place any settlements at higher mountainous elevations. Here are examples of settlements near seashore locations:

Land of Jershon (given to the people of Anti-Nephi-Lehi): And it came to pass that the chief judge sent a proclamation throughout all the land, desiring the voice of the people concerning the admitting their brethren, who were the **people of Anti-Nephi-Lehi**.

And it came to pass that the voice of the people came, saying: Behold, **we will give up the land of Jershon, which is on the east by the sea**, which joins the land Bountiful, which is on the south of the land Bountiful; and this land Jershon is the land which we will give unto our brethren for an inheritance. (Alma 27:21–22)

Zoramite land of Antionum: For it was the cause of great sorrow to Alma to know of iniquity among his people; therefore his heart was exceedingly sorrowful because of the separation of the Zoramites from the Nephites. Now the Zoramites had gathered themselves together in a **land which they called Antionum, which was east of the land of Zarahemla, which lay nearly bordering upon the seashore, which was south of the land of Jershon**, which also bordered upon the wilderness south, which wilderness was full of the Lamanites. (Alma 31:2–3)

Settlers from land of Zarahemla establish new defense cities: And it came to pass that when Moroni had driven all the Lamanites out of the east wilderness, which was north of the lands of their own possessions, he caused that the **inhabitants who were in the land of Zarahemla and in the land round about should go forth into the east wilderness, even to the borders by the seashore, and possess the land**.

And it came to pass that the **Nephites began the foundation of a city, and they called the name of the city Moroni; and it was by the east sea**; and it was on the south by the line of the possessions of the Lamanites.

And they also began in that same year to build many cities on the north, one in a particular manner which they called **Lehi, which was in the north by the borders of the seashore**.

And it came to pass that in the commencement of the twenty and fourth year of the reign of the judges, would also have been peace among the people of Nephi had it not been for a contention which took place among them concerning **the land of**

Lehi, and the land of Morianton, which joined upon the borders of Lehi; both of which were on the borders by the seashore. (Alma 9, 13, 15, 25)

Land of Moroni: Behold, it came to pass that while Moroni was thus breaking down the wars and contentions among his own people, and subjecting them to peace and civilization, and making regulations to prepare for war against the Lamanites, behold, the Lamanites had come into **the land of Moroni, which was in the borders by the seashore.** (Alma 51:22; see also, Alma 62:25, 32)

City of Moroni: And the **city of Moroni did sink into the depths of the sea,** and the inhabitants thereof were drowned. (3 Ne. 8:9, see also, 3 Ne. 9:4; 10:13)

City of Nephihah: But it came to pass that **Amalickiah would not suffer the Lamanites to go against the city of Nephihah to battle, but kept them down by the seashore,** leaving men in every city to maintain and defend it. (Alma 51:25)

Cities of Nephihah, Lehi, Morianton, Omner, Gid and Mulek: And thus he went on, taking possession of many cities, **the city of Nephihah, and the city of Lehi, and the city of Morianton, and the city of Omner, and the city of Gid, and the city of Mulek, all of which were on the east borders by the seashore.** (Alma 51:26)

People living by borders of the west sea: And now it came to pass that **Helaman did march at the head of his two thousand stripling soldiers, to the support of the people in the borders of the land on the south by the west sea.** (Alma 53:22)

City of Antiparah and the city beyond: And we were to **march near the city of Antiparah, as if we were going to the city beyond, in the borders by the seashore.** (Alma 56:31)

Land of Joshua: And we marched forth and came to the **land of Joshua, which was in the borders west by the seashore.** (Morm. 2:6)

City Teancum and city Desolation: And it came to pass that the armies of the Nephites were driven back again to the land of Desolation. And while they were yet weary, a fresh army of the Lamanites did come upon them; and they had a sore battle, insomuch that the **Lamanites did take possession of the city Desolation,** and did slay many of the Nephites, and did take many prisoners. And the remainder

did flee and join **the inhabitants of the city Teancum. Now the city Teancum lay in the borders by the seashore; and it was also near the city Desolation.**
(Morm. 4:2–3)

We should note that the southern Jaredite lands were congruent with the northern areas of Nephite settlement and would have shared the same sea west and sea east (see “*Arriving in the Promised Land*” in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*). Here are examples of Jaredite places near seashore locations:

Place called Ablom: And the Lord warned Omer in a dream that he should depart out of the land; wherefore Omer departed out of the land with his family, and traveled many days, and came over and passed by the hill of Shim, and came over by the place where the Nephites were destroyed, and from thence eastward, and came to a **place which was called Ablom, by the seashore**, and there he pitched his tent, and also his sons and his daughters, and all his household, save it were Jared and his family. (Ether 9:3)

City where the sea divides the land: And it came to pass that Lib also did that which was good in the sight of the Lord. And in the days of Lib the poisonous serpents were destroyed. Wherefore **they did go into the land southward**, to hunt food for the people of the land, for the land was covered with animals of the forest. And Lib also himself became a great hunter. **And they built a great city by the narrow neck of land, by the place where the sea divides the land.** (Ether 10:19–20; see “*A Place Where the Sea Divides the Land*” in our topic article, *The Narrow Neck of Land: A Touchstone of Book of Mormon Geography*)

Battles in borders upon the seashore: And it came to pass that he fought with Lib, in which Lib did smite upon his arm that he was wounded; nevertheless, **the army of Coriantumr did press forward upon Lib, that he fled to the borders upon the seashore.**

And it came to pass that **Coriantumr pursued him; and Lib gave battle unto him upon the seashore.**

And it came to pass that **Shiz did pursue Coriantumr eastward, even to the borders by the seashore**, and there he gave battle unto Shiz for the space of three days. (Ether 14:12–13, 26)

Not only were the settlements of the Book of Mormon people located at near sea level locations, but the seas that surrounded their lands are consistently named and placed by the record keepers to orient their readers—and not higher mountainous areas (see our topic article, *“From the Sea West to the Sea East”: The Orientation of the Book of Mormon Lands to the Sea*).

Lamanite settlements on the seashore

As noted above, when reporting the spatial pattern of the Nephites and Lamanites at approximately 99 to 77 B.C., Mormon describes the Lamanite locations as follows:

Now, **the more idle part of the Lamanites** lived in the wilderness, and dwelt in tents; and they **were spread through the wilderness on the west, in the land of Nephi; yea, and also on the west of the land of Zarahemla, in the borders by the seashore, and on the west in the land of Nephi, in the place of their fathers’ first inheritance, and thus bordering along by the seashore.** And also there were **many Lamanites on the east by the seashore, whither the Nephites had driven them.** (Alma 22: 28–29)

Note that in all locations the Lamanites were living “by the seashore.” A seashore environment would provide the Lamanites with a ready source of seafood of all types, including sea-based species forbidden by the “law of Moses.” This most likely would

Borders

Phrases such as “borders of the wilderness,” “borders by the seashore,” “borders of Zarahemla” or “borders of Manti” are common in the Book of Mormon text, especially when describing lands adjoining the seashore (Alma 22:28; 50:9, 25; Morm. 4:3). The word border is not found in the Book of Mormon record. The word always appears with an “s” as borders. Borders is not the plural of border, but has its own meaning. In older English, the term borders denotes a district, territory or frontier of some width between two land areas. These named tracts of land often indicate imprecise border regions and are sometimes called marches. The term borders can apply to a stretch of territory along a coastal area. This older definition of borders is helpful in understanding the geography of the Book of Mormon where phrases such as the “borders of Manti” do not refer to line borders, nor multiple line borders, but to land of some width. A border can be a line if a line is mentioned, such as when describing the defense “line which was between the land Bountiful and the land Desolation” (3 Ne. 3:23).

not have been a limitation to the “idle” Lamanites (Mormon’s term) as it would have been to any Nephites and Lamanites who observed the food avoidance statutes of this divine law. Enos, who hunted “beasts in the forests,” makes the observation that the Lamanites in his day were “feeding upon beasts of prey; dwelling in tents, and wandering about in the wilderness with a short skin girdle about their loins and their heads shaven; and their skill was in the bow, and in the cimeter, and the ax. And many of them did eat nothing save it was raw meat; and they were continually seeking to destroy us.” In contrast, “the people of Nephi did till the land, and raise all manner of grain, and of fruit, and flocks of herds, and flocks of all manner of cattle of every kind, and goats, and wild goats, and also many horses” (Enos 1:3, 20–21).

City of Zarahemla in Lowland Basin

The city of Zarahemla was located in the “center of the land” in a basin surrounded by wilderness areas on all four sides. The head of the river Sidon was within this basin near the city of Zarahemla, and the river flowed southwest to the sea west for some 30 miles. Even though the city was in the “center of the land,” its elevation was only about 400 feet above sea level (*see reference below*), certainly not an unexpected elevation for a river location this distance from its mouth. The elevations of Paris (*the Seine*), London (*the Thames*) and Cairo (*the Nile*) are lower than 400 feet, even though they are situated at a greater distance from the mouths of their respective rivers. All the Book of Mormon references supporting this physiographic setting for the city of Zarahemla, as well as our proposed location in Baja California, are set out at some length in our topic article, *The River Sidon: A Key to Unlocking Book of Mormon Lands*.

Clearly, the Book of Mormon people, both Lamanites and Nephites, preferred and settled in locations closer to a seashore or at near sea level elevations. These more hospitable lower elevations are reflective of a middle latitude setting such as Baja California or the Biblical lands and not a tropical location such as Mesoamerica which favors the cooler temperatures afforded by higher elevations. In other words, the high altitude settlement pattern within the *Altitudinal Zonation* of Mesoamerica is the complete reversal or the antithesis of the Book of Mormon and Biblical settlement pattern. *Altitudinal Zonation*, and the principle behind it, was a key reason for our not accepting existing models of Book of Mormon geography which seem to ignore the subject, and instead we sought locations such as Baja California which match this fundamental and vital scriptural fingerprint.



Upland wilderness areas in central Baja California

There are four distinct wilderness areas surrounding the city of Zarahemla with drainage systems that surface at a lagoon (head of the river Sidon) in the center of the land. The water in the lagoon flows into the Rio San Ignacio (river Sidon) then continues to flow southwest to the Pacific Ocean.

Animals on the Land and in the Sea and Air

Animals have habitats. And habitats reflect the climates and physical environments that animals favor and are capable of surviving within. And each of these habitats—or *biomes* as they are often called—has a spatial pattern on the earth's surface that is restricted in its extent. Biomes are climatically and geographically defined as a similar set of climatic conditions on planet earth, such as communities of plants, animals, and soil organisms, and are sometimes referred to as *ecosystems*. Examples of biomes are tropical rain forests, temperate grasslands, Mediterranean chaparral, desert xerophytic scrublands and diverse marine environments. The Book of Mormon record mentions a number of animals both in the Jaredite account and the record of father Lehi's descendants, and we suggest their overlapping habitat patterns or biomes converge to provide fingerprints or clues for confirming the Book of Mormon lands in Baja California. The Jaredite animals are found in the Book of Ether as abridged by Moroni.



Baja California has extensive Mediterranean chaparral biomes with associated animal and plant habitats.

Asses	(1 Ne. 18:25; Mosiah 5:14; 12:5; 13:24; 21:3; Ether 9:19)
Beasts	(1 Ne. 7:16; 16:31–32; 17:11; 18:25; and some 25 more references, including three Jaredite citations, Ether 6:4; 9:34; 10:26)
Cattle	(2 Ne. 17:25; Enos 1:21; Mosiah 13:18; 3 Ne. 3:22; 4:4; 6:1; Ether 9:18)
Cows	(1 Ne. 18:25; Ether 9:18)
Cumoms	(Ether 9:19)
Cureloms	(Ether 9:19)
Dogs	(Mosiah 12:2; Alma 16:10; Hel. 7:19; 3 Ne. 7:8; 14:6)

Dragons	(Mosiah 20:11; Alma 43:44)
Elephants	(Ether 9:19)
Fatlings	(Mosiah 11:3; Alma 1:29; Hel. 6:12)
Flocks	(2 Ne. 5:11; Enos 1:21; Mosiah 2:3; 5:14; 7:22; and some 75 more references, including six Jaredite citations, Ether 1:41; 2:1; 6:4; 9:31; 10:12; 14:19)
Fowls	(2 Ne. 2:15; Alma 34:10; 3 Ne. 13:26; Ether 2:2, 16; 6:4)
Game	(3 Ne. 4:2, 20; Ether 10:21)
Goats	(1 Ne. 18:25; Enos 1:21; Alma 14:29; Ether 9:18)
Herds	(2 Ne. 5:11; Enos 1:21; Mosiah 7:22; 21:16; 22:2, 6; and some 15 more references, including two Jaredite citations, Ether 6:4; 10:12)
Honey Bee	(1 Ne. 17:5; 18:6; Ether 2:3, “deseret”)
Horses	(1 Ne. 18:25; 2 Ne. 12:17; 15:28; Enos 1:21; Alma 18:9–10, 12; 20:6; 3 Ne. 3:22; 4:4; 6:1; 21:14, Ether 9:19)
Lions	(Mosiah 20:10; Alma 14:29; 3 Ne. 20:16; 21:12; Morm. 5:24)
Oxen	(1 Ne. 18:25; Mosiah 13:24)
Serpents	(3 Ne. 14:10; Morm. 8:24; 9:24; Ether 9:31, 33; 10:19)
Sheep	(Alma 5:39; 25:12; 3 Ne. 14:15; 20:16; 21:12; Ether 9:18)
Swine	(3 Ne. 14:6; Ether 9:18)
Vultures	(Mosiah 12:2; Alma 2:38)
Wild Goats	(1 Ne. 18:25; Enos 1:21)
Whales	(Ether 2:24; 6:10)
Wolves	(Alma 5:29; 3 Ne. 14:15)

Our intent is not to describe and delineate the environmental and spatial habitats of each of these animals—some include a vast extent of the earth’s surface and others have far more limited habitats and natural ranges. Our intent is to suggest that all of these animals, *today* or in the *past*, have populated a habitat territory of the peninsula of Baja California and the adjacent lands extending into what is now the state of California, an area where we place a northern extension of the Jaredite lands. Here are our observations after considering the animals mentioned in the Book of Mormon record:

- ❑ The Jaredites and the Nephites occupied basically the same area and environment, so any consideration of habitats would include the animals in both records. (See “*Arriving in the Promised Land*” in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*)
- ❑ Moroni in the Book of Ether mentions two unknown Jaredite animals by their untranslated names: *cumoms* and *cureloms*. We, like others, would want to know the animals represented by these names. These two unknown animals, like the Jaredite horses, asses and elephants, “were useful unto man.” This implies they were domesticated. Camels, mules and elk would be valuable additions to the collections and top our list of potential animals. Camels, mules and even elk have been domesticated, but some animals, such as the American bison, resist domestication. We note that in the English of the 1600s the names of some animals, especially those native to other lands, had not yet settled into precise usage within the common speech of the day.



The discovery of camel bones in Baja California may provide an insight into the variety of domesticated animals among the Jaredites.

Camels, more correctly, should have been called dromedaries, and elk were mistakenly named moose or wapiti. Camel bones have been found in various locations of Baja California and southern California, and especially the *La Brea* tar pits in the urban center of Los Angeles.

- ❑ Lehi’s family appears to have brought seeds but no animals to their new land. They found “upon the land,” however, “beasts in the forests of every kind, both the cow and the ox, and the ass and the horse, and the goat and the wild goat, and all manner of wild animals, which were for the use of men” 1 Ne. 18:25). We could only speculate whether or not these animals were remnants of the Jaredite tenure on the land.

- ❑ Some of the listed animals could be considered domesticated. We suggest, however, that since Lehi's family appears to have not brought any animals, all the domestic animals for a time were *feral* before their arrival. Feral wildlife are animals in a wild state, especially after escape from captivity or domestication.
- ❑ The word "beasts" in older English, as we have noted above, referred to four-legged animals, either domesticated or wild. The word "fowl" referred to any feathered vertebrate animal, including winged game.
- ❑ In the Book of Mormon text, the word "flocks" often appears alone, but the term "herds" is consistently only included in the general phrase, "flocks and herds." The term "flock" in older English meant an assemblage of one kind of any domesticated animal, feeding or traveling in company—from horses to swine to sheep to geese or even elephants. The term "herd" meant a collection of multiple and diverse flocks. Thus the sometimes-questioned Book of Mormon phrase, "flocks of herds," is appropriate when referring to the several flocks that comprise a combined entity called a herd. One, therefore, can have "flocks of herds," meaning multiple flocks of diverse animals within a herd (Enos 1:21). The term "fatling" refers to "a calf, lamb, or other young animal fattened for slaughter."
- ❑ The existence of horses in the new world before the coming of the Europeans is a controversial topic. Nonetheless, petrified horse hoofs have been discovered in Baja California and bones of horses in the *La Brea* tar pits.



Fossilized horse hoof found in Baja California.

- ❑ The word "ass" is the older English name for donkey. A mule is a hybrid animal that results from crossing a male ass with a mare (horse) or, more rarely, a female ass with a stallion. The mule combines the strength of a horse with the endurance and sure-footedness of an ass, and is used for certain tasks for which it is more suited than either, especially load-bearing and pulling. Mules traditionally have been the animal of choice for

traversing the more rugged wilderness areas of Baja California. Unfortunately, a mule is generally sterile. Unlike asses and horses, mules are not mentioned in the Book of Mormon account, unless it is represented by one of the untranslated animal names in the Jaredite record.

- ❑ Baja California in historic times has been a prime domesticated goat environment with untold families basing their livelihood on goats as a source of meat, milk, cheese, hair and skins. This traditional form of husbandry parallels the raising of goats in Biblical lands. Wild goats are also prevalent on the Baja peninsula.
- ❑ Sheep are not mentioned until after the Nephites merged with the people of Zarahemla (the Mulekites) in about 200 B.C., some 400 years after the arrival of Lehi's family. We do not have a helpful explanation for this observation. Possibly the Nephites were provided sheep by the people of Zarahemla (the Mulekites), who may have found Jaredite sheep (Ether 9:18) along with other animals when they arrived in the new world.
- ❑ Wolves are on the list. Wolves have a rather limited habitat or range that extends from western Canada down through the western United States and into northern Mexico and within Baja California. Wolves do not extend their range to Mesoamerica or the eastern United States. Their existence in Baja California provides an essential and confirming fingerprint or clue, but their absence in many areas of the North American continent, such as the New York region or Mesoamerica, present a challenge when attempting to match Book of Mormon geography.



Baja California is a habitat of wolves both today and in the past.

- ❑ Even dragons are mentioned in the Book of Mormon account. When fighting the Lamanites, the people of Limhi “fought for their lives, and for their wives, and for their children; therefore they exerted themselves and like **dragons did they fight**” (Mosiah 20:11). And when the Lamanites fought captain Moroni’s army, “**they**

did fight like dragons, and many of the Nephites were slain by their hands, yea, for they did smite in two many of their head-plates, and they did pierce many of their breastplates, and they did smite off many of their arms; and thus the Lamanites **did smite in their fierce anger**" (Alma 43:44). In older English, the phrase, "like a dragon," meant to act, "fiercely, violently." We suggest the word dragon may refer to crocodiles or alligators. In older English these aquatic reptiles were sometimes called "dragons." This was also true in Chinese languages. The habitats of crocodiles (especially *mangroves* along sea coasts) include Baja California, although in recent years these endangered animals appear to have been wiped out. Johan Jakob Baegert, a Jesuit missionary at San Luis Gonzaga in Baja California from 1750 to 1767, reported the following:

However, in all of [the water courses of Baja California] abide **alligators** of considerable size and since some of them are capable of devouring a full-grown man, it is necessary to be on guard while drawing water, bathing, or washing. I have seen several of these creatures. (Johan Jakob Baegert, *Highlights from Reports from the American Peninsula California*, Society of Jesus, 1771, translated from German by M. M. Brandenburg and Carl. L. Baumann, University of California Press, Berkeley, 1952, p. 11.

The Jesuit mission at San Luis Gonzaga was in the southern area of the peninsula where we place the land of Nephi. In the original German of Baegert's work, the word translated as alligators is *Krokodillen* or crocodiles. The physiological differences between the two is slight. These creatures are fierce fighters, matching the context of the word "dragons" in the Book of Mormon account (Mosiah 20:11; Alma 43:44; see also, Ps. 74:13; 91:13; 148:7; Isa. 13:22; 27:1; Ezek. 29:3; and Fig. 9, Facsimile No. 1, Book of Abraham).

- We note with some interest that vultures are the only bird mentioned in the Book of Mormon text. During our trips to Baja California we found "vultures of the air" everywhere, and they certainly appear to be the most ubiquitous of inland flying creatures. We propose the vulture as the "State Bird" for the peninsula.



Vultures are the most prevalent bird of prey in Baja California. They are mentioned in the Book of Mormon.

- ❑ In the Book of Mormon story, serpents (the older English word for snakes) at times were a hinderance to the movement of beasts and people (Ether 9:31–34). Baja California has been declared by herpetologists, “snake heaven,” because of the agreeable environment the landscape affords such reptiles. (See L. Lee Grismer, *Amphibians and Reptiles of Baja California, Including Its Pacific Islands and the Islands in the Sea of Cortés*, University of California Press, September 2002)

- ❑ Whales are mentioned in Moroni’s account of the Jaredite journeys “across the great sea which divideth the lands” to their promised home (Ether 2:13). The lagoons of the west coast of Baja California are the world-renown birthing and breeding grounds of the thousands of gray whales that inhabit the vast reaches of the Pacific Ocean. The gray whales in the months of February and March are readily spotted in significant numbers from both coasts of the peninsula, a captivating sight that draws hundreds of tourists (see “*Waters of Sidon*” in our topic article, *The River Sidon: A Key to Unlocking Book of Mormon Lands*).



Thousands of gray whales migrate annually to the protective lagoons on the west coast of Baja California.

- ❑ Pearls, a secretion of oysters, are noted in the Book of Mormon account. Indeed, the risen Lord and Savior Jesus Christ mentioned pearls in his sermon to the people of Bountiful after his resurrection, the same admonition set forth on a mountain in Galilee.

Give not that which is holy unto the dogs, **neither cast ye your pearls before swine**, lest they trample them under their feet, and turn again and rend you. (3 Ne. 14:6; see also, Matt. 7:6)

Mormon mentions the prideful challenge the possessing of pearls was to the people:

And now, in this two hundred and first year [A.D. 201] there **began to be among them those who were lifted up in pride, such as the wearing of**

costly apparel, and all manner of fine pearls, and of the fine things of the world. And from that time forth they did have their goods and their substance no more common among them. And they began to be divided into classes; and they began to build up churches unto themselves to get gain, and began to deny the true church of Christ. (4 Ne. 1:24–26)

With its abundant oyster beds, Baja California for nearly three centuries was the *natural pearl* center of the world. This role changed with the rise of the *cultured pearl* industry which developed elsewhere in the late nineteenth century. John Steinbeck's famous literary work, "*The Pearl*," is based upon pearl gathering in Baja California.

The capacity of all the animals mentioned in the Book of Mormon account to live and survive today within the habitats of Baja California, and, for some, over the intervening centuries, cannot be ignored. One such evidence comes from the skeletal remains of animals found in the *La Brea* tar pits in the urban heart of the city of Los Angeles, a location with corresponding environmental habitats to the adjoining peninsula of Baja California. The tar pits were often covered with water, and over many centuries, animals came to drink and were trapped in the tar and their bones preserved. Some claim the animals were trapped suddenly in a catastrophic event. Nearly all the land animals mentioned in the Book of Mormon record appear on the lists of animals whose bones are found in these tar pits. Goats, oxen, sheep and swine are exceptions. These four animals could be considered domesticated. Even elephants, lions, and horses are on the list. See these web pages: *Wikipedia*, La Brea Tar Pits; Fauna and Flora of Rancho La Brea (http://palaeo.gly.bris.ac.uk/Palaeofiles/Lagerstatten/rancho_la_brea/fanflo.html); and Museum: La Brea Tar Pits (http://www.triposo.com/poi/W__55880589).

The most important point we would make is that the habitats of every one of the animals (both terrestrial and maritime) mentioned in the Book of Mormon fall within the environmental limits of Baja California and comparable lands to the North. We leave it to others to make a similar claim for alternative areas proposed as the Book of Mormon lands.

Plants on the Land

Plants like animals have habitats. And these habitats reflect the climates, microclimates and landscape associations that plants favor and are capable of surviving within. These habitats or natural environments are influenced by annual patterns of temperature, precipitation and length of day and have a limited or restricted fingerprint or effect on the earth's surface. The Book of Mormon record mentions a number of plants (and items associated with plants) both in the Jaredite account and the record of father Lehi's descendants, and we suggest, as with animals, their overlapping habitat patterns or biomes converge to provide fingerprints for confirming the Book of Mormon lands in Baja California.



Crops grow in specific habitats based on climate (such as temperature, precipitation and length of day).

Barley	(Mosiah 7:22; 9:9; Alma 11:7,15)
Cloth	(<i>Cloth apparel</i> : Jacob 2:13; Alma 1:6, 27, 32; 4:6; 5:53; 31:28; 32:2; Hel. 13:28; 4 Ne. 1:24; Morm. 8:36–37; <i>Cloth material</i> : Mosiah 10:5; Alma 1:29; 43:19; Hel. 6:13; Ether 10:24)
Corn	(Mosiah 7:22; 9:9,14)
Fields	(<i>Agricultural</i> : (Mosiah 9:12, 14; 11:16; 12:11; 20:8; 23:6; 3:2; 4:2; 26:5; 33:5; 34:20, 24–25; Hel. 12:2; 3 Ne. 13: 28, 30; 24:11)
Figs	(3 Ne. 14:16)
Forests	(1 Ne. 18:25; Enos 1:3; Mosiah 8:21; 18:30; 20:8; 3 Ne. 20:16; 21:12; Ether 10:19)
Fruits	(1 Ne. 17:5–6; 18:6; Enos 1:21; Mosiah 9:9; 10:4; Hel. 11:13, 17; 3 Ne. 24:11; Ether 9:17, 35)
Gardens	(Hel. 7:10; 9:8, 11)
Grapes	(3 Ne. 14:16)

Grain	(1 Ne. 8:1; Enos 1:21; Mosiah 7:22; 10:4; 11:3; 12:6; 21:16, 18, 21; 23:1; 24:18; Alma 1:29; 3:2; 4:2; 11:7; 62:29; Hel. 6:12; 11:6, 13, 17; 3 Ne. 3:22; 4:6; 6:2; Ether 9:17; 10:12)
Lilies	(3 Ne. 13:28)
Linen	(Mosiah 10:5; Alma 1:29; 4:6; Hel. 6:13; Ether 9:17; 10:24)
Neas	(Mosiah 9:9)
Olives	(Jacob 5:17)
Seeds	(1 Ne. 8: 1; 16:11; 18:6, 24; 2 Ne. 5:11; Mosiah 9:9; Alma 32:28, 30–33, 36, 39; 33:1; Ether 1:41; 2:3)
Sheum	(Mosiah 9:9)
Silks	(Alma 1:29; 4:6; Ether 9:17; 10:24)
Thicket of Small Trees	(Mosiah 18:5; see also, Hel. 3:9; 3 Ne. 4:28; 14:17–19)
Thistles	(Mosiah 12:12; 3 Ne. 14:6)
Thorns	(3 Ne. 14:6)
Timbers	(Alma 50:2–3; 53:4; Hel. 3:5–7, 9–10; see also, 1 Ne. 18:1–2)
Vineyards	(Mosiah 11:15)
Wheat	(Mosiah 9:9; 3 Ne. 18:18)
Wine	(Mosiah 11:15; 22:7, 10; Alma 55:8–11, 13, 30–32; 3 Ne. 18:1–3, 8; 20:5–8; Ether 15: 22; Moro. 5:1–2; 6:6)

Our intent is not to describe and delineate the environmental and spatial habitats of each of these plants—some include a vast extent of the earth’s surface and others have far more limited habitats. Our intent is to suggest that all of these plants, *today* or in the *past*, have populated or existed within a habitat territory of the peninsula of Baja California and the adjacent lands extending into what is now the state of California, an area where we place a northern extension of the Jaredite lands. Here are our observations after considering the plants mentioned in the Book of Mormon record:

- Some of these plant terms—fruits, seeds, vineyards, and flocks—have metaphorical meanings, for example, “seeds” and “fruits” can refer to one’s descendants. These figurative references, understandably, are not included. Plant related words in the prophecies of Isaiah, Nephi and others are also not listed. Items or products related to plants—fields, gardens, vineyards, seeds, wine, linen, cloth, silks—are included.

- ❑ The Jaredites and the Nephites occupied basically the same general geographical area and environment, thus any consideration of habitats could include plants listed for either group. (See “*Arriving in the Promised Land*” in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*) In the Jaredite record, as abridged by Moroni in the Book of Ether, only forests and a few items related to plants are mentioned: cloth, silks, linen, fruits and wine, but other agricultural activities are implied.

- ❑ The Jaredites carried “seeds of every kind” to their promised land (Ether 1:41, 2:3). Lehi’s family also brought “seeds of every kind” to their new homeland (1 Ne. 16:11; 18:6, 24). It would be difficult to know which Jaredite plants, especially the domesticated ones, survived to Nephite times. Nonetheless, all the seeds identified with plants in the Book of Mormon text were once domesticated within the Nephite tenure on the land: “seeds of corn, and of wheat, and of barley, and with neas, and with sheum, and with seeds of all manner of fruits” (Mosiah 9:9). It is not inconceivable that Lehi’s family gathered additional seeds from the Bountiful area (Oman) and other “fertile parts” of the Arabian peninsula to add to the seeds they brought from the land of Jerusalem (see section, “*Jerusalem to Bountiful: Planting Crops and Gathering Seeds,*” above).

- ❑ As we have noted, in older English the word “fruits” referred to not only fruit as we use the word today but also included vegetables and nuts and sometimes one’s posterity and even the products of one’s labors. Some fruits are mentioned in the Book of Mormon account by name, for example, figs and grapes (3 Ne. 14:16).



Figs are grown in specific locations like Baja California.

- ❑ Barley is one of the most intriguing of the listed plants. Measures of barley were part of the Nephite exchange system (Alma 11:1–20). The value of a day’s work was compared to quantities of barley, gold and silver and “every kind of grain.” This was

also the case among the Israelites in the Old World (Lev. 27:16), although the Nephites “did not reckon [in older English, to count out (money) for payment] after the manner of the Jews who were at Jerusalem; neither did they measure [in older English, to make proportional to or commensurate with something else] after the



Barley was essential part of the Book of Mormon money system for trade and commerce.

manner of the Jews; but they altered their reckoning and their measure, according to the minds and the circumstances of the people, in every generation, until the reign of the judges, they having been established by king Mosiah” (Alma 11:4). For our purposes, all of this implies that barley was an essential and ubiquitous grain crop, and a crop that would have been grown where the people lived and traded for gold, silver and

other commodities and paid wages. Barley, a winter crop, grows well throughout Baja California and in many other middle latitude climates, but only at the very highest elevations in Mesoamerica, well above the major populated areas, if at all.

- ❑ In older English, the term “corn” referred to the “seeds” of cereal grains such as wheat, rye or barley, or even “seeds” of fruits such as grapes or apples. Because of its imprecise meaning, “seven different words in Hebrew and three in Greek have been translated as corn” in the King James version of the Bible (see “Corn” in the *LDS Bible Dictionary*). Today the term “corn” generally refers to “maize,” a prominent grain native to the western hemisphere.
- ❑ Olives, figs and grapes (and associated wine and vineyards) are most representative of Mediterranean climate lands, but can have growing regimes somewhat beyond. The term “vineyard” can also apply to olive growing areas (see Jacob, chapter 5).
- ❑ The risen Lord asked at the temple in the land of Bountiful: “Do men gather grapes of thorns, or figs of thistles?” (3 Ne. 14:16). And He also declared: “Consider the lilies of the field how they grow; they toil not, neither do they spin” (3 Ne. 13:28). We anticipate that the Lord would not mention grapes, thorns, figs, thistles or lilies if the

people had not been acquainted with these plants, or if they were not part of their environment. Jacob, the brother of Nephi, quoted at length the allegory of the Lord to Zenos, comparing a tame and wild olive tree to the house of Israel (Jacob 4:15 to 6:4). Jacob, who was born in the wilderness after his family left the land of Jerusalem, seems to take for granted that his listeners, his own people, had a working knowledge of olive tree horticulture in their new homeland at that time (about 544 B.C.).

- ❑ Linen is a textile made from the fibers of the flax plant. Flax is native to the region stretching from the eastern Mediterranean to India. Seeds of flax could have been gathered by Lehi's family when they left the land of Jerusalem, and we suggest these flax seeds would have grown well in the similar climate of Baja California.



Linen textiles are made from the fibers of the flax plant.

- ❑ The Book of Mormon text mentions “silks” (note the plural). The producing of “silks” could refer to the lustrous fiber created by silkworms and made into thread and fabric, as historically developed in China. This would require mulberry trees, or the equivalent, for silkworms to feed upon. The word “silks,” we suggest, could simply reflect its older English usage in the plural form, “denoting the substance of which a garment, etc., is composed,” such as high quality cloth woven from cotton or wool or similar fibers.
- ❑ When Lehi's family landed and journeyed into the wilderness they found many animals “in the forests” (1 Ne. 18:25). Enos, living in the land of Nephi, hunted “beasts in the forests” (Enos 1:3; see also, Mosiah 8:21). And the “forest of Mormon” was near the “place of Mormon” (Mosiah 18:30). King Limhi's people “laid wait in the fields and in the forests” to fall upon their foes (Mosiah 20:8). These few references are the only mentions of “forests” in the Nephite record. Moroni notes in the Jaredite account that, “in the days of Lib,” at locations in the “land southward” where they hunted, the “land was covered with animals of the forest” (Ether 10:19).

These few references give the impression that forested areas were not numerous nor contiguous in the Book of Mormon lands but contained animals for hunting. The word “timber” appears in the text, but there is no mention of the types of trees in these forested areas. The word “timber” in older English did not refer to raw trees but wood that had been cut and prepared for building, comparable to our use of the word lumber today.

- ❑ It appears from the record that the existing stands of trees in the land northward had been almost completely deforested by the previous inhabitants—the Jaredites—and any future supply of timber depended on new trees that, “should spring up upon the face of the land” (Hel. 3:9). Protecting “whatsoever tree should spring up ... that it should grow up,” implies that the landscape of these northern lands was not the many thousands of fast-growing trees of a tropical rain forest region, but the



Tall cacti (such as the Cordon) in Baja California contain hardwood cores that can be used for building.

more widely spaced and slower-growing trees of a more temperate zone such as the Mediterranean and semiarid climate areas of Baja California where every tree counts, and even slow-growing varieties of tall cacti (40 to 60 feet) have hardwood centers that are used as construction timbers. (See “Cement” in our topic article, *Searching for Book of Mormon Ruins: What should we expect to find?*)

- ❑ We note that before the final battle at Cumorah, Mormon’s “people, with their wives and their children, did now behold the armies of the Lamanites marching towards them; and with that awful fear of death which fills the breasts of all the wicked, did they await to receive them.” And “every soul was filled with terror because of the greatness of their numbers” (Morm. 6:7–8). This ability to see an enemy “marching” from some distance and for some time implies an open landscape and not a nearly impenetrable tropical environment. In a similar vein, one would not expect Mormon to reference the singular existence of “a thicket of small trees” in his record of Alma’s baptizing in the “waters of Mormon,” in the land of Nephi, if the landscape

and environment consisted of ubiquitous and dense tropical foliage (Mosiah 18:5). On the other hand, a single “thicket of small trees,” providing a visible diversion and an acceptable hiding place in an otherwise open landscape, is typical of a Mediterranean-type climate. Within this climate regime there is a considerable diversity of habitats and species. Vegetation types can range from limited forest areas to open woodlands, oak savannas, shrub lands and grasslands, yielding complex “mosaic habitats” which are known by the Spanish term, *chaparral*.

- ❑ Gardens and fields are mentioned in the text. The Nephite fields were tended for crops as well as for flocks (see Alma 34:24–25). The record indicates that the Jaredites made “all manner of tools with which they did work their beasts” and made “all manner of tools to till the earth, both to plow and to sow, to reap and to hoe, and also to thrash” (Ether 10:25–26). Thrash is an older



Gardens and agricultural fields are mentioned in the Book of Mormon record.

English word for thresh, as in threshing grain, the separating of grain from a plant by flailing. These are the traditional procedures of agriculture in the middle latitudes and not the harmful “shifting cultivation” practices so often required for the leached soils of tropical lands (see *Wikipedia*, Shifting cultivation).

- ❑ Zeniff, in an account of his people in the land of Nephi, mentions two seeds by their untranslated names—*neas* and *sheum* (Mosiah 9:9).
- ❑ Johan Jakob Baegert, a Jesuit missionary at San Luis Gonzaga in Baja California from 1750 to 1767, reported the following:

But wherever there is a piece of land provided with moisture, either by the proximity of a swamp or because it is possible to irrigate, the picture is entirely different. Anything at all can be planted or sown and everything will do well. The soil bears hundredfold and out-produces the most fertile regions of Europe. There is wheat, corn, rice, melons (watermelons and also other varieties) weighing twenty pounds, pumpkins, cotton, lemons, oranges, bananas, pomegranates, delicious honey-sweet grapes, and olives. The fig trees bear fruit twice within one summer. Two or even three crops can be

harvested from the same cornfield in one year; the corn grows eight feet high and often bears twelve ears to a hill. I have seen grapevines in [Baja] California which bore a medium-sized basketful of good grapes in the second year and had grown as thick as an arm in the third and fourth year; the new shoots attained a length of forty-five feet and more in one year. (Johan Jakob Baegert, *Highlights from Reports from the American Peninsula California*, Society of Jesus, 1771, translated from German by M. M. Brandenburg and Carl. L. Baumann, University of California Press, Berkeley, 1952, p. 27.

The Jesuit mission at San Luis Gonzaga was in the southern area of the peninsula where we place the land of Nephi. With one exception, every grain, fruit and vegetable named in the Book of Mormon record is mentioned in Baegert's account. Only barley is not listed, but where wheat can be grown, barley can also be produced.

- ❑ Isaiah and the Nephite prophets forewarned that their lands of inheritance would be “cursed” by the Lord because of transgression, after the demise of their civilizations. The nature of this cursing would alter the growing ability of their lands, especially the prophesied decrease in rainfall. After this “cursing” would come a “blessing” upon the land, the same blessing that was pronounced upon the Biblical lands. Today, hundreds of new agribusinesses are springing up in Baja California. These enterprises are impressively modern and based on sophisticated agricultural techniques such as drip irrigation practiced in Israel (see “*The Lord will Comfort the Waste Places*” in our topic article, *Prophesied Cursing and Blessing of Book of Mormon Lands*).

The most important point we make, however, is that the habitats of every one of these plants or plant associations fall within the environmental and climatic purview of the peninsular of Baja California and adjacent areas to the North. And indeed, the best evidence for this situation comes from the ability to “grow exceedingly” all the mentioned items on the peninsula today—from figs and grapes to olives, wheat, barley and more—and even thistles and thorns.

We leave it to others to make similar claims for alternative areas proposed as the Book of Mormon lands.

Minerals in the Earth

Minerals unlike animals do not move over the land, and unlike plants and animals do not disappear from the landscape or have to regenerate themselves. Minerals are where they are until they are extracted by man or moved by natural ground disturbances or transferred as part of one's "cultural baggage," such as gemstones or metal tools. The minerals mentioned in the Book of Mormon text are helpful fingerprints for confirming Baja California as the homeland of the record keepers. But unlike plants and animals where we identify habitats, we need to actually find these minerals in Baja California today and in precisely the relative locations described in the Book of Mormon text, for example, where we place the land of Zarahemla, and not just within some vast, nebulous area of a continent.

Gold



Silver



Copper



Brass	(2 Ne. 5:15; Jarom 1:8; Mosiah 8:10; 11:3, 8, 10; Ether 10:23)
Copper	(1 Ne. 18:25; 2 Ne. 5:15; Jarom 1:8; Mosiah 8:10; 11:3, 8, 10; Ether 10:23)
Flint	(2 Ne. 5:21)
Gold	(1 Ne. 18:25; 2 Ne. 5:15; Jacob 1:16; 2:12; Jarom 1:8; Mosiah 2:12; 4:19; 8:9; 11:3, 8–9, 11; 19:15; 22:12; 28:11; Alma 1:29; 4:6; 11:3–5, 7–10, 19; 15:16; 17:14; 31:24, 28; Hel. 6:9, 11, 31; 7:21; 12:2; 13:28; 3 Ne. 6:2; 27:32; 4 Ne. 1:46; Ether 9:17; 10:7, 12, 23)
Iron	(2 Ne. 5:15; Jarom 1:8; Mosiah 11:3, 8; Ether 10:23)
Precious Ores	(2 Ne. 5:15; Jacob 2:12; Hel. 6:11)
Precious Stones	(Alma 17:14)
Silver	(1 Ne. 18:25; 2 Ne. 5:15; Jacob 1:16; 2:12; Jarom 1:8; Mosiah 2:12; 4:19; 11:3, 8–9; 19:15; 22:12; Alma 1:29; 4:6; 11:3–4, 6–7, 11–12, 22; 15:16; 17:14; 31:24; Hel. 6:9, 11, 31; 7:21; 12:2; 13:28; 3 Ne. 6:2; 27:32; 4 Ne. 1:46; Ether 9:17; 10:12, 23)

Steel (2 Ne. 5:15; Jarom 1:8; Ether 7:9)
Ziff (Mosiah 11: 3, 8)

Our intent is not to describe and delineate the environmental and spatial locations of each of these minerals—some are found in sizable deposits within the earth's surface and others have more limited reserves. Our intent is to confirm that all of these minerals exist at or near the expected locations within the territory of the peninsula of Baja California and the adjacent lands extending into what is now the state of California, an area where we place a northern extension of the Jaredite lands. Here are our observations after considering the minerals mentioned in the Book of Mormon record:

❑ From our reading of the Book of Mormon text, we suggest all the minerals appear to have been an integral part of the culture of the people and not just inventoried items found within their environment. Brass and steel, alloys produced from the minerals, are included on the list. Understandably, we do not list mineral-related words found in the prophecies of Isaiah, Nephi and others.

❑ The Jaredites and the Nephites occupied basically the same geographical area and environment, thus any general consideration of mineral types and locations could include either group. (See *“Arriving in the*

Promised Land” in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*) In the Jaredite record, as abridged by Moroni in the Book of Ether, gold, silver copper, brass, iron and steel are mentioned, along with the making and using of metal implements.

❑ Gold, silver and copper and all manner of ores were found by Lehi's family immediately upon arriving in their new homeland:



Ancient metal sword displayed in the La Paz Museum.

And it came to pass that **we did find upon the land of promise**, as we journeyed in the wilderness, ... **all manner of ore, both of gold, and of silver, and of copper.** (1 Ne. 18:25)

Note the word “both” in the above reference. It is followed by a series of three items, gold , silver and copper (also see, Alma 34:21). Normally in English the word “both” should refer to only two objects. In older English, however, the term “both” could extend to more than two items in a series. This grammatical anomaly is found in the writings of Chaucer, Shakespeare and Bunyan. Gold, silver and copper appear to be the “big three” in value and importance to the cultures of the Book of Mormon people and often appear together within the same verse (1 Ne. 18:25; 2 Ne. 5:15; Jarom 1:8; Mosiah 11:3, 8; Ether 10:23). Gold and silver had obvious intrinsic value in the Nephite society, especially as precious metals that played a vital role in their monetary exchange system (Alma 11:1–20), as well as adorning their sacred structures and their persons (see, for example, Mosiah 11:8–9, 11; Alma 4:6; 17:14; 31:28; Ether 10:7, 12, 23). All of this led to pride. In the 60 references that mention gold, in almost every case silver is mentioned in a pairing with gold. Gold occurs regularly in native form in the natural environment. The others—copper, silver and iron—occur primarily as minerals, though copper is occasionally found in its native state in commercially significant quantities. A smelting process reduces metals out of these ores.

- ❑ Gold is mentioned at the place of landing (1 Ne. 18:25), in the land of Nephi (2 Ne. 5:15), in the land of Zarahemla (Alma 1:29), in the land northward (Hel. 6:9, 11) and in the lands of the Jaredites (Ether 10:23). Understandably, any metals mentioned in the Book of Mormon record, especially gold and silver, could have been moved from one land to another either as mined ores or finished products.



Gold

- ❑ Brass is a combination of copper and an alloy, generally zinc. Zinc is not mentioned in the Book of Mormon record, but an unknown mineral, with an untranslated name, *Ziff*, is recorded. Some claim *Ziff* means “metallic brightness” in Hebrew, and conceivably could be the hoped for, and possibly necessary, zinc. The word bronze is not mentioned, but was

considered in older English to be a synonym for brass, but its usage was mainly confined to describing alloys of copper and tin rather than copper and zinc.

- ❑ Iron and steel are mentioned in both the Nephite and Jaredite records. Steel consists of iron and one or more alloys. Possibly ziff could be such an alloy. Chemically steel is a nearly pure iron, the proportion of other substances varying from less than 1 to 3 per cent. In the past, steel was defined as containing more carbon than wrought iron, and less than cast iron; but since about 1860 the name has been extended to certain products containing very little carbon. We do not know the alloy metals used by the Nephites and Jaredites to make steel, nor the metallurgical processes they employed. We can only speculate. Steel was used for the making of swords and even bows for hunting. When Nephi obtained Laban's sword, he "drew it forth from the sheath thereof; and the hilt thereof was of pure gold, and the workmanship thereof was exceedingly fine, and [he] saw that the blade thereof was of the most precious steel" (1 Ne. 4:9). The hunting bow Nephi broke, "was made of fine steel" (1 Ne. 16:18).



Raw iron ore, notable by the orange rust on the surface.

- ❑ The Jaredites also produced steel. Moroni records that Shule "came to the hill Ephraim, and he did molten out of the hill, and made swords out of steel for those whom he had drawn away with him; and after he had armed them with swords he returned to the city Nehor, and gave battle unto his brother Corihor, by which means he obtained the kingdom and restored it unto his father Kib" (Ether 7:9; see "*The Hill Ephraim*" in our topic article, *Jared, his Brother and their Friends: A Geographical Analysis of the Book of Ether*). The Jaredite swords found by Zeniff's people, when searching for the land of Zarahemla, had hilts that had "perished, and the blades thereof were cankered with rust" (Mosiah 8:11; see also, Ether 7:9). Zeniff's party also reported the Jaredite breastplates they found were large and made "of brass and of copper, and [were] perfectly sound." They also returned with the "twenty-four plates which [were] filled with engravings, and [made] of pure gold" (Mosiah 8:9–10).

- ❑ Tools and machinery are often created out of metals. Nephi made “tools” from the ore he “did molten out of the rock” to construct his ship “after the manner” which the Lord had “shown unto him” (1 Ne. 17:9–10, 16). He also taught his “people to build buildings, and to work in all manner of wood, and of iron, and of copper, and of brass, and of steel, and of gold, and of silver, and of precious ores, which were in great abundance” (2 Ne. 5:15).

Jarom, the son of Enos, recorded that his people “became exceedingly rich in gold, and in silver, and in precious things, and in fine workmanship of wood, in buildings, and in machinery, and also in iron and copper, and brass and steel, making all manner of tools of every kind to till the ground” (Jarom 1:8).



Metal implements displayed in the La Paz Museum.

Machinery in older English referred to contrivances or structures of any kind created skillfully and inventively to serve a particular purpose, including a vehicle or conveyance (usually wheeled), especially one drawn by a horse or horses, or other draft animals. The Jaredites “were exceedingly industrious, and they did buy and sell and traffic one with another, that they might get gain. And they did work in all manner of ore, and they did make gold, and silver, and iron, and brass, and all manner of metals; and they did dig it out of the earth; wherefore, they did cast up mighty heaps of earth to get ore, of gold, and of silver, and of iron, and of copper. And they did work all manner of fine work” (Ether 10:7, 12, 22–23). The Jaredites “did make all manner of tools to till the earth, ... and they did make all manner of tools with which they did work their beasts. And they did make all manner of weapons of war. And they did work all manner of work of exceedingly curious workmanship” (Ether 10:25–27). In older English, the term “curious” meant “skilled.”

- ❑ Precious ores are mentioned in the Book of Mormon record, but their nature and purpose is not stated (2 Ne. 5:15; Jacob 2:12; Hel. 6:11). Precious in older English meant, “of great value; expensive, costly.” The term “ore” in older English could mean copper and its derivatives such as brass and bronze.

- ❑ Precious stones are also mentioned (Alma 17:14). A precious stone is “a stone of a kind prized for its beauty, hardness, or rarity and used in ornamentation or jewelry; a gemstone, a jewel.” Although not mentioned in the Book of Mormon record, diamonds, emeralds, rubies and sapphires are examples of gemstones.
- ❑ Flint may have been the means for igniting fires or for making simple tools.

We suggest Nephi, the son of Lehi, had metallurgical tutoring as a young man before his family set off from the land of Jerusalem. On the shores of Bountiful, the Lord spake unto Nephi, saying:

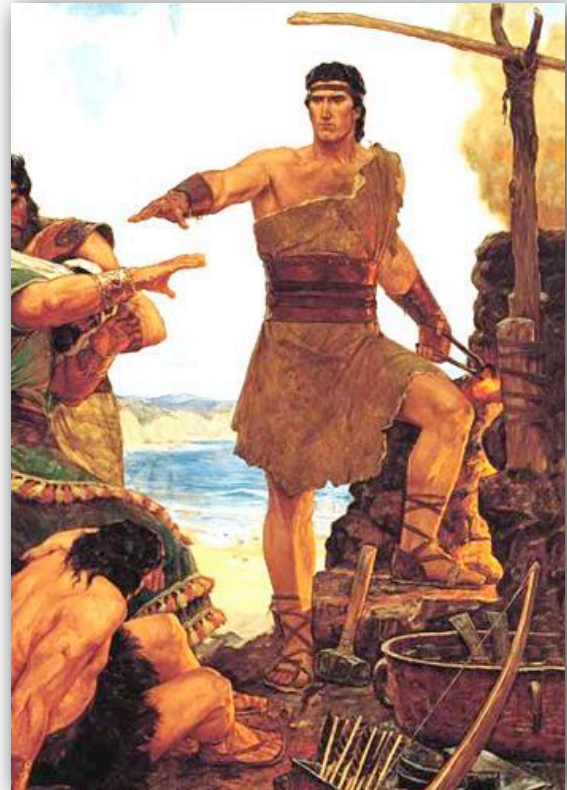
Thou shalt construct a ship, after the manner which I shall show thee, that I may carry thy people across these waters. And I said: Lord, **whither shall I go that I may find ore to molten, that I may make tools to construct the ship after the manner which thou hast shown unto me?**

And it came to pass that the Lord told me whither I should go to find ore, that I might make tools.

And it came to pass that **I, Nephi, did make a bellows** wherewith to blow the fire, of the skins of beasts; and after I had made a bellows, that I might have wherewith to blow the fire, I did smite two stones together that I might make fire. (1 Ne. 17:7–11)

And it came to pass that **I did make tools of the ore** which I did molten out of the rock. And when my brethren saw that I was about to build a ship, they began to murmur against me, saying: Our brother is a fool, for he thinketh that he can build a ship; yea, and he also thinketh that he can cross these great waters. (1 Ne. 17:16–17)

Nephi appears to be comfortable working with the ore the Lord directs him to find in Bountiful. Nephi’s concern was building the ship not making the tools. The Lord’s help was required to construct the ship not working the ores he found upon the land.



Nephi appears to have possessed skills in metallurgy. Painting by Arnold Friberg.

Moreover, Nephi's brothers do not question his ability to make tools, only his ability to build a ship and sail across the "great waters."

And as noted above, Lehi's family upon arriving in their new homeland identified and named gold, silver and copper deposits, an identification that would be difficult, if not impossible, without some training. When they relocated to the land of Nephi, Nephi immediately taught the people how to work with wood and all manner of metals:

And I [Nephi] did teach my people to build buildings, and to work in all manner of wood, and of iron, and of copper, and of brass, and of steel, and of gold, and of silver, and of precious ores, which were in great abundance. (2 Ne. 5:15)

It stands to reason that Nephi, and possibly others of the family, possessed metallurgical skills.

To readily and immediately locate gold, silver and copper on the land it would be necessary to find "outcrops" on the surface and not deposits buried at some depth. Thus at our proposed landing site of Lehi's family in the southern end of Baja California we should expect to find copper, gold and silver accumulations as outcrops on the



A typical copper-gold outcropping found in granite.

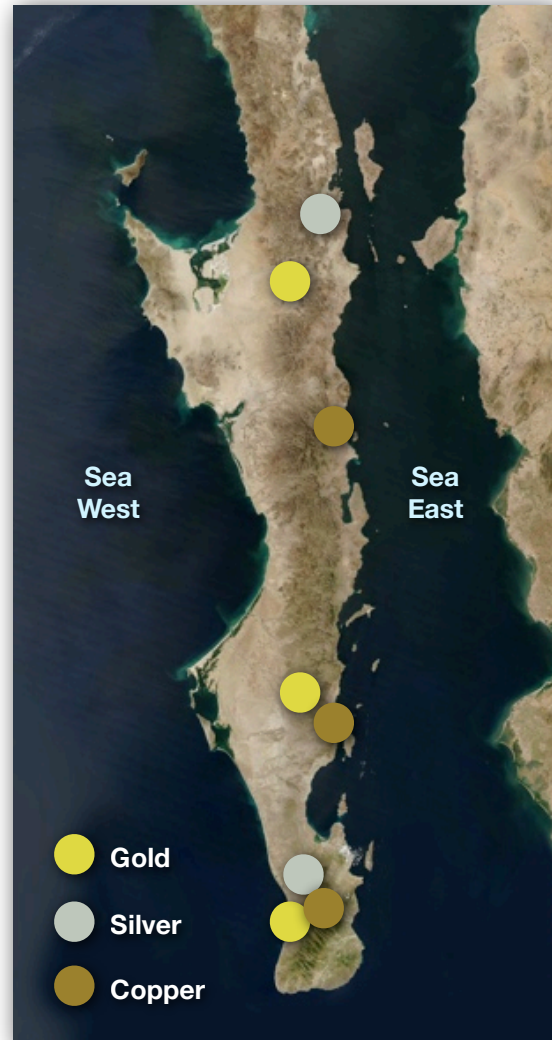
land today, or, at least historical accounts of such deposits. And indeed we do. Within a few miles of Todos Santos, the location on the western side of the southern end of the peninsula where we suggest Lehi's family landed, *Vista Gold Corporation* of Colorado has claims to extract gold, silver and copper with open-pit mining, although they recently have run into roadblocks from environmental groups

opposing their operations. The gold reserves alone amount to 1.3 million ounces, worth nearly a billion dollars, and much of the gold is deposited in seams at the surface level. And only 30 miles inland the copper, silver and gold mines near San Antonio were

opened in 1784, and between 1861 and 1864 some 20 companies were incorporated to work these mines, specifically the mines at *El Triunfo* and *San Antonio Real* between La Paz and Todos Santos. Full scale production ended in the 1950s.

Moreover, all the listed minerals are found in numerous deposits on the peninsula of Baja California today and have been known since the time of the early Spanish conquest and mined at commercial levels. In the center of the peninsula where we place the lands of Zarahemla and Bountiful, significant commercial mining of gold, silver and copper has taken place at the historic *San Juan* mine and at a mining complex called *El Arco*. The San Juan mine, considered to have been one of the largest gold and silver mines in Baja California, is located about 15 miles from Bahia de los Angeles where we place the land of Bountiful in the narrow neck of land and 110 miles from the city of Zarahemla. El Arco is between the lands of Bountiful and Zarahemla some 65 miles from the city of Zarahemla. Millions of dollars worth of gold, silver and copper have been taken from these mines.

In 1884 the French company *El Boleo* founded the copper mining town of Santa Rosalia on the eastern coast of Baja California, some 45 miles from the city of Zarahemla. El Boleo exported copper and other ores from the mines until they closed in 1954. The company built a company town for their workers and even installed a metallic church building (The Santa Barbara Parish) which is claimed to have been designed by Gustave Eiffel of Eiffel Tower fame. *Baja Mining*, a Canadian firm, has reopened the Boleo mine with a significant financial commitment and an extensive infrastructure. This is a copper-cobalt-zinc-manganese mining project. The company



Locations of significant current and historic mining operations in Baja California.

estimates the mining area contains 534 million tons of ore. The nearby island of San Marcos is the site of a major gypsum operation. The gypsum is shipped all over the world for the manufacture of wallboard. In the northern lands small-scale commercial mining has been carried out in several locations from time to time over the last three centuries. Arthur North, an indomitable adventurer who traveled by foot and burro the length of Baja California from December 1905 to September 1906, mentions the locations of these historic mines of gold, copper, iron ore, onyx (at *El Marmol*) and various jewels and minerals, with fabled names such as "Julius Caesar," "Evangelina" and "San Julio." (Arthur Walbridge North, *The Mother of California*, Paul Elder and Company, San Francisco and New York, 1908)

The mountain ranges of Baja California are part of the North American Cordillera, the high mountainous zone that extends from Alaska on the North, south through western Canada and the United States and continuing down the entire length of the Baja California peninsula, with outliers in mainland Mexico. The Baja California portion of the Cordillera extends the length of the peninsula and rises in elevation to over 10,000 feet. This extensive North American Cordillera (which includes the Rocky Mountains range) contains significant mineral deposits, especially gold, silver and copper, and continues to be mined in notable quantities.

Even though Baja California has not been fully prospected for minerals (like many areas of the earth's surface) sufficient deposits of the required types have been found, matching all the minerals mentioned in the Book of Mormon record. And just as important, the prescribed minerals are found in the required locations, such as the place of Lehi's landing and the land of Zarahemla, thus conforming to not only statements in the text but also the spatial pattern of Book of Mormon lands and settlements.

Alternate locations proposed as the Book of Mormon lands may also measure up to such a claim, but we leave the process of matching minerals within these environments to others.

Confirming the Location of Book of Mormon Lands

The Book of Mormon story provides a profusion of environmental evidences—all of which match Baja California. In this article we have identified and considered geographical evidences or fingerprints related to climate, minerals, plants, animals and even latitude, longitude and elevation. These lesser known signposts complement the more obvious and larger *footprints* such as seas and landforms we match in other articles. It is to be hoped that we have demonstrated that there is no need to twist the wording of the text to match the physical environment of Book of Mormon lands to Baja California, nor do we need to ignore any recorded features. In this article (and in all our articles) our intent has been to consider all relevant references in the Book of Mormon text and not to selectively choose from among the hundreds of applicable verses.

Any region put forward as the Book of Mormon lands would be subject to these matching procedures, and if the results are not conclusive one should question the viability of its candidacy. At a low evidential level an investigator could seemingly connect several people to a crime scene, but to identify and convict a perpetrator, one, hopefully, would need to match all the evidence. As for the other suspects:

“If it doesn’t fit, you must acquit.” Likewise, at some level an inquirer could match elements of the Book of Mormon text to Baffin Island or the Antarctic Peninsula, or even parts of Mesoamerica or the New York area of North America. But where would one find habitats for the pearls, the whales, the wolves and other essential environmental and climatic evidence? And where would one find the copper, gold and

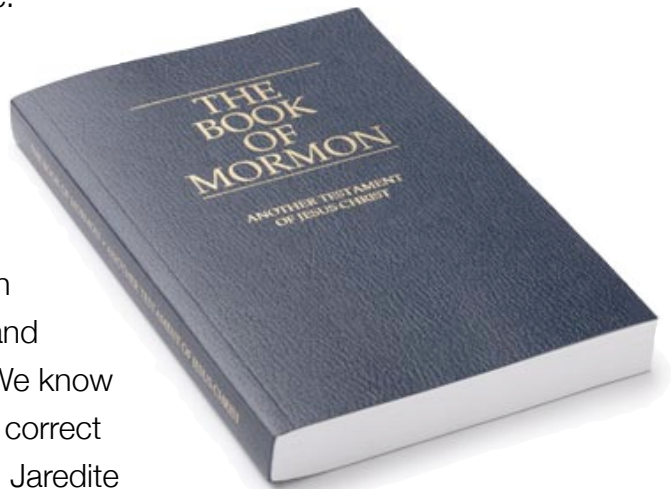
The Lands of the Record Keepers

The Book of Mormon is a history of the record keepers—such as Nephi, Alma, Mormon and Ether—and not a history of their descendants or even their cousins. Thus the Book of Mormon text describes *only* the lands where these record keepers lived. This fundamental truth is often overlooked in the search for Book of Mormon lands. After the last battles of the Nephites and Lamanites, the survivors were swept off these lands by divine decree and scattered to distant locations throughout the Americas. Thus we should not expect the present-day locations of the descendants of these scattered survivors to be the original lands of the record keepers, even though these progeny may possess cultural traits of their forefathers. Today, we can find descendants of Biblical Jews in New York City, Europe and Russia, but it does not follow that these scattered locations are the homelands of the ancient Jewish record keepers. (See our topic article, *Prophesied Cursing and Blessing of Book of Mormon Lands*)

silver deposits in the relative locations prescribed by the text? And how would one identify a place where *all* the seeds from Jerusalem could “grow exceedingly,” including grapes and olives? And where would one find a place whose latitude, longitude and elevations match statements in the Book of Mormon account? And, lest we forget, these geographical and environmental evidences led us to the location of Zarahemla—the latitude and longitude coordinates are 27 degrees north and 113 degrees west, with an elevation of some 400 feet.

When asked to single out the most important evidences or strengths of our proposal, we respond: In our proposal, all possible geographical signposts and descriptions match the area of Baja California. This border to border and top to bottom alignment of features seems to us as far more significant than any single evidence or set of evidences. Our goal has always been to successfully match every possible geographical description in the Book of Mormon account to the proposed area of Baja California. If this is not possible, within reason, we would abort our project. So far, nothing has deterred us from the case.

The translation of the Book of Mormon came by the gift and power of God, and we have found the book’s numerous geographical details to be correctly recorded, and in harmony with existing topographical and environmental features on the earth. We know the Book of Mormon to be a true and correct account of the Nephite, Lamanite and Jaredite cultures and civilizations. We also believe the most important contribution of the Book of Mormon is not its geography or its cultural details, but its clear and masterful contributions to our understanding of gospel doctrines of salvation, correct principles of behavior, and the consequences of unrighteous choices.



A “land choice above all other lands” can only remain an environmentally blessed land if the occupiers keep the commandments the Lord prescribes for that land. The Lord’s solemn words to father Lehi succinctly state a divine decree for his descendants: “Inasmuch as ye shall keep my commandments ye shall prosper in the land; but

inasmuch as ye will not keep my commandments ye shall be cut off from my presence” (2 Ne. 1:20). This precept appears in an additional 18 places in the Book of Mormon (1 Ne. 2:20; 4:14; 2 Ne. 1:9; 4:4; Jarom 1:9; Omni 1:6; Mosiah 1:7; 2:22, 31; Alma 9:13; 36:1, 30; 37:13; 38:1; 48:15, 25; 50:20; and Hel. 3:20). A precept is a general rule intended to regulate behavior. And as the prophet Joseph Smith declared concerning the Book of Mormon: “... a man would get nearer to God by abiding by its precepts, than by any other book.”

This precept, affirmed by the Lord to father Lehi, should fortify our resolve and serve as a warning for today:

Wherefore, I, Lehi, have obtained a promise, that inasmuch as those whom the Lord God shall bring out of the land of Jerusalem shall keep his commandments, they shall prosper upon the face of this land; and they shall be kept from all other nations, that they may possess this land unto themselves. And if it so be that they shall keep his commandments they shall be blessed upon the face of this land, and there shall be none to molest them, nor to take away the land of their inheritance; and they shall dwell safely forever.

And [the Lord] hath said that: Inasmuch as ye shall keep my commandments ye shall prosper in the land; but inasmuch as ye will not keep my commandments ye shall be cut off from my presence. (1 Ne. 1:9, 20)

And thus it was.

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