Yes, Noah's Flood May Have Happened, But Not Over the Whole Earth

Lorence G Collins

INTRODUCTION

The Bible (Genesis 6–9) describes a worldwide flood (the Noachian Flood) covering even the highest mountains of the earth and the construction of a huge boat (a rectangular box-like craft) that transported animals, at least two of a kind of all land animals on the earth. The Qur'an (Suras 11 and 71) has almost a duplicate story with a similar huge boat that transported animals and a worldwide flood. In addition two older stories exist in ancient Babylonian epics that describe a huge flood. One is the Epic of Gilgamesh, describing a flood on the Euphrates River (Academy of Ancient Texts nd). The other is the Epic of Atrahasis, which has a huge flood on the Tigris River (Byers nd).

In the Epic of Gilgamesh, Gilgamesh is warned that a god plans to destroy all humanity and is told to build a ship to save himself, his family, friends, and cattle. In the Epic of Atrahasis, a tribal chief survived with his family by floating in a boat down to the Persian Gulf. After the flood subsided, the chief got out on dry land and erected an altar and sacrificed to a water god so that such a flood would not happen again (Anonymous nd-a). Noah also built an altar when he got off the Ark and offered sacrifices (Genesis 8:20). Because these stories all describe an ancient huge flood in Mesopotamia, it is extremely likely that a huge flood could have occurred. However, the next question is: "Did the Noachian Flood cover the whole earth?"

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SCIENTIFIC EVIDENCE AGAINST A WHOLE-EARTH FLOOD

The Bible says that the rains that created the Noachian Flood lasted for 40 days (Genesis 7:17), that the waters prevailed on the earth for 150 days (Genesis 7:24), and after these 150 days the waters gradually receded from the earth so that by the seventh month and the seventeenth day, Noah's Ark came to rest upon the mountains of Ararat (Genesis 8:4). A year plus two months and twenty-seven days later the earth was dry enough so that Noah, his family, and the load of animals could disembark from the Ark (Genesis 8:14).

Because this flood was intended by God to destroy all flesh on earth (Genesis 6:13) and because sedimentary rocks on all continents contain fossils that supposedly represent the "destroyed flesh of all life," it might be thought that the Bible story, describing a whole-earth flood, was true. However, interlayered with these fossil-bearing sedimentary rocks on all continents are layers of evaporite rock salt (sodium chloride), gypsum (hydrated calcium sulfate), anhydrite (calcium sulfate), and various potash and magnesium salts, which are associated with red beds (shales) containing fossilized mud cracks (Schreiber and others 2007).

Many of these mineral compounds and red beds have combined thicknesses on different continents of more than one kilometer (~3,281 feet) (Collins 2006). The red beds are red because they contain red hematite (iron oxide) which formed from magnetite grains that were oxidized while the muds were exposed to oxygen in open air. The mud cracks can form only under drying conditions that cause the mud to shrink and form polygonal cracks. The evaporite mineral compounds in the layers are deposited in the correct chemical order predicted by the solubility of each kind of ion in these compounds and whose increasing concentrations during the evaporation of water would cause them to precipitate in a predictable depositional sequence as the water volume decreased. Such evaporite deposits would be expected to occur where a marine sea was once present and to disappear when the sea became completely dry. Therefore, one could expect these evaporites to be at the top of the supposed Noachian Flood deposits when the water supposedly receded and the land dried out, but certainly not in different levels in between older and younger fossiliferous "Flood deposits".

We read in the Bible that there is only one time in which the Flood waters are said to recede and leave the earth dry. That is, no multiple worldwide climatic conditions are described in which flooding, then drying to a dry earth, more flooding, more drying to a dry earth, in repeated cycles that occur over and over again in that Flood year. On that basis, it is logical that all the kinds of evaporite deposits and red beds in many different levels in the supposed Noachian Flood deposits could form only in local climates with desert drying-conditions and could *not* possibly have formed all at the same time — a time when a flood covered the *whole* earth for more than one year (Collins 2006). On that basis, the Noachian Flood story cannot describe a whole-earth flood, but it could only represent a large regional flood.

REGIONAL EVIDENCE FOR THE NOACHIAN AND SIMILAR FLOODS

Two rivers, the Euphrates and Tigris flow through Mesopotamia, which is now the country of Iraq (Figure 1). There are several layers in exposed rocks near these two rivers in southeastern Mesopotamia (Iraq) that are likely flood deposits. Most are about a foot (0.3 m) thick, but one is as much as 3 meters thick (MacDonald 1988). Flood debris from this same thick deposit along the Euphrates River near the ancient Sumerian city of Shuruppak about 200 km southeast of Baghdad has been dated by the C^{14} method, giving an age of 2900 BCE (Best nd). Flood deposits 2.4 meters thick are also reported by MacDonald (1988) as far northeast as the ancient Babylonian city of Kish (120 km south of Baghdad). At any rate, the many flood-deposit layers show that flooding in southeastern Mesopotamia was not unusual in ancient times.

Similar large local floods are common throughout history around the world. For example, monsoon storms in Bangladesh frequently produce much rain over the country and in the Himalaya Mountains, which rise in the northern part of the country (Anonymous nd-b). Runoff of water from the rain and melting snow during such storms create great floods in four rivers that converge to the Wang River, which then drains into a huge delta in the Bay of Bengal (Anonymous nd-b). Thousands of people have been drowned in this delta region by many such floods during the last century. Almost every culture through history has a flood story to tell, as would the people in Bangladesh, but in each of these times and places, the floods would have been local and not worldwide.

Many creationists have pointed out that the Bible indicates that God promised not to cause another huge flood to occur and, therefore, there cannot be any floods that are similar to the Noachian Flood (Genesis 9:13–15). Therefore, the geological record should show at least one unique flood event that is different from all the large regional floods for which there is geological evidence.

WHY WAS THE LOCAL LARGE FLOOD POSSIBLE?

Storms that occur in Mesopotamia usually come from the Mediterranean Sea, cross the mountains in Syria, Turkey, and western Iran, move southeasterly over Mesopotamia to the Persian Gulf, and then exit in the Gulf of Oman. The Euphrates and Tigris Rivers that would transport water from these storms leave higher land in northern Mesopotamia and enter a nearly flat area about 130 km north of Baghdad. In this 130-km interval the gradients of these rivers are small, with the elevation dropping about 3 m per km along the course of the rivers. Both the Euphrates and Tigris Rivers near Baghdad have elevations of about 30 m above sea level, and at the city of As Samawah (280 km south of Baghdad), the Euphrates River has an elevation of 9 m (a drop in elevation of 21 m) (NOAA nd). A similar 21-meter drop occurs along the Tigris River. On that basis, the gradients of the two rivers in these intervals are 0.075 m per km. In the additional 360 km to the Persian Gulf (sea level) the gradients are only about 0.025 m per km. Therefore, in both southeastern and central Mesopotamia the gradients are so low that the rivers barely flow downhill, and frequent flooding could be common.

A large river has natural levees. During a big storm, water rushing down the channel carries abundant sedimentary debris. If the water in the channel overflows its banks onto the adjacent flood plain, the velocity immediately slows because of friction with the


FIGURE 1. *Map of Mesopotamia (Iraq).*
FIGURE 2. *Map showing elevation contours around the Euphrates and Tigris Rivers that extend NW–SE through Mesopotamia.*

flat land, and the water at lower speed cannot carry its entire load of sediment. Heavier coarser particles are deposited abruptly on tops of the banks adjacent to the river while finer silts and clay particles are transported onto the flood plain. When such overflowing floods are repeated year after year, the coarser sediments deposited adjacent to the river build up natural levees on both sides of the channel. Natural levees along the Euphrates and Tigris Rivers rise up to 4 to 5 meters above the river channels, and the surface of these levees slope gently away from the rivers for 5 to 8 km toward lower, adjacent, nearly-flat flood plains that are up to 105 km wide (Tactical Pilotage Chart TPC G-4C, H-6A, and H-6B). The people living in Mesopotamia in biblical times would have had their villages on the natural levees because the flood plains would have been swampy.
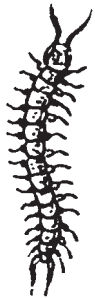
WHAT HAPPENED DURING THE FLOOD?

The watershed for the Euphrates and Tigris Rivers on which the flood could have occurred extends for more than 1600 km from the Persian Gulf through Mesopotamia into Syria and Turkey and laterally for about1000 km from eastern Saudi Arabia to southwestern Iran — an area of more than 1.6 million square kilometers. On that basis, if abundant rain fell, not only in the mountains of Syria and Turkey, but also in Saudi Arabia and Iran, the tributary streams from these countries would all contribute their volumes of water to the flood plains of the Tigris and Euphrates Rivers (Figure 2).

Normally, in lesser storms most water runoff would have come primarily from the mountains in Syria and Turkey and not also from Saudi Arabia and Iran. During the flood, upstream where water first accumulates, the depth of water on the flood plains may be barely over the tops of the natural levees, but downstream the water "piles up" because it does not flow very fast downhill on a nearly flat surface. Therefore, downstream water depths could reach 32 m or more above the tops of the levees.

This increase in depth would be intensified where the two flood plains with a width of 275 km in the northern section would be squeezed into a 220-km width in the lower part of the drainage system where the two rivers join. The joining of the two rivers would also increase the volume of the water in the flood plains, thereby increasing the depth. At any rate, all higher land on the natural levees where the people in the villages were present would be completely submerged. Thus, it would be possible for a flood to have occurred in mid-Mesopotamia, perhaps about 2900 BCE, as evidenced by the scientifically dated flood deposits.

REMNANT EVIDENCE OF THE FLOOD

When the huge storm ceased that caused the flood, there would have been huge lakes, and it could have taken months to drain the water in these lakes into the gulf — which could easily explain why the Noachian Flood took so long to recede (as much as one year, according to Genesis 8:14). Evidence for this poor drainage can be seen in the present-day lakes in the flood plains. Lake Hawr al Hammar is 32 km wide and more than 80 km long, lies on the flood plain of the Euphrates River west of Basra, and several other large lakes are on flood plains adjacent to the Tigris River (for example, Hawr as Sa'diya and Hawr as Saniyalt). The poor drainage would be caused by the fact that the water covering the flood plains would have no channel through which to flow, would not flow uphill over the sloping natural levees to re-enter the river channels, and the slopes of the bottoms of the lakes would have been nearly flat with gradients toward the gulf of 0.025 to 0.075 meters per kilometer.

EFFECTS OF THE CURVATURE OF THE EARTH

Because of the curvature of the earth, the horizon drops from where the viewer is standing. However, the drop is proportional to the square of the distance between the viewer and an object on the horizon (Young nd). From these relationships, it can be seen that a tribal chief (or Noah) stand-ing on the deck of a large boat (Ark), perhaps 7.8 meters above the water, would not be able to see the tops of any hills as high as 15 m from as little as 24 km away across flood plains covered with water because the curvature of the earth prevents it (See the Appendix for examples of calculations). Most hills in this region that *are* as much as 15 m high are more than 95 km away from the river levees. Therefore, the survivors of the Flood could see *only water in all directions* while they were floating down the Tigris River and over the flood plains. Many of these hills would also be partly covered with water which would make their tops project less above the water level, and therefore, the curvature of the earth would make them disappear from the line of sight in even a shorter distance than 24 km.

Northeast and southwest of the nearly flat surface that contains the two rivers, the topography rises to more than 455 m in Saudi Arabia and in Iran. Calculations show that elevations of 455 m high cannot be seen beyond 86 km away, and these places are more than 160 km from the Euphrates or Tigris Rivers. Therefore, none of the high country in Saudi Arabia or Iran would be visible to a tribal chief (or Noah). On that basis, the "whole world" would definitely appear to be covered with water during the Flood, and that was the "whole world" for the people in this part of southeastern Mesopotamia at that time.

CONCLUSIONS

If the 3.4-meter–thick layer of flood deposits in southeastern Mesopotamia (MacDonald 1988) represents a huge flood of ancient times, and if it is the remnants of the one described in the early Babylonian epics, then the authors of these epics were likely survivors who lived in a village on natural levees on the lower parts of either the Euphrates or Tigris Rivers where the flood waters covered their village, natural levees, and adjacent flood plains for distances of 160 to 320 kilometers so that no land could be seen, and their "whole world" would have been under water.

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APPENDIX

The drop in the horizon (curvature) does not vary linearly but with the square of altitude .The formula is:

$$\sqrt{2rh+h^2},$$

where r is the radius of the earth and h is the altitude above the earth's surface (Young nd).The radius of the earth varies a little at different locations on the surface, but is on average 6378 km. A simpler calculation derived from this formula is 3.57 km times the square root of the height of the eye in meters.

For a person who is 1.8 meters (6 feet) tall, the eye level is about 1.75 meters above the ground. If we place that person on the deck of an ark that is 30 cubits (13.6 meters) high and that is floating so that 2/3 of its height is above the surface

BOOKREVIEWS

REFRAMING SCOPES: JOURNALISTS, SCIENTISTS, AND LOST PHOTOGRAPHS FROM THE TRIAL OF THE CENTURY

by Marcel Chotkowski LaFollette Lawrence (KS): University Press of Kansas, 2008. 196 pages

Reviewed by Charles A Israel

How many readers of this journal, if asked to think of images of the Scopes trial, find mental pictures of Spencer Tracy, Fredric Marsh, and other actors from *Inherit the Wind*? Sure, we know the film and play it was based on was really a McCarthy-era allegory, but the Hollywood image has proven quite sticky indeed.The real Scopes trial, held in Dayton, Tennessee, in the summer of 1925, was carried on WGN radio and covered by colorful print journalists of the era like HL Mencken and Joseph Wood Krutch, and their word-pictures have proven highly influential. Some contemporary photographs and more editorial cartoons have survived, but for many the real Dayton has been overtaken by the fictional Hillsboro. Now there is a possible cure for this condition.

In 2005, eighty years after the trial of high school teacher John Thomas Scopes, historian Marcel Chotkowski LaFollette discovered an amazing collection of photographs in an only partly processed collection at the Smithsonian Institution Archives. In this short volume, she has intelligently blended the restored photographs with pictures from other collections for a total of fifty-one images. Attached to each is an informative caption, and from the assemblage she draws attention to themes and interpretations of the trial lost from view in other accounts. We see the expected cast: defendant Scopes, guest prosecutor William Jennings Bryan, and defense attorney Clarence Darrow. More valuable, perhaps, are the images of the defense team of lawyers, scientist–witnesses, and interested supporters assembled on the steps of their trial headquarters. While most contemporary and historical attention from the trial has centered on the high-

of the water, then the total for h will be 1.75 + 6.06 = 7.81 meters.

Thus, we calculate the distance to the horizon:

$$(3.57\text{km})(\sqrt{7.81}) = 9.98 \text{ km}.$$

Similarly, we can use this calculation to compute how far away a hilltop has to be before it disappears below the horizon. If the hills were 15 meters tall, as occurs in high ground between the two river systems south of Baghdad, these hills are below the horizon at:

$$(3.57\text{km})(\sqrt{15}) = 14 \text{ km}.$$

If we add the additional 9.98 km that Noah would gain by standing on the deck of the ark, the hilltops would be invisible from any distance greater than about 24 km. Since these hills are more than 95 km from the river levees, they would be invisible from the Ark.

If the elevations were 455 meters high, as occurs in eastern Saudi Arabia and on the steep slopes of the Zogras Mountains in southwestern Iran, the calculations are

$$(3.57 \text{ km})(\sqrt{455}) = 76.15 \text{ km}.$$

So a person standing on the ark could see these mountaintops at about 86 km away. Since these elevations are more than 320 km away from the Euphrates River and more than 160 km away from the Tigris River, they would also be invisible from the ark.

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