SPECIAL FEATURE

MYSTERIES OF OUR FROZEN PAST

FEW PEOPLE DISPUTE THAT AN ICE AGE ONCE STRUCK THE PLANET, LEAVING TELLTALE MARKS. BUT MANY MYSTERIES REMAIN. WHEN DID IT OCCUR IN BIBLICAL HISTORY? WHAT KICK-STARTED THE MASSIVE ICE BUILDUP? WHY DID ANIMALS GET SO BIG? THE BIBLE GIVES US ESSENTIAL CLUES TO ANSWER EACH QUESTION.
WHEN WAS THE ICE AGE IN BIBLICAL HISTORY?


BY ANDREW SNELLING AND MIKE MATTHEWS

Just down the road from Cincinnati in the north central USA is Big Bone Lick, “the cradle of American paleontology.” The discovery of huge bones from mastodons, giant sloths, and other Ice Age creatures sparked the first scientific expedition to collect vertebrate fossils in North America. In 1807 President Thomas Jefferson sent General William Clark (of “Lewis and Clark” fame) to gather bones and ship them to the White House. Among the treasures Clark found were spear points.

After two centuries of research, we now have enough information to begin recreating scenes from the rise and fall of the Ice Age. As a massive ice sheet expanded over Canada, it drove out most living things, and then it continued to push south into the Ohio valley. Eventually, the heavy snows stopped and the earth warmed. Once the ice began to melt, animals returned to Big Bone Lick, along with spear-wielding humans. Museums worldwide depict similar scenes from this unique era.

But it is still difficult to interpret the earth’s dynamic past based on present, slow processes. During the Ice Age the earth’s landscapes, forests, and grasslands bore little resemblance to our own. Indeed, the thick ice sheets drew so much water out of the ocean that large tracts of ocean floor became dry ground. Herds of animals wandered across a 1,000-mile-wide grassy plain that stretched from Asia across the Bering Strait to North America, and people actually lived in the lowlands between England and Europe. (Fishermen in the North Sea sometimes dredge up their stone tools, which look surprisingly similar to those found at Big Bone Lick!)

Many pieces of the “Ice Age puzzle” remain unsolved, but one thing is sure. Based on the Bible, we can be certain that the changes occurred within just a few human generations—not over millions of years. What follows is only a benchmark based on our starting parameters.

WHEN DID THE ICE AGE BEGIN?

The Bible gives us many clues to help us nail down the real time frame of the Ice Age. For example, when did it begin?

**Bible Fact: Eight Generations from the Flood to Abraham.** The Bible gives us an inerrant chronology for marking historical events. It tells exactly how many human generations passed from the Flood to Abraham’s birth: eight.\(^1\) God’s judgment occurred at Babel sometime during the days of Peleg, who was the fourth generation after the Flood (Genesis 10:25; see the timeline on page 50).\(^2\)

The Bible also reveals that humanity stayed at the plains around Babel until “the Lord scattered them abroad over the face of all the earth” (Genesis 11:9).\(^3\) This means that at least three generations passed between the Flood and the first appearance of humans in Africa, Asia, and Europe. Meanwhile,
the animals on the Ark had already fulfilled God’s command to “abound on the earth, and be fruitful and multiply” (Genesis 8:17).⁴

The Bible also tells us precisely how many years passed from Peleg’s birth to Abraham’s birth. According to the most-often used Hebrew version of the Old Testament (the Masoretic text), the total is 190 years.⁵ Each generation lasted about thirty years until Abraham’s father, Terah. He waited seventy years to have children, so you could say he waited two generations, making a total of either five or six generations from Babel to Abraham.

With this information, can we set an approximate date for the start of the Ice Age?

**Geological Fact: Growth of Arctic Ice Sheets.** The “Ice Age” is an informal expression. So first it is necessary to define the term before discussing its timeline.

In secular thinking the Ice Age does not refer to the first formation of ice on the planet. Indeed, forests grew on Antarctica and the Arctic before ice began to form.⁶ Drilling down through Antarctica’s ice sheet, scientists have found in sediment layers beneath the ice sheet fossils of a subtropical rainforest, complete with palm trees and macadamia trees. For these to grow, the land would have to be frost-free for a brief time after the Flood.

As the earth cooled, however, grasslands expanded on the continent, while the forests changed to deciduous trees and tundra. Finally, the whole continent was covered by ice, which marked the beginning of the post-Flood cool-down. In the old-earth view, all this took place millions of years before the Ice Age and without a global Flood.

The “Ice Age” actually refers only to the period when great ice sheets arose in the Northern Hemisphere, well after the Antarctic ice sheet had formed (see map on page 50). The deposits from this time period—caused by moving ice and melting waters—are technically known as the Pleistocene. According to old-age assumptions about radiometric dating, the deposits were laid between 2.6 million years and 11,700 years ago (9,700 BC). As the term Ice Age is used in science publications, its end does not refer to the melting of the ice sheets, but to the rising world temperatures that started the dramatic and relentless retreat of the ice.

Though this range is clearly not accurate because it lies outside the Bible’s total timeline of 6,000 years, several lines of evidence support the choice of the Pleistocene layers for the Ice Age. Anywhere that these layers have been tested by radiometric dating, the ages fall within this range. Also, the plants and animals associated with these layers fit the Pleistocene. Indeed, the woolly mammoth (Mammuthus primigenius) and the saber-tooth cat (Smilodon fatalis)—descendants of the original elephant and cat kinds on the Ark—first occur in these layers and disappear at the end of this time frame, except for a few holdouts on a remote Russian island. (See “Why Were Animals So Big?” p. 56, which discusses how the first elephant and cat kinds on the Ark might produce all this variety during the Ice Age.)

Apart from Antarctica and a few high mountain chains, sediments deposited before the Ice Age do not show signs of cold-weather environments or ice sheet activity. Indeed, the world appears to have been a pretty balmy place until the Ice Age.

Knowing these things, how can we use the human history described in the Bible to shed light on the Ice Age’s beginning? Well, for one thing, no human tools or fossils appear anywhere on the earth until found in deposits from the beginning of the Ice Age.⁷ (God appears to have wiped away all remains of pre-Flood man; see Genesis 6:7.) Since their earliest remains suddenly appear throughout the Old World (Asia, Africa, and Europe), it appears that these are the people who scattered from Babel.

So it is reasonable to conclude that the start of the Ice Age in the Northern Hemisphere (the Pleistocene) roughly coincides with the Babel judgment, around a century or so after the Flood (perhaps 2250 BC).

Who knows, perhaps the Ice Age was part of God’s plan to keep people from quickly resettling in one place again. The unpredictable climate would have made it difficult for anyone to settle down and raise seasonal crops in the years immediately following Babel’s dispersion.
WHEN DID THE ICE AGE END?

The Bible also sheds light on the Ice Age's end, though in an indirect way. If we can determine the dates of the first cities built after Babel, including Ur, and then show their relationship with dates for the last human and animal remains from the Ice Age, we can establish approximately when the Ice Age ended.

Bible Fact: Thriving Cities by Abraham’s Day. The Bible mentions that some very important cities were established by Abraham's day and continued to thrive throughout Old Testament times. For instance, the city of found earlier in the fossil record were not anything you would want to ride! It appears that most wild versions of these beasts of burden were extinct by Abraham's time, along with many other Pleistocene mammals (like wild horses in the Americas).

Archaeological Fact: No Cities Associated with Ice Age Remains. The fossil and archaeological record offers us a phenomenal wealth of data from thousands and thousands of sites on every continent. In case after case, radiocarbon dating confirms a general pattern. While the “radiocarbon ages” are wrong because they exceed the Bible’s timeline, the relative ages are useful. If something dates at 40,000 radiocarbon years and something else at 20,000 or 5,000, we know the first find is older than the second, and so on.⁹

Radiocarbon dating shows that every fossil from the Ice Age predates anything from the earliest known human settlements. Several cities have been continuously inhabited since Abraham’s day, so it’s not likely that we’re just missing evidence.¹⁰ Many large mammals specifically designed for cold weather went extinct when the Ice Age ended, in a period known as the “Ice Age extinction event” (see “Mystery of the Megafauna Extinction,” p. 57). We are also able to date human fossils and other remains from the earliest human settlements around the world.

In no case do these settlements, including Ur, date as early as the end of the Ice Age. At the time of Ur’s settlement it was a port city on the Persian Gulf, but this gulf did not even exist during the Ice Age. Only later did the melting ice sheets raise the ocean enough to flood into the area and fill the gulf.¹¹

WHAT WERE PEOPLE DOING DURING THE ICE AGE?

Archaeologists have found thousands of campsites and small settlements where Noah’s descendants lived after the Babel dispersion during the Ice Age. These early pioneers were daring explorers and settlers, quickly reaching as far as Australia and the Americas. Everywhere they went, they found unfamiliar plants, weather cycles, soils, and wild animals. Cast off from the pampered life of the city, the tiny bands had to invent whole new ways of doing things, including living off the land while caring for their children.

Bible Fact: The Whole Earth Is Settled. The Bible does not reveal much about the biology and geology of the Ice Age, but it does tell us about the languages, culture, and migrations of the people of that time. They began as a united people with one language, capable of accomplishing great feats (Genesis 11:5). But God recognized the danger of unity without obedience to His word, so He scattered the people from Babel.

Twice the Bible repeats that “the Lord scattered them abroad from there over the face of all the earth” (Genesis 11:8-9). Notice that this was the Lord's doing. This supernatural event is essential for a proper understanding of human history. Yet without God's written Word archaeologists would have no way of knowing this happened.
Archaeological Fact: Brief Appearance of Neanderthals, Woolly Mammoths, and “Stone Age” Villages. The fossil and archaeological record gives us a wealth of amazing detail about the creatures that Noah’s descendants met and the places where they lived.

Various species of the saber-tooth cat (such as Smilodon fatalis) began appearing as the Ice Age got underway, though not in the areas first settled by humans. The woolly mammoth (Mammuthus primigenius) did not appear until later, but as the cold increased and grasslands spread across northern Asia and North America, its numbers quickly filled the grassy plains. Humans soon followed in their steps.

Another interesting development during the Ice Age was the appearance of Neanderthal people, whose range was restricted to Europe and the Near East. Like all other humans, they were descendants of the people who scattered from Babel. Their remains do not appear until the middle of the Ice Age, and they disappeared as the glaciers reached their maximum and the cold, dry weather reached its worst.12

Their short, squat bodies were better suited for the cold than the taller, thinner bodies of their contemporaries, the Cro-Magnon people (other descendants of Babel people), who looked like us. The Neanderthals used heavy spears to hunt woodland animals, but these woods began disappearing at the height of the Ice Age, to be replaced by grasslands or barren tundra. The Cro-Magnon, in contrast, made finely crafted arrows and other weapons that enabled them to hunt more easily on the open plains. The vast number of the Cro-Magnon campsites and fossils indicate these men and women were more successful at adapting to the changes.

The toolmaking technology that archaeologists find is not a record of millions of years of human advancement. These improvements could easily happen within decades after Babel.

SAME STONE TOOLS, DIFFERENT VIEWS

Stone tools and other artifacts from the Ice Age do not come with signs on them telling us their age and significance. Depending on your starting assumptions, you can reach very different conclusions, even if you start with the very same facts.

Consider one interesting example. Everywhere we find the earliest known stone tools—in Europe, Asia, and Africa—they have the same basic design, called Acheulean tools.* This type of tool appears in most Ice Age layers. Then suddenly, near the end, lots of new styles were adopted, such as the smaller Mousterian blades associated with Neanderthals.

If you believe the Ice Age lasted 2.6 million years, then you must assume human beings were making the same basic tools for at least 50,000 generations before any new ideas were invented. That scenario does not quite fit what we know about human ingenuity.

God’s Word gives us a different picture of human history. The earth is only six thousand years old, and humans lived here since the first week. All the Ice Age peoples were descendants of Noah’s three sons, who already knew how to build ships, towers, and cities.

We would expect the people who scattered from Babel to share many of the same technological skills. They also lived longer than we do, sometimes over four centuries. So they could pass down technology to many generations. In fact, it is conceivable that most of the stone tool innovations occurred within a single generation. (Noah’s son Shem was still alive when Abraham was growing up!)

MYSTERIES OF OUR FROZEN PAST

1 COMING TO AMERICA

Today, the Bering Strait separates Russia and America; travel requires a ship or plane. But during the Ice Age, the ocean was so low that a 1,000-mile-wide grassy plain connected the two continents. You could walk across, eating mammoths as you went. And fugitives from Babel actually did!

2 THE BRITISH PENINSULA

Today, the English Channel separates the British Isles from the continent of Europe. But during the Ice Age, Britain was not an island. The ocean was so low that the shallow seafloor was dry land, known as Doggerland. People from Babel actually lived there until the melting ice flooded their homeland.

A DIFFERENT WORLD

When our ancestors scattered from Babel, they encountered a very different world. At the height of the Ice Age, you could walk to England or Japan without a boat. For a brief time, you could even hike overland from Asia to North America. The Persian Gulf didn't even exist.

So it’s a huge mistake to assume that the pioneers from Babel settled in places where we find people today. The fossil record indicates that this era was rocked by constant flooding, supervolcanoes, massive earthquakes, and “super snowstorms.”

Eventually, things settled down. Many families began raising seasonal crops, and when their populations reached sufficient size, they founded new cities.

LINING UP THE ICE AGE

The Bible gives us an absolute timeline for understanding world events. By lining up the right clues, it is possible to narrow down when the Ice Age most likely occurred.

FLOOD ~2350 B.C.

1st POST-FLOOD GENERATION (Arphaxad)
2nd POST-FLOOD GENERATION (Salah)
3rd POST-FLOOD GENERATION (Eber)
1st POST-BABL (Peleg)
First tools and humans
Division of languages at Babel
Fossils

FORESTS IN ANTARCTICA
ANTARCTICA NOW ICE

First mastodons
3 FINDING NEW HOMES
The Persian Gulf apparently did not exist during the Ice Age. The ocean was so low that coastal waters became dry land. Conditions were harsh, so archaeologists do not find cities from this time. After the ice melted and filled the gulf, however, people returned to the area and built cities like Ur, a thriving port on the gulf.
Sometime after the demise of Neanderthal people, the first “stone age” villages begin appearing all over the Old World. We find them by the thousands, in some instances spread over several acres, and apparently predating any “cities” we know of.

It is hard to imagine such extreme changes in weather, landscapes, and vegetation during the rapid Ice Age and the years that followed. Some lush places in the north were stricken by drought, while monsoons filled the Sahara Desert with lakes and grasslands, attracting rhinoceroses, crocodiles, and human settlers. For a time at the end of the Ice Age, the drenched Nile Valley was not even habitable (at least, no human artifacts or villages have been found from this time). The great cities of Memphis and Luxor did not arise until many years later.

PUTTING IT ALL TOGETHER

Why did people wait so long after Babel to build cities and farm again? Problems included the tiny populations, the threat of skirmishes, and the changing climates. We also know from the fossil record that they faced constant flooding, dust storms, supervolcanoes, massive earthquakes, meteors, and downpours of snow or rain on a scale never before seen. It was much safer to live off the land and gather wild grains and game, as people still do in harsh environments. On top of those problems was God’s supernatural intervention to scatter the small groups of families over the face of the earth. The very purpose of this judgment, after all, was to limit mankind’s ability to “do whatever they imagine.” And it was clearly successful!

Big Bone Lick is a stark reminder of this difficult time in earth history. The “lick” was a salt deposit that appeared as the ice sheets began retreating. Animals came to lick the salt and then got trapped in the boggy ground. Humans arrived in the area later, at the end of the Ice Age. Their weapons show up in the fossil record about the same time that the large Ice Age mammals went extinct—around 2100–2000 BC. Only later would various cultures begin building pyramid-like mounds and well-defined cities in the Americas, as they did elsewhere in the world.

We still have a lot to learn. But we know for certain that the Bible sheds light that puts our world into perspective, including the Ice Age. In fact, it is essential to a right understanding of reality. That extends to modern worries, such as global warming and endangered species, because our understanding of the future is built upon our correct understanding of the past. If mankind would only take God’s Word to heart, it would transform our thinking in every area, and open up amazing new vistas in science and archaeology.

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NOTES

2 Most Jewish and Christian commentators believe that the context of Genesis 10:25 means that the confusion of languages at Babel occurred in Peleg’s day. The Bible does not explicitly say when Babel occurred during Peleg’s life, however. Theoretically it could have occurred anywhere within the three centuries that he lived, but this article is using the earliest possible date, his birth, as a rough “first estimate.” If the division at Babel occurred later than Peleg’s life, then the Ice Age was even shorter than the estimates in this article. See “Egypt or Babel: Which Came First?” Answers, April–June 2008, pp. 30–33.

3 Some have argued that only some people settled at Babel, but Genesis 11:10 says that they “settled in the plains of Shinar, and the only antecedent is the “whole earth” (the whole earth’s population). Then Genesis 11:8–9 says God scattered them “here and there” and confused humanity’s language “there” (not at multiple places).


5 Other old versions of the Bible, such as the Samaritan Pentateuch and the Greek Septuagint, add one hundred years to the patriarchs after Shem, for a total of six hundred years. They also add another person, Canaan, whose age would add yet 130 more years to this era. This topic, though important, is not the concern of this article.

6 The Bible does not give the specific date of Abraham’s birth. Just the age that Terah began having his three children. Some have argued that Terah was 130 when he fathered Abraham, though not that it changes the fact that Terah was 70 when his first son was born in Ur.

7 Even more evidence has been discovered since the magazine last reported on it in Biblical Atlas: “Forests in Antarctica after the Flood?” Answers, July–Sept. 2010, online exclusive. Some might argue that these deposits from vegetation and animals formed into lake during the Flood, but in fact there is a sequence of changes from tropical forest to temperate forest to scrub to tundra. Such a natural sequence, which also appears in other post-Flood deposits worldwide, indicates climate changes over time, not floating debris from the year-long Flood.


9 For a full explanation of the value and limits of radiocarbon dating, see Andrew Snelling’s three-part series of articles in Answers (Oct.–Dec. 2010 to Apr.–June 2011 issues).

10 David Livingstone, “Ur Connects Babel to Today,” Answers, April–June 2008, pp. 36–37. Note that the earliest remains from some cities possibly have not survived rising water tables and continuous “borrowing” of old building materials for new projects. But in most excavated cities, such as Nineveh, archaeologists are confident they have found the very first remains when they find “virgin soil” under them.


12 See ref. 8, especially the maps of human remains from the Ice Age. In every place that Neanderthals are found, humans with a different appearance appear in deposits that are even lower in the fossil record than Neanderthals. And once Neanderthals appear, their features show up in both children and adults. So the popular view that Neanderthal features result from younger age is not supportable. See Tanya M. Smith et al., “Dental Evidence for Ontogenetic Differences between Modern Humans and Neanderthals,” Proceedings of the National Academy of Sciences 107, no. 49 (2010): 20923–20928.
WHAT STARTED THE ICE AGE?

TRANSPORTING ENOUGH ICE AND SNOW TO COVER THE CONTINENTS IS IMPOSSIBLE UNDER CURRENT CLIMATE CONDITIONS. THE ONLY VIABLE SCIENTIFIC MODEL WOULD REQUIRE A UNIQUE CATASTROPHE—LIKE THE BREAKUP OF THE EARTH’S CRUST DURING THE FLOOD—TO ENERGIZE THIS ICE MACHINE.

By Larry Vardiman

Geophysicists have a love-hate relationship with “the Ice Age” (the popular term for a series of ice ages that supposedly struck the earth every 100,000 years). On one hand, they believe they can prove that small fluctuations in the sun’s heating over millions of years coincide with the coming and going of ice ages. Yet they can’t figure out how such minor blips in solar heat could cause thick ice sheets to cover half the globe every 100,000 years.

They suggest that other factors must be at play. Perhaps minor changes in the distance and angle to the sun worked like a pacemaker to regulate the ebb and flow of ice ages.1 But they can’t seem to identify a mechanism that could take such minor variations and amplify them enough to produce an Ice Age.

Perhaps their models don’t work because they don’t begin with the Bible.

A CATASTROPHIC GLOBAL FLOOD

Genesis recounts a global, catastrophic event that would have dramatically changed earth’s geology, biology, and climate. Scripture says that “all the fountains of the great deep were broken up, and the windows of heaven were opened. And the rain was upon the earth forty days and forty nights” (Genesis 7:11–12).

The Flood described in Scripture was so massive that the very crust of the earth broke apart. Our planet’s original supercontinent broke into several smaller landmasses. Those new continents apparently shifted about, mountains thrust upward, great cracks extended tens of thousands of miles, and hot magma spewed up through volcanoes and cracks into the oceans. For months, seawater covered the continents and then retreated from the land. These processes produced so much heat that the average ocean temperatures climbed to over 100°F (38°C), much warmer than today.

This warm ocean set in motion a series of events that would lead to an Ice Age.2

Hot ocean water evaporated rapidly, forming intense storms that dropped heavy precipitation on the continents for hundreds of years after the Flood. As the water evaporated, however, the temperature of the ocean cooled. Eventually it reached the equilibrium we know today. But during the brief period when the oceans were hot, cold temperatures and heavy snowfall on the continents would eventually produce an Ice Age, beginning in polar regions and then rapidly extending over the continents and on the mountains.

Volcanic dust blocked out the sun and kept the continents cold, preserving the ice through the summers. Once the oceans cooled and the volcanoes became less active, however, the clouds thinned, allowing more sun to heat the earth and melt the ice sheets and glaciers. The ice sheets then melted back toward the poles, and glaciers retreated higher up the mountains.

The Ice Age caused by the Genesis

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THE ICE AGE CAUSED BY THE FLOOD IS A ROBUST MODEL VALIDATED BY BIBLICAL AND SCIENTIFIC DATA.

Flood is not a weak, theoretical possibility, but a robust, verifiable event validated by biblical and scientific data.

There's no need to postulate a feedback mechanism to amplify minor changes in the sun's heating and angle, as old-earth assumptions require. The high-energy events during the Genesis Flood were more than sufficient to cause an Ice Age. One needs only to recognize that the Bible is a source of historical truth and that a global, catastrophic literal Flood covered the earth a few thousand years ago.

RECENT CREATIONIST MODELING OF STORMS DURING THE ICE AGE

New computer technology allows us to study this marvelous mechanism in greater detail.

Under the unique post-Flood conditions, “super storms” would develop that dumped rain and snow at unheard-of rates, somewhat similar to the super-hurricane (or hypercane) that has raged on Jupiter for centuries, known as the Great Red Spot. Super storms, formed under extreme temperature differences present during and following the Genesis Flood, would have produced as much precipitation in days as regular storms do in years today.

Using a high-resolution numerical model developed at the National Center for Atmospheric Research, creationists have recently simulated winter storms, tropical cyclones, and nor’easters thought to have occurred during the Ice Age after the Genesis Flood. Each type of storm grew larger and stronger because of the heat released from the ocean.

Precipitation increased by a factor of six in several different types of winter storms when the ocean temperature was warmed to 113°F (45°C). Figure 1 shows the precipitation that would fall in Yosemite National Park, one of North America’s most famous Ice Age sites. If the precipitation in each snowstorm increased this much, and the total number of snowstorms increased, then glaciers thousands of feet thick would readily develop in only hundreds of years.

Other simulations have shown how typhoons (called hurricanes in the Western Hemisphere) would behave in the Arabian Sea near Africa’s east coast and hurricanes off Florida’s coast. In both cases, a warm ocean would intensify the storms into massive hypercyclones (greater than category 5 hurricanes). Light to moderate rain fell over all the modern desert regions of the Middle East.

This result supports historical evidence that Israel, the rest of the Middle East, and North Africa were well-watered for a brief time following the Genesis Flood. The simulated hurricanes off Florida’s coast also intensified into hypercyclones and changed the direction of storms to better fit the weather patterns that occurred during the Ice Age.

Three nor’easters (storms along the coast of the northeastern U.S. and Canada) were also simulated under warm ocean conditions. These storms matter because they are necessary to draw moisture from the Atlantic Ocean and form an ice sheet in eastern Canada.

In the simulation, all three storms grew immensely in vigor, wind speeds increased, and the heavy precipitation fell all over the Northeast in the pattern expected during the Ice Age. The additional snow from nor’easters explains the mountain of snow known as the Laurentide ice sheet of eastern Canada during the Ice Age.

RAPID GLACIAL SURGING

Critics have said a single Flood-caused Ice Age is impossible because only multiple ice ages could form the complex deposits we find at the edges of former ice sheets. However, recent simulations of the Des Moines Ice Lobe show that ice can surge quickly, forming lobes that can move as fast as four miles per year and leave complex deposits (Figure 2). Lobes of ice thought to have taken tens of thousands of years to form are now believed to develop in much less time. Consequently, a single, rapid Ice Age is a likely scenario.

Simulations confirm that warm oceans after the Genesis Flood caused intense evaporation and snow and ice storms during a single Ice Age of short duration. If we use God’s Word as our starting point, we do not need to rely on unknown mechanisms that require hundreds of thousands of years. In fact, there is no scientific justification for those models. Instead, the Bible gives us the big picture that helps make sense of our world.
“SUPER STORMS” DURING THE ICE AGE
(Figure 1)
Molten magma released during the Flood heated the oceans enough to create “super storms” that generated mountains of snow. Computer simulations of winter storms at Yosemite show that raising the ocean’s surface temperature would cause storms to dump six times more precipitation than they do today.

RAPID SURGES OF ICE
(Figure 2)
During the Ice Age, advancing and retreating ice at the edges of ice sheets tore up the surrounding landscape and left complex deposits. Recent simulations of the Des Moines Ice Lobe show that the ice can surge very rapidly. Lobes of ice do not take tens of thousands of years to form.

NOTES:

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WHY WERE THE ANIMALS SO BIG?

Ice Age animals, especially the large mammals, seem to have won a special place in people’s hearts. While plenty of other strange and wonderful fossils inhabit museums, let’s face facts: nobody makes children’s movies or television shows about armored fish or extinct sea-scorpions. On the other hand, mammoths, saber-toothed cats, and other giant mammals show up everywhere in popular culture. Just look at the success of the Ice Age animated movies. Fascination with Pleistocene megafauna (“big animals” of the Ice Age) is alive and well.

One reason for our fascination is that many familiar animals possessed unusual traits during the Ice Age (who put hair on those elephants?) or lived in unusual places (why did giant South American armadillos move to Texas?). The main interest, however, is that they were, well, big. Something about being big impresses us. An ordinary beaver: no big deal. But an eight-foot-long beaver: now that’s impressive!

RULES, RULES, RULES

Unlike physics and chemistry, biology has relatively few mathematical rules or “laws.” And the handful of useful equations (such as those in population genetics) rarely apply to real-world situations. Why? Unlike molecules or falling bowling balls, living creatures don’t often follow simple rules. They are dynamic and unpredictable.

Cope’s Rule. Although biology is often too complicated for us to understand why many things are the way they are, biologists have identified some patterns. A couple of these patterns relate to the size of Ice Age organisms. The first is Cope’s rule, named after the famous nineteenth-century paleontologist Edward Drinker Cope. Studying mammal fossils from North America, Cope noticed that within similar kinds of animals (such as the dog or deer families), the fossil species found in the lower layers were often smaller than the species found higher up. Since the Ice Age layers are high up, Ice Age layers often contain larger species. But why is Cope’s rule true? Scientists don’t know for sure.

Because Cope was an evolutionist, he thought some unknown principle of evolution produced larger organisms with time. Although creationists disagree with Cope’s understanding of evolution, the trend from small to big might still apply to the “kinds” (baramins) of animals that left Noah’s Ark after the Flood. The big Ice Age mammals are not new kinds of creatures but merely larger variations within the original kinds that God created on Day Six of Creation Week.

We know that each land-dwelling baramin was represented on Noah’s Ark (Genesis 6:19–20). Since God desired these Ark-saved kinds to “be fruitful and multiply on the earth” (Genesis 8:17), perhaps the size increase occurred within the baramins as the animals left the mountains of Ararat and multiplied to fill the earth.

Among many mammal kinds, Cope’s
rule fits the pattern: many of the earliest post-Flood mammals were small, but their descendants were often much larger, including rhinos, deer, cats, and even some rodents, like beavers.

But why should mammal lineages get bigger over time? It turns out that being bigger has lots of advantages. While bigger mammals need more food than smaller ones, bigger mammals don't need as much food per pound.1 Moreover, bigger versions can move faster than their smaller comrades, and perhaps they are better at intimidating predators or escaping from them. And interestingly, larger animals usually live longer than smaller ones.

So in choosing small animals to go on the Ark, God satisfied several needs at once. Small animals take up less space and eat less. This would reduce the stress on Noah and his family. In the barren years after the Flood, smaller animals could also make do with less food, find shelter more easily, and generally reproduce more quickly.

At the same time, God wisely chose small animals that would be able to produce larger members of their kinds over time. As earth rebounded from the effects of the Flood (the climate stabilized, etc.), this variety of sizes would help post-Flood animals adapt to changing conditions. As food became more plentiful and temperatures cooled, these larger descendants could take advantage of the new conditions.

**Bergmann's Rule.** The second "rule" may apply to the specific climate conditions of the Ice Age itself. The nineteenth-century German biologist Carl Bergmann noticed that species tend to be larger in colder climates than similar species of the same genus living in warm climates. This makes sense because a larger body retains heat more efficiently. As an animal's total size increases, its surface area increases, but not as quickly as its volume.

Think about hot water in a water balloon. A little water makes the balloon expand a lot, but it doesn't stay warm very long because so much surface area is exposed to the air. If you keep filling the balloon, the water will stay hot much longer because the surface area does not grow as fast as the volume of water. In the same way, a large animal stays warmer because a smaller proportion of its surface area is exposed to the air.

While this trend is recognized among species of living mammals and birds, Bergmann's rule can also be used to compare species within the same baramin living at different times. They would tend to be larger as the weather became cooler. In other words, many mammals were already increasing in size after the Flood (Cope's rule), but some animals could also have increased in size as a direct response to dropping temperatures (Bergmann's rule).

**Which Rule Rules?**

These two biological principles explain at least part of our Creator's designs for mammals to vary. Depending on the mammal kind being studied, either rule could explain the large size, or both rules might have operated at the same time. It is also likely that other forces, still unknown to scientists, affected the animals after the Flood, so lots of work is still left to be done!

As paleontologists look into the fossil record of the big Ice Age mammals, they may be able to tease out some of the rules at work. On the one hand, some animals, such as the giant ground...
sloth Megalonyx and the armored Glyptotherium, got big far from cooling temperatures. So Cope’s rule is a strong contender.

On the other hand, some animals had specific adaptations for the cold that are not seen in most other creatures of their baramin. Two examples are the large body size of the saber-tooth cat Smilodon (who possessed a stocky body and short but powerful limbs) and the woolly mammoth’s large size and many cold-detering features (see sidebar). Both of these animals are good candidates for Bergmann’s rule.

THE “BIG” PICTURE

So when it comes to understanding the animals of the Ice Age, it’s an interesting mix. While some animals appear to have gotten larger because of abundant available resources and the efficiency of size (Cope’s rule), as temperatures dropped after the Flood, bigness had additional advantages, such as better heat retention (Bergmann’s rule). And there are certainly other, as yet undiscovered, factors involved as well. What is truly amazing is that our wise and loving Creator foreknew all these needs and equipped each kind with the ability to adapt and thrive in the constantly changing post-Flood world.

NOTES

1 For example, while an elephant eats much more than a mouse, an elephant uses less energy per pound to stay alive. Also, an elephant’s heart rate is much slower than a mouse’s, and elephants use much less energy to keep their body warm because their huge volume helps insulate them from heat loss. Because of this, larger animals can afford to have a slower metabolism than smaller ones.


3 This example may actually follow what is known as Allen’s rule: animals in colder environments tend to have shorter limbs than those in warmer environments.
WOOLLY MAMMOTH

An Ice Age collection wouldn’t be complete without the woolly mammoth, *Mammuthus primigenius*. Standing 9 feet (3 m) tall and weighing in at over 5 tons, *M. primigenius* is why the word *mammoth* is a common word for huge in the first place. Its distribution, too, was as big as its name: woolly mammoth fossils are found across the Northern Hemisphere, from the United Kingdom and Germany to Kazakhstan, Russia, Canada, and the United States (from Washington State to Maryland). Their adaptations to cold climates include a heavy coat of hair, a fat layer under the skin, and small ears (by elephant standards!).

GIANT BEAVER

Who would have thought that beavers could get so big? The giant beaver *Castoroides ohconensis* could grow to over 8 feet (2.5 m) long and weigh up to 200 pounds (90 kg). Like modern beavers, *Castoroides* had long, sharp incisors. Its skeletal anatomy, though larger, is very similar in proportion to living beavers, leading most paleontologists to believe that *Castoroides* probably looked and behaved much the same, having a large, flat tail and building dams. *Castoroides ohconensis* fossils are found east of the Rocky Mountains in the United States, and in Ontario and the Yukon Territory, Canada.