

The Size of the Ark

By: Arnold C. Mendez, Sr.

"And God said unto Noah... Make an ark of gopher wood; rooms shall you make in the ark, and you shall pitch it within and without with pitch. And this is the fashion which you shall make it of... the length of the ark shall be three hundred cubits, the breadth of it fifty cubits, and the height of it thirty cubits. A window shall you make in the ark, and in a cubit shall you finish it above; and the door of the ark shall you set in the side thereof; with lower, second, and third stories shall you make it." (Gen. 6:14-16)

A cubit is the distance between an adult's elbow and tip of the finger, generally 18-inches. Most Hebrew scholars believe the cubit to have been between 17½ -21½ inches long. This means that the ark would have been 450 feet long, 75 feet wide and 45 feet high if the 18 inch cubit was used. If a larger cubit was used it would have been proportionately longer.

The displacement tonnage of the ark, which is the weight of water it would displace at a draught of 15 cubits, would be more than 22,000 tons. By comparison the U.S.S. *Salem*, a 716-foot-long heavy cruiser commissioned in 1949, has a displacement tonnage of 21,500 tons. The ark's gross tonnage which is a measure of cubic space (100 cubic feet is one gross ton) would be 15,100 tons. The ark's total volume would have been 1,518,000 cubic feet. This would equal the capacity of 569 modern railroad stock cars. The standard size for a stock car is 44 feet long and a volume of 2670 cubic feet. This would make a train more than 5 ½ miles long. The floor space for the ark would be over 101,000 square feet. This would be more floor space than 21 standard college basketball courts. By comparing the measurements of the ark it is easy to see that it would be comparable to today's ocean going vessels. It was probably the largest vessel of its type built until the late 1800's when metal ships were first constructed.

The ark was built on a 1:6 ratio (50 cubits:300 cubits). The science of naval architecture reveals that the most stable ratio for an ocean going vessel is 1:6. All modern day ocean going vessels use this same length to width ratio. It is estimated that the ark could easily have survived even the largest of ocean waves. If the ark were equipped with a dragging stone anchor, it would have been properly positioned to meet any size ocean wave. The design of the ark would have made it almost impossible to turn over.

Was Noah's Ark big enough to hold all the animals?

How many and what type of animals would the ark have to carry? Many scoffers suggest that the ark would have been overloaded. They suggest that Noah would need to gather millions of different animals. Since there are millions of species of animals there would have been millions of animals on the ark! Is this true?

The word species and the biblical word "kind" are often used interchangeably. This is incorrect since they are not synonymous. The biblical word "kind" denotes an organism that reproduces others like itself. The species concept is much narrower than this; therefore many species can be included in a single biblical "kind." The word kind is probably closer to the modern taxonomic

unit of genus, and in some cases the larger taxonomic unit, family.

The Canidae (canine) family includes about 14 genera of dog like animals. These include the coyote, dog, wolf, jackal, etc. The ark did not have to contain the hundreds of species of canines that make up this group. In reality, these were all represented by a few "kind." These "kind" would then produce all the animals that make up the Canidae family. For example all of the hundreds of varieties of domestic pigeons that have all been produced originated from one species, the wild rock pigeon (*Columbia livia*).

Another question that often arises is the question of how many clean and unclean animals would Noah have to take on board the ark. Many scoffers will say that Noah had to take 7 pair of clean animals and 7 pair of the birds (Gen. 7:2-3).

How many birds were clean and how many were unclean? The answer to that question is found in Leviticus 11, and Deuteronomy 14. The clean birds are not described like the clean animals and clean fish. On examination of these two chapters certain characteristic of unclean birds are noted and by exclusion the characteristic of the clean birds can be determined. Also by examining other parts of the Bible these characteristics will dovetail with Leviticus and Deuteronomy. Clean birds belong to the orders: Galiformes, Anseriformes, and Passeriformes. This includes chickens, waterfowls, pigeons and some grain eating perching songbirds. The vast majority of the birds are unclean which means that only one pair of them would be included in the ark.

In reality when properly understood Noah took on 7 individual (not 7 pairs) animals and birds of each kind that were clean. Since these were clean animals and clean birds that would be used for food later, it would be important to have extra breeding stock. In reality there were 3 pair of clean animals and clean birds plus a seventh. The seventh one was to be offered as a sacrifice at the end of the flood (Gen. 8:20). If an animal were unclean, which the vast majorities were, then only one pair was taken aboard.

The ark would have had more than enough room to carry all the animals. When the Bible is properly researched this is very obvious. Only air breathing, land dwelling animals would have to be placed aboard the ark (Gen. 7:22).

The following animals could have survived outside the ark (Whitcomb 1998, p.68):

- 25,000 species of fish
- 1,700 tunicates (mane chordates like sea squirts) found throughout the seas
- 600 echinoderms including star fish and sea urchins
- 107,000 mollusks such as mussels, clams and oysters
- 10,000 coelenterates like corals and sea anemones, jelly fish and hydroids
- 4,000 species of sponges
- 31,000 protozoan, the microscopic single-celled creatures.

Noah would not have to be concerned with the aquatic mammals such as the dolphins, whales,

porpoises, sea lions, and walrus. There are also many aquatic reptiles that could survive outside of the ark. These would include many types of snakes, alligators, crocodiles, and sea turtles. There are almost a million species of arthropods that would survive the flood. Animals such as the following: shrimps, crabs, lobsters, and many other crustaceans. All of the insects could survive outside the ark. More than 35,000 species of worms and nematodes would also survive the flood.

In reality only a small percentage of the animals would have to be taken on board the ark. The vast majority of the animals that inhabit the earth either live in water and/or do not have "the breath of life."

How many animals did the ark carry?

Many writers on the subject of Noah's ark have different estimates for the amount of animals that the ark would have to carry. In John Woodmorappe's book, *Noah's Ark: A Feasibility Study*, he states that only about 2,000 animals would have to be on the ark. Being rather conservative he continues his study with the assumption that 16,000 animals could easily be cared for on the ark. Doctors Morris and Whitcomb in their book, *The Genesis Flood*, estimate that approximately 35,000 animals were placed on board the ark.

Let's be conservative and use the figure of 40,000 animals. This allows for extra animals to represent those that have gone extinct and those animals that have not been properly cataloged. This figure of 40,000 animals is 5,000 more than largest of the previously mentioned numbers. Based on our present understanding of the number of animals this figure should convince even the most doubtful cynic.

Animal space calculations

Most animals are not very large. The average size of all animals, is the size of a sheep, some say a small rodent. One railroad stock car can carry about 240 sheep. This would mean that all 40,000 animals could fit in 167 railroad cars. The ark's total capacity was 569 stock cars. The 40,000 animals would require less than 30% of the ark's space. In other words all the animals could fit on one of the ark's three decks. This would leave the other 70% of the ark's space for Noah's family, food, supplies, and baggage.

Dimension of the Ark 300 cubits x 50 cubits x 30 cubits. If the cubit used is 18" then conversion gives us the following dimensions:
450 ft × 75 ft × 45 ft

Deck Area of the Ark 450 ft × 75 ft × 3 decks = 101,250 ft²

Volume of the Ark 450 ft × 75 ft × 45 ft = 1,518,750 ft³

Many biologists state that the average size of most vertebrates is the size of a sheep. Other sources state that the average size is about the size of a small rabbit. Since there is some doubt as

to what is the average size of the animals that were brought into the ark, and this paper is a conservative analysis of the carrying capacity of the ark, we will use the larger sheep average. We will also base our calculation on four different occupancy estimates. The first is my own conservative estimate of 40,000. The second is the estimate of Whitcomb at 35,000. The final two figures of 16,000 and 2,000 are based on the work of Woodmorappe. The 16,000 figure is based on the biblical kind being equivalent to the taxonomic rank of genus. The second figure of 2,000 is based on the biblical kind being equivalent to the taxonomic rank of family.

Based on railroad industry figures a railroad stockcar can hold 240 sheep and each stock car has a capacity of 2670 ft³. Therefore each sheep requires 11.125 ft³. Most authorities on rabbit husbandry give the dimensions for a rabbit hutch as 3.0 ft³ per animal. If the average animal size is indeed the size of a small rabbit the calculations shown below could be reduced by a factor of three.

The following calculations show the amount of the ark space that would be required to carry the stated number of animals, the average size of a sheep.

$$40,000 \text{ animals} \times 11.125 \text{ ft}^3 = 445,000 \text{ ft}^3 \text{ or } \frac{445,000 \text{ ft}^3}{1,518,750 \text{ ft}^3} \times 100 = \mathbf{29\%} \text{ of the Ark's capacity}$$

$$35,000 \text{ animals} \times 11.125 \text{ ft}^3 = 389,375 \text{ ft}^3 \text{ or } \frac{389,375 \text{ ft}^3}{1,518,750 \text{ ft}^3} \times 100 = \mathbf{25\%} \text{ of the Ark's capacity}$$

$$16,000 \text{ animals} \times 11.125 \text{ ft}^3 = 178,000 \text{ ft}^3 \text{ or } \frac{178,000 \text{ ft}^3}{1,518,750 \text{ ft}^3} \times 100 = \mathbf{11.7\%} \text{ of the Ark's capacity}$$

(kind = genus taxon)

$$2,000 \text{ animals} \times 11.125 \text{ ft}^3 = 22,250 \text{ ft}^3 \text{ or } \frac{22,250 \text{ ft}^3}{1,518,750 \text{ ft}^3} \times 100 = \mathbf{1.4\%} \text{ of the Ark's capacity}$$

(kind = family taxon)

Summary

It is obvious that when all the facts of the Genesis account of the flood are examined that there is no reason to doubt that the ark could easily have carried its intended cargo. The biblical account is not a revision of a Babylonia myth. All the scientific evidence shows that the ark could easily have contained all of the animals that were used to repopulate the earth after the flood

Works Cited

Whitcomb, John C., Morris, Henry M. 1998. *The Genesis Flood, the Biblical Record and its Scientific Implications*. Presbyterian and reformed Publishing Co. Phillipsburg, NJ.

Woodmorappe, John. 1996. *Noah's Ark a Feasibility Study*. Institute for Creation Research. Santee, CA

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