

convection, but little attention has been paid to the source of carbonate. Theoretically, the only source of additional calcium is the peridotite. Clinopyroxenes are an alternative, but no mention is made in the literature about their presence.¹²

Initial thermodynamic calculations of the serpentinization process have yielded ages of 100 to 10,000 years.¹⁰ ¹⁴C dating of the carbonate structures, on the other hand, have revealed ages of up to 30 ka,¹³ while the age of the oceanic lithosphere is 'confidently' established (by way of magnetic anomalies) to be in the order of 1.5 Ma.¹⁰ Once again, there is a major discrepancy between the various dating methods.

Rapid processes

Long-age geologists generally accept that diagenesis is a very slow process, taking hundreds of thousands to millions of years. These new discoveries have reduced the duration of certain types of diagenesis by two or three orders of magnitude. While, to the secular geologist, travertine and tufa formation is a rapid process, serpentinization and other similar processes are considered to take a very long time. The fact that large amounts of water and heat can dramatically reduce this duration has come as a surprise.

In contrast, young-earth creationists have always emphasized that the exceptional, unrepeatable event of the Genesis Flood was accompanied by tremendous amounts of water and volcanic and igneous heat altering the massive sedimentary deposits that it had created. Regional-scale hydrolyze-type, exothermal, chemical reactions (like serpentinization) are potentially important geological mechanisms, in areas lacking in volcanic activity.¹⁴ Thus, most of the sedimentary deposits could have been subjected to intense heat and water circulation that could have generated almost the complete array of sedimentary and metamorphic rocks known today. And where igneous and chemical heats met, the resulting rocks could have been very complex and of high metamorphic grade.

References

1. Apart from igneous rocks, the only major bound or diagenized rocks forming today are travertine and tufa, along with some minor beach rocks. Evaporites are not forming as bound rocks, and likewise reefal constructions are not true rocks but rather aggregates, as they need diagenesis to become limestones. So, volumewise, I believe travertine and tufa are the most important true rocks forming today.
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3. Chafetz, H.S. and Folk, R.L., Travertines: depositional morphology and the bacterially constructed constituents, *J. Sed.Pet.* **54**(1): 289–316, 1984.
4. <gsa.confex.com/gsa/2004AM/finalprogram/abstract_77540.htm>, October 2004.
5. Diagenesis refers to all the physical, chemical and biological changes that occur within a sediment after deposition as it compacts and lithifies. Diagenesis excludes weathering and metamorphism.
6. Silvestru, E., The standing stones of creation, *TJ* **18**(1):3–5, 2004.
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9. Schwarzschild, B., Isotopic analysis of pristine microshells resolves a troubling paradox of paleoclimatology, *Physics Today* **54**(12):16, 2001.
10. Kelley, D.S. *et al.*, An off-axis hydrothermal vent field near the Mid-Atlantic Ridge at 30° N, *Nature* **412**:145–149, 2001.
12. Normal ocean water does not precipitate carbonate.
11. Oxidizing of olivine and pyroxenes into serpentine (magnesium iron silicate hydroxide).
13. Früh-Green, G.L. *et al.*, 30,000 years of hydrothermal activity at the Lost City Vent Field, <www.sciencemag.org/cgi/data/301/5632/495/DC1/1>, October 2004.
14. In contrast, modern sedimentology has restricted epigenetic formations to areas of known centres of igneous activity, completely excluding such regional-scale processes from the equation. See: Selley, R.C., *Applied Sedimentology*, Academic Press, London, p. 14, 2000. Yet another example of an unholistic approach in earth sciences.

Jonah and *Leedsichthys problematicus*, the problem fish

Matthew Murdock

The book of Jonah talks about a 'great fish' that was large enough to swallow a man alive. Many have scoffed at the Bible, claiming that no whale or fish could ever swallow a man. These critics, however, are unaware of the fossil evidence of 'great fish' in countries all around the world.

About ten years ago I visited the Ann Arbor Museum of Natural History in Michigan. I recall staring in amazement as I stood next to a skull of an extinct¹ fish named *Dunkleosteus terrelli* (figure 1).² The skull itself was about 1 m high, but the largest skull found was 1.2 m high.

I thought to myself that if the skull was this big, then its body length must be incredible. Some quick research indicated that this armored fish may have reached a length of almost 5 m. If it were not for the glass separating us, I could have easily climbed into its mouth. Also, if *Dunkleosteus* was this large, then there could be other fossil fish somewhere even larger, and perhaps even fossil evidence of a fish large enough to swallow a man.

World's biggest fish fossil found; but largely ignored

The fossil bones of a giant fish named *Leedsichthys problematicus* (figure 2) provide support for the reliability of the book of Jonah. *L. problematicus* was named after an English farmer, Alfred Leeds, who discovered the first fossils of this species in the late 1800s. The name 'problematicus' refers to the problem paleontologists encountered trying to classify this new fish.

Leeds sold this skeleton to the Hunterian Museum (Glasgow University) way back in 1915, but few have



Figure 1. Skull of *Dunkleosteus terrelli*

ever heard of this discovery. Oddly enough, work on reconstructing it began only about five years ago. This fish, alleged to be 155 million years old, was an astonishing 15 m long. But a new specimen of the same species found recently surpasses this, reaching a length of about 30 m!^{3,4} This is about the length of 3 school buses and is twice the size of a whale shark (14 m),⁵ or about the size of a blue whale, making it the largest fish ever discovered.

Unlike *Dunkleosteus*, *Leedsichthys* would not have torn its prey apart with its teeth. In fact it didn't have teeth on its jaws; it used thousands of gill rakers with needle-like teeth to filter

plankton and small fish from the water.⁶ This fish was large enough to swallow a man whole.

Avoiding the digestive process

How did Jonah survive inside the creature? Hydrochloric acid breaks down food inside the stomach and is strong enough to go through stainless steel. Is it possible for Jonah to have remained undigested?

Some sharks are able to control their digestive systems, and could keep from digesting a swallowed object for several days. Because of this, undigested food is commonly found inside shark stomachs during dissection.⁷



Figure 2. Artist's impression of *Leedsichthys problematicus* (from <www.bbc.co.uk/science/seamonsters/factfiles/closeup.shtml?leedsichthys>)

We are not given enough details to know for sure what sea creature this was, so any ideas on how Jonah was not digested would be mere speculation. The Bible said that God 'prepared' the creature, so I'm sure He protected Jonah from the natural decay process and digestion as well. Or He could have: (1) caused the decay process to stop while Jonah was inside the fish, or (2) undone the damage this process would do when Jonah was later regurgitated.

The whale shark can turn its stomach inside out and bring up its contents in a process called gastric eversion.⁸ The whale shark may not have been the only 'fish' with this ability, and Jonah's body could have been easily 'spat out' upon dry land.

Conclusion

We must recognize that it is not possible to know with certainty what species of fish swallowed Jonah; the Bible does not tell us. But having found fossil evidence of some of these giants should help silence the sceptics (who claim that the story is impossible) and support biblical accuracy.

References

1. Alleged to be 360 million years old, but fish were made only one day before man, according to Genesis.
2. *Dunkleosteus* is named after Dr David Dunkle, one of the first men to study this creature. The name *Dunkleosteus* literally means 'Dunkle's bones'.
3. <www.bbc.co.uk/science/seamonsters/factfiles/leedsichthys.shtml>, 15 December 2004.
4. <www.channel4.com/history/microsites/B/big_monster_dig/programmes/leedsichthys/monster.html>, 15 December 2004.
5. The whale shark is not a whale at all, but a member of the shark family.
6. <www.nerc.ac.uk/publications/documents/pe-aut02/bigfish.pdf>, 15 December 2004.
7. Richards, W., Letter to editor, *Creation* 17(3): 5, 1995.
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