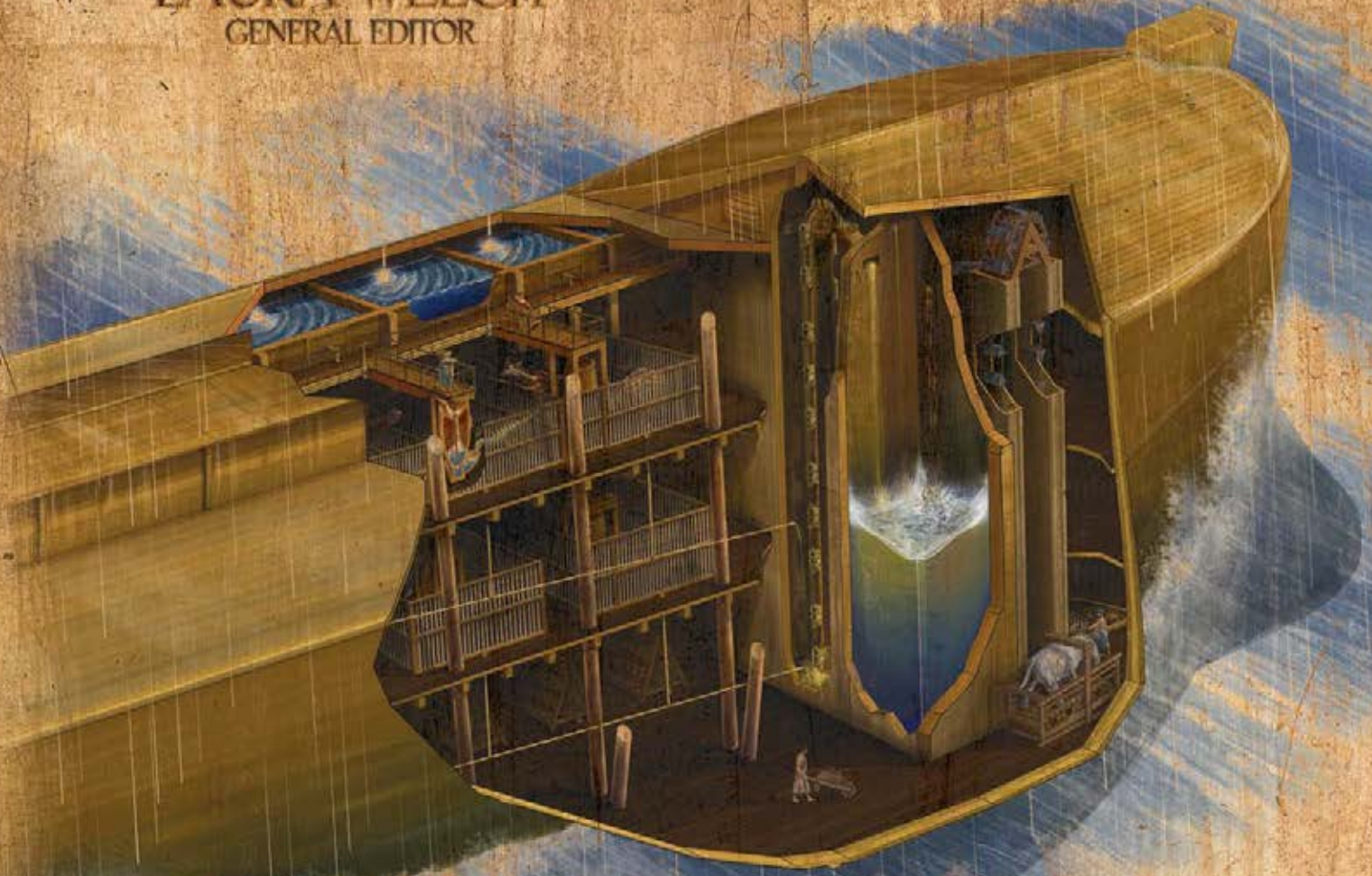


LAURA WELCH  
GENERAL EDITOR



# Inside Noah's Ark

WHY IT WORKED

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## Table of Contents

	Introduction .....	4
1	Starting Points .....	6
2	The Ark Through the Ages.....	10
3	Could It Work? .....	16
4	Food & Water Storage .....	24
5	Feeding & Watering .....	32
6	Wastewater Systems.....	38
7	Maintaining the Ark's Environment.....	48
8	Ancient Man: The Pre-Flood World.....	52
	Conclusion.....	60



# Introduction

So the LORD said, “I will destroy man whom I have created from the face of the earth, both man and beast, creeping thing and birds of the air, for I am sorry that I have made them.” But Noah found grace in the eyes of the LORD.

— Genesis 6:7–8

**N**oah’s Ark has intrigued people for thousands of years. There are just so many questions related to this small collection of verses in the Book of Genesis. Has it been found? How did it work? Was it a real boat or just a religious metaphor? Could all the animals fit? Eight people, one boat, and the epic journey that saved representatives of the animal kinds — it is a biblical account that demands attention.

Hundreds of flood legends from around the world seem to echo the Genesis account. Early historians like Alexander Polyhistor and Josephus cited Berosus of Chaldea in describing the Ark being in a specific location that was visited by people who took small pieces of it with them to ward off evil. Over time, this view began to change, though many additional historical accounts continued to present it as reality rather than a morality tale.

Then as people began to see the Bible as less historical and more metaphorical, there began to be questions about the feasibility of Noah’s Ark and whether the Great Flood could have even occurred. As people discounted the biblical timeline for a secular one that includes billions of years, the Ark became little more than a fairy tale. Even many believers unwittingly support such a view when they portray the Ark as looking more like a cute overstuffed bathtub. Secularists tried to make it appear that the boat, the Flood, and the whole account were impossibilities.



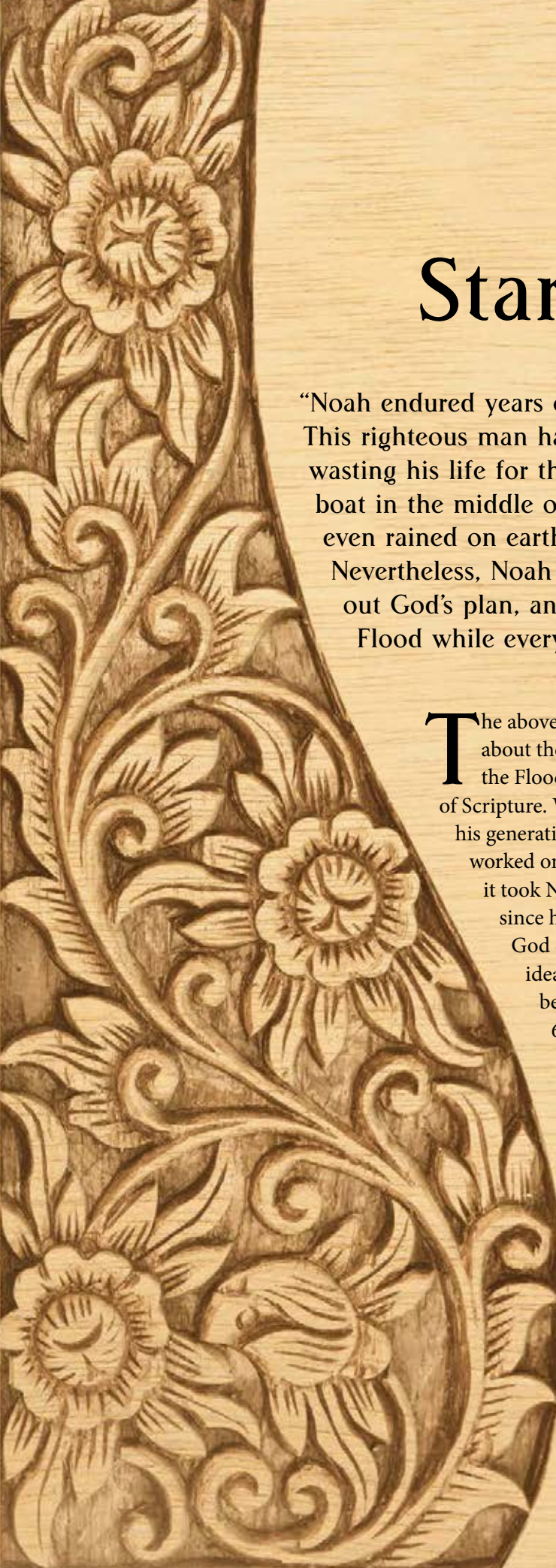
People's interest in Noah's Ark has not faded away — even in our modern and skeptical time. In a January 2010 poll by CBS News and Vanity Fair, Noah's Ark was the top choice for “which lost artifact would you most like to find,” at 43 percent of all poll participants and 65 percent of those who identify as evangelicals.<sup>1</sup>

Now, at the Ark Encounter in Williamstown, Kentucky, a huge wooden replica of Noah's Ark has taken shape and confronts the skeptics with scientific details and other teaching that highlight the vessel and the Genesis account as viable history as they answer some of the world's most common and critical questions.

Why is this such an important effort? It is vital as a tool to show that God's Word about the history of God's world is true. If Noah was real, and the Ark was built, and the Flood occurred, what message is there for the world today?

The truth impacts our view of history from the very beginning — when man was created perfect and without sin. After mankind's Fall, the Bible tells us that by Noah's time, the world consisted of people whose only thoughts were of evil all the time. The only exception was Noah — who God would task to save part of His creation when His judgment was unleashed on the world.

This truth also affects our view of our origins. Ancient man was not the primitive ape-like creature that is so popularly depicted today. We see remarkable advances in the earliest civilizations that reveal lost and sophisticated knowledge of the world and the universe that has had to be “re-discovered.”



## Chapter 1

# Starting Points

“Noah endured years of ridicule from those around him as he worked. This righteous man had been spending his family’s inheritance and wasting his life for the better part of a century building a massive boat in the middle of nowhere. To make matters worse, it had never even rained on earth, so how could the world ever be flooded? Nevertheless, Noah tirelessly withstood the abuse to faithfully carry out God’s plan, and in the end, he and his family survived the Flood while everyone else died.”

The above retelling reflects common misconceptions many Christians have about the Flood account. Apart from Noah building the Ark and surviving the Flood with his family, the remaining details are not found in the pages of Scripture. While it is plausible that Noah was mocked by wicked people in his generation, the Bible never includes this detail, and it never states that he worked on it in the middle of nowhere or in a desert. The amount of time it took Noah to complete the Ark was likely much shorter than 100 years, since his sons were probably already grown and married by the time God commanded him to construct the Ark (Genesis 6:14, 18). The idea that it never rained on the earth prior to the Flood is speculative, being based on Genesis 2:5, a verse describing conditions on day 6 prior to the creation of man. Is it a legitimate interpretation of Scripture to apply the unique conditions of the creation week throughout the entire pre-Flood era of over 1,650 years?<sup>1</sup>

Genesis 6:14–16 explains the basic instructions about the Ark that God gave to Noah:

- Make it out of gopherwood
- Make rooms or enclosures in it for the animals
- Cover it inside and out with pitch
- Make it 300 cubits long, 50 cubits wide, and 30 cubits high<sup>2</sup>
- Finish it one cubit from the top (probably a reference to an opening at the top)
- Set a door in the side of the Ark
- Make it with three levels or decks<sup>3</sup>

The Bible provides a few details about the Ark, but there is much we are not told. This fact explains why the embellishments mentioned earlier have been slipped into the biblical account. How did the Ark Encounter approach the topics on which Scripture is silent? Consider the following questions:

- Did Noah's culture possess the technological capabilities to build the Ark?
- How long did it take Noah to build the Ark?
- How many people, if any, assisted with the work?
- Did Noah know how many animals would be on board and how long the Flood would last?
- Did God perform miracles to assist and protect Noah throughout the construction of the Ark and during the Flood?

The Ark Encounter team worked through these questions and so many others to develop plausible solutions. A handful of well-reasoned assumptions guided their decisions.

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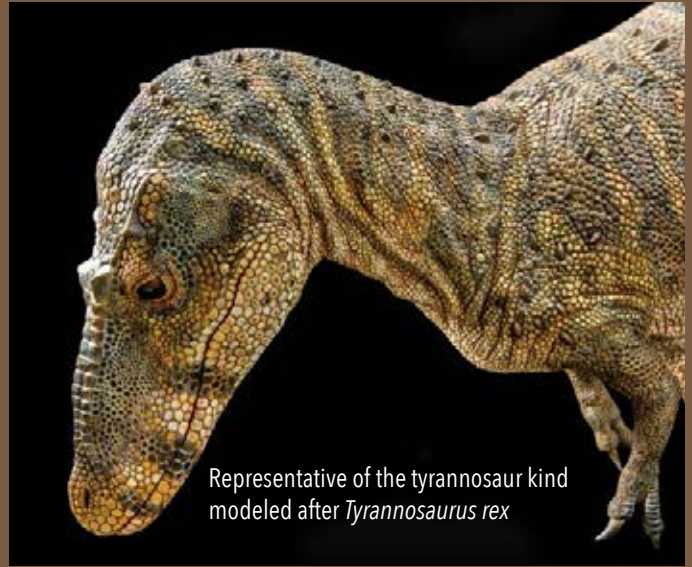
**First**, the Bible is the Word of God, so it served as the final authority on matters that it specifically addresses. This means that the truths about the Ark and Flood outlined in Scripture could not be ignored or altered to fit a given model. For example, the Ark's dimensions could not be expanded to accommodate the necessary animals, and they could not be shrunk to reduce the workload of the Ark's occupants.



**Second**, the Ark Encounter researchers needed to determine just how many details about the Ark the Lord gave Noah. Did He provide thorough plans so that Noah merely needed to prepare the materials and put them together? Did He only give Noah the instructions listed in Scripture, meaning that Noah would need to work out the remaining complex details? The Ark Encounter opted for the latter position — God only gave Noah the instructions mentioned in the Bible. This means Noah was intelligent enough to figure out how to build such a massive boat, or at least hire people with the ability. Such a view should not be surprising since the Bible indicates man was created by God to be intelligent from the beginning. Certainly it is possible that God told Noah more than Scripture reveals, but even if He did, modern readers are not privy to that information.



**Third**, since the Bible mentions that only eight people boarded the Ark and survived the Flood, then the Ark must have been seaworthy. The seakeeping of the Ark has been extensively researched by Tim Lovett and other engineers and naval architects. Mr. Lovett has shown that a wooden vessel with the Ark's proportions could indeed survive the worldwide Flood, particularly if it featured certain design elements, such as a bowfin, stern projection, and a multilayered hull. Proving the Ark's seaworthiness is beyond the scope of this work. For more on this subject, please see Tim Lovett's book, *Noah's Ark: Thinking Outside the Box*.



Representative of the tyrannosaur kind modeled after *Tyrannosaurus rex*

**Fourth**, the Lord said that the animals would come to Noah to be kept alive on board the Ark (Genesis 6:20). Noah did not have the implausible task of tracking down every kind of animal as often alleged by skeptics in their efforts to mock the biblical account. However, God did tell Noah to bring "all food that is eaten" for his family and the animals (Genesis 6:21). This means that Noah and his family needed to work hard to tend all the animals because God did not miraculously take care of all the details, as some Christians believe.

These two details led to a couple of areas of research for the Ark Encounter team. How many animals were required on the Ark and how could Noah's family provide for all of them? Beginning in 2011, a group of researchers led by Dr. Georgia Purdom of Answers in Genesis has sought to determine the maximum number of animals required to be on the Ark. As chapter 3 will explain, even using "worst-case" assumptions, the total number of animals on board was likely fewer than 7,000.

Using this data, Ark Encounter researchers were able to calculate the space, food, and water requirements for the animals. Since God told Noah to make rooms or nests (Genesis 6:14), the Ark Encounter team set about designing enclosures that would minimize the amount of manual labor involved in the feeding of the animals and their cleanup. Creative solutions and nifty contraptions could have been constructed, but the team remained mindful that the Ark's systems needed to strike a balance between efficiency, reliability, and safety.

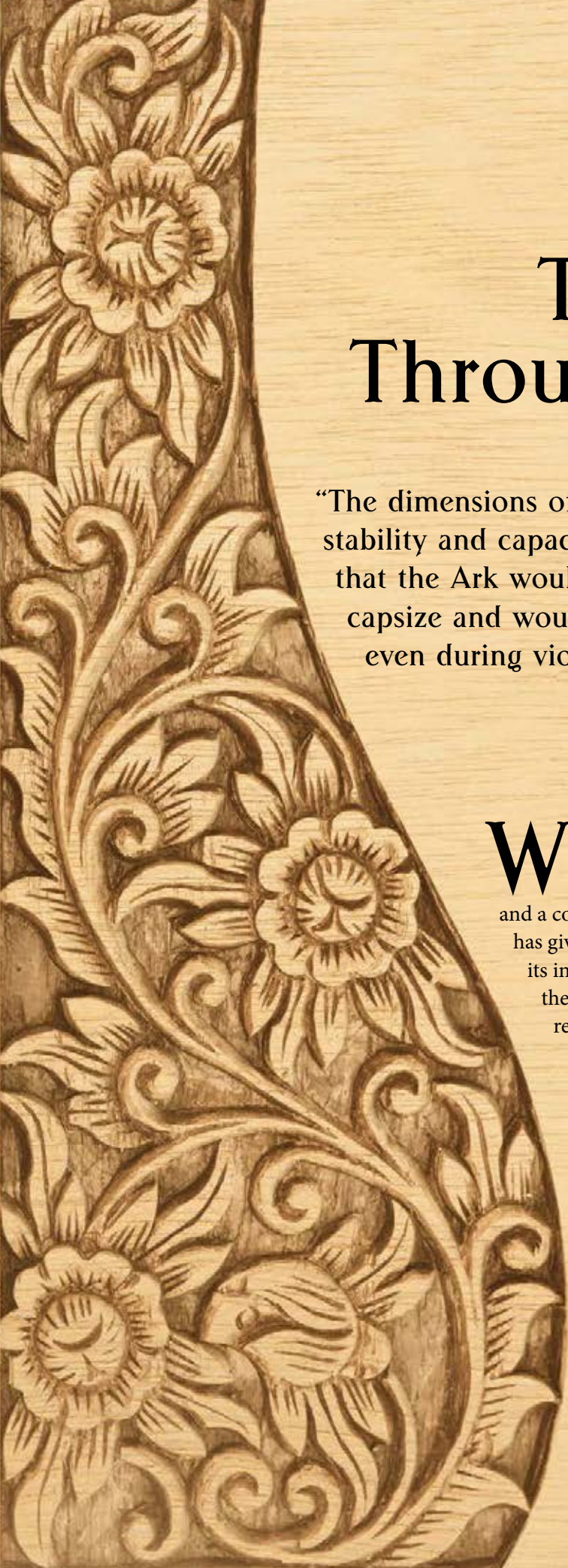




**Fifth**, when thinking about the construction of the Ark and its various systems, one must decide what technological advancements may have been available to Noah. Without evidence of pre-Flood human civilizations in the fossil record, the Ark Encounter team relied on the scant clues found in Scripture. Tubal-Cain was an instructor in bronze and iron, and his half-brother was the leader of those who played the harp and flute (Genesis 4:21–22). We also know that Noah had the know-how to build the Ark. Based on these clues we can see that Noah's culture had achieved a certain level of technological acumen, but just how advanced were they? Ark Encounter researchers determined to picture the technological capabilities of the antediluvian world as being comparable to ancient Greece or Rome. These empires were capable of grand construction projects, including shipbuilding, and like the people of Noah's world, they were extremely corrupt.

**The final** assumption made by the Ark Encounter researchers is that Noah's Ark has not actually been discovered in recent years. Throughout the construction period, numerous people contacted the Ark Encounter claiming that the real Ark had been found in modern Turkey, so the Ark team should just go look at the original to determine how Noah accomplished his tasks. As amazing as it would be to discover the real Noah's Ark, there has been no solid evidence to verify the claims of its discovery. In fact, the Ark Encounter team believes it is highly unlikely that Noah's Ark still exists since wooden structures do not survive the elements for thousands of years.

Using Scripture as their authority and these six assumptions to guide them, the Ark Encounter team sought to figure out how Noah's family could have accomplished so many important tasks during their year-long stay on the Ark.



## Chapter 2

# The Ark Through the Ages

“The dimensions of the Ark were ideally designed both for stability and capacity. It has been shown hydrodynamically that the Ark would have been practically impossible to capsize and would have been reasonably comfortable, even during violent waves and winds.”

— Dr. Henry Morris,  
*The Henry Morris Study Bible*<sup>1</sup>

**W**hen you study the depiction of the Ark in historical images, you will find a vast array of styles — some more practical than others. The Bible gives us only a brief description of dimensions and a couple of other aspects of the Ark’s design. This lack of detail has given artists great leeway over the years to stylize the boat and its inhabitants in diverse ways. Many reflect the style of the period the artwork is created in — while others built metaphorical and religious connotations into their designs.

The following examples are shared to reveal how historical figures chose to respond to many of the same questions and objections to the biblical account of Noah’s Ark that are still prevalent in the world today. While some of these attempts are clearly off the mark, the Ark Encounter begins with a biblical starting point, and then, with the use of science, research, and historical examples, demonstrates the feasibility of the Ark and its ability to protect Noah’s family and representatives of the animal kinds.

## St. Augustine |354-430 A.D.|

St. Augustine popularized the allegorical method of interpreting the Bible, but in many cases, he believed the text was both historical and allegorical. In his work, *City of God*, he explained how the animals could fit in the Ark:

“They say, too, that the area of that ark could not contain so many kinds of animals of both sexes, two of the unclean and seven of the clean. But they seem to me to reckon only one area of 300 cubits long and 50 broad, and not to remember that there was another similar in the story above, and yet another as large in the story above that again; and that there was consequently an area of 900 cubits by 150. And if we accept what Origen has with some appropriateness suggested, that Moses the man of God, being, as it is written, ‘learned in all the wisdom of the Egyptians,’ Acts 7:22 who delighted in geometry, may have meant geometrical cubits, of which they say that one is equal to six of our cubits, then who does not see what a capacity these dimensions give to the ark?”<sup>2</sup>

While Augustine over-calculated by a factor of three, his reminder that the Ark had three levels is on point. Augustine’s calculations are wrong. Three levels of 300 x 50 do not equal 900 x 150. Consider,  $300 \times 50 \times 3 = 45,000$ .  $900 \times 150 = 135,000$ . He tripled both figures when he should have only tripled one of them. He went on to discuss the types of animals, their physical needs, housing, and diet:

“Another question is commonly raised regarding the food of the carnivorous animals — whether, without transgressing the command which fixed the number to be preserved, there were necessarily others included in the ark for their sustenance; or, as is more probable, there might be some food which was not flesh, and which yet suited all. For we know how many animals whose food is flesh eat also vegetable products and fruits, especially figs and chestnuts.

What wonder is it, therefore, if that wise and just man was instructed by God what would suit each, so that without flesh he prepared and stored provision fit for every species? And what is there which hunger would not make animals eat? Or what could not be made sweet and wholesome by God, who, with a divine facility, might have enabled them to do without food at all, had it not been requisite to the completeness of so great a mystery that they should be fed?”<sup>3</sup>

## Origen |c.184-c.253 A.D.|

Another early Christian writer, Origen, in *Homilies on Genesis and Exodus*, describes the Ark as more pyramidal with a flat top rather than an actual ship, then goes into detail on the internal arrangement of living quarters and storage:

“Now these separations of dwelling places appear to have been made for this reason, that the diverse kinds of animals or beasts could be separated more easily in individual rooms and whatever animals are tame and less active could be divided from the wild beasts. Those separations of dwellings, therefore, are called nests.”<sup>4</sup>

As to life on board the Ark, he writes:

“... since all the animals spent a whole year in the ark, and of course, it was necessary that food be provided that whole year and not only food, but also that places be prepared for wastes so that neither the animals themselves, nor especially the men, be plagued by the stench of excrement. They hand down, therefore, that the lower region itself, which is at the bottom, was given over and set aside for necessities of this kind. But the region above and contiguous to this one was allotted to storing food. And indeed it seemed necessary that animals be brought in from without for those beasts whose nature it was to feed on flesh, that feeding on their flesh they might be able to preserve their life for the sake of renewing offspring, but other provisions would be stored up for other animals, which their natural use demands.”<sup>5</sup>

He also wrote *Contra Celsum* as a response to an early critic of Christianity named Celsus who described the history of Noah as “. . . their fantastic story — which they take from the Jews — concerning the flood and the building of an enormous ark, and the business about the message brought back to the survivors of the flood by a dove (or was it an old crow?). This is nothing more than a debased and nonsensical version of the myth of Deucalion, a fact I am sure they would not want to come to light.”<sup>6</sup>

The objections to the biblical account have not changed much since Origen’s time, and neither has the mockery from skeptics.

## Josephus |37-100 A.D. |

Some historians and scholars approached the topic of the Ark as an actual ship designed to be seaworthy and functional. Note the detail and safety recorded in Josephus' account of Noah's Ark:

"... that he should make an ark of four stories high, three hundred cubits long, fifty cubits broad, and thirty cubits high. Accordingly he entered into that ark, and his wife, and sons, and their wives, and put into it not only other provisions, to support



their wants there, but also sent in with the rest all sorts of living creatures, the male and his female, for the preservation of their kinds; and others of them by sevens. Now this ark had firm walls, and a roof, and was braced with cross beams, so that it could not be any way drowned or overborne by the violence of the water. And thus was Noah, with his family, preserved."<sup>7</sup>

## Bishop Wilkins |1614-1672 A.D. |

In 1668, Bishop John Wilkins, an Anglican member of the clergy in England, went into great detail to explain the animals and contents of Noah's Ark in his work, *An Essay Towards a Real Character, and a Philosophical Language*. "Bishop John Wilkins took on the 'Atheistical scoffers' who dared say the expanding diversity of the natural world was an argument against 'the truth and

authority of Scripture.' . . . Wilkins' rebuttal . . . tried to work out exactly how many of which animals would fit in Noah's Ark, a vessel whose dimensions were 'set down to be three hundred cubits in length, fifty in breadth, and thirty in height.' He even made a chart...."<sup>8</sup>

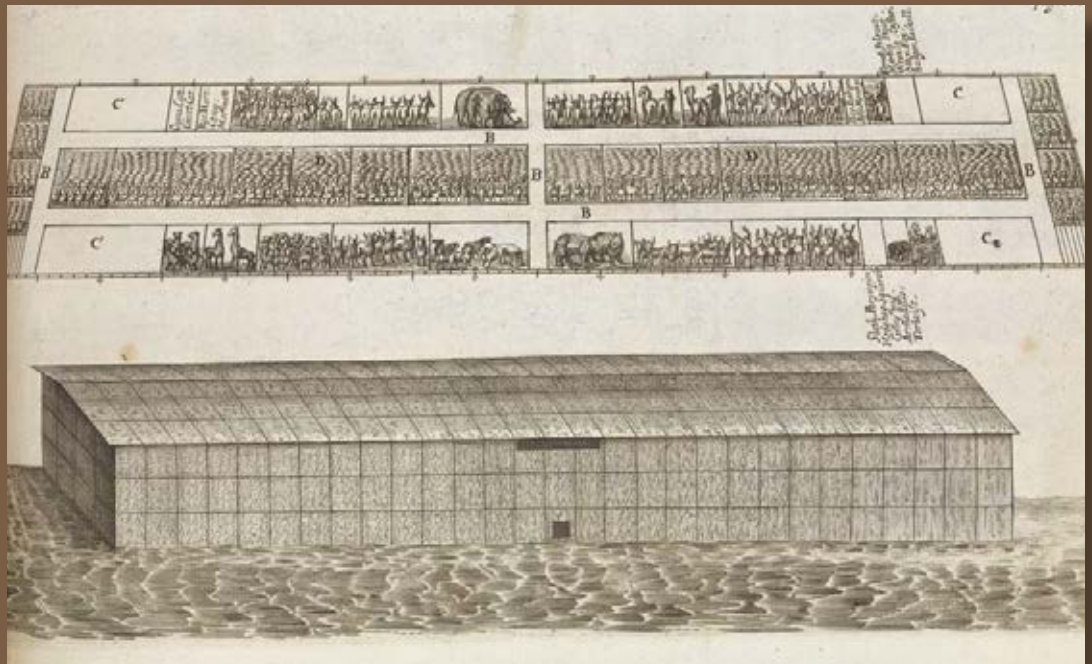


Illustration from Wilkins' essay showing layout and exterior of the Ark; he included charts with numbers of animals categorized by eating hay; fruits, roots, and insects; or being carnivorous. He even went into detail about the capacity of the Ark for animals, their housing, other supplies, and collection of dung.

## Kircher |1602-1680 A.D.|

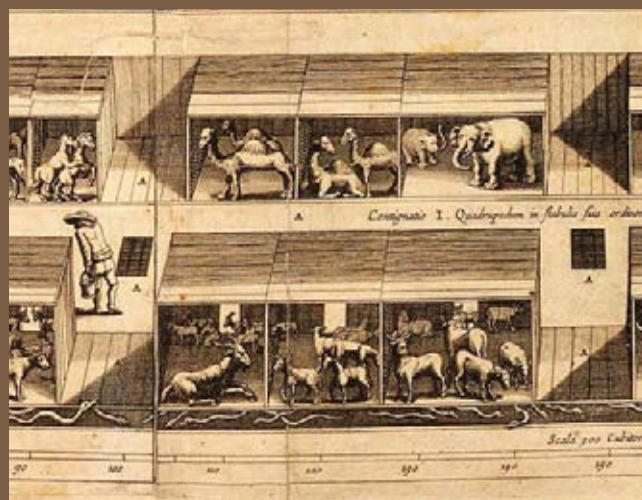


Internal view of Noah's Ark showing the animals housed in their compartments over three decks, along with people caring for them and the storage of supplies.

In 1675, Jesuit German scholar and renowned man of knowledge Athanasius Kircher collected and shared his research on the biblical account in his book *Arca Noë*. These included his calculations on the vessel's dimensions, as well as addressing popular arguments about overcrowding and questions as to how meat-eating animals on the Ark were fed. Some of his other theories are more fanciful — the inclusion of the creatures called sirens and his thoughts on why snakes were on the Ark as a reminder of the Fall.<sup>9</sup>

“The main focus here is not the Flood, but the vessel. Working its structure out, even to the minutest detail, was a way of making the fundamental laws that govern everything explicit. His reason for giving such a detailed account was not to provide the reader with useful information, but rather to show that everything is consistent. As Kircher explains, Noah was just the fabricator of the Ark; God himself was the architect. Indeed, God went so far as to instill into Noah the knowledge of how to construct the Ark. So the Ark would be a marvelous work, comparable to the seven wonders of the ancient world.”<sup>10</sup>

From determining the measurements of a cubit to the mystery of gopherwood, Kircher made detailed analysis and arguments regarding the Ark. His diagrams of the exterior and interior of the ship, down to actual placements of animals and supplies, were equally detailed.



A detail from Kircher's drawing.

## Modern Renaissance



Box-like Ark depictions were predominant at the resurgence of the Creationist movement in the early 70s and 80s. As studies about seaworthiness and stability have continued, ship design features have been tested and are now included in many Ark images.

By undertaking the challenge of answering questions about the size, viability, number of animals, layout, and design of the vessel, these historians and theologians defended the truth of the biblical account. While some of their reasoning and calculations may have proven faulty, their attempts remain admirable.

The publication of *The Genesis Flood* by Dr. Henry Morris and Dr. John Whitcomb was a pivotal work in re-introducing the idea of literal truth to the concepts of creation and the global Flood of Genesis. It also discussed Noah's Ark as an actual vehicle by which mankind and representatives of the animal kinds were saved. In Dr. Morris' commentary notes for Genesis 6:16, he states:

“The three decks may have been laid out as follows: large animals on the bottom; small animals and food storage on the middle deck; family quarters, possessions, records, etc., on the top deck. Water could have been stored in cisterns on the roof and piped throughout the ark where needed. Overhead water storage could also have provided fluid pressure for various other uses.”<sup>11</sup>

In 1996, another groundbreaking work related to the Ark was published. In *Noah's Ark: A Feasibility Study*, John Woodmorappe used common-sense solutions to demonstrate how eight people could care for the needs of an estimated 16,000 animals, based on the genus level of taxonomy.

“This work is a systematic evaluation of the housing, feeding, watering, and waste-disposal requirements of some 16,000 animals on Noah's Ark. It is also a comprehensive rebuttal to the myriads of arguments that have been made against the Ark over the centuries. It is shown that it was possible for eight people to care for 16,000 animals, and without miraculous Divine intervention.”<sup>12</sup>

Australian researcher Tim Lovett focused attention on the Ark's construction. After years of study and design, Lovett wrote the following:

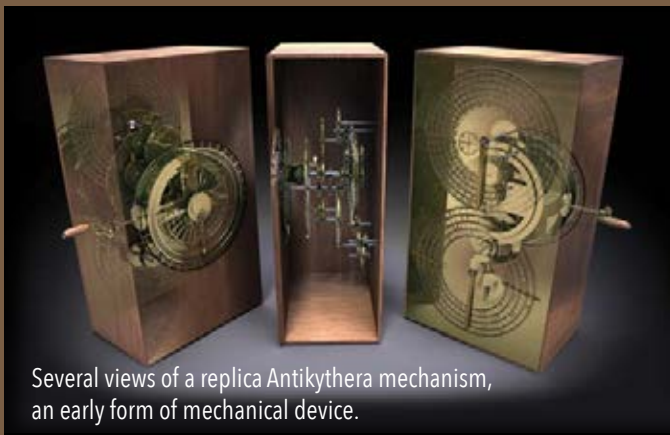
“The Bible gives the all-important dimensions of the ark, but leaves out many aspects of its construction. This suggested design reflects a stable, comfortable, and seaworthy vessel that was capable of fulfilling all the requirements stated in Genesis. It also makes the most sense of a rather elongated lifeboat.”<sup>13</sup>

These books represent a renaissance for creation science, which had fallen out of favor due to the uniformitarian philosophy popularized in the 1800s followed by the prevalence of Charles Darwin's *Origin of Species*. Morris and Whitcomb's work brought into focus the need to bridge the perceived gaps between science and biblical history. Woodmorappe, Lovett, and many others have built upon *The Genesis Flood*, examining relevant subjects in light of new data and diligent study of Scripture. Adding their own research to the mix, the Ark Encounter team produced a life-size Ark that addresses skeptical questions and demonstrates the feasibility of the Flood account.

## Could Such a Large Wooden Ship Float?

It is not surprising that few ancient ships can measure up to the noted size of the Ark, even taking into account differing views on the length of a cubit. One of the principal arguments against the viability of the Ark since the early church is its size. However, history has left us intriguing clues about other ships that would come close to rivaling it.

- *Leontifera* — the largest ship of Ceranus engaged in a naval battle in 280 B.C. — powered by 1,600 rowers and estimated between 400 and 500 feet; [The ship] was admired for her “large size and exquisite construction.”
- Plutarch’s description of Demetrius’ fleet — built around 294 B.C., “they had a speed and effectiveness which was more remarkable than their great size” — based on the number of oars per tier, it is estimated to have been over 400 feet in length.
- Athenaeus records several examples of very large ships, including one at 420 feet long and over 70 feet high, built by Ptolemy Philopator and powered by 4,000 rowers [*Tessarakonteres*].<sup>14</sup>

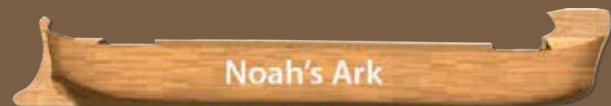
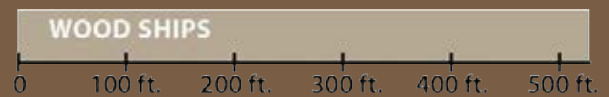


Several views of a replica Antikythera mechanism, an early form of mechanical device.

The Chinese treasure ships of Admiral Zheng He during the Ming Dynasty were also said to have been between 400 and 600 feet in length.

There are also tantalizing clues that ancient Egyptian boats were much more sophisticated and prevalent in their use, because of discoveries of seagoing vessels like those at Mersa/Wadi Gawasis, than assumed from the limited number of other ships recovered at various sites.

Ancient shipwreck sites are also providing additional evidence of the skills of early shipbuilders, including that of the Antikythera wreck,<sup>15</sup> a very large ship that sank over 2,000 years ago.



The *Wyoming*, built in 1909, is often discussed in connection with the Ark because its size approaches Noah’s vessel. With a deck length of 350 feet (450 feet overall from tip to tip), this schooner was the largest wooden ship in modern times. Skeptics like Bill Nye cite the *Wyoming* in an attempt to dismiss the biblical account as absurd. The *Wyoming* notoriously had several problems due to its size. The long planks of its hull twisted and buckled, which demanded the use of a pump to bail water from the hold. Tragically, the *Wyoming* sank in 1924, and all 14 people on board were lost at sea.

Several details are often ignored by skeptics when discussing the *Wyoming*. First, the *Wyoming* and many other large wooden ships built around the same time were “commercial workhorses built as quickly as possible and with an expected working life of only 12–15 years or as little as ten.”<sup>16</sup> Second, as mentioned earlier, several ancient wooden ships were reportedly close to the size of the Ark. These were apparently constructed with stronger hulls that allowed them to overcome the problems faced by the *Wyoming*. Finally, the *Wyoming* carried thousands of tons of coal along the Atlantic coast for nearly 15 years! The Ark needed to float for a maximum of five months before landing on a mountain in the region of Ararat (Genesis 8:4).