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## Biological Conditions in Book of Mormon Lands.

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## Biological Conditions in Book of Mormon Lands.

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The researches of archæologists, ethnologists, and geologists in America have in late years contributed much in support of the Book of Mormon account of ancient American civilization. It shall be the purpose of this article to call attention to evidence in favor of that account from another field of scientific research.

A record of this evidence is found in *Bulletin 145* of the Bureau of Plant Industry, of the U. S. Department of Agriculture, issued in April, 1909. This bulletin is entitled *Vegetation Affected by Agriculture in Central America*, and contains results of extensive investigations into the relations between the vegetation of that region to conditions that have existed there in past ages. In other words, it is a bionomic, or ecological study, presented by Mr Orator F. Cook, who is in charge of bionomic investigations of tropical and subtropical plants for the U. S. Department of Agriculture.

Before taking up what Mr. Cook says, the Book of Mormon account will be briefly reviewed. Students of that book will

remember that Jared and his company left Asia at the time of the confounding of language, (Ether 1: 33) which according to Bible chronology was 2,311 B. C. After some years of travel they finally landed in America, perhaps somewhere on the west coast of Mexico or Central America. From this point they spread and increased until their civilization occupied all of North America. In places the population was very dense, Central America being a center of great activity (Ether 10: 20-28). After many hundreds of years great contentions arose, and the people were finally all destroyed except Coriantumr who, in his wanderings, found the city of Zarahemla and the people of Mulek in South America some hundreds of years B. C. (Omni 1: 20-22). Thus the Jaredite civilization in America lasted about two thousand years closing soon after the arrival of the colonies from Jerusalem.

It will be remembered that the people of Nephi left Jerusalem six hundred years B. C., while the followers of Mulek left eleven years later. These two colonies landed separately, but were united at Zarahemla during the reign of Mosiah. From there they gradually spread northward and, on reaching North America, they found that the previous occupants of the country (the Jaredites) had made the land desolate as far as its natural vegetation was concerned.

Helaman describes in a concise manner the conditions found in the forty-sixth year of the reign of the Judges (Helaman 3). He says:

And it came to pass in the forty and sixth, yea, there was much contention and many dissensions, in the which there were an exceeding great many who departed out of the land of Zarahemla, and went forth unto the land northward, to inherit the land;

And they did travel to an exceeding great distance, insomuch that they came to large bodies of water, and many rivers;

Yea, and even they did spread forth into all parts of the land, into whatever parts it had not been rendered desolate, and without timber, because of the many inhabitants who had before inherited the land.

And now no part of the land was desolate, save it were for timber, etc.; but because of the greatness of the destruction of the people who had before inhabited the land, it was called desolate.

And there being but little timber upon the face of the land, nevertheless the people who went forth, became exceeding expert in the work

ing of cement; therefore they did build houses of cement, in the which they did dwell.

And it came to pass that they did multiply and spread, and did go forth from the land southward to the land northward, and did spread insomuch that they began to cover the face of the whole earth, from the sea south, to the sea north, from the sea west to the sea east.

And the people who were in the land northward, did dwell in tents, and in houses of cement, and they did suffer whatsoever tree should spring up upon the face of the land, that it should grow up, that in time they might have timber to build their houses, yea, their cities, and their temples, and their synagogues, and their sanctuaries, and all manner of their building .

And it came to pass as timber was exceeding scarce in the land northward, they did send forth much by the way of shipping;

And thus they did enable the people in the land northward, that they might build many cities, both of wood and of cement.

I desire to call especial attention to the fact that they found the *native vegetation* removed in this section, which undoubtedly is Central America. They also began a process of reforestation, and, in the meantime, did much building with *cement*.

Continuing from the period described by Helaman, the Book of Mormon tells us of this second civilization that flourished over the land for a number of centuries before the Lamanites finally reverted to a state of savagery.

Keeping in mind these two civilizations, as described by the Book of Mormon, and their effects on the natural vegetation of the land, we shall review some of Mr. Cook's discoveries and conclusions.

In his introduction, (page 7) he says:

Savages who live by hunting and fishing or upon wild fruits, seeds, and honey may occupy a tropical region without seriously disturbing the previous balances of organic nature; but no careful observer of the agricultural aborigines of Central American countries can doubt that they have had very definite influences upon their surroundings, or that influences of the same kind have been exerted for long periods of time.

He comments at some length on the vegetation in the region under discussion, considering the balance between certain types of plants and the succession of types under different conditions. He shows how "localities which contain remnants of ancient for-

ests can be recognized by the presence of complete faunas of humus-inhabiting forest animals, such as the millipeds and centipeds, and some of the lower orders of insects and arachnids."

From these various relations he points out how Central America has gone through periods of forest removal and reforestation. Commenting on the time covered by the processes he says (page 14):

Of the periods of time required for such changes to be accomplished only rude estimates are possible in the present state of our knowledge. A thousand years appears a small allowance for the complete reforestation of a thoroughly denuded region, and for the spread of humus-inhabiting organisms over the reforested country. The survival of the humus-inhabiting animals on the ruin-covered hill is hardly to be considered possible, for the pyramids and chambered buildings which covered the summit, as well as large areas of the elaborately terraced approaches, appear to have been faced all over with *cement*.

Continuing his account of the ancient civilization and its effects. Mr. Cook says (page 16):

Many localities which are now occupied by apparently virgin forests are shown by archæological remains to be regions of reforestation. Thus in the Senahu-Cahabon district of Alta Vera Paz relics of two or three very different types of primitive civilizations indicate that as many ancient populations have occupied successively the same areas which are now being cleared anew by the coffee planters as though for the first time.

It does not yet appear that any considerable region of forest has been explored in Central America without similar evidence that the present forests are not truly virgin growth. Even in extremely humid and insalubrious lowlands of the Atlantic slope of Costa Rica many relics of ancient civilizations have been uncovered in cleaning away the heavy tropical forests to make banana plantations. The same has recently been found to be true of the uninhabited coast regions of eastern Guatemala.

It is not probable that more than a small proportion of the tribes which have inhabited the Central American region were builders of stone structures or other permanent monuments by which ancient occupations could be proved. The likelihood that many tribes might pass without leaving any permanent evidence of their existence makes it more remarkable that all parts of Central America have in one prehistoric age or another been the scenes of primitive agricultural civilizations sufficiently advanced to work in stone, or at least to pile up terraces or earthworks

of regular form. Some of the more barbarous tribes might occupy a region for thousands of years and yet leave no traces other than the fragments of broken pottery. These fragments are so abundant and so generally distributed in Central America that they appear as a regular constituent of alluvial soils and surface deposits.

Terracing of the land shows that agriculture was extensively practiced in former times in regions now unoccupied. Two principal forms of prehistoric stone terraces, built evidently for agricultural purposes, may be recognized in the Central American region, in addition to the narrow terraces of earth described in a previous section. There are (1) narrow, high terraces to hold drainage water and prevent erosion in the narrow valleys or on steep slopes of mountains and (2) broad, low terraces apparently leveled to keep rain water from running off rather than to apply irrigation.

He further states

That the ancient occupants of the humid mountain regions of eastern Guatemala by agricultural civilizations were very prolonged and were repeated in several prehistoric ages as indicated by the very severe erosion which the region has suffered. It is not likely that such deeply dissected contours would have been formed if the country had not been kept in a denuded condition for long periods of time.

Space will not permit of further quotation from either account, but sufficient has been said to show that the most careful biological and agricultural investigations are in strict harmony with the revealed word.

Briefly summarizing: The Book of Mormon tells of two distinct civilizations holding sway in America. The first remaining about two thousand years and the second continuing also for a long period. Their great agricultural activity is often referred to, and the clearing away of the forests by at least the first people is made very plain.

The present flora and fauna of Central America, and the various remains found there, clearly indicate to the scientist that the region was anciently occupied for long periods by different civilized peoples, also that these peoples practiced intensive systems of agriculture and removed the virgin forests, leaving the land in a denuded condition. Terraces, used to assist agricultural operations and prevent the erosion brought on by the forest denudation, are every-

where encountered. The work in cement mentioned by Helaman was found by Mr. Cook to still be preserved in the ruins.

No exact dates can be determined, from the workings of the forces in nature, but the vegetation in Central America, the number and distribution of the lower forms of animal life in the forests, and the erosions indicate, as nearly as such things can, that the dates given in the Book of Mormon are correct.

As time goes on and the field of human knowledge is widened, it becomes more obvious that the story of the ancient civilization in America, as it is being told to scientists by "rock and tree," is the same story that was told to the boy prophet by "the voice from the ground" a generation ago.

Ithaca, N. Y.

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## Here, Upon Thy Holy Mountain.

*(For the Improvement Era.)*

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Here, upon thy holy mountain,  
 Lord, a living prophecy,  
 Under Truth's celestial fountain,  
 Lo, thy people wait for thee.

Soon the sky shall roll asunder,  
 And proclaim thy mighty name  
 In eternal peals of thunder  
 From thy chariots of flame.

Hangs thy sword o'er shrine and steeple,  
 And o'er Mammon's crowded halls;  
 Lord, reclaim thy chosen people,  
 Ere thy pending judgment falls.

Lift us up from every nation  
 Into thine eternal rest,  
 When the world to condemnation,  
 Sees thy glory manifest.

THEO. E. CURTIS.