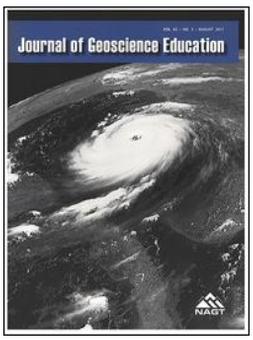

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# Bogus "Noah's Ark" from Turkey Exposed as a Common Geologic Structure

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# Bogus "Noah's Ark" from Turkey Exposed as a Common Geologic Structure

Lorence Gene Collins
Department of Geological Sciences
California State University, Northridge
Northridge, California 91330-8266

David Franklin Fasold
14781 Pomerado Road, #234
Poway, California 92064

**ABSTRACT**

A natural rock structure near Dogubayazit, Turkey, has been misidentified as Noah's Ark. Microscopic studies of a supposed iron bracket show that it is derived from weathered volcanic minerals. Supposed metal-braced walls are natural concentrations of limonite and magnetite in steeply inclined sedimentary layers in the limbs of a doubly plunging syncline. Supposed fossilized gopherwood bark is crinkled metamorphosed peridotite. Fossiliferous limestone, interpreted as cross cutting the syncline, preclude the structure from being Noah's Ark because these supposed "Flood" deposits are younger than the "Ark." Anchor stones at Kazan (Arzap) are derived from local andesite and not from Mesopotamia.

**Keywords:** Pseudoscience; structural geology.

## Introduction

Thirty-five years ago, *Life* magazine carried a story of an expedition sent to investigate the outline of a ship in a mud-flow near Dogubayazit in western Turkey (*Life*, 1960; see p. 112). An aerial photo in this story was captioned: "Noah's Ark?" Upon reaching the site (Figure 1) at 7,000 feet elevation, investigators found the boat-like appearance (Figure 2) to be only superficial. One scientist in the group ventured that nothing in nature could produce such symmetry, although nothing man-made was discovered. But after two days of looking for a cause of the phenomenon, the site was temporarily abandoned for lack of evidence. Other searches for the Ark continued, however, and placed Noah's barge on Mount Ararat farther to the north, much closer to where various creationists placed the Ark.

With the search still underway twenty-five years later, another explorer reclaimed the mound near Dogubayazit as Noah's Ark, which according to him contained "trainloads" of gopherwood (Wyatt, 1994). On the basis of this renewed interest in the area, representatives of the Turkish Ministry of Cultural Affairs and the High Commission on Ancient Monuments moved quickly to protect the site from exploitation, declaring the area a national park. However, skeptics and those who believed that the Ark was on Mt. Ararat remained unconvinced the Dogubayazit phenomenon is the Ark.

David Fasold, co-author of this paper, also began studies of the site in 1985, making nine trips in the following years to look for evidence. Today, the area is a military forbidden zone and is off limits to all researchers, except for Fasold who officially remains the only non-Turk having access. Placed directly on the project by the Rector of the Atatürk University at Erzurum, Fasold has worked closely with project leader, Associate Professor Salih Bayraktutan, with on-site investigations.

During his investigations, Fasold found the following bits of evidence to suggest that this structure could have been the Ark. (1) The length and average overall width of the structure is exactly the same as prescribed in the Bible, "300 by 50 cubits." (1 Egyptian cubit = 0.5236 m or 20.6 inches) (2) The buried structure exhibits the same nine divisions described in the Epic of Gilgamesh: "Its innards I divided into nine parts," says the Assyrian flood hero, "One IKU (acre) was its whole floorspace" (Gardner and Maier, 1984). Also, the structure displays the same area as in the Ark (44,100 square feet). (3) Metal-detecting surveys have located over 5,000 buried iron targets arrayed in a symmetrical pattern from the pointed end to the rounded end of the structure, which recalls Tubal-Cain, a biblical antediluvian "instructor of every craftsman in bronze and iron" (Genesis 4:22, NKJV).

Much of what Fasold uncovered should be viewed as circumstantial. Other streamlined rock-shapes have been found in the area (Güner, 1986), but according to Bayraktutan, these shapes do not display the same morphological and internal features. Fasold's ground-penetrating radar survey appeared to confirm the existence of an internal structure, featuring symmetry and regular distribution (Fasold, 1988). Nevertheless, Bayraktutan found it difficult to explain why the site had so many geometric properties if it were just some randomly formed natural outcrop. Even marine engineers had made studies and commented on it (Windsor, 1992, 1993).

Furthermore: (4) Scattered some 24 km away are eleven, large, flat stones, each with a circular hole at one end and weighing between 4 and 10 tons (Figure 3). These could be interpreted as the anchor drogues referred to in the Qur'an: "In the name of Allah, it will cast anchor" (Dawood, 1956; see Houd 11:40). And, (5) Ancient place names relating to the Flood story abound and virtually surround the location (Fasold, 1988). Here are a few examples: Hero's Anchorage, Voluntary Pilgrimage, Vowing Sacrifice, Raven Won't Land, and Judgement Day. Fasold noted that such historians as Berossus, Nicholas of Damascus, and Josephus, recording hearsay in their day, reported that pilgrims often visited the biblical Ark to recover pitch, highly prized for talismans.

Although Fasold dismissed tabloid discoveries of petrified rib timbers, coprolite, and exotic metal rivets, which were uncovered in clandestine excavations, as

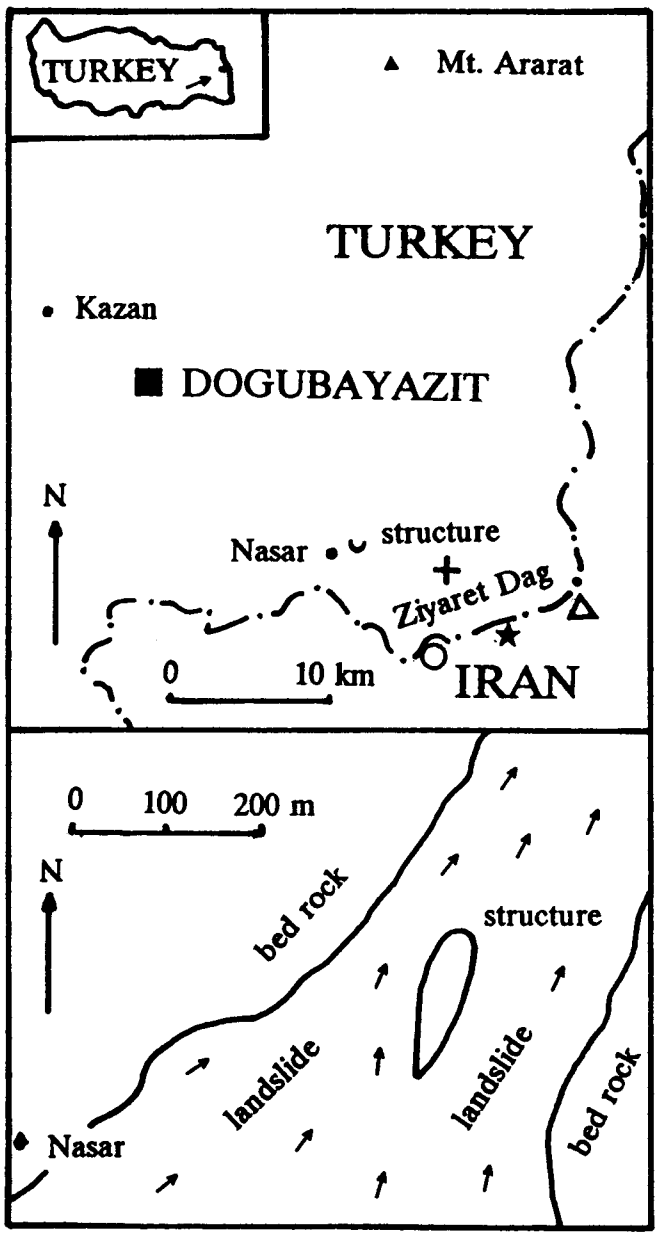


**Figure 1. Location map of boat-shaped structure in eastern Turkey. Symbols: O Mt. Judi, + Mahser, Δ Ziyaret Dag, ★Yigityatatgi.**

being the fruit of over-active imaginations, the prime evidence that an Ark with true artifacts really might exist came from an iron fitting recovered *in situ* in 1985 by a physicist, John Baumgardner, from Los Alamos, New Mexico. On the basis of an interpretation by Baumgardner (1988) that chemical analyses demonstrated that the fitting is composed of man-made iron, Fasold surmised how all the iron fittings came to be arrayed in a boat-like pattern (Fasold, 1988).

Fasold was fully aware that there is no geological evidence for a flood of such magnitude as could float a ship of these dimensions so far and so high beyond the modern ocean, except through the power of myth. Nevertheless, the reports of supposed man-made iron held out the hope for a legitimate discovery. After

**Figure 2. Photo of boat-shaped structure, mistakenly identified as Noah's Ark, 17 km southeast of Dogubayazit, Turkey. Tapes mark alignment of four of thirteen lines of limonite concentrations from which a supposed iron-bracket was obtained. (Copyright of photo is retained by David Fasold.)**

nine years of surveys and deploying every remote sensing device available, he waited for the Turks to excavate the structure. A reluctance on their part to do so caused him to become suspicious, and his enthusiasm for discovery began to wane. His first logical step then was to start from the beginning and request confirmation for the iron fitting. Was it really man-made?

It was at this time that I (Collins), as senior author and a geologist, came into the picture. In order to respond to Fasold's question and other queries, I first examined thin sections of the supposed iron bracket from the Ark to determine whether the iron could have been forged in a furnace. I also analyzed thin sections of what he thought might be replacement material that had seeped into void spaces, which he thought were places where wood poles and other structural supports had decomposed to leave cavities, and which now were filled with layered deposits.

Fasold also brought me a sample chip recovered from an anomalous ribbed-rock at Kazan (Arzap). This large rock had once been held in veneration by the local people, mounted upright and carved with glyphs. Sounding hollow when hit with a hammer, this rock was claimed by one researcher in his video to be petrified gopherwood (Wyatt, 1994). Fasold disagreed because he did not envision the Ark as being constructed of wood. It would be logical to assume, Fasold says, that Noah built an overly large proto-Sumerian-type craft of bundled reeds. There would be nothing left after so many years since Noah's time, but the anomalous rock displayed some interesting rippled impressions. If anything, Fasold felt it was more likely some pitch-like substance, now hardened, which was originally applied over the hull leaving

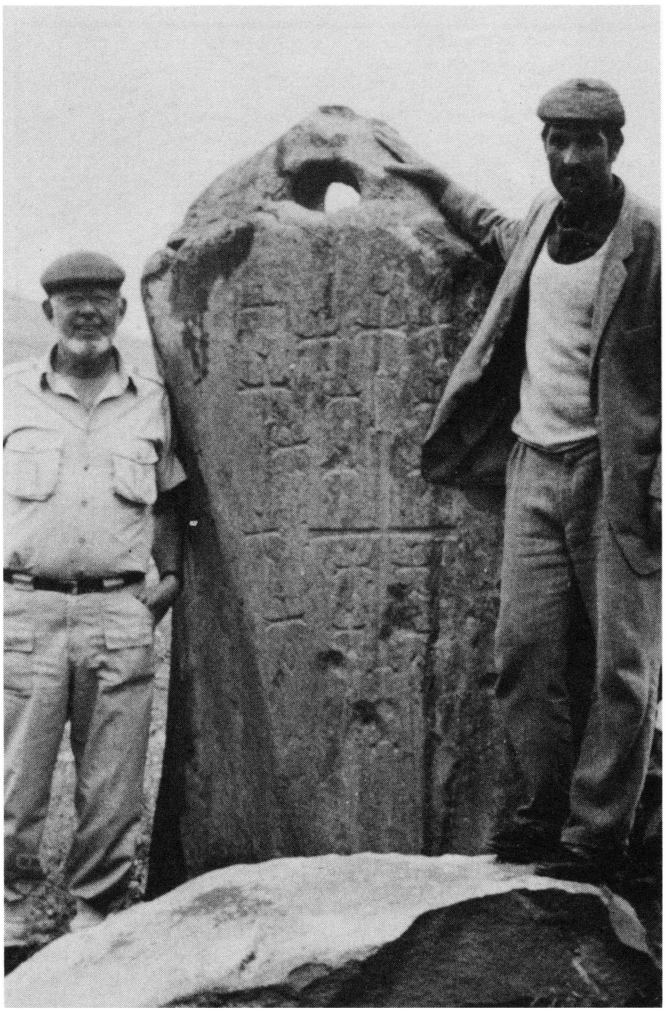

**Figure 3. One of eleven anchor stones in cemetery near Kazan (Arzap), Turkey, 24 km northwest of the structure. (Copyright of photo is retained by David Fasold.)**

imprints of reeds. It was worth looking at a thin section of this rock.

I also made a thin section of one of the "anchor drogues" (Figure 3) and obtained a chemical analysis to see if these stones could have been quarried by Noah in Mesopotamia. Finally, I interpreted aerial and ground photographs of the site and surrounding region. Some of my conclusions are preliminary, but are presented here because the site is now currently inaccessible to investigators, due to political unrest near the Iran-Turkey border. The following are the results of my analysis and interpretations.

## Microscopic and Chemical Studies

The "anchor stone" (Figure 3) at Kazan (Arzap) is a fine-grained (0.001-1.0 mm) porphyritic volcanic rock in which phenocrysts (0.2-1.0 mm) consist of ~6% ilmenitic magnetite (a titanium and iron oxide containing some manganese) and ~29% plagioclase (andesine-labradorite). The very fine-grained ground mass (~65%) contains plagioclase and ilmenitic magnetite, but with larger amounts of ilmenitic magnetite than occurs as phenocrysts. The composition of this

| Oxides | Percent | Trace Elements | PPM |
|---|---|---|---|
| $SiO_2$ | 60.15 | Sr | 513 |
| $Al_2O_3$ | 17.97 | Ba | 503 |
| $Fe_2O_3$ (total iron) | 5.81 | Zr | 206 |
| CaO | 5.25 | Rb | 39 |
| $Na_2O$ | 4.26 | Y | 18 |
| MgO | 2.30 | Nb | 17 |
| $K_2O$ | 1.71 | | |
| LOI | 0.98 | | |
| $TiO_2$ | 0.94 | | |
| MnO | 0.08 | | |
| $Cr_2O_3$ | 0.01 | | |
| **Total** | 99.92 | | |

**Table 1. Chemical analyses of the sample of "anchor stone." Analysis by Chemex Labs, Inc., Sparks, Nevada.**

anchor stone is unusual because it lacks magnesium-rich minerals such as pyroxenes and olivine. A chemical analyses of this rock is given as Table 1.

All rock samples from the structure are pyroxene-bearing andesite or basalt partly altered to serpentine. Local calcite veins (3-5 mm wide) cut across the rock. Ilmenitic magnetite is a common accessory.

The supposed "iron bracket" is composed of granules of limonite, some of which have sizes and shapes that match those of ilmenitic magnetite crystals in the andesite of the Ark, the anchor stone, and nearby peridotite. These granules are enclosed in a matrix of calcite, clay, quartz, and fragments of anthophyllite. Many limonite granules exhibit rhythmic concretionary layers. Rare veins of pyrolusite ($MnO_2$) locally cut the limonite.

## Interpretations

Volcanic rocks similar to the andesitic "anchor stones" occur in the area surrounding Mt. Ararat (Pearce and others, 1990). The almost total absence of volcanic rocks in Mesopotamia (now Iraq) (Pearce and others, 1990; Aswad and Elias, 1988), where Noah's Ark is alleged to have been constructed, reasonably eliminate the possibility that the anchor stones were transported to Kazan by Noah's Ark. Because of the great weight of these stones, a nearby source is much more likely.

The layered samples of rocks in the mud that Fasold recovered and believed to be cavity-fillings are andesite and basalt pebbles, typical of conglomeratic mud-flows in volcanic terranes. Similar samples recovered by him from areas claimed by others to be rib timbers, planking, and deck beams are also andesite or basalt pebbles or boulders and show no evidence of petrified wood.

In the field, the supposed iron brackets have the outward appearance of pieces of black, metallic, elemental iron. The black, shiny surfaces, however, are characteristic of goethite (crystalline limonite, a hydrated iron oxide). This mineral is associated in the "structure" with black, ilmenitic, magnetite granules,

| Oxide | Percent |
|---|---|
| $SiO_2$ | 3.56 - 9.51 |
| $Al_2O_3$ | 2.67 - 4.44 |
| $TiO_2$ | 0.09 - 3.16 |
| $Fe_2O_3$ | 76.14 - 89.39 |
| MgO | 0.00 - 0.90 |
| $MnO_2$ | 0.11 - 1.25 |
| CaO | 0.20 - 7.62 |

**Table 2. Scanning electron microscope analysis of samples from the supposed iron bracket. (Analyses provided by John Baumgardner of Los Alamos National Laboratories, New Mexico).**

and possibly pyrite or pyrrhotite because locally some sulfur is reported in chemical analyses. Both magnetite and goethite cause a metal detector to buzz just like elemental iron. Therefore, investigators might presume that they had found rusted iron metal (Wyatt, 1994).

If Noah's ship builders had forged this supposed iron bracket in a primitive smelter, the bracket would not consist of iron that was thoroughly mixed with clay, quartz, calcite, and anthophyllite particles but would have been solid iron. In molten iron these matrix minerals would have been separated as slag or destroyed. Furthermore, scanning-electron (SEM) chemical analyses of five different places in the iron bracket show the variability given in Table 2.

This variability also rules out the idea that the iron was formed by smelting because smelting would homogenize the molten metal and produce a nearly constant composition. The high and variable titanium contents occur because the limonite grains were derived by hydrous alteration of ilmenitic magnetite granules, eroded from different volcanic sources and having variable $TiO_2$ contents.

Potassium, aluminum and silicon oxides reported in the iron bracket occur in interstitial clay. Small percentages of calcium oxide are either from calcite and apatite (where phosphorous occurs) or are totally from calcite where phosphorous is absent. Apatite is common in volcanic rocks where it is intergrown with plagioclase or magnetite, and, therefore, it can be eroded, transported, and become a constituent of rocks in the structure (Figure 2).

### Supposed Walls In The Ark Structure

Linear (planar) limonite concentrations along supposed walls in the Ark were traced independently by three investigators, each using different electronic instruments but producing the same results (Wyatt, 1994). Thirteen lines of limonite, marking supposed walls, converge toward the structure's pointed end, and a similar convergence occurs at the opposite, "blunt" end. Transverse to the longitudinal limonite concentrations are nine lines of limonite, which were interpreted to be walls dividing Ark rooms.

Although these relationships might seem to be logical evidence to indicate that the structure was originally man-made, I, as a geologist, can show that all these features could be formed by natural processes. Joining of lines in concentric shells at the structure's pointed end is consistent with the structure being an eroded doubly plunging syncline (Figure 4). At the blunt end, however, lines were not found wrapped around parallel to the outer, relatively resistant rock of the Ark, which a cross-sectional view of a doubly plunging synclinal structure predicts. Their absence here occurs because eroded alluvium from the Ark's interior spills over the rounded end and buries the bedrock. Therefore, converging lines of limonite and magnetite are covered so that they are undetected. Moreover, streams of eroded limonite and magnetite granules, projecting beyond the resistant layer, give the false appearance of a metal-braced structure extending beyond the rounded end (Fasold, 1988).

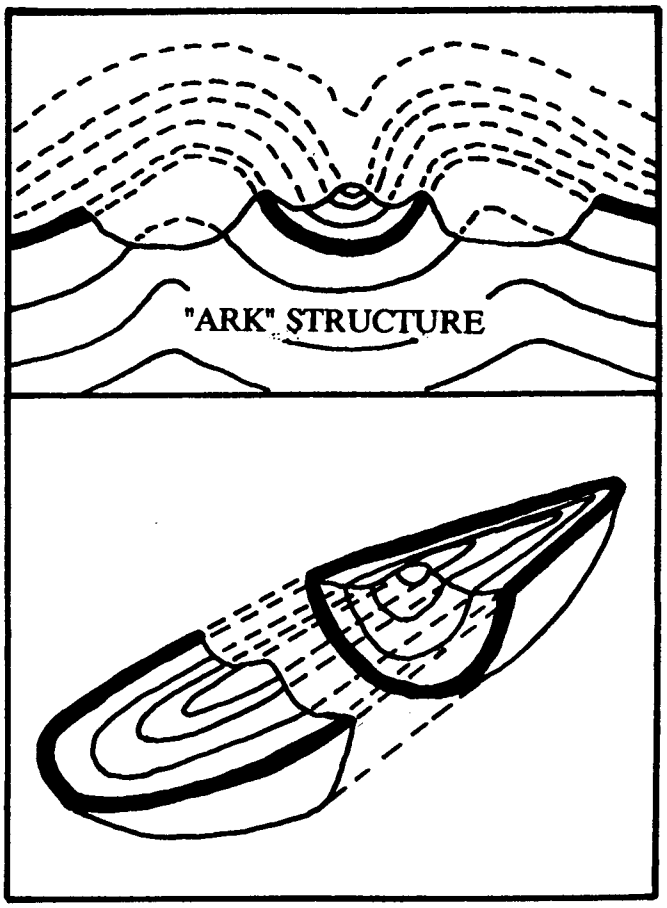


**Figure 4. Cross-section of an eroded syncline with landslide channels on both sides truncating anticline crests (or axes) and a schematic drawing of the structure, with longitudinal lines which symbolically represent limonite-magnetite concentrations. Central and outer layers of syncline are slightly more resistant to erosion than intermediate layers.**

Limonite concentrations in dividing walls can be formed naturally because stresses applied to rocks that are folded into a boat shape commonly produce fracture patterns that cut across sedimentary layers. Water moving through these fractures and coming in contact with ilmenitic magnetite (or pyrite) granules

**Figure 5. Overview of the structure (center) surrounded by landslide debris. Across the landslide to the left are the same geologic formations as in the center of the structure but continuing up slope (see Figure 4). (Copyright of photo is retained by David Fasold.)**

in the layers, would produce the limonite concentrations and stains.

Finally, no fossilized wood or traces of elemental carbon, wood, or reed fragments have ever been found associated with the limonite walls or in any other place during trenching or core drilling. The absence of ancient biotic carbon supports the hypothesis that the boat-shaped structure is not Noah's Ark. Inorganic carbon in calcite in veins cutting the layers, however, is common.

## Analysis of Regional Geology

Fossiliferous limestone intersects the Ark structure on one side and is also found in outcrops on both sides beyond the adjacent landslide debris. On that basis, the doubly plunging syncline has likely formed *in situ* rather than being an allochthonous block transported in a landslide.

Across the landslide (200 m from the Ark) there is a resistant bed at the top of a scarp (Figure 5). Layers above and below this resistant bed have erosional forms and vegetation that match that of layers above and below the outer resistant bed of the Ark. These matching characteristics suggest that rocks composing the Ark are the same as those in the distant slope. Therefore, if such a correlation can be demonstrated, further support is provided that the Ark structure is not man-made.

## Geologic History

On the basis of the information given above, I suggest the following geologic history for the origin of the structure. Rocks in the supposed Ark, which now conform to the U-shape of the syncline, were deposited initially in a horizontal or near-horizontal position. These rocks were composed of tiny grains of clay, quartz, calcite, anthophyllite, and local concentrations of ilmenitic magnetite as well as poorly sorted pebbles and boulders of andesite and basalt. They were products of weathering and erosion of volcanic rocks in nearby mountains and were transported by streams and deposited in a basin. Subsequently, these layers were compacted into rock and folded into a doubly plunging syncline. A marine sea advanced over the folded rocks and eroded and cut a channel in which fossiliferous limestone was later deposited. This was followed by uplift and further erosion that removed most of the limestone and scoured the fold to create the boat-shaped profile. Finally, swelling clays (bentonite) in mud in surrounding mountains caused a large landslide to occur. This landslide carried disoriented blocks of rock and mud that were channeled around the synclinal structure (Figure 5). Some time early in this history, following uplift, the limonite concretions ("iron brackets") were formed in the sediments, both inside and outside the synclinal structure, as ground water from rain and melting snow reacted with ilmenitic magnetite (and pyrite) granules along bedding planes and fracture zones.

## Conclusion

Evidence from microscopic studies and photo analyses demonstrates that the supposed Ark near Dogubayazit is a completely natural rock formation. It cannot have been Noah's Ark nor even a man-made model. It is understandable why early investigators falsely identified it. The unusual boat-shaped structure would so catch their attention that an eagerness to be persons who either discovered Noah's Ark or confirmed its existence would tend to override caution. An illustration of the degree to which caution was disregarded by supporters of the Noah's Ark hypothesis is shown by the mistaken identification of a metamorphosed peridotite with crinkle folds as either gopherwood bark or casts of fossilized reeds that supposedly once covered the Ark (Wyatt, 1994). Furthermore, if the Creationism Flood hypothesis were valid (Baumgardner, 1985, 1990), the "dead animals" represented by fossils in this limestone must have died in the supposed Flood, and these fossilized remains are found in channels that cut the supposed Ark. Therefore, the supposed Ark is older than the deposits of the supposed Noachian Flood, and this relationship in itself conclusively refutes the hypothesis that the structure is the preserved remnants of the Ark.

When the site is again accessible to foreign investigators, the area near Kazan (Arzap) needs to be examined to see if outcrops of volcanic rocks occur there that have a mineralogy similar to that of the anchor stones. If so, a local source for the anchor stones is strongly supported. Lacking this information for this article,

however, in no way negates the conclusion that the boat-shaped rock formation is totally natural.

Finally, David Fasold suggests that, although the structure is not Noah's Ark, it may very well be the site which the ancients regarded as the ship of the Deluge and may have played a role in the Flood story. As a geologist, I find this to be an interesting speculation.

### Acknowledgments

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### ABOUT THE AUTHORS

Lorence G. Collins is a retired professor of geology from California State University, Northridge. He was educated at the University of Illinois and has special interests in the origin of granite and ore deposits.

David Fasold is a merchant marine officer who has been fascinated with archaeology and biblical history. He headed one of the last teams that was allowed excavation rights in Turkey.

### Food for Thought

When the Spanish settlers in Mexico began in the sixteenth century to push northward into the country known as Texas, they were led on by rumors of cities of gold, the seven cities of Cibola. At the time that was not so unreasonable. Few Europeans had been to Texas, and for all anyone knew it might contain any number of wonders. But suppose that someone today reported evidence that there are seven golden cities somewhere in modern Texas. Would you open-mindedly recommend mounting an expedition to search every corner of the state between the Red River and the Rio Grande to look for these cities? I think you would make the judgement that we already know so much about Texas, so much of it has been explored and settled that it is simply not worthwhile to look for mysterious golden cities. In the same way, our discovery of the connected and convergent pattern of scientific explanations has done the very great service of teaching us that there is no room in nature for astrology or telekinesis or creationism or other superstitions.

Steven Weinberg, 1993,
*Dreams of a Final Theory – The scientist's search for the ultimate laws of nature*:
New York, Vintage Books, 340 p. (from p. 50).