

# **When the Rains Failed: Studies in Climatology and the Biblical Text**

Rodger Dalman

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Rodger Dalman  
5549 Girard Ave. N.  
Brooklyn Center, MN 55430

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# CHAPTER 1: STUDYING CLIMATE CHANGE

## Introduction

Palestine was located on the edge of a semi-arid region and climate conditions in the land were always somewhat tenuous. Droughts and famines struck Palestine periodically, and these droughts were often interpreted as Yahweh's judgment on Israel's sins. Occasionally, textual and archaeological evidence has been found for famines recorded in the Biblical text. Ancient records like this are now being augmented by an increasing academic interest in climate change. The last few decades have seen an increasing a concern over global warming. Research has explored the process by which both global and regional climate conditions have changed in the past and how climate conditions are likely to change in the future.<sup>1</sup>

## Evidence for Climate Change

The most popular method for dating past climates has been the analysis of plant material from the past. Plant materials used in climate change studies have included tree rings and pollen grains found in ancient sediments. Chronological years have been found by counting tree rings back into the past. Climate conditions can then be studied by comparing the individual tree rings. The width of a tree ring is closely related to amount of rain that falls in each year. S. C. Porter discussed one interesting application of tree ring studies. He noted that glacial moraines can sometimes be dated with dendrochronology when trees are buried in the moraine. This provides a chronological context for the maximum glacial advance that produced the moraine. Glacial moraines are the long, winding dirt and stone hills that are pushed in front of a glacier as it moves forward. When glaciers retreat, they simply melt away and leave the moraines behind. So moraines usually mark the furthest limit of glacial advance.<sup>2</sup>

Another form of arboreal evidence is based on the presence of tree pollen in soil cores. Trees are quite sensitive to climate change. For example, oak trees today are seldom found north of Canada's border with Minnesota. During the last glacial period, oak trees were seldom found

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Climate change studies can be rather confusing at first. A wide variety of dates are often proposed for the same event or climatic period. Each proposed chronology reflects the characteristics of the specific site studied in the book or article. Authors also use different kinds of dates. Authors use dates BC, bc, BCE, or BP. BC dates are chronological dates (Before Christ). Dates bc are radiocarbon dates which may be quite different from chronological dates. BCE dates are identical to BC dates. BCE stands for Before the Common Era, and it is seen as being more politically correct than Before Christ. BP dates are Before the Present. When reading BP dates, it is helpful to check the publication date of the book or article (although BP dates are usually approximations anyway). Radiocarbon dates must be converted to calendar dates with the use of calibration curves, and there are several different (and inconsistent) calibration curves in use. As dates for past events approach the last glacial age, radiocarbon dates may differ from chronological dates by nearly a thousand years. Unfortunately, many authors do not indicate which set of dates they are using. To avoid confusion, most dates in the rest of this book will be converted from BP dates to BC dates by simply subtracting 2000 years from the date. No attempt will be made to reconcile chronological years and radiocarbon year. When checking the sources used in this section, it should be remembered that most of the authors use a BP dating system instead of a BC dating system.

2

Stephen C. Porter, "Glaciological Evidence of Holocene Climatic Change," in T. M. L. Wigley, M. J. Ingram, and G. Farmer, eds. *Climate and History: Studies in Past Climates and their Impact on Man*, (Cambridge: Cambridge University Press, 1981), 90.

north of South Carolina. So the kind of tree pollen found in a region testifies to the climate at that time. Beyond that, trees of any kind will not grow north of a specific latitude, and the tree line changes somewhat with climate conditions. North of the tree line, there is only tundra. The tree line is determined by the amount of sunlight available, the climate conditions, and the elevation of a site above sea level. The tree line in any period gives somewhat limited evidence for the climate conditions at the time.<sup>3</sup>

Tree pollen is not the only kind of pollen used in climate change studies. Most plants grow only within a limited range of climate conditions. So the kind of pollen found in a soil core testifies to the climate when the soil was formed.<sup>4</sup> Pollen studies are often used to study soil core layers. These soil cores may be taken from dry land, peat bogs, lake bottom sediments, or ocean floor sediments. Pollen studies have played a key role in the debate about the Younger Dryas. The most important tundra plant in Europe is *dryas octopetala*. When a soil core level contains exclusively *dryas* pollen and no pollen from warmth loving plants, it is fair to assume that the region knew very cold weather when the soil was formed.<sup>5</sup> In New England and Atlantic Canada, climate change has been studied by noting increases in alder, spruce, and birch pollen. These trees can tolerate cold weather. They replace warmth loving trees like oak and ash as the climate cools. So the kind of pollen used in dating depends on the region studied. When a soil layer contains pollen from oak trees, the assumption is made that the layer was formed during warmer years as forests once more spread across the region.

Evidence for climate change is often found by studying plankton in ocean bottom sediment layers. Plankton is made up of tiny plants and animals in the oceans. Plankton is the base for almost all food chains in the ocean, and it is the source for much of the earth's free oxygen. The kind of plankton that appears in sediment cores gives strong evidence for the ocean temperature when that kind of plankton lived. Different forms of plankton are found in different ocean temperature regions. One species of plankton is especially important for climate change studies. It is called *N. pachyderma*. This kind of plankton resembles an amoeba with a shell. It takes two forms, a left-coiling form and a right coiling form. The left-coiling form only grows in water that is colder than 10 degrees centigrade. In water that is colder than 5 degrees centigrade, it becomes the dominant form of plankton. This cold loving form can make up almost 100% of the plankton in the Arctic Ocean. The right-coiling form of this plankton appears only in warmer water. So the form of this plankton found in a sea bottom core gives rather good evidence for the temperature of the surface sea water when the sediment settled to the bottom.<sup>6</sup>

Another popular form of climatological evidence comes from isotope studies. Most commonly, isotope studies are conducted with deep ice cores from Greenland and Antarctica.

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Frank Oldfield, "Late Quaternary Vegetational History in South West France," *Pollen et Spores* 6 (1964): 166-167. Timothy F. Ball, "Historical Evidence and Climatic Implications of a Shift in the Boreal Forest Tundra Transition in Central Canada," *Climatic Change* 8 (1986): 121-134.

4

Grace S. Brush, "Pollen Analyses of Late-Glacial and Postglacial Sediments in Iowa," in E. J. Cushing and H. E. Wright Jr., eds. *Quaternary Paleoecology*, (New Haven: Yale University Press, 1967), 99-115. S. I. Saad and S. Sami, "Studies of Pollen and Spores Content of Nile Delta Deposits (Berenbal Region)," *Pollen et Spores* 9 (1967): 467-503.

5

Donald T. Rodbell, "The Younger Dryas: Cold, Cold Everywhere?" *Science* 290 (2000): 285-286.

6

Thomas M. Cronin, *Principles of Paleoclimatology*, (New York: Columbia University Press, 1999), 210-211.

Evidence for climate change can be gained by counting the annual freeze layers in ice cores, and then analyzing the isotopes found in both ice and air bubbles contained within each ice layer.<sup>7</sup> Climate information can be gained from these studies because heavier water molecules like  $^1\text{H}_2^{18}\text{O}$  and  $^1\text{H}_2^{16}\text{O}$  evaporate more slowly from the water surface and condense more rapidly into rain than normal  $^1\text{H}_2^{16}\text{O}$  water molecules. The result is that increased amounts of heavier isotopes appear in rain water that falls during warmer temperatures. The isotope concentration in water, ice, or sediment is called its  $\delta$ -value. Dansgaard, White, and Johnsen noted that an increase of 5% of  $\delta^{18}\text{O}$  corresponds to a temperature increase of 7 degrees centigrade. Shackleton and Opdyke studied a sediment core from the equatorial Pacific Ocean floor. They found  $\text{O}^{18}$  evidence for ten different glacial periods in that past.<sup>8</sup> Many other forms of evidence have also been used to study ancient climates. All of these forms of evidence have clear limitations. A study of the limitations of these methods must remain beyond the bounds of this book. Climate change studies in general will have only limited appeal to those who are committed to a very young earth on the basis of their exegesis. However climate change studies may provide an interesting model for those who are willing to entertain one of the old earth options for interpreting Genesis 1-3. This model may also provide a useful evangelistic polemic for reaching people who are committed to an old earth position.

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E. J. Steig, et al, "Synchronous Climate Changes in Antarctica and the North Atlantic," *Science* 282 (1998): 92-95.

8

J. White, et al, "How Reliable and Consistent are Paleodata from Continents, Oceans, and Ice?" in J. A. Eddy and H. Oeschger, eds. *Global Changes in the Perspective of the Past*, (New York: John Wiley & Sons, 1993), 75-76. W. Dansgaard, J. W. C. White, S. J. Johnsen, "The Abrupt Termination of the Younger Dryas Climate Event," *Nature* 339, #6225, (1989): 532. H. H. Lamb, *Climate: Present, Past and Future* 2 (New York: Barnes & Noble, 1977), 310.

## CHAPTER 2: NOAH'S FLOOD AND CLIMATOLOGY

### The Younger Dryas and History

If an old earth position is assumed, the last Ice Age occurred around 18,000 BC. At this time, approximately 30% of the earth's surface was covered with ice.<sup>9</sup> F. Doumenge noted that the Mediterranean Sea was around 120 meters shallower than it is today. The sea was divided into three temperature zones determined by the geology of the sea floor and the sources of the rivers that flowed into the sea. The western temperature zone was cold. Doumenge argued that temperatures in the western Mediterranean resembled current conditions in the North Sea. Penguins, seals, and whales lived in the western basin. The eastern Mediterranean basin was warmer than this.<sup>10</sup> H. E. Wright argued that the north Mediterranean region was dry during the last glacial period, and Europe was covered by tundra.<sup>11</sup>

There has been broad and general agreement about the process by which the glacial ice melted at the end of the last ice age, although there has also been endless debate over the chronology of these events. There is broad agreement that the great ice sheets melted in a series of warm and cold periods.<sup>12</sup> These warm and cold periods lasted anywhere from a few centuries to a few millennia. During warm periods, the glacial ice melted very rapidly, and the ocean level rose rapidly. During cold periods, ice fields began to form once more. These alternating warm and cold periods had a remarkable impact on plant life in the northern hemisphere. During warm periods, tundra plants were replaced by forests over a wide area. During cold periods, the forests died away, and were replaced with tundra plants once more. A decade ago, it was popular to see the first warm period somewhere between 13,000 and 11,000 BC. This warm period was followed by a cold era called the Older Dryas. This cold period ended in renewed warmth and rapid glacial melt. This warm period was called the Alleröd Fluctuation. It ended around 9000 BC and was followed by a thousand years of full glacial cold called the Younger Dryas.<sup>13</sup> After a thousand years, the climate warmed for the last time at the beginning of the Preboreal period.

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Karl W. Butzer, "Patterns of Environmental Change in the Near East During Late Pleistocene and Early Holocene Times," in Fred Wendorf and Anthony E. Marks, eds. *Problems in Prehistory: North Africa and the Levant*, (Dallas: SCM Press, 1975), 389.

10

François Doumenge, "The Mediterranean Crises," *UN University Lecture*, #16. Blue whales still inhabit the western Mediterranean to this day.

11

Wright argued that pollen studies near Lake Mirabad and lake Zeribar showed that oak tree pollen appeared no earlier than 9000 BC in the Zagros mountains north of Mesopotamia. H. E. Wright Jr. "Climatic Change in the Zagros Mountains-Revisited," in Linda S. Braidwood, et al, eds. *Prehistoric Archaeology Along the Zagros Flanks*, (Chicago: The Oriental Institute of the University of Chicago, 1983), 506-507. H. H. Lamb argued that regions north of the Mediterranean Sea were a treeless dry steppe before 13,000 BC. He argued that pollen studies demonstrated steppe vegetation especially in northwest Spain, northern Italy, and Macedonia. At the same time, pine forests covered parts of Texas and New Mexico that are now arid high plains. Lamb, *Climate: Present, Past and Future*, 352-354.

12

Barry argued that most of the glacial ice melted in two warm periods: 14,000 BC to 11,000 BC, and 8000 BC to 5000 BC. Roger G. Barry, "The Significance of Global Snow and Ice Cover for Global Change Studies," *GeoJournal* 27 (1992): 294.

13

Neil Roberts, *The Holocene: An Environmental History*, (Oxford: Basil Blackwell, 1989), 53.

In recent years, this pattern has been called into question.<sup>14</sup> While many authors still defend the older chronology, many others now merge the two cold periods. They date the beginning of the Younger Dryas somewhere between 13,000 and 11,000 BC instead of dating the Older Dryas at this time. This can be very confusing. Authors who write about the Younger Dryas are likely to propose start dates for this climate period anywhere within a 4000 year span of time. That is a very wide time span since full glacial cold lasted until 15,000 BC. In general, it is much easier to defend a linkage between the Younger Dryas and Biblical history if the Younger Dryas is dated between 9000 and 8000 BC. While pollen and isotope studies can be argued either way, a more recent Younger Dryas is also much easier to fit into the archaeological record. There is no clear evidence for settled village life anywhere in the world before 9000 BC.

Ruddiman and McIntyre argued that between 14,000 and 11,000 BC, the polar weather front and the winter sea ice limit covered the whole north Atlantic from the center of Spain northward. Their evidence for this claim came from the difference between polar and subpolar varieties of plankton found in sea bottom cores from this time period.<sup>15</sup>

Andrew Goudie argued that the Zagros Mountains were covered with glaciers before the end of the last glacial era, and the snow line was somewhere between 1200 and 1800 meters lower than it is today. The mountains below the snow line were cold with bleak steppe conditions. Goudie argued that the mountains were too cold to be occupied before 11,000 BC. Goudie argued that the transition between cool steppe and warm oak-pistachio savannah should be dated somewhere around 9000 BC. Goudie's evidence for this transition came from pollen and lake sediment studies. Emmer and barley also first appeared in the region at this time.<sup>16</sup>

Ruddiman and McIntyre argued that glacial ice sheets in the northern hemisphere had become relatively thin by 11,000 BC. The early phase of rapid ice disintegration had occurred largely by breaking ice bergs from glaciers and melting them in the ocean. Ruddiman and McIntyre argued that after 11,000 BC, sea ice south of 50 degrees latitude was melting rapidly. Ruddiman and McIntyre argued that during these years, the polar weather front retreated to a line loosely from Labrador to Iceland. This brought a very warm period to Europe and the Near East. This warm period is called the Alleröd Fluctuation. There is no way to determine the winter sea ice limits during this period.

The Alleröd Fluctuation may be an ideal candidate for the time period when God created a garden in the land of Eden, and brought to the garden the man that He had created. The Garden of Eden may have been located in the mountains north of Mesopotamia since the Tigris and Euphrates Rivers flowed out of the garden. Before 11,000 BC, these mountains had been barren tundra incapable of supporting a human population. After 11,000 BC, the Alleröd brought warmth to the region, and the area began to resemble a garden. Forests spread rapidly through

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K. D. Bennett, "The Last Glacial-Holocene Transition in Southern Chile," *Science* 290 (2000): 325-328.

15

William F. Ruddiman and Andrew McIntyre, "The North Atlantic Ocean during the Last Deglaciation," *Palaeogeography, Palaeoclimatology, Palaeoecology* 35 (1981): 145.

16

Andrew Goudie, *Environmental Change*, (Oxford: Clarendon Press, 1992), 141.

the mountains north of Mesopotamia, and into southern Europe.<sup>17</sup> A wide variety of pollen types appear in soil cores from the Alleröd in the region that the Bible called Eden. This land remained a paradise until Adam and Eve rejected God's covenant. Yahweh decreed that they would be driven from the garden to earn their living with great difficulty on a cursed land.

If this model is accepted, there is no way to know when Adam and Eve revolted against God, or how long they lived near Eden before the Alleröd came to a close. Evidence for human occupation of northern Europe during the Alleröd may come from the Laacher See volcano in the Rhineland. This volcano erupted during the late Alleröd covering the Alleröd era vegetation with ash and pumice. Two human skeletons and several hearths were found below this ash but no evidence for permanent human settlements.<sup>18</sup> The Alleröd Fluctuation may also have marked the beginning of the Natufian hunter/gatherer culture in Palestine and of Neolithic cultures elsewhere. Genesis 4:20 may have borne witness to the presence of an early hunter/gatherer culture. This verse noted that Lamech's son Jabal was the father of those who lived in tents with livestock.

After the end of the Alleröd, the earth became truly a cursed place as Yahweh had promised. The Alleröd was followed by the Younger Dryas, when full glacial cold returned for a thousand years. During the Younger Dryas, much of the forest land north of Palestine died out and was replaced by tundra vegetation once more.<sup>19</sup> The villages that had been formed by Cain's descendants gradually disappeared because of the drought. The Iranian Plateau saw a complete break in human occupation during the Younger Dryas, as did regions like the Azraq basin and the oasis at El Kum.

Ruddiman and McIntyre argued that between 9000 and 8000 BC, the polar front returned south all the way to the northeast corner of Spain. This brought nearly full glacial cold to Europe and the Near East. The southern edge of the polar sea ice was only slightly further north during the Younger Dryas than during the full glacial cold. Ocean temperatures returned to glacial cold everywhere beyond of 52/53 degrees north latitude. Arctic ice bergs were very common in the north Atlantic during these years, and the ice rafted ash into the ocean.<sup>20</sup> The Younger Dryas were cold and dry in general, but the aridity became more severe as the Younger Dryas progressed. The degree of aridity changed somewhat from region to region.<sup>21</sup>

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During the Alleröd, the ocean surface was still around 40 meters below its current sea level. The Dover Strait between England and France was still dry ground. The flow of sea water from the Atlantic Ocean into the Mediterranean Sea was reduced by 30%. Lamb, *Climate: Present, Past and Future*, 346-348.

18

"Younger Dryas Forces Human Choices," *Geotimes*, (April, 1999), 10. Michael Baales, and Martin Street, "Hunter-Gatherer Behavior in a Changing Late Glacial Landscape: Alleröd Archaeology in the Central Rhineland, Germany," *Journal of Anthropological Research* 52 (1996): 281.

19

H. H. Lamb argued that during the Alleröd, birchwoods became common in England. Pines spread through Germany. Oak and Hazel trees became common in France. Lamb argued that during the Younger Dryas, tundra stretched from northern England to the German plain. Lamb argued that areas of birch and pine may have survived in southern Germany. Lamb, *Climate: Present, Past and Future*, 371.

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Ruddiman and McIntyre, "The North Atlantic Ocean during the Last Deglaciation," 145.

21

T. J. Crowley, et al, "Group Report: Use of Paleoclimatic Data as Analogs for Understanding Future Global Changes," in J. A. Eddy and H. Oeschger, eds. *Global Changes in the Perspective of the Past*, (New York: John Wiley & Sons, 1993), 64-65.

Europe was completely depopulated during the Younger Dryas. Human occupation continued in the Levant, but only clustered around areas that still had water.<sup>22</sup> Harvey Weiss argued that the Younger Dryas brought a change to the nature of human culture. Weiss argued that before the Younger Dryas, only a hunter/gatherer culture existed. Weiss argued that during the Younger Dryas, it became much harder for people to find food. So they were forced to adapt by developing simple agriculture.<sup>23</sup> Weiss was perhaps oversimplifying the evidence. Genesis recorded that Cain and Able were already engaged in agriculture at the expulsion from Eden. However, the Younger Dryas marked the start of basin irrigation agriculture in the ancient Near East.

There has been quite a debate about the cause of the Younger Dryas. When evidence for the Younger Dryas cold period was first found, it was assumed that this was only a local event in the North Atlantic region. It was assumed that melting sea ice, sea icebergs, and glacial ice simply cooled down the climate like melting ice cubes in a glass of water. In 1989, Fairbanks published a detailed study of the history of coral formations near Barbados. He demonstrated that the rate of ocean level rise after the end of the last glacial period slowed down greatly during the Younger Dryas. During these cold years, the sea surface did continue to rise, but only very slowly. This implied that the Younger Dryas cold could not have been caused only by the melting of glacial and sea ice.<sup>24</sup> The rising sea levels during the Younger Dryas were caused by ice melting in the Antarctic instead of the northern hemisphere.<sup>25</sup>

Shortly after the Younger Dryas period was discovered, it became apparent that this cold period was very wide spread. In 1987, Bard et al studied two ocean bottom cores from the coastal regions of Ireland and Portugal. These cores came from areas 2000 km apart. Yet the cores resembled each other quite closely. Plankton and oxygen isotope studies gave clear evidence for the beginning and end of the Younger Dryas. Both cores dated these climate periods at the same time, which suggested that the Younger Dryas was a uniform characteristic of the whole region. Bard et al dated the Younger Dryas between 9010 and 8390 BC. They described the transition between the Younger Dryas and the subsequent Preboreal period as being "instantaneous." By this they meant that the transition took less than 400 years, which was the finest chronological resolution that their dating methods could provide.<sup>26</sup>

The ultimate cause of the Younger Dryas should probably be sought outside of the earth's climate system. If the Younger Dryas had been caused simply by a breakdown in the earth's heat distribution system, other regions of the earth would have warmed greatly while the

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Jonathan Adams, "Did Indo-European Languages Spread before Farming?" <http://sarasvati.simplenet.com/aryan/Indo2.html>.

23

Harvey Weiss, "Beyond the Younger Dryas: Collapse as Adaptation to Abrupt Climate Change in Ancient West Asia and the Eastern Mediterranean," in G. Bawden and R. Reycraft, eds. *Confronting Natural Disaster: Engaging the Past to Understand the Future*, (Albuquerque: University of New Mexico Press, 2000).

24

Cronin, *Principles of Paleoclimatology*, 218-219.

25

R. B. Alley, et al, "Holocene Climatic Instability: A Prominent Widespread Event 8200 yr Ago," *Geology* 25 (1997): 483-486.

26

Edouard Bard, et al, "Retreat Velocity of the North Atlantic Polar Front During the Last Deglaciation Determined by <sup>14</sup>C Accelerator Mass Spectrometry," *Nature* 328 (1987): 791-794.

northern hemisphere cooled. That does not seem to have been the case. The Alleröd and the Younger Dryas periods greatly affected climate conditions across most of the world, although not all areas were affected at exactly the same time or in exactly the same way.<sup>27</sup> Evidence for the Younger Dryas has been found in Africa, China, New Zealand, the South Atlantic, South America, North America, the Near East and Europe.<sup>28</sup> While the Younger Dryas may have been caused by something outside the earth's system, the transitions between climate periods occurred too rapidly for this explanation to be sufficient. Several recent studies have noted that the earth's climate system remains relatively stable until pushed beyond some threshold. Then the whole climate system changes radically and very abruptly indeed.<sup>29</sup>

## Noah's Flood and the Younger Dryas/Preboreal Transition

Climatologists claim that sea levels rose rapidly after the end of the Younger Dryas. In the next 2000 years, the sea level rose over 40 meters. The Persian Gulf shore moved north by several hundred meters per year.<sup>30</sup> Ruddiman and McIntyre argued that between 8000 and 7000 BC, the polar front was pushed back all the way to the mouth of the Labrador Sea. The earliest sub-polar mollusks appeared at Baffin Island around 7725 BC.<sup>31</sup> In a 1989 study, W. Dansgaard,

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Cockcroft, Wilkinson, and Tyson argued that even South Africa knew much colder temperatures between 10,000 BC and 8000 BC. M. B. Cockcroft, M. J. Wilkinson, and P. D. Tyson, "The Application of a Present-Day Climatic Model to the Late Quaternary in Southern Africa," *Climate Change* 10 (1987): 171.

28

Mel A. Reasoner, and Margret A Jodry, "Rapid Response of Alpine Timberline Vegetation in the Younger Dryas Climate Oscillation in the Colorado Rocky Mountains, USA," *Geology* 26 (2000): 51. Stephen C Porter, "Chinese Loess Record of Monsoon Climate during the Last Glacial-Interglacial Cycle," *Earth Science Reviews*, (June 2001): 115. "A Head Start on Cooling," *Science* 289 (2000): 833-834. Rewi M. Newnham, and David J. Lowe, "Fine-Resolution Pollen Record of Late-Glacial Climate Reversal from New Zealand," *Geology* 28 (2000): 759. Gunhild C. Rosqvist, et al, "Late Glacial to Middle Holocene Climatic Record of Lacustrine Biogenic Silica Oxygen Isotopes from a Southern Ocean Island," *Geology* 27 (1999): 967. Rainer Zahn, "Fast Flickers in the Tropics," *Nature* 372 (1994): 621-622. Gerald H. Haug, et al. "Southward Migration of the Intertropical Convergence Zone through the Holocene," *Science* 293 #5533 (2001): 1304. L. G. Thompson, et al, "A 25,000-Year Tropical Climate History from Bolivian Ice Cores," *Science* 282 (1998): 1858-1864. Mark A. Maslin, and Stephen J. Burns, "Reconstruction of the Amazon Basin Effective Moisture Availability over the Past 14,000 Years," *Science* 290 (2000): 2285-2287. David B. Madsen, "A High-Elevation Alleröd-Younger Dryas Megafauna from the West-Central Rocky Mountains," *Intermountain Archaeology* 122 (2000): 100-113. Zicheng Yu, and Ulrich Eicher, "Abrupt Climate Oscillations During the Last Deglaciation in Central North America," *Science* 282 (1998): 2235-2238. Atle Nesje, "Younger Dryas and Holocene Glacier Fluctuations and Equilibrium-Line Altitude Variations in the Jostedalbre Region, Western Norway," *Climate Dynamics* 6 (1992): 221-227. D. Kroon, et al, "Century- to Millennial- Scale Sedimentological-Geochemical Record of Glacial-Holocene Sediment Variations from the Barra Fan (N.E. Atlantic)," *Journal of the Geological Society* 157 (2000): 643. W. Shotyk, et al, "History of Atmospheric Lead Deposition Since 12,370 <sup>14</sup>C yr BP from a Peat Bog, Jura Mountains, Switzerland," *Science* 281 (1998): 1635-1640.

29

W. H. Berger and L. D. Labeyrie, eds. *Abrupt Climatic Change: Evidence and Implications*, (Boston: D. Reidel, 1987).

30

T. J. Crowley, et al, "Group Report: Use of Paleoclimatic Data as Analogs for Understanding Future Global Changes," in J. A. Eddy and H. Oeschger, eds. *Global Changes in the Perspective of the Past*, (New York: John Wiley & Sons, 1993), 64-65.

31

Ruddiman and McIntyre, "The North Atlantic Ocean during the Last Deglaciation," 145.

J. W. C. White, and S. J. Johnsen studies the transition from the Younger Dryas to the subsequent Preboreal period. They argued that this transition may have occurred at 8770 BC give or take 150 years. This is more than 700 years earlier than the date suggested by Ruddiman and McIntyre for the same transition. Dansgaard, White, and Johnsen argued that this transition appeared as a sudden shift in all of the parameters that they studied, including heavy isotope studies, chemical trace element studies, acidity studies, and continental dust studies.<sup>32</sup>

It is important to note how rapidly this transition occurred. It is truly striking how rapidly the Younger Dryas began and ended. The transitions between warmth, full glacial cold, and renewed warmth may have been less than a decade. Recent studies have suggested that the Younger Dryas may have resulted in part from changes in the Great Conveyor, the broad system of deep and shallow ocean currents that carry warm equatorial water into the North Atlantic basin.<sup>33</sup> Only minor changes in the sea's salinity and temperature may have had a huge impact on the direction of the deep ocean's currents.<sup>34</sup> These ocean currents in turn have an enormous impact on climate conditions world wide.<sup>35</sup>

R. B. Alley et al discussed the transition between the Younger Dryas and the Preboreal periods. They used as their evidence a study of the GISP2 ice core from Greenland. Alley et al argued that the Younger Dryas ended very abruptly. They claimed that the transition took at the outside less than fifty years. They argued that dust concentrations in the ice core suggested that the Younger Dryas may actually have ended even more rapidly than that. Dust concentration in the ice core suggested that the Younger Dryas may have shifted to the Preboreal climate in less than twenty years. Finally, they studied snow thickness evidence from the ice core. The evidence from snow thickness suggested that the Younger Dryas/Preboreal transition may actually have occurred in as little as a year or two. After this transition, the amount of annual snowfall doubled. They added that the same kind of ice core evidence suggested that the transition from the Oldest Dryas to the Bölling/Alleröd warm period may also have occurred extremely

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Dansgaard, White, and Johnsen, "The Abrupt Termination of the Younger Dryas Climate Event," 532.

33

Dan Seidov, et al, eds. *The Oceans and Rapid Climate Change: Past, Present and Future*, (Washington DC: American Geophysical Union, 2001).

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Broecker argued that the earth's climate system resists change until it is pushed beyond some threshold. Then it leaps suddenly into a new pattern. Broecker discussed especially how the great ocean currents could change their course. Wallace S. Broecker, "The Biggest Chill," *Natural History* 96 (1987): 74-82. William S. Broecker, "Global Warming on Trial," *Natural History* 4 (1992): 6-14. R. Muscheler, et al. "Changes in Deep-Water Formation during the Younger Dryas Event Inferred from 10Be and 14C Records," *Nature* 400 (2000): 567. Carsten Ruhlemann, et al, "Warming of the Tropical Atlantic Ocean and Slowdown of Thermohaline Circulation during the Last Deglaciation," *Nature* 402 (1999): 511.

35

Seidov, *The Oceans and Rapid Climate Change: Past, Present and Future*. Broecker argued that around 9000 BC, the ocean currents stopped bringing warm water north. Almost immediately, the average temperature in Europe dropped 12 degrees. This resulted in the Younger Dryas, which Broecker argued lasted for 800 years. Broecker, "Global Warming on Trial," 6-14.

rapidly.<sup>36</sup> If the transition between the Younger Dryas and the Preboreal occurred in a very short time period, this transition may be a good candidate for the source of Noah's flood.

What would have been the water source for Noah's flood? Transitions from cold to warm periods have often been accompanied by substantial rainfall.<sup>37</sup> Basin irrigation cultures living on the valley floors could have been destroyed by flash floods roaring down the river valleys. Such local floods would have occurred simultaneously in many places, and could have brought an end to the entire culture. There is rather strong evidence that massive flooding did indeed strike the ancient Near East during the Younger Dryas/Preboreal transition. The evidence for this flooding begins with the North Atlantic Oscillation, or the NAO. Heidi Cullen and Peter deMenocal studied the relationship between the North Atlantic Oscillation and the amount of water that flowed through the Tigris and Euphrates valley. The name "North Atlantic Oscillation" described the rather permanent, year round presence of a low pressure region in the atmosphere near Iceland, and high pressure regions near the Azores and the eastern Mediterranean basin. These pressure zones tend to strengthen and weaken at the same time. They give the climate of the North Atlantic a bipolar structure. As these pressure zones strengthen, weaken and wander, they have a great impact on climate conditions in eastern North America, Europe, the Mediterranean basin, and the Near East.

As the high pressure zone near the Azores weakens, warm moist air flows into Europe and the Mediterranean basin. In the winter, this warm moist air creates strong rains in the Mediterranean region. These rains move as far to the east as the headwaters of the Tigris and Euphrates Rivers, and greatly increase stream flow throughout Mesopotamia. Cullen and deMenocal concluded that the Atlantic Ocean was the primary source for the moist air which eventually fell as rain and flowed down the Tigris and Euphrates Rivers.<sup>38</sup> This climate system can still be seen in the Near East today. Rainfall in Israel occurs largely in the winter. Israel sees an average annual rainfall between 500 and 900 mm of rain. Less than 1mm of rain falls during the summer months, and only in the northern part of the country. During the summer months, the Persian Gulf Trough dominates the region. This is a low pressure region that extends from the

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Alley et al noted that there was a sharp change in ice layer thickness at a depth of 1,678 meters. They dated these layers at 11,640 ± 250 years before 1950. They identified this date as the end of the Younger Dryas. They noted that this depth also marked a major change in the ice isotope concentration and dust concentration. R. B. Alley et al, "Abrupt Increase in Greenland Snow Accumulation at the End of the Younger Dryas Event," *Nature* 362, #6420, (1993): 527.

37

The Ohm and Wetter rivers in Germany saw annual flooding at the end of the Younger Dryas. Hanneke Bos, "Aspects of Late Glacial-Early Holocene Vegetation Development in Western Europe," <http://www.bio.uu.nl/~palaeo/Research/Lateglac/lateglac.htm>. It is clear that the Younger Dryas brought severe drought to Sub-Saharan Africa. The end of the Younger Dryas brought much rainfall to the region. Lake levels in Ethiopia and Africa reached their highest levels around 600 years after the end of the Younger Dryas, then fell rapidly. David Neev and K. O. Emery, *The Destruction of Sodom, Gomorrah, and Jericho: Geological, Climatological, and Archaeological Background*, (New York: University Press, 1995), 115.

38

Heidi M. Cullen and Peter B. deMenocal, "North Atlantic Influence on Tigris-Euphrates Streamflow," *International Journal of Climatology* 20 (2000): 853-863. D. Pozo-Vázquez, et al, "An Analysis of the Variability of the North Atlantic Oscillation in the Time and the Frequency Domains," *International Journal of Climatology* 20 (2000): 1675-1692.

Asian Monsoon low through the Persian Gulf and northward through the Aegean Sea and Turkey.<sup>39</sup>

The North Atlantic Oscillation is important because it demonstrates that Atlantic Ocean temperature variations have a direct impact on weather patterns across the ancient Near East. Even a relatively mild change in North Atlantic Ocean temperature can affect temperature and moisture levels in the air, and can send flooding down the Tigris and Euphrates basins. However, the Younger Dryas/Preboreal transition was accompanied by far more than normal flooding. During this transition, the Great Conveyor currents suddenly began bringing warm equatorial water into the North Atlantic. This happened when the whole region was still locked in near glacial cold. The warm water flowed past the Atlantic coast of Africa, and it flowed into the Mediterranean basin. This warm water produced huge clouds of evaporated water. These clouds struck the cold air masses in the northern hemisphere, and dropped as rain. A vast amount of rain fell on the whole region until Europe and the Near East warmed enough to stabilize the climate system. It might actually have taken 40 days and 40 nights for the climate system to stabilize.

This is more than simply conjecture. One of the hot topics of research in recent years has been the presence of thick sapropel layers in sediment on the floor of the eastern and western Mediterranean Sea basins. A total of 12 sapropel layers have been found at different levels in cores from the Mediterranean Sea floor. The Mediterranean Sea sapropel layers were discovered in 1952. As is always true with hot topics, the sapropel layers have been interpreted in a number of ways.<sup>40</sup> One of the more interesting studies of sapropel layers in the eastern Mediterranean basin was written by M. Rossignol-Strick et al.

Rossignol-Strick et al described a thick sapropel layer that appeared in sea bottom core samples across the eastern Mediterranean Sea. They argued that radiocarbon dates for sediments above and below this layer have dated it at the transition between the Younger Dryas and the subsequent Preboreal period. They dated this transition sometime between 8500 and 8000 BC. Rossignol-Strick et al explained how sapropel layers were formed. Sapropel layers were layers of black, pelagic mud that contained a great deal of marine organic material. They were formed in transitions to warm periods when large amounts of fresh water flowed into the sea. The fresh water created a low salinity water layer that remained on top of the normal sea water instead of mixing with it. This happened because the heavily salted water had greater density. During the summer months, the surface water evaporated. This thinned the water layer. The two layers eventually mixed in the winter when the surface water cooled. This increased its density and it down welled into the heavily salted layer.

The layer of low salinity surface water prevented oxygen from being transported into the deep, heavily salted water on the sea floor. When the deep salt water layer was cut off from oxygen, it eventually stagnated. Many marine organisms died, and were replaced with high salt tolerant and stagnation tolerant species. The water's oxygen depletion prevented decomposition, and a thick black layer of sediment was created. Rossignol-Strick et al suggested that this thick sapropel layer was created at the end of the Younger Dryas because the transition to a warmer

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Hadas Saaroni and Baruch Ziv, "Summer Rain Episodes in a Mediterranean Climate, the Case of Israel: Climatological-Dynamical Analysis," *International Journal of Climatology* 20 (2000): 191-194.

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See the discussion in Gert. De Lange, et al, "Sapropels and Palaeoceanography (SAP): Palaeoceanographic, Palaeo-climatic, Palaeo-environmental and Diagenetic aspects of Sapropel Formation in the Eastern Mediterranean (MAS3-CT97-0137)," <http://www.geo.unimib.it/Conisma/SAP1.htm>.

climate regime caused great river floods to pour a very large amount of fresh water into the Mediterranean Sea. They noted that this sapropel layer was formed at the beginning of the African Rainy Period which lasted from 8000 to 6000 BC.<sup>41</sup>

François Doumenge discussed the most recent sapropel layer on the floor of the Mediterranean Sea. He proposed a date for this layer at 6000 BC, which is 2000 years later than the date proposed by Rossignol-Strick et al. Doumenge associated this sapropel layer with Noah's flood. He argued that heavy rains fell in the Middle East, in the Nile river basin, and in the East African Rift valley. These heavy rains increased the Nile river runoff until it resembled the current flow of the Amazon River. Doumenge argued that so much rain fell in the region that a surface layer of low salinity water between 15 and 20 meters deep covered the surface of the Mediterranean Sea. He argued that all life below this low salinity layer died for lack of oxygen. He claimed that the heavy rainfall lasted between 40 and 60 years.<sup>42</sup>

Further evidence for this flooding might come from a study published by Andre Goudie. He described a very important event that happened around 9000 BC. That event was the demise of many of the mammals in the world. Goudie noted that a massive reduction in mammal species occurred at some point after 13,000 BC, and that the reduction in species may have centered around 9000 BC. This mass extinction affected especially the big game animals. There remains a strong debate over whether this mass extinction of mammal species was caused by human action or environmental change.<sup>43</sup> It is not impossible that this massive extinction may have resulted from climate changes associated with the Younger Dryas and the transition to the Preboreal period.

A memory of this time may well have been preserved in flood accounts both in Genesis and across the region. The account would also have been preserved in Job 22:15-17. This passage described rebels who lived before Noah's flood. It notes that their foundations were washed away by a river. The massive floods would have destroyed evidence of previous human habitation across much of the ancient world.

It is fair to ask how river valley floods could have lasted for so long. After all, it could be expected that the flood would pour downhill and flow out of the valley. The real history of Mesopotamia may not have been that simple. During the Younger Dryas, drought conditions converted the Tigris and Euphrates rivers from meandering rivers to braided streams with marshes and lakes. The braided rivers had many channels separated by small islands. The channels were very shallow, and were filled with sediment. The channel paths changed constantly. Mesopotamia as a whole had only a slight downhill slope after the Euphrates emerged from the Syrian highlands at Hit, and the Tigris passed the contemporary village of Tikrit. So a vast flood that covered the whole valley would have taken a very long time to drain southeast to the sea. Even the limited Missouri and Mississippi valley floods of 1993 took over a month to fall back to normal levels. The Missouri valley floods filled the whole river valley. The flooding at the end of the Younger Dryas would have been far more extensive, and would have filled Mesopotamia for a much greater time period.

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Martine Rossignol-Strick, et al. "After the Deluge: Mediterranean Stagnation and Sapropel Formation," *Nature* 295 (1982): 105-110.

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Doumenge, "The Mediterranean Crises."

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Goudie, *Environmental Change*, 140-143.

Yahweh promised in Genesis 8:20-22 that He would never again curse the ground because of man's sins.<sup>44</sup> As long as the earth remained, seed time and harvest, cold and heat, summer and winter would never cease. After the flood, climate conditions have been rather unstable at times. Several cold and dry periods have occurred, but the earth has never again fallen into a full glacial cold like the Younger Dryas.

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44

The covenant sign of Noah's covenant was the glory rainbow that covered the earth in Gen. 9:12-17. This glory bow reappeared in Ezek. 1:28 as the glory that surrounded God's throne. So the sign of God's covenant may be God's presence in His creation. This rainbow has been interpreted in various ways. See: Laurence A. Turner, "The Rainbow as the Sign of the Covenant in Genesis IX 11-13," *Vetus Testamentum* 43 (1993): 119-124.

## CHAPTER 3: GENESIS 1-11 AND MESOPOTAMIAN HISTORY

### Post-Flood History

After the end of the Younger Dryas, human populations slowly spread rapidly across the world.<sup>45</sup> Noah's family established an agricultural life style. They lived in a tent and grew grapes. Noah became drunk on the wine of his vines, and exposed himself before his family. Noah's son Ham mocked his father, while his sons Shem and Japheth treated him with respect and covered his nakedness. When Noah became sober, he knew what had happened. He made a prophecy that would shape Israel's history until the end of time. Noah pronounced a curse not on Ham, but on Ham's son Canaan. Noah decreed that Canaan's descendants should serve Shem's descendants, and that Japheth should dwell in Shem's tents. So Shem was given rightful authority over all of Noah's descendants. Shem's descendants became the East and West Semitic peoples. For much of their history, Shem's descendants followed a semi-nomadic life style. They founded rather few cities, although they often lived in cities founded by others. The West Semitic peoples would eventually give rise to Abraham and the Israelites. The conflict that Noah began in Genesis 9:25-27 would lead eventually to Israel's conquest of Palestine.

If Noah's flood was associated with the end of the Younger Dryas somewhere around 8200 BC, it is not surprising that this period was followed by a millennium of relative silence in the archaeological record. It took time for the human population to grow large enough to spread across the region and to leave significant archaeological remains. Perhaps not surprisingly, the great river valleys were largely avoided by human populations for a millennium after the great floods.

By 7000 BC, farming was becoming common in many areas of the ancient Near East.<sup>46</sup> Wild wheat and barley were being planted in Turkey. Between 7000 BC and 6000 BC, farming communities in southwestern Anatolia and Greece were raising sheep, goats, and pigs.<sup>47</sup> The earliest farming villages in northern Iraq appeared between 7000 and 5000 BC. Çatal Hüyük in Anatolia (modern Turkey) may have been occupied as early as 6700 BC, although that date has been debated.<sup>48</sup> Jarus Zarins argued that pastoral nomadism had appeared in the ancient Near

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Kimball Banks suggested that the Central Sahara was inhabited after 8000 BC. This period marked the beginning of the period of greatest rainfall in the Sahara. Kimball M. Banks, *Climates, Cultures, and Cattle: The Holocene Archaeology of the Eastern Sahara*, (Dallas: Southern Methodist University, 1984), 2.

46

Doeke Eisma, "Stream Deposition and Erosion by the Eastern Shore of the Aegean," 67-81 in William C. Brice, ed. *The Environmental History of the Near and Middle East Since the Last Ice Age*, (New York: Academic Press, 1978), 76. Alfred Haldar, *Who Were the Amorites?* (Leiden: E. J. Brill, 1971), 33-35. Haldar discussed evidence raised by Mortensen, Raikes and Dyson on the subject. P. Mortensen, "On the Chronology of Early Village Farming Communities in Northern Iraq," *Sumer* 63 (1961): 73-80.

47

Eisma, "Stream Deposition and Erosion by the Eastern Shore of the Aegean," 76. See also the discussion in Davis A. Young, "The Antiquity and the Unity of the Human Race Revisited," *Christian Scholar's Review* 24 (1995): 380-396.

48

Jack Finegan suggested a date of 6700 BC in his book *Archaeological History of the Ancient Middle East*, (New York: Barnes & Noble, 1979), 85. On the other hand, Robert Ehrich claimed that the earliest dated level at Çatal Hüyük radiocarbon dated to 6385 BC, give or take 101 years. Robert W. Ehrich, *Chronologies in Old World Archaeology*, (Chicago: University of Chicago Press, 1954), 124.

East by the end of the 7th millennium BC. It appeared in semi-arid regions that he claimed had been largely empty of population for three millennia. Zarins argued that these pastoral nomads contributed strongly to the settlement of Akkad, the Semitic region of northern Mesopotamia. Zarins suggested that these pastoral nomads may have begun their rise to political dominance in northern Mesopotamia as early as the Protoliterate period.<sup>49</sup>

W. G. Lambert made an interesting point about the religious artifacts found at Çatal Hüyük. He noted that objects found there resembled a mother goddess figure and possibly a bull god. Lambert argued that religious myths did not develop gradually in the ancient Near East. Instead, they existed at the earliest settlement levels. Lambert argued that the history of the ancient Near East recorded the gradual running down of an ancient mode of thinking that dated all the way back to the prehistoric era.<sup>50</sup> Lambert was certainly not an evangelical. He saw the Old Testament account as containing mythical material. However, his basic point has some validity. The history of the ancient Near East did see the gradual loss of truth that was originally known among Noah's earliest descendants. Already at Çatal Hüyük, human culture was descending into idolatry.

Around 6000 BC, Mesopotamia, the Nile valley, and the Indus valley were first re-settled. It is unclear why the river valleys were not settled before this. It may be that memories of the great flood made people hesitate to inhabit a flood plain. It was once popular to argue that the valleys were just too swampy to inhabit before 6000 BC. Recent climate change studies have suggested a better reason why the river valleys were first re-settled around 6000 BC. The years between 6200 BC and 6000 BC saw a brief return to cold and drought conditions.<sup>51</sup> Marginal areas like the Iranian plateau were emptied of population at this time.<sup>52</sup> The river valleys may have been settled after 6000 BC simply because water could be found there.

The earliest settlements in Mesopotamia belonged to the Hassuna and Samarra cultures. Little is known about the ethnic background of these earliest inhabitants of Mesopotamia, and it is unclear whether specific ethnic groups had even developed in the ancient Near East at this time. These were Neolithic cultures, using obsidian weapons and crude pottery.<sup>53</sup> Neolithic settlements were not uncommon across the ancient Near East at this time. Wreschner discussed a Neolithic

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Juris Zarins, "Early Pastoral Nomadism and the Settlement of Lower Mesopotamia," *Bulletin of the American Schools of Oriental Research* 280 (1990): 54-56.

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W. G. Lambert, "Old Testament Mythology in its Ancient Near Eastern Context," *Supplements to Vetus Testamentum* 40 (1986): 124-143.

51

D. C. Barber et al, "Forcing of the Catastrophic Drainage of Laurentide Lakes," *Nature* 400 #6742 (1999): 344-348. Barber et al suggest that this drought happened in the North Atlantic region because the Laurentide glacial lakes began draining into the Hudson Strait instead of draining southeast into the St. Lawrence estuary. This change had a rather brief but profound impact on the northern hemispheric climate system.

52

M. H. Ganji, "Post-Glacial Changes on the Iranian Plateau," 149-163 in William C. Brice, ed. *The Environmental History of the Near and Middle East Since the Last Ice Age*, (New York: Academic Press, 1978), 156.

53

Jack Finegan, *Light from the Ancient East*, (Princeton: Princeton University Press, 1946), 13-14.

settlement in Palestine near Neve Yam. Wreschner argued for a 5000 BC date for the settlement although that date is at best somewhat uncertain.<sup>54</sup>

The Hassuna and Samarra cultures were followed by the Ubaid culture which began after 5200 BC. Samuel Kramer argued that Semitic nomads from Syria and Arabia immigrated into Mesopotamia during the Ubaid period. Kramer argued that these Ubaid immigrants had entered Mesopotamia with an established religious tradition. If so, Shem's descendants may have made up part of the Ubaid culture.<sup>55</sup> Since the believing tradition was largely preserved among Shem's descendants, some of the earliest inhabitants of Mesopotamia may well have still known the true God. However, the dominant religion in the valley would already have become idolatry. Kramer argued that the population of Mesopotamia believed that each city was protected by only one god. He argued that the city deity was originally worshiped at a small shrine with a table and altar.<sup>56</sup>

Ubaid period settlements in Mesopotamia were built on virgin soil, so they were the earliest settlements at their sites.<sup>57</sup> The Ubaid culture survived for quite a long time. It was a sparsely settled, rural, agricultural culture that included small villages and scattered settlements.<sup>58</sup> Since the Ubaid period lasted for so long, it has become convenient to subdivide it into several smaller time periods. The earliest part of the Ubaid period is represented by the Halaf culture in the northern part of Mesopotamia. The Halaf culture in the north spread rapidly across a large part of Mesopotamia, Anatolia and the Levant (which is Syria and Palestine). It was a high culture with beautiful and detailed pottery. It also used rather advanced forms of agriculture.<sup>59</sup>

After 4800 BC, the Halaf culture in Mesopotamia was replaced by a later phase of the Ubaid called the Eridu culture. With the rise of the Eridu culture, the center of population and civilization moved from the northwest end of the valley to the southeast end of the valley. This

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Ernst. E. Wreschner, "The Submerged Neolithic Village 'Neve Yam' on the Israeli Mediterranean Coast," 325-333 in P. M. Masters and N. C. Flemming, eds. *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, (London: Academic Press, 1983), 329. The uncertainty of dating Neolithic sites can be seen in C<sup>14</sup> dates from Tell Hammam et-Turkman. Charcoal from phase IV B at this site has produced C<sup>14</sup> dates of both 4160 BC and 8330 BC. For the data, see Peter M. M. G. Akkermans, "An Updated Chronology for the Northern Ubaid Periods in Syria," *Iraq* 50 (1988): 130.

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There has been substantial debate about the origin of the Ubaid culture. Frankfort, Akkerman, and Le Mièrè argued that the Ubaid people came originally from Iran. Oates argued strongly against this explanation for their origin. Henri Frankfort, *Archaeology and the Sumerian Problem*, (Chicago: University of Chicago Press, 1932), 18-19. Peter M. M. G. Akkerman and Marie Le Mièrè, "The 1988 Excavations at Tell Sabi Abyad, a Later Neolithic Village in Northern Syria," *American Journal of Archaeology* 96 (1992): 1-22. Joan Oates, "Eridu and the Sumerian Problem," 126-133 in Tom Jones, ed. *The Sumerian Problem*, (New York: John Wiley & Sons, 1969), 129.

56

Samuel Noah Kramer, *From the Poetry of Sumer: Creation, Glorification, Adoration*, (Berkeley: University of California Press, 1979), 54-55.

57

Uruk was a very important site. It was the Ereck of Gen. 10:10. It is often called Warka in academic literature.

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Robert McC. Adams and Hans J. Nissen, *The Uruk Countryside: The Natural Setting of Urban Societies*, (Chicago: The University of Chicago Press, 1972), 6-9.

59

N. Y. Merpert and R. M. Munchaer, "The Earliest Levels at Yarim Tepe I and Yarim Tepe II in Northern Iraq," *Iraq* 49 (1987): 1-36. Peter M. M. G. Akkerman, "An Updated Chronology for the Northern Ubaid and Late Chalcolithic Periods in Syria: New Evidence from Tell Hammam et-Turkman," *Iraq* 50 (1988): 109-146.

would seem to be consistent with Genesis 11:1-2. Genesis recorded that men moved east into the land of Shinar before the Tower of Babel was built. As the Eridu culture moved east to the region of Shinar, villages like Uruk, Ur, and Eridu became more important. Crown and Mellaart suggest that this culture was based on improved irrigation. This irrigation produced a surplus of population which enabled the Ubaid culture to spread across Mesopotamia.<sup>60</sup>

This may have happened in the days of Shem's descendant Peleg. Genesis 10:25 noted that in his days, the land was divided, irrigated, or canalled, depending on how the verb *palag* is translated.<sup>61</sup> Irrigation may have provided an economic basis for the earliest civilizations in the ancient Near East. Irrigation required both political organization and social differentiation. These factors produced economic prosperity and led to the rise of a centralized culture.<sup>62</sup> Moses may have chosen to record the advent of irrigation in Peleg's time because it marked a parting of the ways between the settled population descended from Ham and the semi-nomadic population descended from Shem.<sup>63</sup> Jarus Zarins pointed to the presence of a Semitic population of semi-nomadic people in Mesopotamia at this time.<sup>64</sup> Shem's descendants in Mesopotamia may well have been in tension with the rising idolatry in Mesopotamia. Evidence for this rising idolatry can be seen in the earliest level of the ziqqurat at Eridu.<sup>65</sup>

## Uruk and a Tower to Heaven

Jack Finegan noted that the next phase in Mesopotamian history lasted from 3500 BC to 3100 BC. It was centered at the city of Uruk. The Uruk period began around 3500 BC as climate conditions improved in southeast Mesopotamia. Oak forests spread through the mountains north of Mesopotamia, and severe floods struck cities in the valley.<sup>66</sup> During the Ubaid period, the

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Alan D. Crown, "Climatic Change, Ecology and Migration," *Australian Journal of Biblical Archaeology* 1 (1971): 18.

61

Gen. 10:25 has often been translated to suggest that in Peleg's day the earth was divided. This translation has been interpreted in unusual ways including allusions to continental drift. The Hebrew noun *'erets* can mean either earth or land. The verb *palag* can mean divide. However, a survey of the cognate languages reveals that the verb was also used to mean engrave or dig canals. In the cultural environment of the ancient Near East, it makes far more sense to suggest that in Peleg's day the land was canalled or irrigated than to suggest that the earth was somehow divided. See the discussion in: David M. Fouts, "Peleg in Gen 10:25," *Journal of the Evangelical Theological Society* 41 (1998): 17-22.

62

Karl W. Butzer, "Perspectives on Irrigation Civilization in Pharaonic Egypt," 13-18 in Denise Schmandt-Besserat, ed. *Immortal Egypt*, (Malibu: Undena, 1978), 13-18.

63

See the discussion in Fouts, "Peleg in Gen 10:25," 17-22.

64

Zarins argued that the Akkadians, or Kishites, were a Semitic population of semi-nomads. Zarins suggested that they had entered the valley from the western desert in the late fourth or early third millennium BC. Zarins, "Early Pastoral Nomadism and the Settlement of Lower Mesopotamia," 54-56.

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The great Eridu ziqqurat would later rise on the site of a small temple built in this age. The bottom temple layer of the ziqqurat at Eridu contained fragments of a kind of pottery called Eridu ware. This kind of pottery was in common use in Mesopotamia between 5000 BC and 4300 BC.

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Alan D. Crown, "Climatic Change, Ecology and Migration," *Australian Journal of Biblical Archaeology* 1 (1971): 15.

earliest occupation levels at sites around Uruk had been small, scattered villages that were only occupied for a short time. The earliest settlements around Uruk suggest that the population of the region was very sparse and widely scattered.<sup>67</sup> The pre-historic sites around Uruk also had a highly consistent culture. This should not be surprising. During the Ubaid period, human populations were still being re-established after the flood. So the population in the ancient Near East as a whole was quite limited. Also, the center of population during the Ubaid period was in the northwestern part of Mesopotamia, rather far from Uruk. All of this changed during the Uruk I period. The Early Dynastic I period at Uruk saw the largest city population ever to exist at Uruk. The city grew at the expense of the countryside. Whole districts around Uruk were depopulated as people poured into the cities. The increased urbanization at cities like Uruk produced the first centrally administered kingdoms in Mesopotamia. Sites near Uruk saw this great increase in urbanization much earlier than sites near Ur or Eridu.

Karl Butzer argued that irrigation agriculture was the economic base for civilizations like the 1st Dynasty at Uruk. Irrigation allowed high intensity agriculture to develop. With a large food supply, it was possible for large populations to exist within a reasonable distance of a central worship and administrative site. Archaeological and historical evidence links the rise of irrigation agriculture to the rise of social stratification and to the development of complex economies. A strong central government was needed to create and maintain the irrigation systems that supported the city economies.<sup>68</sup>

The construction of the Anu ziqqurat at Uruk was well underway by this time.<sup>69</sup> A total of two dozen ziqqurats were eventually built throughout Mesopotamia. Jack Finegan suggested that the ziqqurat at Uruk was the earliest of these ziqqurats.<sup>70</sup> The ziqqurats were great centers of both worship and education. The Uruk period was a literate era from beginning to end. The earliest large collection of written texts to have survived was written at this time. Between 500 and 600 tablets were found at Uruk that were written after 3200 BC.<sup>71</sup> William F. Albright

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McC. Adams and Nissen, *The Uruk Countryside*, 6-9.

68

Butzer, "Perspectives on Irrigation Civilization in Pharaonic Egypt," 13. McC. Adams and Nissen, *The Uruk Countryside*, 11, 87-88. Elizabeth F. Hendrickson, "The Early Pastoralism in the Central Zagros Highlands (Luristan)," *Iranica Antiqua* 20 (1985): 41.

69

McC. Adams and Nissen, *The Uruk Countryside*, 11, 87-88. Ziqqurats were continually rebuilt and enlarged. When they were rebuilt, a wall was erected around the old structure. The area within this wall was filled with dirt. The resulting structure was then used as the base for a much larger temple. The process resulted in a stepped temple tower. The ziqqurat at Eridu was rebuilt and enlarged in this way 18 times. As they were enlarged, they were rebuilt according to the laws and ordinances of the ziqqurat at Eridu. E. Douglas Van Buren, "Foundation Rites for a New Temple," *Orientalia* 21 (1952): 293-306.

70

Finegan, *Light from the Ancient East*, 19-20.

71

Joan Oates, "Ur and Eridu, the Pre-History," *Iraq* 22 (1960): 32-50.

suggested that the similarities between East and West Semitic poetry may date all the way back to this time period.<sup>72</sup>

All of this sounds remarkably like Genesis 11:1-9. In this passage, the population of Mesopotamia had moved east across the valley floor to the land of Shinar which was the southeastern part of the valley. The rise of an empire and tower in Shinar could then correspond with the 1st Dynasty at Uruk, when rural populations were being replaced by organized city cultures.<sup>73</sup> The early sanctuary at Uruk was being rebuilt into one of the first ziqqurats that Mesopotamia was to know. Ziqqurats were also being expanded in cities like Babel at this time.

God sent His special presence down to Shinar to see the city and temple tower that the Uruk culture had built.<sup>74</sup> By confusing their language, God limited man's ability to found an empire opposed to Him, and God scattered the population. The confusion of tongues might refer in part to the Sumerian immigration into the valley. After the Sumerian immigration, Mesopotamia would never again know a consistent culture and language. The Sumerian period in Mesopotamia began in roughly 2900 BC. The Sumerians claimed to have moved into southern Mesopotamia from a land named Dilmun.

Surprisingly, there is even a Sumerian text from Mesopotamia that seems to describe the end of the Uruk period. This text is often called *The Epic of Enmerkar*. It records that at one time there were no dangerous animals on earth. All men were united in one culture, and all men praised the god Enlil with a single language. The epic claims that god Enki confused man's language and caused dissention between men.<sup>75</sup> So this text may very well point back toward the same time period as the Tower of Babel account.

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William F. Albright, "The Role of the Canaanites in the History of Civilization," 328-362 in G. E. Wright, ed. *The Bible and the Ancient Near East*, (New York: Doubleday, 1961), 339. Alfred Haldar had argued that an immigration of Semitic people had entered Mesopotamia either at the same time as the Sumerians, or earlier. Haldar, *Who Were the Amorites*, 4-5.

73

It is unclear how much of the earth's human population was gathered around the tower. Dale DeWitt noted that the Hebrew word *eretz* can mean land as easily as earth. If translated as land, perhaps only the inhabitants of Mesopotamia were gathered at the tower. Dale S. DeWitt, "The Historical Background of Genesis 11:1-9: Babel or Ur?" *Journal of the Evangelical Theological Society* 22 (1979): 15-26. DeWitt suggested that the Tower of Babel account should be dated at the end of the Ur III period. This would seem to be too late a date. Several languages had been in use in Mesopotamia for a thousand years before this time.

74

Patrick Miller noted that Gen. 11:1-9 differed in an important way from Mesopotamian texts. In Mesopotamia, the gods decreed the construction of cities. In Genesis, God opposed and prevented the rise of cities. Genesis interpreted the first city as a direct revolt against God's decree. Patrick D. Miller Jr. "Eridu, Dunnu, and Babel: A Study in Comparative Mythology," 143-168 in Richard S. Hess and David Toshio Tsumura, eds. *I Studied Inscriptions from before the Flood*, (Winona Lake: Eisenbrauns, 1994).

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Samuel Noah Kramer, "The 'Babel of Tongues': A Sumerian Version," 278-282 in Richard S. Hess and David Toshio Tsumura, eds. *I Studied Inscriptions from before the Flood*, Winona Lake: Eisenbrauns, 1994.

## CHAPTER 4: PROBLEMS WITH CLIMATOLOGICAL INTERPRETATION

### Empirical Problems with the Climate Change Model

The climatological model for interpreting Genesis 1-11 is not without serious problems. The first problem is that some scholars would reject the practicality of applying climate change evidence either to the archaeological record or the biblical text. The fields Biblical Archaeology and Biblical Exegesis adapted to climatological evidence more slowly than other parts of the academic world. James Sauer noted in 1994 that many archaeologists still believed that climatic conditions in the ancient Near East had not changed significantly over the last 10,000 years. Sauer traced several lines of evidence that demonstrated the reality of climate change during this period.<sup>76</sup>

The climatological model also faces empirical problems with the model itself. Several of these problems are related to chronology. As has been noted, the date for the Younger Dryas has been a topic of repeated debate. When evidence for the Younger Dryas was first discovered, it was believed that two great cold epochs dominated the post-glacial world. The first cold period was thought to have followed initial post-glacial warming and to have lasted from 13,000 BC to 11,000 BC. This cold epoch was called the Older Dryas. This cold period was followed by the Alleröd Fluctuation and the Younger Dryas. While some authors continue to defend this pattern, many others now combine the Older and Younger Dryas, and date the Younger Dryas at any time between 8000 BC and 13,000 BC. This debate suggested at least some uncertainty in the interpretation of the evidence.

The climatological model for Genesis 1-11 also suggests that settled human populations should only have appeared after the proposed 10,000 BC date for the Garden of Eden. The field of Archaeology is badly split on the date defended for the appearance of settled village life. About half of the authors in the field claim that there is no evidence for agriculture or settled village life anywhere in the world before about 9000 BC. The other half of the field argues for village life substantially earlier than this. This debate over the origin of agriculture and village life is not a Bible/science debate. It is simply a debate within the field of Archaeology about how the evidence should be understood. It is fair to argue that a good case can be made both for and against the view of village life defended in the climatological model for interpreting Genesis 1-11.

A third chronological problem centers on the age of the human race. The climatological model suggests that the human race is only 12,000 years old. This conflicts markedly with almost every position defended by archaeologists and paleontologists. It is fair to ask whether the evidence for the origin of human life can actually be interpreted in terms of this model. Of course, bones are very highly chemically reactive with their environment. So very old bones are quite difficult to date with any certainty whether they are dated with radiocarbon dating, thorium dating, or amino acid racemization. Often ancient bones are dated by suggesting dates for the rock layers above and below the deposits within which they are found. However, dating methods used for rock layers are also rather highly problematic. So whether *homo sapien* bones can

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<sup>76</sup> James A. Sauer, "A New Climatic and Archaeological View of the Early Biblical Traditions," 365-398 in Michael D. Coogan, et al, eds. *Scripture and Other Artifacts: Essays on the Bible and Archaeology in Honor of Philip J. King*, (Louisville, KY: Westminster John Knox, 1994), 367-369.

actually be proven to predate 10,000 BC is a rather difficult evidential question, and each author's presuppositions are likely to play a key role in the conclusions reached.

### **Exegetical Problems with the Climate Change Model**

The climatological model for interpreting Genesis 1-11 also must face a number of exegetical challenges. First, the model assumes an old earth interpretation of Genesis 1-11. While a number of old earth interpretations have been proposed for Genesis, none are without significant problems. It is unlikely that the climatological model will be found attractive by those who defend a young earth view of Genesis 1-11, unless the evidence is significantly reinterpreted. It may be that Genesis 1 could be interpreted as a Mosaic polemic against Egyptian theology since passages like Ezekiel 20 described Israel's idolatry in Egypt.

Another exegetical problem with the climatological model is that it suggests that Noah's flood was limited to the ancient Near East. The model assumes that Noah's flood destroyed all of human life, but did not cover all the land on the surface of the earth. This is out of keeping with the traditional understanding of the Genesis text and with current evangelical flood geology models. Noah's flood has been a very difficult topic of debate within the evangelical world, and a wide variety of rather unlikely models have been suggested to explain it. Young earth authors have tended to see evidence for a global flood in the earth's geology and its fossil record.<sup>77</sup> Evangelical authors who are not committed to a young earth model have tended to see the geological evidence in a very different way. Daniel Wonderly and Davis Young have written discussions of the difficulties that flood geologies must face.<sup>78</sup> It is possible that the Genesis text itself may have been poorly understood.<sup>79</sup>

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Duane T. Gish, *Evolution: The Challenge of the Fossil Record*, (El Cajon: Creation-Life Publishers, 1985), 51.

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Daniel E. Wonderly, *Neglect of Geological Data: Sedimentary Strata Compared with Young-Earth Creationist Writings*, (Hatfield: Interdisciplinary Biblical Research Institute, 1987). Davis Young, "Scripture in the Hands of Geologists," *Westminster Theological Journal* 49 (1987): 1-34, 257-303. Davis Young, "Some Practical Geological Problems in the Application of the Mature Creation Doctrine," *Westminster Theological Journal* 35 (1973): 268-280.

79

Gen. 7:19 claimed that every high *har* under the *shamayim* was *kâcâh*. This verse has often been interpreted to mean that the waters of Noah's flood were deep enough to submerge every mountain on earth. Many of those who are committed to a young earth and a deep global flood will simply assume that the Hebrew text must be interpreted this way and find no other interpretation very attractive. The Hebrew text might not refer to a global flood at all. The Hebrew word *har* can mean mountain, but it can also refer to elevations of any height including small hills. The Hebrew word *kâcâh* can mean covered. It can as easily mean clothed, concealed, hidden, or overwhelmed. All of these ideas are related to the root idea of covering. The range of usage of these words suggests a few possible interpretations for Gen 7:19. One possibility is that during the forty day storm that caused Noah's flood, the far mountains had been hidden from view by clouds and rain. Another possibility is that a relatively shallow flood had occurred in the mountains as well as the valleys. An Egyptian hymn to the sun god Aten is quite interesting in this regard. The hymn was written during Egypt's Amarna Age, shortly after Joshua died. The hymn claimed that Aten had made a Nile river in heaven that resembled the Nile on earth. The heavenly Nile produced rain that fell on the earth's mountains. The hymn claimed that the rain from the heavenly Nile had created waves in the mountains that resembled the waves of the Mediterranean Sea. The hymn noted that the water from these waves was eventually used to irrigate fields and settlements. Vincent Arieh Tobin, "Amarna and Biblical Religion," in Sarah Israelite-Groll, ed, *Pharaonic Egypt: the Bible and Christianity*, (Jerusalem: Magnes Press, 1985), 236. This is interesting because it located the waves of the great deep upon the mountains, but the waves formed a flash flood instead of a global flood. If this is accepted as a parallel, perhaps the flood waters of Noah's flood covered the high *har* because the flood waters were found in the mountains as well as in the valleys.

A third exegetical problem concerns the limits of the culture gathered at the Tower of Babel. The Genesis text has often been interpreted to suggest that the whole world was a consistent culture. The climatological model suggests that the Genesis text was only intended to describe events in the ancient Near East. It may be fair to argue that the words "all the earth" in Genesis 11:1 could be understood in the same way that these words must be understood in Genesis 41:57. Moses claimed that the famine was severe in all the earth, and all the earth came to Egypt to buy food. This can hardly be taken as a claim that the population of China, Europe, and the Americas came to Egypt to purchase food. "All the earth" in Genesis 41:57 must refer to the Near East. It is less clear whether the *'erets*, or earth, of the flood account could have been the same limited *'erets* in Genesis 41:57.

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A different kind of explanation may also be possible. The *har* covered by the flood might have been worship sites instead of mountains. Authors like Meredith Kline have suggested that the Garden of Eden was the earth's first holy mountain sanctuary. Meredith G. Kline, *Kingdom Prologue*, Meredith G. Kline, 1993. Howard N. Wallace, *The Eden Narrative*, (Atlanta: Scholars Press, 1985), 88. The strongest evidence for this can be found in Ezek 28:11-16. Kalman Yaron, "The Dirge over the King of Tyre," *Annual of the Swedish Theological Institute* 3 (1964): 28-57. Herbert G. May, "The King in the Garden of Eden: A Study of Ezekiel 28:12-19," 166-176 in Bernhard W. Anderson and Walter Harrelson, eds. *Israel's Prophetic Heritage*, (New York: Harper & Brothers, 1962). H. J. Van Dijk, *Ezekiel's Prophecy on Tyre*, (Rome: Pontifical Biblical Institute, 1968). While this was a complicated prophecy, it identified Eden as the holy mountain of God, the place of gold and stones of fire. After Adam and Eve were driven from the garden, they carried with them the idea that God should properly be worshiped on mountain tops. From Genesis to Revelation, Scripture is full of descriptions of mountain top worship places and man made elevations used as worship sites. The ancient Near East was also full of holy mountain worship places. Many of these were theologically defined at great and high mountains, even though they were only man made structures in the valley. Sjöberg and Bergmann, *The Collection of the Sumerian Temple Hymns*. An example of this would be the ziqqurats of Mesopotamia. According to the temple hymns preserved after 2300 BC, these ziqqurats were claimed to be high mountains that filled the whole earth, even though they were only relatively small structures. Only a limited river valley flood may have been required, if the "har" covered by Noah's flood were the idolatrous worship sites in use before the flood.

## CHAPTER 5: ISRAEL'S PATRIARCHS AND CLIMATOLOGY

### Abraham and a Famine in the Land

The first famine has received quite a bit of academic attention in recent years. It began around 2300 BC and lasted for three centuries. This drought was a global event that may have been felt as far away as Australia.<sup>80</sup> In Egypt, it produced the First Intermediate Period when the land descended into political, social, and economic disruption. In western Mesopotamia, many sites were abandoned across the Habur River valley and the Assyrian plains.<sup>81</sup> In the Levant, drought nearly brought an end to the Early Bronze Age culture. William Dever argued that the years between 2300 and 2000 BC constituted a non-urban interlude between the Early Bronze Age and Middle Bronze Age. Dever argued that cities like Megiddo were reduced to villages and the highlands of Palestine were almost unpopulated. He suggested that the Early Bronze Age culture continued only on the fringe of the semi-arid land.<sup>82</sup> Adam Zertal studied the settlements on the Shechem syncline during this drought. He noted that the population of the Shechem syncline collapsed during the drought. Between 2000 and 1750 BC, there were only two settlement sites in the region. Then between 1750 and 1550 BC, populations returned to the syncline. He noted that 22 settlements were built in the highlands and 49 in the valleys. Zertal noted that both fortified and unfortified settlements were built at this time.<sup>83</sup> By 1800 BC, Ashkelon had grown so large that it had a population between 12,000 and 15,000 people. By the 17<sup>th</sup> century, Canaan reached its economic and military high point in the Middle Bronze Age. The population of the Shechem Syncline was ten times as large as it had been during the great drought.<sup>84</sup>

The significance of this famine for Israel's history depends on the dates that are defended for Israel's patriarchal age. Traditional patriarchal age dates have been calculated by adding the 480 years of I Kings 6:1 and the 430 years of Exodus 12:40 to 966 BC. This approach was taken by Merrill who suggested that Abraham entered Canaan in 2091 BC and that Joseph was brought to Egypt in 1899 BC.<sup>85</sup> Similar chronologies have been popular in the evangelical community, but

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H. H. Lamb, *Climate, History and the Modern World*, (New York: Methuen, 1982), 131.

81

A. Gibbons, "How the Akkadian Empire Was Hung Out to Dry," *Science* 261, (1993): 985. H. Weiss, et al. "The Genesis and Collapse of Third Millennium North Mesopotamian Civilization," *Science* 261 (1993): 999.

82

W. G. Dever, "New Vistas on the EB ('MB I') Horizon in Syria-Palestine," *Bulletin of the American Schools of Oriental Research*, #237 (1980): 35-64.

83

Adam Zertal *The Manasseh Hill Country Survey: Volume 1: The Shechem Syncline*, (Leiden: Brill, 2004), 46-53. See also Aaron Brody, "From the Hills of Adonis through the Pillars of Hercules: Recent Advances in the Archaeology of Canaan and Phoenicia," *Near Eastern Archaeology* 65 (2002): 69-71. James M. Weinstein, "The Chronology of Palestine in the Early Second Millennium B.C.E." *Bulletin of the American Schools of Oriental Research* #288 (1992): 634.

84

Lawrence E. Stager, "Port Power in the Early and the Middle Bronze Age: The Organization of Maritime Trade and Hinterland Production," *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas E. Esse*. (Atlanta: American Schools of Oriental Research, 2001), 633-634.

85

E. H. Merrill, "Fixed Dates in Patriarchal Chronology," *Bibliotheca Sacra* 137 (1980): 241-243.

have not been universally accepted.<sup>86</sup> For example, Hoerth recently argued for an 18th Dynasty exodus and a patriarchal age during Egypt's Second Intermediate Period.<sup>87</sup> This would move Joseph forward to the Hyksos era.<sup>88</sup>

If the traditional dates for Israel's patriarchal age are accepted, Abraham entered the Levant in the latter part of this famine. Palestine was occupied only by semi-nomadic people who farmed small fields in the summer and moved to warmer areas in the winter. If Abraham entered Palestine at this time, it should not be surprising that Abraham also led a mobile life style in Palestine. Genesis 12:10 may have referred to this famine. This passage noted that Abraham passed through Palestine and entered Egypt because the famine in Palestine was still severe.<sup>89</sup>

If the traditional dates for Israel's patriarchal age are accepted, Abraham entered Egypt near the end of the First Intermediate Period. Famine conditions in Egypt had begun to ease after 2135 BC as Nile annual flood levels rose once more. As Abraham entered Egypt, he would have encountered a civil war. Improving climate conditions at this time had led to a struggle for power between the southern ruler at Thebes and the northern ruler at Herakleopolis. The ruler of Herakleopolis may have wanted Abraham's assistance in his struggle with Thebes since Abraham led a very large household. In Genesis 14, Abraham led a force of 314 armed men who had been born into his household. That suggested that Abraham's household may have been as many as a thousand people, and Lot's household was still present with Abraham at the time. So Abraham's household would have been significant help for an Egyptian ruler involved in a civil war. When the Egyptian ruler realized that Sara was Abraham's wife, he forced Abraham to leave the land immediately. The Egyptians viewed adultery by married people as a serious social evil, and Sara's presence in Pharaoh's household could have caused him problems. After Sara was removed from his house, Pharaoh gave Abraham gifts of servants and livestock. MacDonald argued that such gifts were often given to chiefs in the Levant to gain their alliance with Egypt.<sup>90</sup>

If Israel had left Egypt during the 19th Dynasty as has so often been claimed, Abraham would have entered Palestine somewhere between 1925 BC and 1875 BC. By this time, the

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Kitchen accepted the 430 year claim of Ex. 12:40. Yet he also argued that the 480 years of I Kings 6:1 should be understood as the total of several concurrent periods in order to support a 19th Dynasty exodus date. See the discussion in J. J. Bimson, "Archaeological Data and the Dating of the Patriarchs," 53-89 in A. R. Millard and D. J. Wiseman, eds. *Essays on the Patriarchal Narratives*, (Winona Lake: Eisenbrauns, 1983), 84-85.

87

Hoerth argued for this chronology from the Septuagintal text of Ex. 12:40 as well as his interpretation of Gen. 15:13; Acts 7:6; 13:19, and Gal. 3:16-17. A. J. Hoerth, *Archaeology & The Old Testament*, (Grand Rapids: Baker Book House, 1998), 58.

88

Hoerth, *Archaeology & The Old Testament*, 142-147, 179.

89

Genesis never praised conditions in Palestine. After the exodus, Moses called Palestine "a land flowing with milk and honey." This phrase was used 13 times from Exodus to Deuteronomy.

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J. MacDonald, "Egyptian Interests in Western Asia to the End of the Middle Kingdom: An Evaluation," *Australian Journal of Biblical Archaeology* 2 (1972): 85.

famine was over and cities were beginning to reappear in the Levant.<sup>91</sup> Passing peacefully through the land would have been much more difficult.<sup>92</sup>

### Isaac and a Famine in Palestine

Genesis 26 recorded a new famine that struck Palestine during Isaac's life. Genesis 26:1 recorded that Isaac sought refuge in Gerar with Abimelech during the famine. Isaac dug wells to grow crops and support his flocks. The population of Gerar eventually resisted his use of their groundwater during the drought. They filled his wells with dirt and drove him from the region. Genesis 26 gave little information that could be used to date this famine. It happened at some point between the birth of Jacob in Genesis 25 and Jacob's theft of Esau's blessing in Genesis 27. Merrill argued that Jacob was born in 2006 BC.<sup>93</sup> If that date was approximately correct, an Egyptian text may have mentioned the famine. Barbara Bell argued that unusually low Nile flood levels brought distress to Egypt for a few years during the reign of Sesostri I, although the wealth of Nomarch tombs during his reign testified to the general prosperity of age. Nomes were administrative districts in Egypt that resembled city states. Bell noted that Ameny's tomb text recorded such a famine. Ameny was the Nomarch, or local ruler, of the Beni-Hasan nome at this time.<sup>94</sup> Ameny claimed: "When years of famine came, I plowed all the fields of the Oryz Nome, as far as its southern and northern boundaries, preserving its people alive, and furnishing its food so that there was none hungry therein. ... Then came great Niles, producers of grain and of all things, (but) I did not collect the arrears of the field (taxes)."<sup>95</sup> This famine struck Egypt somewhere between 1971 and 1911 BC depending on how Middle Kingdom chronology is understood.

### Joseph and the Famine Years

If traditional dates for Israel's patriarchal age are assumed, Joseph was brought to Egypt around 1899 BC. This would have been during the Middle Kingdom when Egypt was a dominant power in the region. Merrill argued that Joseph's years of abundance and famine in Genesis 41:46-49 were dated between 1886 BC and 1872 BC.<sup>96</sup> Even if these dates are accepted, it is difficult to identify the pharaoh that Joseph served. Callender noted that high, middle, and low chronologies continue to be defended for the Egyptian Middle Kingdom. Possible co-

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G. Auld and M. Steiner, *Jerusalem I: From the Bronze Age to the Maccabees*, (Macon University Press, 1996), 24.

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This problem would be less severe if Auld and Steiner's dates for the famine are accepted. They dated the famine in western Mesopotamia between 2200 and 1900 BC. Auld and Steiner, *Jerusalem I: From the Bronze Age to the Maccabees*, 24.

93

Merrill, *Fixed Dates in Patriarchal Chronology*, 242.

94

A Nome was an Egyptian administrative district not unlike a city state.

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Barbara Bell, "Climate and the History of Egypt: The Middle Kingdom," *American Journal of Archaeology* 79 (1975): 225.

96

Merrill, "Fixed Dates in Patriarchal Chronology," 247.

regencies remain a source of debate, and the chronology of the period remains in flux.<sup>97</sup> Joseph could have been a vizier for Amenemhet II, Sesostris II, Sesostris III, or Amenemhet III depending on how the Biblical and Egyptian chronologies are understood.

The historical evidence for Joseph's famine remains problematic. Barbara Bell used textual and archaeological evidence to suggest that Amenemhet III could have been Joseph's sovereign. She noted evidence for unusual abundance followed by economic difficulty during the reign of Amenemhet III. Agricultural abundance in Egypt was almost entirely tied to the annual Nile flood levels. High floods produced abundance because a larger land area could be cultivated. Low floods brought hardship and famine. Bell noted that flood inscriptions have been found written on the valley walls beside Semna and Kumma near the second Nile cataract. These texts recorded very high Nile flood levels during the reign of Amenemhet III. His inscription at Semna described Nile floods that were between 8 and 11 meters higher than normal flood levels.

Bell argued that the flood texts at Semna and Kumma were supported by physical evidence. Bell noted that a line could be seen on the rock cliffs around the valley near the second cataract. Below that line, the rocks were clearly worn by water. Above the line they were not water worn. This line appeared 8.73 meters above the level of the 1931 high flood line and it appeared at the same level everywhere in the valley. Bell also found a pocket of water laid flood deposit in a rock level 6.23 meters above the 1931 high flood line. A piece of pottery found in this flood deposit could not be dated by pottery style, but it did demonstrate that the high flood levels had occurred at some point after pottery came into use in the valley.

The high flood levels of Amenemhet III could fit Joseph's seven years of abundance. Bell noted that the highest recorded flood level occurred during Amenemhet III's 30th year. After that, Nile flood levels retreated to their normal height. Bell suggested that these lower levels might have caused economic difficulty for a nation that had grown accustomed to unusually high flood levels. Bell suggested that this may have been the setting for Joseph's famine years.<sup>98</sup> That suggestion would seem difficult to accept. A retreat to normal flood levels would not have caused a devastating famine in the Levant. It may also be difficult to make this suggestion work chronologically.<sup>99</sup> This famine would have struck Egypt after Merrill's suggested dates for Joseph's famine, but earlier than Hoerth's suggestion of Hyksos era dates. So Bell's work demonstrated the instability of Nile flood levels at the end of the Middle Kingdom, and demonstrated the possibility of Joseph's years of abundance. However Bell's suggested association of Joseph with Amenemhet III may not have been correct.

If Amenemhet III's abundance is not associated with Joseph, could evidence for Joseph's famine be found earlier in the Middle Kingdom? No evidence has survived for a famine during the reigns of Amenemhet II or Sesostris II, although the Egyptians may simply not have preserved a record of economic difficulties during their reigns. The possibility of a famine during the reign of Sesostris III is rather intriguing. At first sight, Joseph's famine would seem to

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G. Callender, "The Middle Kingdom Renaissance (c. 2055-1650 BC)," 148-183 in Ian Shaw, ed. *The Oxford History of Ancient Egypt*, (Oxford: University Press, 2000), 148-149.

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Bell, "Climate and the History of Egypt: The Middle Kingdom," 261.

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This problem would be less severe if the Septuagintal reading of I Kings 6:1 is accepted instead of the reading in the Massoretic text. The Septuagint claims a time period of 440 years instead of 480 years. This would move Joseph 40 years closer to the reign of Amenemhet III.

be historically unlikely at this time. Sesostris III was a very strong ruler, and the records of his reign give little indication of economic difficulty. Sesostris III was reputed to be one of the strongest rulers that Egypt ever knew. Herodotus claimed that he, “traversed the whole continent of Asia, whence he passed on into Europe, and made himself master of Scythia and of Thrace.”<sup>100</sup> While not historically accurate, Herodotus' claims exemplified the renown gained by Sesostris III among succeeding generations.

The strongest evidence for Sesostris III's power was that he regained control of Egypt's delta nomes from the nomarchs. During the First Intermediate Period, these Nomarchs had become independent. Earlier Middle Kingdom Pharaohs had been unable to control them, and several of the Nomarchs had built very expensive tombs for themselves. The Nomarchs' title was Great Overlord. This title went out of use during the reign of Sesostris III.<sup>101</sup> The Nomarchs also stopped decorating their own tombs in an expensive way during his reign. This has been interpreted as evidence for the great political and military strength of Sesostris III. If he could control the Nomarch's power, he must have been a strong ruler indeed.

It would be just as easy to interpret the evidence in a different way. Genesis 47:13-25 noted that all the money and land in Egypt came into Pharaoh's hands except the lands owned by the priests. So Joseph's famine would have given Pharaoh complete control of every Nome in Egypt. Even the Nomarchs themselves would have become his slaves to buy grain during the famine. The Nomarchs would have been unable to build new tombs for themselves because they simply would not have had the resources to do so. This interpretation would be consistent with Paul Ray's suggestion that Joseph's land reforms may have been connected with Sesostris III's ability to break the Nomarchs' power.<sup>102</sup> Genesis 47:26 noted that Pharaoh continued to collect his 20% for property ownership all the way down to Moses' day. That remained true even through the Hyksos era.

Evidence for unusually high Nile flood levels during the reign of Sesostris III can be found in an inscription at the Dal cataract. This text noted that the Nile river water level in the winter of that year equaled the high water line usually reached at the height of the annual Nile flood.<sup>103</sup> If the river water was this high in the winter, how high was the annual flood that year?

Unusually high Nile flood levels may also be suggested by the location of forts which were built by Sesostris III near the second Nile cataract. The fort at Semna was 83 kilometers north of the Dal cataract. Amenemhet I and Sesostris I had built forts near the second Nile cataract at the beginning of the Middle Kingdom. These forts were reused by Pharaohs Amenemhet II and Sesostris II. However, Sesostris III did not use these older forts. He rebuilt the fort at Semna 15 meters above the high flood line. The bottom level of the older fort had been eroded by flood water even though the fort was almost eight meters above the normal high flood line. It would be tempting to suggest that the very high flood levels had already appeared during the reign of Sesostris III and that he had rebuilt the second cataract forts above the new high flood level.

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M. Komroff, ed. *The History of Herodotus*, trans. G. Rawlinson, (New York: Tudor, 1928), 114.

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Callender, “The Middle Kingdom Renaissance (c. 2055-1650 BC),” 167-175.

102

P. J. Ray, Jr. “The Duration of the Israelite Sojourn in Egypt,” *Andrews University Seminary Studies* 24 (1986): 242.

103

Bell, “Climate and the History of Egypt: The Middle Kingdom,” 238.

During his eighth year, Sesostris III reopened an old canal around the second Nile cataract. It was dug at a low enough level that it could be reopened in the 18th Dynasty by Thutmose I and Thutmose II. The level of this canal suggested that Egypt saw normal flood levels in the eighth year of Sesostris III. The Nile flood levels may have risen by the tenth year of his reign. Flood levels may then have fallen below normal levels by the nineteenth year of his reign because in that year, Sesostris III noted that he could only pass the second Nile cataract with great difficulty. The water level was too low for him to pass even in the canal that he had opened in his eighth year. This may suggest a water level so low that it could have caused famine conditions in Egypt. So Joseph's years of abundance and famine could have occurred during the reign of Sesostris III even though his reputation would not be consistent with such a famine.

## CHAPTER 6: THE EXODUS AND CLIMATOLOGY

### The Sea Crossing Debate

Few events in the Old Testament have set off more academic debate than Israel's sea crossing in Exodus 14. Countless books and articles have centered their attention on whether,<sup>104</sup> when,<sup>105</sup> where,<sup>106</sup> and how<sup>107</sup> Israel crossed the sea. A surprising amount of evidence has been gathered on all sides in the debate. If it is assumed that the Israelites did in fact cross the sea, one of the more interesting questions becomes where such an event could have occurred. There have been three main theories about where Israel crossed the sea. All three theories begin Israel's journey in the northeast Nile delta near Wadi Tumilat.

The first theory about the location of Israel's sea crossing suggested that Israel traveled north from Wadi Tumilat. They then would have traveled across a sand ridge that forms a thin arc stretching out into the Mediterranean Sea between the Nile River and Palestine. This ridge of sand formed the outer edge of Lake Sirbonis. After arriving at the east end this sand highway in the sea, they would have crossed directly to Kadesh-barnea. According to this theory, the sea crossing actually happened either in Lake Sirbonis itself or further east in Lake Menzaleh. This theory is strengthened by the fact that a Baal shrine was present much later on the sand ridge around Lake Sirbonis.<sup>108</sup>

There are several problems with this theory. In Exodus 13:17-18, God specifically warned Israel not to travel north by the Way of the Philistines. By travelling north around Lake Sirbonis, the Israelites would still have faced the Egyptians when they arrived at the east end of the lake. The greatest problem with this theory is that there is no archaeological evidence that the sand ridge around Lake Sirbonis existed in the Mosaic age. The earliest artifacts on the ridge were made almost a thousand years later.<sup>109</sup> A variant form of this position suggests that Israel traveled along the southern shore of Lake Sirbonis. Israel would then have taken the coastal road north into Palestine. This theory is nearly as difficult to sustain as the earlier one. The southern

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Robert Luyster, "Myth and History in the Book of Exodus," *Religion* 8.1 (1978): 155-170. A. H. W. Curtis, "The 'Subjugation of the Waters' Motif in the Psalms; Imagery or Polemic?" 245-256 in *Studies in Honour of F. F. Bruce*, (Manchester University Press). Brevard S. Childs, "A Tradition-Historical Study of the Reed Sea Tradition," *Vetus Testamentum* 20 (1970): 406-418. Bernard F. Batto, "The Reed Sea: Requiescat in Pace," *Journal of Biblical Literature* 102.2 (1983): 27-35.

105

John J. Bimson and David Livingston, "Redating the Exodus," *Biblical Archaeology Review* 13.5 (1987): 40-53. Charles H. Dyer, "The Date of the Exodus Reexamined," *Bibliotheca Sacra* 140 (1983): 225-243. Leon J. Wood, "Date of the Exodus," 66-87 in J. Barton Payne, ed. *New Perspectives on the Old Testament*, (Waco: Word Books, 1970).

106

Tommy Brisco, "The Sinai Peninsula and the Exodus," *Southwestern Journal of Theology* 20 (1977): 23-32.

107

George W. Coats, "History and Revelation: The Reed Sea Event," *Lexington Theological Quarterly* 4 (1969): 22-31. Lewis S. Hay, "What Really Happened at the Sea of Reeds?" *Journal of Biblical Literature* 83 (1964): 397-403.

108

Henri Cazelles, "Donnees geographiques sur l'Exode," *Revue d'Histoire et de Philosophie Religieuses* 35 (1955): 51-58.

109

See the discussion in: Tommy Briscoe, "The Sinai Peninsula and the Exodus," *Southwestern Journal of Theology* 20 (1977): 23-32.

shore of Lake Sirbonis was very heavily populated. The coastal road north into Palestine was fortified by Thutmose III. Its forts had hardly been finished at the exodus. They were strong and well fortified. So Israel would hardly have traveled along the coastal road into Palestine.<sup>110</sup>

The second main theory about the location of Israel's sea crossing suggests that Israel left Egypt by crossing the Bitter Lakes directly east of Wadi Tumilat. Most versions of this central theory require the Israelites to cross the desert region of Et Tih, which would have been difficult. The best argument for a central route may be Exodus 15:22. This verse noted that Israel traveled from the Sea of Reeds into the wilderness of Shur. It has often been argued that the wilderness of Shur was located northeast of the Bitter Lakes. If that location for the wilderness of Shur is accurate, the Israelites must have crossed near the Bitter Lakes. Unfortunately, the location of Shur is no less certain than the location of other places named in the exodus account. Genesis 25:18 seemed to locate Shur further south than this.

The third main theory for the location of Israel's sea crossing placed it further south, across the Red Sea itself. This position is certainly more easily consistent with the New Testament which claimed that Israel crossed the Red Sea instead of the Reed Sea. A more radical version of this theory can be seen in the Koran. Islam teaches that Israel left Egypt twenty miles south of the Red Sea shoreline where the sea is 600 feet deep. Islam argues that a crossing at that site would be a far greater miracle, and would thus give God far more glory. So it must be right.

Several arguments have been raised against a southern crossing. There are no reeds there, so how could it be a sea of reeds? It may be too far south for the Israelites to have been able to reach in the time allowed. A southern crossing would have forced the Israelites to pass near the Egyptian Sinai mines, and it is assumed that they would have been hesitant to do so. These are weak arguments. Jonah 2:5 demonstrates that the word *sûph* in *yam sûph*, sea of reeds, can be used to describe salt water plants as well as fresh water reeds. The rate of Israel's travel toward the Red Sea can not be determined. There is no way to know how strong a force the Egyptians had at the Sinai mines, or if they were even in use at the time. Mining activity in the Sinai was rather sporadic.

### **The *Yam Sûph*, and the Red Sea**

Exodus 15:4, 22 claimed that Israel crossed the *yam sûph*. In theory, if this *yam sûph* could be identified, then the site of Israel's sea crossing would be known. Unfortunately, the identification of the *yam sûph* has been anything but simple. The *yam sûph* discussion has necessarily been bound up with the broader debate over the sea crossing location, but the debate has not produced a universally accepted understanding of this term.

The *yam sûph* debate has been complicated by the fact that the noun *sûph* is rather rare in Hebrew. Other than the twenty-three instances of the name *yam sûph* in Scripture, the noun only appears three times.<sup>111</sup> Each time, it clearly refers to reeds, rushes, swamp plants, or marshlands.

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110

G. I. Davies, "The Way of the Wilderness: A Geographical Study of the Wilderness Itineraries in the Old Testament," *Supplements to Vetus Testamentum* 41.

111

Ex. 2:3, 5 refers to the reeds where the infant Moses was placed. Is. 19:6 describes God's judgment on Egypt, promising that the reeds and Sûph will be dried up. Then Jonah 2:6 uses the noun Sûph to describe vegetation wrapped about the prophet's head. Authors who have understood *yam sûph* as a Sea of Reeds have tried to determine what kind of plants these *sûph* may have been, and where they may have been found. On this, see Francisco, "The Exodus in its

The academic discussion has drawn heavily on two possibly related Hebrew words, the hollow verb *sûph* and the noun *soph*. The verb describes bringing things to a complete end.<sup>112</sup> The noun appears rather often, and describes the end of a great many things.<sup>113</sup>

While these words look much like the *sûph* of Exodus, their meaning is quite different. Various suggestions have been proposed for bridging this gap. Maurice Copisarow suggested that a patriarchal age root *sûph*, end, evolved forms of meaning marsh, end, tempest, and Red Sea.<sup>114</sup> He then suggested that the name *yam sûph* was misunderstood by the Massoretic tradition and vocalized incorrectly as Sea of Reeds rather than End Sea. William A. Ward disagreed, suggesting that the original root was the Semitic biconsonantal word *sph*, bowl. He suggested that the idea bowl gave rise to marsh, a very large bowl. He then suggested that marsh gave rise to the meaning end or border because journeys normally ended at one marshland or another.<sup>115</sup> Both of these suggestions are rather speculative.<sup>116</sup> Interpreting *yam sûph* as an End Sea has led

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Historical Setting," 17, and Shafei, "Historical Notes on the Pelusiac Branch, the Red Sea Canal and the Route of the Exodus," 260. The results of this discussion have not been conclusive. The Red Sea water level has changed since the Mosaic age. The salinity and water level of the inland lakes have changed greatly. Canals in use in antiquity have silted up and dried out. Coastal regions have sunk and have become saline. So plant life patterns present today do not duplicate plant life patterns seen in the Mosaic age. See Montet, *Eternal Egypt*, 4, and William H. Shea, "A Date for the Recently Discovered Eastern Canal of Egypt," *Bulletin of the American Schools of Oriental Research* 226 (1977): 34. Further confusing the issue is the question of exegesis. When Jonah spoke of *sûph* beneath the sea in Jonah 2:5, he could have been reflecting current usage, interpreting *sûph* as seaweed. However, he also could have been describing his experience by using traditional imagery which had its roots in Near Eastern mythology. The same verses do speak of the *tehôm*, the bars of the earth, and the bases of the mountains. See Bernard F. Batto, "Reed Sea: Requiescat in Pace," *Journal of Biblical Literature*, vol. 102 (1983): 32, 33.

112

The hollow verb appears in Est. 9:28; Ps. 73:19, and Is. 66:17. Other possible examples can be found in Jer. 8:13 and Zeph. 1:2, 3, although these could be based on a different root. Solomon Mandelkern, *Concordantiae Hebraicae atque Chaldaicae*, (Tel Aviv: Hierosolymis, 1978), 794.

113

The noun appears in 2 Chron. 20:16; Dan. 4:8; 4:19; 7:28; Num. 21:14; Ecc. 3:11; 7:2, and Joel 2:22. Saebo noted that the Qumran literature also reads as "end" in three texts. See G. Johannes Botterweck, Helmer Ringgren and Heinz-Josef Fabry, eds., *Theologisches Wörterbuch zum Alten Testament*, 5 vols. (Stuttgart: W. Kohlhammer, 1986), 5: 794.

114

Copisarow, "The Ancient Egyptian, Greek and Hebrew Concept of the Red Sea," 12.

115

William A. Ward, "The Semitic Biconsonantal Root *SP* and the Common Origin of Egyptian *CWF* and Hebrew *SUP*: 'Marsh(-Plant)'," *Vetus Testamentum* 24 (1974): 344, 345.

116

Another possibility is that *sûph* may be drawn from a Semitic final aleph root *sp'* which means to feed. This root appears in the Canaanite verb to eat, *sp'*, the PostBiblical Hebrew and Aramaic verb to eat, *sp'*, *spy*, and the Hebrew noun *mispo*. See Stanislav Segert, *A Basic Grammar of the Ugaritic Language*, (Berkeley: University of California Press, 1984), 19. The Hebrew noun *mispo* is especially interesting. In Gen. 42:27; 43:24 and Judg. 19:19, it describes marsh plants used as fodder in Egypt and Canaan. On marsh plants used as fodder in Egypt, see Papyrus Sallier I, 4, 9. On marsh plants in Canaan, see Harold N. and Alma L. Moldenke, *Plants of the Bible*, (Waltham: Chronica Botanica, 1952), 40, 50, 62, 92, 120, 121. Final aleph roots do not normally form biconsonantal nouns, but there are exceptions to this rule. Other examples can be seen in Ex. 17:16; Job 15:31, and Dan. 6:18. The double stroke sign in the Egyptian *cwfy* could be taken as evidence for a final aleph in the Semitic prototype. However, it is not clear whether this sign should be interpreted as a *y* or simply as an unvocalized place holder. See Ward's arguments against vocalizing it. Ward, "The Semitic Biconsonantal Root *SP*," 339, 340.

to the suggestion that the Exodus account may be an example of a Near Eastern creation myth.<sup>117</sup> Positions similar to this have been defended recently by Batto, Hyatt, and others.<sup>118</sup>

The *yam sūph* debate has drawn heavily on a late Egyptian word *cwfy* which is usually understood to be a hieroglyphic spelling of *sūph*.<sup>119</sup> This word became rather common in Egyptian texts after the Eighteenth Dynasty flooded Egypt with Semitic captives.<sup>120</sup> Since *cwfy* did not appear in Egyptian texts before this time, it appears to be a foreign word brought into Egypt rather than an Egyptian noun which spread into the Semitic world.<sup>121</sup>

The Egyptian word *cwfy* was used in contexts where the word "marsh" would be expected to appear. Sometimes *cwfy* appeared with the article, indicating that a specific area was in view. In these cases, the noun would mean something like "the marshlands near \_\_\_\_\_," with the blank filled in by any of several locations bordering on swamp areas.<sup>122</sup> The most famous example of *cwfy* in the texts comes from Papyrus Anastasi III, 2:11-12, which described the delta city of Pi-Rameses. This papyrus claimed that the *cwfy* came to the city with papyrus reeds, and the waters of Horus with rushes.<sup>123</sup> A variety of other texts have been cited by Gardiner and others. One text described Egyptian workers who cut marsh plants in the *cwfy*. In another, Horus hid from Seth in the *cwfy*.<sup>124</sup> Still another visualized the Nile valley as an ox standing with its tail resting on *cwfy*.<sup>125</sup> Another listed *cwfy* as a festival offering given to the gods.<sup>126</sup>

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117

Snaith, "Yam Suph: The Sea of Reeds: The Red Sea," 397.

118

See Batto, "The Reed Sea: Requiescat in Pace," 32, and Hyatt, *Commentary on Exodus*, 164.

119

J. Simmons expressed doubts about the validity of this identification because the Egyptian rope sign would not normally become a Hebrew *sameck*. Simmons, *The Geographical and Topographical Texts of the Old Testament*, 78, 120

This word is spelled with four signs, the rope, the chick, the horned snake or snail, and the double stroke. See Adolf Erman and Hermann Grapow, *Wörterbuch der ägyptischen Sprache*, 5 vols. (Berlin: Akademie, 1955), 5: 359. This word has been transliterated in a variety of ways, including: *cwf*, *cwfy*, *twfi*, *toofi*, *tufi*, and *soofy*.

120

Ward noted that *cwfy* may have been in use long before it appeared in print. Ward, "The Semitic Biconsonantal Root SP," 348, 349. Foreign words would have been spoken in Egypt long before they were accepted as Egyptian words, and the 19th Dynasty could have turned such Semitic words into standard usage. See also Redford, "The Relations between Egypt and Israel from El-Amarna to the Babylonian Conquest," 197.

121

In these contexts, *cwfy* sometimes appeared with the town determinative, even though a swamp clearly was in view. See Gardiner, *Ancient Hebrew Onomastica*, 2:201-204 for a list of places where the noun *cwfy* appeared in the Egyptian texts. His work is normally cited in current discussions of the question. Ward mentioned a text where *p3-cwfy* seemed to describe the area near Lake Menzaleh. Ward, "The Semitic Biconsonantal Root SP," 341.

122

Since this text mentions both Per-Raamses and *sūph*, it has been translated and cited in many sources. See Ward, "The Semitic Biconsonantal Root SP," 341, and Shafei, "Historical Notes on the Pelusiac Branch," 237, 259.

123

Ward, "The Semitic Biconsonantal Root SP," 342.

124

Gardiner, *Ancient Egyptian Onomastica*, 2:168. Gardiner identified this reference as part of a fictional story called the *Blinding of Truth*.

125

See Lambdin, "Egyptian Loan Words in the Old Testament," 153, Ehlen, "Deliverance at the Sea: Diversity and Unity in a Biblical Theme," 169, and J. D. Douglas, ed. *The Illustrated Bible Dictionary*, 3 vols. (Wheaton: Tyndale House Publishers, 1980), 3:1323.

How did an Egyptian area come to be called a *yam sùph*? While no definite answer can be given, the parallel with the Fayum is quite instructive. The Fayum is a large depression west of the Nile and south of the delta. In the Biblical period, this depression contained an enormous reed filled lake which was fed by a branch of the Nile. It also contained some of the best farm land in Egypt. The Egyptian names for this region included *ta-she*, Lake Land and *sha-t Asar*, the Lake of Osiris.<sup>127</sup> During the empire age, the Fayum was filled with Asiatic slaves, including captives from Syria and Palestine. At this time, a new name came into use for the region. It came to be called *pa-ym*, The Sea.<sup>128</sup> There can be no doubt that *yam* was a Semitic loanword imported into Egyptian. The name of the Canaanite sea god Yam appeared ten times in the Astarte Papyrus alone. The Astarte Papyrus seems to be a hieroglyphic version of the Canaanite Baal Yam myth. So this papyrus illustrates Yam being brought into the Egyptian language.<sup>129</sup> So the name *pa-ym*, The Sea, probably was a name given to the region by its Semitic inhabitants. This name was handed down among Semitic speaking peoples, and was preserved down to the present time as Fayum. However, along side of this Semitic name, the traditional Egyptian names for the region also continued in use. For example, the Ptolemaic era shrine of El-'Arish still called the Fayum by the traditional name of *ta she*.<sup>130</sup>

The name *yam sùph* probably arose in a similar way. The Semitic peoples living in the eastern delta and in Wadi Tumilat needed a name to describe the vast marshy areas around them. They chose a Semitic name which accurately described those regions, and which probably approximated Egyptian names in use at the time. So instead of calling the swamps an Egyptian name like *sh.t 'i3rw*, Field of Reeds, *sh.t htp*, Field of Offerings, or *mr nh3*, Winding Waterway, they chose the Semitic name *yam sùph*, Sea of Reeds. If so, then John Towers is quite justified in claiming that *sh.t 'i3rw* and *yam sùph* are identical in meaning. Towers may also be correct in suggesting that the name *yam sùph* could have carried overtones drawn from Egyptian theology.<sup>131</sup> When Yahweh destroyed Pharaoh's army in the *yam sùph*, that event would have turned those Egyptian overtones into an effective polemic against Egyptian theology.

The name Red Sea is also an important part of the debate about the location of Israel's sea crossing. The earliest known appearance of the name Red Sea can be found in the writings of Herodotus. He was a Greek historian who was a contemporary of Esther in the Old Testament.<sup>132</sup> For Herodotus, the body of water now called the Red Sea was only a gulf of the real Red Sea. Herodotus used the name *eruthra thalassa*, or Red Sea, to describe a much larger region including the current Red Sea, the Persian Gulf, and the Indian Ocean. The name Red

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127

See Gardiner, "The Name of Lake Moeris," 37-51, David, *The Pyramid Builders of Ancient Egypt*, 254, and Budge, *An Egyptian Hieroglyphic Dictionary*, 2: 720.

128

Montet, *Eternal Egypt*, 3.

129

Gardiner, "The Astarte Papyrus," 74-85, Gardiner, *Late-Egyptian Stories*, 76-81, and Wilson, *The Culture of Ancient Egypt*, 320.

130

Griffith, *The Antiquities of Tell El Yahûjîyeh*, 70-73.

131

Towers, "The Red Sea," 150-153

132

Herodotus lived from 484 B.C. to 425 BC. He has been called the Father of History. He wrote the history of the Persian Empire. George Rawlinson, trans. *The History of Herodotus*, (New York: Tudor, 1941).

Sea referred to the southern sea which surrounded Africa and India.<sup>133</sup> This southern sea was part of the sea which surrounded the whole earth in classical cosmologies.

The Red Sea was also mentioned by the Roman historian Titus Livy, a contemporary of Christ.<sup>134</sup> Livy used the name Red Sea to describe the Indian Ocean.<sup>135</sup> He called the Red Sea the Ocean which held the earth in its embrace,<sup>136</sup> and claimed that it reached the farthest shores of India (*de ultimis Indiae oris*), and the uttermost ends of the earth (*terrarum ultimos*).<sup>137</sup> In the earliest texts, the name Red Sea described quite a large area of water without dividing it up into specific seas. It also clearly was associated with the ends of the earth and with at least the southern part of the primal sea that surrounded the earth.<sup>138</sup> It may be significant that the name Red Sea described the primal deep instead of a smaller region, especially since the color red was associated with so many Egyptian marshland and underworld motifs.

Both the Septuagint Greek text and the New Testament Greek text claim that Israel crossed the *eruthra thalassa* which means Red Sea.<sup>139</sup> This has led many scholars to defend a southern location for Israel's sea crossing across the Red Sea itself. Many other authors have defended a variety of northern routes for the exodus that are all based on the Hebrew text's claim that Israel crossed the *yam sūph*, which means the Sea of Reeds.<sup>140</sup> This creates quite a problem if both the New Testament and the Old Testament are assumed to be inspired and inerrant. Some way must

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133

Herodotus, II, 158. See also the maps in Rawlinson, *The History of Herodotus*, 317-319. The best survey of the classical authors is John Ball, *Egypt in the Classical Geographers*, (Cairo: Government Press, Bulaq, 1942). Komroff, ed. *The History of Herodotus*, 137.

134

Foster gives Livy's probable dates as 59 BC to 17 AD. See B. O. Foster, *Livy*, vol. 1, (Cambridge: Harvard University Press, 1939).

135

*Livy*, Book 45, IX, 6.

136

*Livy*, Book 34, XVII, 15.

137

*Livy*, Book 42, LII, 14 and 45, IX, 6.

138

One Midrashic tradition is very interesting here. This tradition claimed that Jonah traveled through the Red Sea while in the fish's belly. Ibn Ezra and Kinchi held that this was possible because the Red Sea waters extended to the northern Mediterranean Sea. If this pointed back to an earlier tradition, it could reinforce associating the Red Sea with the Great Green and Nun. See Bernard F. Batto, "Red Sea or Reed Sea?" *Biblical Archaeology Review* 10 (1984): 61. Batto used this Midrashic tradition to argue that the Red Sea was a part of the primal deep.

139

Ex. 15:4 in the LXX, and Acts 7:36; Heb. 11:29 in the New Testament.

140

For example, Eakin argued that the Red Sea had to be ruled out because it had no reeds, and because the lengthy route would have enabled Pharaoh to catch Israel. Eakin, "The Reed Sea and Baalism," 378. The length of Israel's route makes a rather strange argument. There is no way to know when Pharaoh sent his forces against Israel. Also, the whole isthmus was fortified to prevent Asiatic incursions. Pharaoh probably could have dispatched forces quite rapidly from any of several sites. Israel crossed the *sūph* near Migdol which was almost certainly one such border fortress. However, it can be questioned whether Israel could have traveled the required distance in the time allowed. On the presence of *sūph* in the Red Sea, Francisco argued that *sūph* could be seaweed according to Jonah 2:5, and that the northern Red Sea does have sea weed. Francisco, "The Exodus in its Historical Setting," 17, 18. John Murray argued that the word *sūph* came from the name of a common form of sea weed that resembled wool, the *Eytiphloea Pinastroides*. John Murray, *A Handbook for Travellers in Egypt*, (London: John Murray, 1873), 227.

be found for Israel's sea crossing to have occurred over both the Red Sea and the Sea of Reeds at the same time.

### **A Proposed Location for the Exodus**

One location deserves more attention than it has received of late. That location is the vast dry basin stretching south from the Shalûf (a ridge of Tertiary limestone south of the Bitter Lakes) to the current Red Sea shoreline. A century ago, it was common for authors to locate Israel's sea crossing in this basin because they assumed that Red Sea waters had filled it in the Mosaic age.<sup>141</sup> The nature of this basin suggests that this was not an unreasonable assumption. Since the Suez Canal has changed the whole character of this region,<sup>142</sup> its geology can best be appreciated by reading descriptions of it written before the Suez Canal was dug. One of the most interesting accounts of this region was written by Edward Robinson. In 1838, he traveled north of the current Red Sea shoreline and described it in detail. He noted that the ground gave every sign of being occasionally flooded. The sand was packed hard by water action, and was covered in places by the kind of saline efflorescence produced by sea water. He noted that this kind of flood packed sand extended a great distance to the northeast. Above the narrows at Suez, he noted that this flood packed floor opened out into a very large bay stretching far north of the present water line. Observing this, he concluded that the gulf originally stretched much further north than its current shoreline.<sup>143</sup>

Robinson's observation is plausible. The area south of the Shalûf is a very low clay basin with sand dunes blown in from the east.<sup>144</sup> The average height of this basin's clay floor is only about four feet above the current Red Sea high tide level. Since the basin is this close to sea level, the whole region is occasionally flooded by storm surges from the Red Sea.<sup>145</sup> Menashe

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141

As recently as 1978, Alessandra Nibbi argued that the Red Sea extended 30 miles further north in the Mosaic age. Nibbi, "The Lake of Reeds of the Pyramid Texts and Yam Sûph," 96. Nibbi footnoted G. Posener, "Le Canal du Nil à la Mer Rouge avant les Ptolomées," *Chronique d'Egypte* 13 (1938): 260-262.

142

When the Suez Canal was dug, the ancient fresh water canal was also reopened to provide drinking water for canal workers. Fresh water from this canal has allowed over 70,000 acres of land to be irrigated for farming, and has made possible a farming population in the region of over 35,000 people. For a discussion, see Glen E. Edgerton, "An Engineer's View of the Suez Canal," *National Geographic Magazine*, 111 (1957): 124.

143

Edward Robinson, *Biblical Researches in Palestine, and in the Adjacent Regions*, 2 vols., (Boston: Crocker and Brewster, 1860), 60, 61.

144

S. R. Driver described this region in 1911. He noted that the soil north of Suez consisted of sand blown in from the eastern desert. Driver, *The Book of Exodus*, 125.

145

Rady et al studied storm surges in the Gulf of Suez and concluded that storms accompanied by strong winds from the northwest would lower gulf water levels, but not create higher storm surges. M. A. Rady, et al. "Tide-Surge Interaction in the Gulf of Suez, Egypt." *Mar. Geod* 17 (1994): 45-62. However, their study did not discuss storms whose winds blew from the opposite direction. It should not be surprising that such a large tract of land stood within two meters of sea level. If it were not for the coastal dunes, a sea level rise of only one meter would flood parts of the northern delta up to 30 km inland. On the northern coast, see G. Sestini, "Implications of Climatic Changes for the Nile Delta," in L. Jetic, J. D. Milliman, C. Sestini, eds. *Climatic Change and the Mediterranean*, 535, (New York: United Nations Environmental Programme, 1992).

Harel notes that in stormy weather, sea water sometimes spreads north five or six miles and reaches a depth of six feet.<sup>146</sup> About once every twenty years, a storm sweeps north enough water to flood the whole plain south of the Shalûf. S. C. Bartlett observed such a storm in 1879. He traveled five miles north of Suez several days after the storm. He found that pools of water six and a half feet deep had stood behind the canal station even at that distance from Suez, and great stretches of water still stretched far north of his position.<sup>147</sup>

If this basin was flooded in the Mosaic age, it certainly could not have been crossed. The basin had such a deep clay floor that when the Suez Canal was dug through the region, earth moving machines could not budge it. The clay had to be broken up with pick axes and removed with baskets.<sup>148</sup> Sea water covering this clay floor would have turned it into a quagmire. An interesting parallel can be drawn here to Egyptian Field of Reeds theology. The Egyptian Pyramid Texts stressed repeatedly that Pharaoh could only cross the Field of Reeds when the marshes were flooded. Then he could float across the marsh on a reed float.<sup>149</sup> Egyptian Coffin Spell 622 noted that those who tried to cross the Field of Reeds when it was not flooded sank into the quagmire and died.<sup>150</sup>

This mythological motif describes Nile delta marshland soil quite accurately. Marsh muck is very dangerous. It can not be crossed on foot because it is too waterlogged to support a man's weight. Those who step into it sink in the muck.<sup>151</sup> It can, however, be crossed when it is dried. An interesting historical example of this can be seen in a pre-Mosaic Egyptian work called *The Admonition of an Egyptian Sage*. This text records that the Egyptian priests were appalled to find that a drought had so dried the marsh that commoners could cross it on foot. The priests were appalled by this because all of the secret Egyptian marshland shrines were open to public inspection.<sup>152</sup> If the region south of the Shalûf was a tidal basin in the Mosaic age, its marshland could have been blown dry in a similar way allowing Israel to cross.<sup>153</sup> A Red Sea storm surge

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146

Harel, "The Route of the Exodus of the Israelites from Egypt and their Wanderings in the Sinai desert: A Geographic Study," 87.

147

S. C. Bartlett, *From Egypt to Palestine*, (New York: Harper & Brothers, 1879), 152. A. P. Schick noted an example of wind blown high water in the Gulf of Aqaba. A. P. Schick, "Tiran: the Straits, the Island, and its Terraces," *Israel Exploration Journal* 8 (1958): 127.

148

Murray, *Handbook for Travellers in Egypt*, 236.

149

See for example Pyramid Texts 340 and 351-353.

150

This interpretation may be supported by an interesting claim by Moses in Ex. 15:12. Moses claimed that God had stretched out His hand, and the earth swallowed Pharaoh's army. This claim would be quite accurate if Pharaoh's forces sank into the marsh slime and died there. Of course, the *erets* of Ex. 15:12 is often taken to be the underworld, and is paralleled with passages like Num. 16:1-32; 1 Sam. 28:13, and Is. 29:4. See Hyatt, *Exodus*, 165.

151

S. C. Bartlett described an example of this. He recorded an interview with M. de Lesseps who designed and dug the Suez Canal. De Lesseps notes that while riding his horse near the Bitter Lakes, he became entangled in such a morass and had great difficulty escaping from it. Bartlett, *From Egypt to Palestine*, 149.

152

Gardiner, *The Admonition of an Egyptian Sage*, 38.

153

Against this interpretation, it could be argued that Ex. 15:4, 5 and Neh. 9:11 associate Israel's sea crossing with the abyss. These verses are sometimes taken as evidence for a deep water crossing. See on this, Gispén, *Exodus*, 147, 148.

could then have drowned the Egyptians. Contemporary examples suggest that waves of sea water between six and ten feet high could have roared north from the Red Sea. Such a storm surge would also have restored the marsh muck's natural viscosity and made the trap inescapable.<sup>154</sup>

The really critical question is whether this long basin was actually covered with water in the Mosaic age. Was the sea level high enough in that region to flood the basin? It has become fashionable among Old Testament scholars to answer that question in the negative and to justify this answer by citing one of William F. Albright's articles. For example, John J. Davis claimed that the Bitter Lakes region could not have been connected to the Gulf of Suez in the 15th century BC. Davis' evidence for this claim was Albright's conclusion that the sea level in the Gulf could not have been very much higher in the 15th century BC, if it was higher at all.<sup>155</sup> Davis then went on to quote the relevant paragraph from Albright's article. The problem with this is in Albright's article itself.

Albright's expedition toured the Sinai for a month. The expedition stopped briefly at a coastal site near Merkhah. Albright identified this site as a small temporary settlement formed in the 15th century BC as a landing and embarkation point for mining expeditions. Albright noted that the edge of this settlement was only five meters above the mean Red Sea level and only two meters above the high tide line. Albright concluded from this that the Red Sea level could not have been more than two meters higher than present in the past 3500 years.<sup>156</sup> Albright's article is all well and good as far as it goes. However it does not address the question of whether the region south of the Shalûf was a tidal basin in the Mosaic age. It is not surprising that a temporary settlement intended as an embarkation point would have built its lowest structures close to the high tide line. An additional meter or two of sea water in the Mosaic age would have turned the whole basin into either a tidal or salt marsh.

This point has not been missed completely by recent Old Testament scholarship. For example, G. I. Davies wrote in his book *The Way of the Wilderness* that several authors have used the evidence from Tell el-Kheleifeh and Abu Zenima to argue that the sea level could not have been higher than present norms in the Mosaic Age. Tell el-Kheleifeh and Abu Zenima were the sites that Albright visited on the Red Sea shore. Davies argued that the evidence from these sites was compatible with a sea level two meters higher than present norms, and that was all that proponents of a northern extension of the Red Sea actually envisaged.<sup>157</sup>

Beyond Albright's article, there is also a large body of evidence bearing on this question that is often overlooked in Old Testament academic discussions. That body of evidence comes from the fields of Climatology and Marine Archaeology. The last three decades have seen the growth

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However, if Israel's sea crossing mimicked Field of Reeds theology, the marshes crossed would have been associated with Nun, the abyss, and the underworld Field of Reeds locations. So drowning in the Field of Reeds was also drowning in the great primal abyss. Faulkner's translation of Coffin Spell 279 is quite interesting here. This spell promised that Pharaoh will "bathe in the basin of the Abyss." If the Abyss here is the Nun, the Great Deep, it contains a shallow basin for bathing in the Field of Reeds.

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This interpretation may be supported by Ex. 15:12. Moses claimed that the earth had swallowed Pharaoh's army. This claim would be quite accurate is Pharaoh's forces sank into the marsh slime and drowned.

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Davis, *Moses and the Gods of Egypt*, 170, 171.

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Albright, "Exploring the Sinai with the University of California African Expedition," 14, 15.

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Davies, *The Way of the Wilderness*, 73, 74.

of quite a large literature on the topic of global climate change.<sup>158</sup> A significant part of this discussion has centered on sea level change. There are dozens of books and articles in print that deal with sea level change either directly or indirectly. Unfortunately, none of this new data gives a clear and certain picture of Red Sea levels in the Mosaic age. While this data can not now pin down the site of Israel's sea crossing, it does provide one arena in which future discussions of the Exodus must take place.

Climatological studies analyze sea level changes by looking for fossil shorelines and then using a variety of dating techniques to date the shoreline. Fossil shorelines point to a long period of stable sea level at that point. Almost every sea shore in the world contains a series of such fossil shorelines both above the sea surface and below it. Tracing and dating these fossil shorelines can reveal much about the history of the site. Unfortunately, there are at least four factors which influence where these shorelines are cut. The interplay of these factors limit how firmly conclusions can be drawn from any site despite the high degree of confidence which many authors display when reporting their findings.

The first factor effecting the location of fossil shorelines is the global sea level itself. The earth's oceans do not have a fixed sea level, but their level changes as land ice is formed and melted. It tends to remain rather constant for long periods then change rather rapidly. At the height of the last glacial period at 16,000 BC, the world ocean level was somewhere between 65 and 130 meters below its current stand. Nearly 10% of the earth's surface was covered by ice, and the glaciers held somewhere between 84,000 and 98,000 cubic kilometers of ice.<sup>159</sup> This ice melted especially rapidly in two periods. It melted at an amazing rate between 14,000 and 11,000 BC producing a very rapid rise in sea level. This melting was interrupted by a thousand years of full glacial cold in the Younger Dryas with stable sea levels. Then very rapid melting returned between 8000 and 5000 BC. By 4000 BC, the last of the Glacial Age continental ice had melted away. Fossil shorelines were created in periods when the sea level was fairly stable.

The second factor effecting the location of fossil shorelines is subsidence. Shorelines can sometimes sink for a variety of reasons including sediment loading, the flow of underconsolidated sediments, and compaction. This can be seen in the Nile delta where older sediments are often rather far below sea level.<sup>160</sup> Another example is the coastal shelf of Delaware and Maryland that has subsided due to the hydroisostatic effect of "water loading."

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There are several ways to get into this discussion. One way is to peruse the "Climatology" subheading in each annual subject index volume of *Physical Abstracts*. It is also useful to read through journals like *Climate Change*, and *Pollen et Spores*. There are good multi-author works like P. M. Masters, N. C. Flemming (eds.), *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, (London: Academic Press, 1983). E. J. Cushing, H. E. Wright, Jr. (eds.), *Quaternary Paleoecology*, (New Haven: Yale University Press, 1967).

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Quite a few figures have been given both for the total volume of ice created in the glacial periods, and for the degree to which the ocean surface was lowered by its formation. One useful study is Roger G. Barry, "The Significance of Global Snow and Ice Cover for Global Change Studies," *GeoJournal*, 27 (1992): 293-297.

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See for example, D. J. Stanley, D. Arnold, A. G. Warne, "Oldest Pharaonic Site," *Research & Exploration*, 8 (1992): 264. D. J. Stanley, "Subsidence in the Northeastern Nile Delta: Rapid Rates, Possible Causes, and Consequences," *Science* 240 (1988): 497-500.

This is a clear example of an ocean shoreline that has been lowered in comparison with other shorelines of similar age.<sup>161</sup>

The third factor effecting the location of fossil shorelines in the vertical movement of crustal plates produced by plate subduction zones. As one plate dives beneath another, it pushes the second plate up. This process forms mountains and volcanoes along the subduction zone. While crustal plates move quite slowly, this movement causes earthquakes which can change shore levels greatly in a very short time. It is often difficult to tell whether the height of a fossil shoreline should be explained by rising sea water or rising land. There has been an ongoing debate between scholars like Neev and Ronen over the extent to which fossil shorelines off the coast of Israel should be explained by plate tectonics.<sup>162</sup>

The fourth factor effecting the location of fossil shorelines is closely related to this. Continental plate rock is relatively light. The continental plates more or less float on the heavier basalt magma beneath them. When a two mile thick layer of ice forms on one part of a continental plate, the weight of the ice pushes that part of the plate down into the magma. As the covered sections sink, uncovered areas near the ice tend to rise above normal levels. Van Andel suggests that crustal plates can be depressed to a depth equal to more than a quarter of the ice thickness covering them. When the ice is removed they rebound rather rapidly at first, then much more slowly.<sup>163</sup> This also creates fossil shorelines both above and below the current sea level.<sup>164</sup>

Given these complicating factors, it is not surprising that climate change studies often disagree with each other. Sea level changes in the Holocene Era have been reconstructed in a variety of ways.<sup>165</sup> It may be convenient to divide these studies into two groups. The first group claims that the world's sea level has not been higher than present at any time since the last ice age. One example of this approach can be seen in an article by D. J. Stanley titled "Nile Delta." Stanley claimed that the Mediterranean Sea level rose between 5500 BC and 500 BC. Stanley claimed that the sea level was about ten feet lower in 5500 BC than it was in 500 BC when it arrived at its current sea level. As a general rule, climatologists working in the Americas tend to deny that the sea level stood higher in the Mosaic age than it stands today.<sup>166</sup> If authors in this

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J. C. Kraft, D. F. Belknap, and I. Kayan, "Potentials of Discovery of Human Occupation Sites on the Continental Shelves and Nearshore Coastal Zone," in P. M. Masters, N. C. Fleming, eds., *Quaternary Coastlines and Marine Archaeology: Toward the Prehistory of Land Bridges and Continental Shelves*, (London: Academic Press, 1983), 106.

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See for example, Avraham Ronen, "Comment on *Mediterranean Coasts of Israel and North Sinai. Holocene Tectonism from Geology, Geophysics and Archaeology*," *The International Journal of Nautical Archaeology* 18 (1989): 263-265. See also Douglas L. Inman, "Application of Coastal Dynamics to the Reconstruction of Paleocoastlines in the Vicinity of La Jolla, California," P. M. Masters, N. C. Flemming, eds., *Quaternary Coastlines and Marine Archaeology*, 1-49. Kraft, Belknap and Kayan, "Potentials of Discovery of Human Occupation Sites on the Continental Shelves and Nearshore Coastal Zone," 93.

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Tjeerd H. Van Andel, "Late Quaternary Sea-Level Changes and Archaeology," *Antiquity* 63 (1989): 734.

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For a discussion of this phenomenon, see Inman, "Application of Coastal Dynamics," 6-10

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One of the better surveys of the question comes from S. Jelgersma, "Sea-Level Changes during the Last 10,000 Years," in *World Climate from 8000 to 0 B.C.: Proceeding of the International Symposium Held at Imperial College, London, 18 and 19 April 1966*, (London: The Royal Meteorological Society), 34-71.

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D. J. Stanley, A. G. Warne, H. R. Davis, M. P. Bernasconi, Z. Chen, "Nile Delta," *Research and Exploration* 8 (1992): 34. D. L. Inman claims that the majority of coastal sites in the world follow this pattern. Inman, "Application

group are correct, it is quite unlikely that seawater could have flooded the basin south of the Shalûf in the Mosaic age. If so, the site of Israel's crossing probably must be sought elsewhere.

The second group consists of a large number of writers who hold that the world sea level rose so far during the post-glacial climate optimum (roughly 7000 to 4000 BC) that it passed the current sea level and rose to a higher sea stand.<sup>167</sup> As a general rule, climatologists working in Europe and the Near East tend to support this perspective. The current debate over climate warming has brought new attention to this group since sea levels are already rising world wide. A rise of twenty feet would be possible if the Ross Ice Shelf melted in Antarctica. The whole ice shelf has been moving toward the sea by a few inches a year.

Climatologists who argue for a higher sea level in antiquity differ from each other on how much higher the sea level rose. They differ on when the highest sea level was reached. They differ especially on the rate at which this high sea level fell to current norms. These differences result from the particular characteristics of the sites at which each author has worked.<sup>168</sup> A few of these writers would suggest that the sea level had already fallen to the present level, or even below it, by the Mosaic age.<sup>169</sup> Others would affirm that there was indeed a higher sea stand in the second millennium BC. Several current writers in this group are worth noting.

Sirri Erinç analyzed seashore levels along the Black Sea and the Mediterranean coast of Turkey in 1978. He concluded that the sea level along Turkey's coast stood two to three meters higher near the post-glacial climatic optimum than it stands at present. He offered as proof of this conclusion widespread and well developed coastal terraces, old beach-rock formations, and coastal caves filled with marine sands and related objects. He concluded that the sea-level off the coast of Turkey has slowly regressed until the present level was reached sometime between 3000-2000 years BP (which is 1000 to 0 BC).<sup>170</sup> Ronald Pearson surveyed the question of sea level change in 1978. He noted authors who argued both for and against a higher sea stand in the post-glacial period. He noted that Buddemeier's dating of coral reefs pointed to a higher global

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of Coastal Dynamics," 8. This is also the pattern implied by D. Prigent, L. Visset, M. T. Morzadec-Kerfourn, J. P. Lautrido, "Human Occupation of the Submerged Coast of the Massif Armoricain and Postglacial Sea Level Changes," In P. M. Masters, N. C. Flemming, *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, (London: Academic Press, 1983), 303-324.

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Evidence for the post-glacial climate optimum can also be seen in the fact that 6,000 years B.P., boreal forests extended north of the current tree line. Foley et al attribute this to warmer temperatures caused by variations in the Earth's orbit. See on this, J. A. Foley, et al., "Feedbacks between Climate and Boreal Forests during the Holocene Epoch," *Nature* 371 (1994): 52-54.

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It is striking that there is so much difference between sites. It is also striking that evidence for a higher sea stand comes largely from Europe and the Near East. There is almost no evidence for a higher sea stand in the Americas. It may well be that the higher shorelines were caused by chaotic geological conditions after the end of the ice age as the small European plates attempted to balance themselves after the weight of the ice was removed.

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Wreschner, for example, suggests that the sea level may have been up to three meters above its current stand between 8000 and 6500 BC. He then suggests that the sea level fell to five meters below its current stand by 4000 BC. Ernst E. Wreschner, "Sea Level Changes and Settlement Location in the Coastal Plain of Israel during the Holocene," *Eretz-Israel* 13 (1977): 277-282.

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Sirri Erinç, "Changes in the Physical Environment in Turkey since the End of the Last Glacial," In William C. Brice (ed.), *The Environmental History of the Near and Middle East Since the Last Ice Age*, (London: Academic Press, 1978), 96.

sea level. Buddemeier argued from his study of coral reefs that the world sea level stood significantly more than one meter above its present height from 3500-2000 BP (which is 1500 to 0 BC).<sup>171</sup>

In 1985, A. Raban and E. Galili wrote an article on recent marine archaeological finds off the coast of Israel. They described a retaining wall at Tel Dor 2.5 meters above the current sea stand that had layers of wave deposited sea shells behind it. They concluded that the sea level must have stood higher than it presently does for the first half of the second millennium BCE.<sup>172</sup> C. E. Larsen and G. Evans surveyed sea level changes in the Persian Gulf in 1978. They noted evidence for a post-glacial sea level in the Persian Gulf approximately a meter higher than present levels, though the date of that higher level is unclear. This is interesting because the Persian Gulf and Red Sea water levels may have been comparable.<sup>173</sup> T. Al-Asfour described fossil shorelines along the coast of Kuwait. He noted that material from the most recent fossil shoreline above the current sea level was carbon dated roughly between 4570 and 3250 BP. He did not mention the height of this fossil shoreline above sea level.<sup>174</sup>

A key part of the sea level discussion is the rate at which glaciers formed after the post-glacial climate optimum.<sup>175</sup> Glacial ice can be dated with some confidence. Its formation lowers the world sea level. So the age of glacial ice gives strong evidence for the rate at which the sea level fell to its current stand. A number of authors have commented on the age of glacial ice, and there is among them general agreement to the position which H. H. Lamb presented in his book *Climate: Present, Past and Future*.<sup>176</sup> Lamb noted that after the last ice age, the course of deglaciation necessarily lagged behind the warming trend in global temperature. He noted that the highest sea level was actually reached 4000 years ago at the end of the period of highest global temperature. He noted also that the glaciers and ice sheets were at their post-glacial minimum between 2000 and 1500 B.C. After that time, there was a major re-advance of glacial ice. In 1982, H. H. Lamb published another book surveying the history of global climate change entitled *Climate, History and the Modern World*. In this volume, he tied the higher post-glacial Red Sea level to Israel's exodus from Egypt. He claimed that the sea level should have been close to its highest level during the Mosaic age. He claimed that Israel's exodus from Egypt

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Ronald Pearson, *Climate and Evolution*, (London: Academic Press, 1978), 204.

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Avner Raban, Ehud Galili, "Recent Maritime Archaeological Research in Israel-A Preliminary Report," *The International Journal of Nautical Archaeology* 14 (1985): 335.

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Curtis W. Larsen, Graham Evans, "The Holocene Geological History of the Tigris-Euphrates-Karun Delta," In William C Brice (ed.), *The Environmental History of the Near and Middle East Since the Last Ice Age*, (London: Academic Press, 1978), 232.

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Taiba Al-Asfour, "The Marine Terraces of the Bay of Kuwait," In William C. Brice (ed.), *The Environmental History of the Near and Middle East Since the Last Ice Age*, (London: Academic Press, 1978), 245.

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For a discussion of the post-glacial climate optimum, see Foley, et al., "Feedbacks between Climate and Boreal Forests during the Holocene Epoch," 52-54. M. Schwarzbach, "The Climatic History of Europe and North America," in A. E. M. Nairn, ed. *Descriptive Palaeoclimatology*, (New York: Interscience Publishers Inc., 1961), 255-291.

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H. H. Lamb, *Climate: Present, Past and Future*, vol. 2, (New York: Barnes & Noble, 1977), 363. Felix G. Sulman, *Short- and Long-Term Changes in Climate*, (Boca Raton: CRC Press, 1982), II: 107.

could be explained by a short term fluctuation in the Red Sea level caused by a storm surge or a tidal wave in conjunction with the higher sea levels of that age<sup>177</sup>

This position is not without its problems. The first is that it depends heavily on Climatological evidence. Climatology is still in many ways an infant science, and there is a great deal of skepticism in exegetical circles about the validity of its conclusions. For example, David Hopkins argued in his book *The Highlands of Canaan* that the correlation of various kinds of data only multiplies probable error.<sup>178</sup> It can only be hoped that as evidence continues to mount, climatologist will be able to draw a more consistent picture of past events.

The second problem with this position has rather more substance. If this region was a tidal basin in the Mosaic age, it is not completely clear what kind of vegetation would have grown in it. This fact raises a problem pointed out by Maurice Copisarow. He noted that the field of reeds could resemble the marshes of Egypt. However, the Red Sea shore is a very different kind of place. It is arid and saline, and no reeds grow there. So any attempt to link the Red Sea and the Bitter Lakes is unwarranted and unnecessary.<sup>179</sup> This is a strong argument. Reeds grow in fresh water, not in salt water. There are no reeds on the Red Sea coast. If the region south of the Shalûf was covered with sea water in the Mosaic age, the salt in this water may well have prevented the growth of reeds. If there were no reeds south of the Shalûf, how could this area have been the Yam Sûph, whatever its water level?

Three points can be raised in response to this argument. First, authors like Copisarow assume that reeds were not present south of the Shalûf in the Mosaic age because they are not present in the region today. This assumption is not at all safe. In marginal areas, even slight changes in precipitation can cause great changes in ecosystems. It is not at all clear whether fresh water plants were present south of the Shalûf when Israel left Egypt.

There are several possible ways that enough fresh water could have been present in this region to grow reeds. 1) Rainfall levels may have been higher at that time since Moses lived so much closer to the post-glacial climate maximum. 2) If Sesostris III did dig a Red Sea canal down to the basin, a substantial amount of fresh Nile water could have flowed into the north end of the basin. After the ancient fresh water canal was reopened in the last century, over 70,000 acres of land were irrigated with its water.<sup>180</sup> So such a canal could have created quite a large area of fresh water marsh plants. Karl Butzer noted that Egypt saw a period of unusually high Nile floods between 1800 and 1150 B.C.<sup>181</sup> So if a canal did exist down to the north end of this basin, it could have created an unusually great amount of water. The higher sea levels covering the south end of this region would have limited fresh water drainage from the north end. 3) While the amount of fresh ground water in the Mosaic age is very difficult to estimate, a dozen

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H. H. Lamb, *Climate, History and the Modern World*, (New York: Methuen, 1982), 118, 119.

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David C. Hopkins, *The Highlands of Canaan*, (Decatur: Almond Press, 1985), 106. See also his discussion of climate change on pages 99-108.

179

Copisarow, "The Ancient Egyptian, Greek and Hebrew Concept of the Red Sea," 10.

180

Edgerton, "An Engineer's View of the Suez Canal," 124.

181

Butzer, *Early Hydraulic Civilization in Egypt*, 33.

fresh water wells can still be found near this basin.<sup>182</sup> This suggests that more water may have been present at an earlier time. 4) The thick clay floor of this basin points to abundant vegetation which must have grown in periods of increased moisture in the region.<sup>183</sup> 5) The crocodile and hippopotami bones found in the Shalûf sands suggest marsh conditions at some point in the past,<sup>184</sup> though there is no clear evidence that either the clay or the bones date to the Mosaic age. So it is not impossible that there may have been enough fresh water in the region to support salt tolerant varieties of reeds, especially if Sesostris III actually did dig a Red Sea canal in the 12th Dynasty.

The second response to Copisarow's position is that it may not matter whether or not there were reeds south of the Shalûf. It makes little difference whether Israel crossed a fresh or salt water marsh. The conditions of Israel's sea crossing would have been quite similar either way. Either kind of marsh would have created an impassible quagmire preventing Israel's passage and drowning anyone attempting to cross.<sup>185</sup> Either kind of marsh could have been blown dry by God's wind, and could have been flooded by a returning storm tide. The only questions are whether a salt marsh could have been called a *yam sûph*, and whether such a quagmire would have met the event's polemical purpose.<sup>186</sup>

The final response to Copisarow's position is that the name *yam sûph* itself had a wider range of meaning than his position suggests. Several scholars have pointed out that the name *yam sûph* was clearly applied to the Red Sea in Numbers 33:10 and to the Gulf of Aqabah in 1 Kings 9:26.<sup>187</sup> It is possible that these references could either describe wadis where the influx of fresh water made small marshes possible, or shallow seashore areas where salt tolerant plants once

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Harel, "The Route of the Exodus," 40.

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Clay deposits can result from sediments in standing water, either fresh or marine. They can also result from the breakdown of soil feldspars by the acids resulting from rotting vegetation. Clay deposits are quite stable and hard to date. Ralph E. Grim, *Clay Mineralogy*, (New York: McGraw-Hill), 528-551. Jean-Claude Gall, *Ancient Sedimentary Environments and the Habitats of Living Organisms*, (Berlin: Springer, 1983), 48-54.

184

Karl Baedeker, *Egypt and the Sudan*, (Leipzig: Karl Baedeker, 1908), 182. At the height of the last ice age, hippopotami were common both in the Nile delta and in the rivers of Palestine. It is not clear how long they survived in the Isthmus of Suez. See on this, Llorca Kolska Horwitz, Eitan Tchernov, "Cultural and Environmental Implications of Hippopotamus Bone Remains in Archaeological Contexts in the Levant," *Bulletin of the American Schools of Oriental Research* 280 (1990): 67-76.

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It is very interesting that there were no roads or caravan routes across this region in antiquity. All caravan routes passed north by the Bitter Lakes, even routes heading south into Sinai. The implication of this is that the region south of the Bitter Lakes was impassable. See on this, Bartlett, *From Egypt to Palestine*, 162.

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The theological implications of this must be considered. Would a salt quagmire have made an appropriate polemic against Field of Reeds theology? It probably would not. Throughout Egypt's history, pictures and sculptures using this imagery always depicted fresh water plants.

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Davis, *Moses and the Gods of Egypt*, 169. James Montgomery suggested that the LXX translation of End Sea in 1 Kings 9:26 may point to a Hebrew original of *soph* instead of *sûph*. James A. Montgomery, "Hebraica: (2) *Yam Sûp* ('the Red Sea')=Ultimum Mare?" *Journal of the American Oriental Society* 58 (1938): 131-132. J. Simons suggested that *yam sûph* may have also been used to describe the Gulf of Aqabah in Num. 21:4, Deut. 1:40 and 2:1. Simons, *The Geographical and Topographical Texts of the Old Testament*, 258, 259. It is unclear in the text whether these references refer to the Red Sea or the Gulf of Aqabah, though one or the other must be in view.

lived. However it is much more likely that they point to a use of the term to describe salt water plants. Several authors have noted that Jonah 2:5 clearly used the word *sûph* to describe salt water sea weed.<sup>188</sup> G. I. Davies noted that some Nineteenth Century authors identified the *yam sûph* in terms of the great quantities of vegetation observed in the Gulfs of Suez and Aqabah.<sup>189</sup> Several kinds of water plants have been suggested as *sûph*, and the shallow marsh north of Suez may well have been a sea of such *sûph* in the Mosaic age.

It is fair to say that H. H. Lamb's observation in *Climate, History and the Modern World* is well taken. It can not be proven that the Gulf of Suez saw a higher sea level in the Mosaic age than it sees today. However, there is ample evidence that such a higher sea level might have existed. If sea level in the gulf was a meter or two higher in the Mosaic age, the Red Sea would have flooded the great basin south of the Shalûf. This basin would have been a clay quagmire which could not have been crossed on foot. It may have been a Sea of Reeds, though the basin's actual vegetation is difficult to determine. It could have been blown dry by a strong east wind, enabling Israel to cross. Then a Red Sea storm surge could easily have drowned Pharaoh's forces.

While this sea crossing location can not be proven to be correct, there is much to commend it. It is consistent with the Old Testament's description of the region as a Sea of Reeds. It is also consistent with claims by both the LXX and the New Testament that Israel crossed the Red Sea. This explanation also requires only a limited appeal to the miraculous. While God can do very unusual things, He does seem to work through natural means more often than not. It is therefore appealing to see this event as a miracle of timing rather than a gross violation of the natural physical laws which God has written into His creation.

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Francisco, "The Exodus in its Historical Setting," 17.

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Davies, *The Way of the Wilderness*, 70.

## CHAPTER 7: CLIMATE CHANGES AFTER THE CONQUEST

### Climatology and the Sea People

The famine that may have had the greatest impact on Israel's history was not recorded in the Old Testament itself. It occurred around 1200 BC, and it marked the end of the Late Bronze Age in the Levant. The famine broke out during the reign of pharaoh Merenptah. The Hittites in Anatolia asked Merenptah to honor Ramesses II's treaty with them by sending them grain for famine relief. When Merenptah described his battle against the Libyans west of the Nile delta, he mentioned the famine in Anatolia and economic difficulties in North Africa that had led to the Libyan war. Merenptah wrote:

They spend their time going about the land, fighting, to fill their bodies daily. They come to the land of Egypt, to seek the necessities of their mouths; their desire is ----- my bringing them like netted fish on their bellies. Their chief is like a dog, a man of boasting, without courage; he does not abide ----- bringing to an end the Pedetishew (*Pd.ty-š w*), whom I caused to take grain in ships, to keep alive that land of Kheta.<sup>190</sup>

A letter was also found at Ugarit that mentioned the famine in Anatolia. The Hittite king commanded Ammurapi of Ugarit to provide a ship to transport 2,000 measures of grain from Mukish to Cilicia.<sup>191</sup> The Hittite king stressed repeatedly that the supply of grain was a matter of life and death. Ammurapi had also sent grain to Cyprus to ease the famine there.<sup>192</sup> Ugarit may soon have suffered from the same famine. Schaeffer argued that the final occupation layer at Ugarit was covered by two meters of pale yellow, powdery dust. Schaeffer interpreted this soil as irrefutable evidence that Ugarit's last days saw a prolonged drought.<sup>193</sup> A generation after that drought, Arnuwandas III of Boghazköy wrote about the hunger that had struck western Anatolia during his father's reign.<sup>194</sup> Redford argued that this famine may also have been mentioned centuries later by Herodotus and Diodorus.<sup>195</sup>

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James H. Breasted, *Ancient Records of Egypt: Historical Documents*, 5 vols. (New York: Russell & Russell, 1962), 3: 244.

191

R. D. Barnett, "The Sea Peoples," 359-378 in I. E. S. Edwards et al, eds. *The Cambridge Ancient History*, vol. 2.2, (Cambridge: Cambridge University Press, 1975), 369. A. Jeonard, Jr. "Archaeological Sources for the History of Palestine: The Late Bronze Age," *Biblical Archaeologist* 52 (1989): 30.

192

M. C. Astour, "New Evidence on the Last Days of Ugarit," *American Journal of Archaeology* 69 (1965), 255.

193

F. A. Schaeffer, "The Last Days of Ugarit: Drought, Famine, Earthquakes and, Ultimately Fire Ended Civilization at Ugarit," *Biblical Archaeology Review* 9 (1983): 74-75.

194

G. A. Wainwright, "Menepthah's Aid to the Hittites," *The Journal of Egyptian Archaeology* 46 (1960): 25.

195

Redford noted that Herodotus and Diodorus mentioned a famine that had forced the people of Syme, Naxos, and Sardis to leave their homes. Donald B. Redford, *Egypt, Canaan, and Israel in Ancient Times*, (Princeton: Princeton University Press, 1992), 244. It is not clear whether this was the same famine.

This famine greatly affected the Aegean Sea area and Asia Minor. Mendenhall noted that almost every site excavated in Greece was destroyed somewhere between 1250 and 1150 BC.<sup>196</sup> Rhys Carpenter argued that the famine affected Crete, the southern Peloponnese, Boeotia, Euboea, Pholia, and the Argolid, but not Western Europe.<sup>197</sup> As these cities were destroyed, ethnic groups around the Aegean Sea left their homes in search of habitable land. While the specific causes of this immigration have been debated at length,<sup>198</sup> the famine at least contributed to their decision to immigrate. The Egyptians called this collection of ethnic groups the Sea People. They moved by land and sea across southern Asia Minor and south along the coast of Syria and Palestine. They destroyed cities and cultures as they overflowed the Levant and poured inexorably toward Egypt. Ramesses III described the Sea People aggression and the destruction that they brought to the region. He wrote:

The foreign countries made a *conspiracy* in their islands. All at once the lands were removed and scattered in the fray. No land could stand before their arms, from Hatti, Kode, Carchemish, Arzawa, and Alashiya on, being cut off *at [one time]*. A camp [was set up] in one place in Amor. They desolated its people, and its land was like that which has never come into being. They were coming forward toward Egypt, while the flame was prepared before them. Their confederation was the Philistines, Tjekker, Shekelesh, Denye(n), and Weshesh, lands united. They laid their hands upon the lands as far as the circuit of the earth, their hearts confident and trusting: "Our plans will succeed!"<sup>199</sup>

When the Sea People were finally defeated, Ramesses III allowed them to settle in the Philistine Pentapolis as Egyptian vassals. Cities like Beth Shean that had been Egyptian strongholds and administrative centers were now inhabited by Egyptians, Canaanites, and Sea People. The arrival of the Sea People brought the Iron Age to Palestine.

Before the Sea People entered Palestine, Israel's highlands had been occupied by a thinly scattered agricultural population. The identity of this population has been debated at length. Those who claim that Israel first appeared in Palestine after 1200 BC often deny that the highlands were inhabited by Israelites at this time. For example, Mazar argued that many small ethnic groups populated the highlands instead of the Israelites.<sup>200</sup> If Israel left Egypt during the 18th Dynasty, the highlands would have been inhabited by Israelite tribes who were following a lifestyle closer to their *habiru* roots than the tribes who lived among the Canaanites on the coastal plains. Merenptah's stela could be interpreted as a description of such a culture perhaps three decades before the Sea People settled into the Philistine Pentapolis.

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George E. Mendenhall, *The Tenth Generation: The Origins of the Biblical Tradition*, (Baltimore: The Johns Hopkins University Press, 1973), 148.

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R. A. Bryson, et al. "Drought and the Decline of Mycenae," *Antiquity* 48 (1974): 46.

198

Suggestions have included: the Trojan War, a Dorian invasion, an earthquake, volcanic activity, climate change, famine, disease, or a combination of these factors.

199

James B. Pritchard, ed. *Ancient Near Eastern Texts Relating to the Old Testament*, (Princeton: Princeton University Press, 1950), 262.

200

B. Mazar, *The Early Biblical Period: Historical Studies*, (Jerusalem: Israel Exploration Society, 1986), 38.

When the Sea People settled in the Pentapolis, many inhabitants of the region fled before them. Canaanites generally fled north into Syria while Israelites on the coastal plain fled east into the highlands. Archaeological evidence suggests that a great wave of immigrants entering the hill country from the coastal plains at this time. Around 300 new settlement sites have been identified from this time period. Bimson noted that the new Iron Age settlements in the highland included 68 settlements in Gilead, 96 in Manasseh, 122 in Ephraim, 12 in Benjamin, and 10 in Judah.<sup>201</sup> These Iron I settlements were Israelite sites because several of them continued into the Iron Age II period as Israelite sites.

Israelites who fled to the highlands would have brought along elements of the city state culture. The highlands certainly saw a dramatic cultural shift at this time. After the beginning of the Iron Age I period, Israelites in the highlands began to dig cisterns instead of relying on collar-rim jars for water storage. These cisterns made it possible for Israel to occupy semi-arid regions that could not have seen permanent occupation without them.

### **Climate Changes after the United Monarchy**

For example, Elijah's drought in 1 Kings 17:1 may have been described in Menander's record of Ethbaal's annals. Ethbaal of Tyre was Jezebel's father. Menander quoted from Ethbaal's annals when he claimed that, "There was a drought in his reign, which lasted from the month Hyperberetaios until the month of Hyperberetaios in the following year. But he made supplication (to the gods), whereupon a heavy thunderstorm broke out." Katzenstein argued that the drought was shorter and less severe on the northern coast of the Levant than it was in Israelite territory. So it only lasted for a year at Tyre.<sup>202</sup> The biblical text witnessed to the fact that the drought was less severe in the north. I Kings 8:1-3 noted that Elijah was able to find shelter in Zarephath after the brook Cherith dried up. Zarephath was a harbor near Sidon in Canaanite territory.

Climate played a role in Israel's history once more toward the end of Israel's Babylonian captivity. Jeremiah had prophesied that the city of Babylon would fall to its enemies. That hardly seemed likely. Babylon's city walls were so thick that six chariots could travel abreast around the top of the wall. It is hard to imagine that anyone in that culture could have knocked down Babylon's walls. However, the Euphrates River flowed through the middle of the city. The Persians were able to take the city in a single day was walking down the river bed. Yamauchi noted that the river would normally have been at its lowest point for the year at the time that the Persians attacked. However, the river depth would still have been over 12 feet deep. Yamauchi noted that there had been a drought for several years. So the river level was unusually low and the Persian army was able to walk up the river bed.<sup>203</sup>

Climate instability remained a feature of Palestine throughout history. For example, Acts 11:28 recorded a famine that struck the ancient world during the reign of Claudius.

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J. J. Bimson, "Merenptah's Israel and Recent Theories of Israelite Origins," *Journal for the Study of the Old Testament* 49 (1991): 4.

202

Menander, *Ant.* VIII: 324, as quoted in H. J. Katzenstein, *The History of Tyre*, (Jerusalem: The Schocken Institute for Jewish Research, 1973), 153.

203 Edwin M. Yamauchi, *Persia and the Bible*, (Grand Rapids, MI: Baker Book House, 1996), 86

## **Conclusion**

Several kinds of evidence shed light on Old Testament history. While archaeological and textual evidence will always remain the most important data for the study of the Old Testament historical background, climatology may also begin to play a significant subsidiary role as an arena of academic discussion. Climatological studies can demonstrate the general accuracy of the Biblical text, and they can suggest ways that God may have accomplished His will in Israel's history.