COMMENT ABOUT RATES OF CORAL REEF GROWTH

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November 14, 2013

www.sciencesandscriptures.com

Living reefs are often presented as a challenge to the biblical model of a recent creation. It is estimated that it would take scores of thousands to many millions of years to grow them. Coral are said to grow too slowly. Examples of fast growth of coral are considered by some critics of creation to be exceptions. Below I add two more examples of fairly rapid coral growth that imply that the rate of growth of coral reefs is not a good argument against the biblical model of a recent creation. For two of my earlier discussions of this topic, see the paper titled Coral Reef Growth,[1] and especially pages 235-239 in the book, Origins: Linking Science and Scripture.[2] This note is just an addendum to these earlier reports.

The icon for living coral reefs that challenge the Bible is Enewetak (Eniwetok) Atoll, a huge reef some 32 kilometers in diameter that rises 1,400 meters above its basalt base. Table 14.1 in my book ORIGINS lists reported rates of reef growth from 0.7 to 414 mm/year and reports of maximum coral organisms' growth rate of 99 to 432 mm/year. At 432 mm/year one could build Eenwetak in 3,340 years. Below are just two more examples of rates of coral growth rates to add to that listing.

In 1944 a United States Navy air attack sunk the Japanese armed aircraft transport, *Fujikawa Maru* in Chuuk (Truk) Lagoon in the Caroline Islands. Thirty one years later, marine biologist, Sylvia Earle, studied the coral growing on the sunken hulk. She [he?]comments:

> "An exceptionally large black-coral tree of the genus *Antipathes* grew in 60 feet of water on the starboard side of the ship. In my years of diving I have seen many examples of this commercially valuable coral, but most were in deep water and a few exceeded a height of three or four feet. This specimen stood 15 feet high. Many of our measurements, in fact, exceeded those for the same kind of corals elsewhere in the world."[3]

This rate of growth represents 147 mm/year, which is not all that fast, but on a linear basis would build Enewetak in 9,524 years. However, black coral have usually elongated branches, which does not provide a massive reef body, but they could still serve as poor sediment traps. An interesting feature of black coral is that they do not harbor light dependent symbiotic zooxanthellae, hence do not need to grow near the surface of the ocean, as most coral do, in order to grow rapidly. Black coral could contribute to reef growth in the deep ocean, but it needs to be kept in perspective that our present living reefs are formed largely by coral that harbor zooxanthellae that require light. For a brief discussion of the paradox of drowned reefs, see Discussion 8, of my webpage.[4] The suggestion above that in Chuuk Lagoon the "measurements, in fact,

exceeded those for the same kind of corals elsewhere" implies that faster rates than what is usually reported are possible.

Another more recent example of moderately rapid coral growth is from Bikini Atoll where 23 tests of atomic bombs were conducted between 1946 and 1958. One test of a hydrogen bomb is said to be the most powerful American atomic bomb ever exploded, and is considered to be a thousand times more powerful than the Hiroshima bomb. Detonated in 1954, it destroyed three islets on the atoll, and crated the gigantic two kilometer wide Bravo Crater. In 2002, a survey of the coral at Bikini, revealed that many, but not all, coral species had recovered. Regarding the Bravo Crater, Zoe Richards reports:

> "I didn't know what to expect – some kind of moonscape perhaps. But it was incredible, huge matrices of branching Porites coral (up to 8 meters high) had established, creating thriving coral reef habitat. Throughout other parts of the lagoon it was awesome to see coral cover as high as 80 percent and large treelike branching coral formations with trunks 30 cm thick. It was fascinating – I've never seen corals growing like trees outside the Marshall Islands."[5]

Simple calculations would indicate that 48 years after the formation of Bravo Crater, *Porites* coral had grown at an average rate of 167mm/ year, if growth started soon after crater formation. At that rate, one could grow Enewetak Atoll in 8383 years, if the favorable light and nutrition conditions found in Bravo Crater would have prevailed. This would have required slow gradual subsidence of the volcanic base so the coral would grow near the surface in order to have sufficient light for rapid growth, and this is plausible.

The illustration of *Porites* in the Zoie Richards report referred to above indicates a more branching kind of pattern than I have seen for *Porites lutea* at nearby Enewetak Atoll. There, as in other places, *Porites lutea* produces a massive growth, while still exhibiting a basic compressed branching pattern. The difference noted could be due to environmental or species differences.

Some wonder if linear rates of growth of branching coral are going to produce the mass of a solid coral reef at the same rate. However, branching coral can serve as a framework and a trap for allochthonous sediments, as well as an environment for a variety of carbonate secreting organisms such as calcareous algae, bryozoans, clams, etc. Furthermore, the branching by the coral themselves can provide additional filling of spaces between the leading frame builders. A. E. Shinn indicates how prolific the branching process can be. In referring to coral reef recovery from hurricanes in Florida he comments that:

> "Recovery, so rapid that storm effects were not noticeable within two years, was due mainly to the rapid growth rate of <u>Acropora cervicornis</u> (10 cm per year in Florida), combined with annual branching

> resulting in geometric proliferation of branches. Calculations show that one small colony with ten branches can produce 59,000 meters of branches in ten years. Although this degree of growth is impossible, in nature serial underwater photographs spanning a period of 12 years clearly demonstrate astonishing growth."[6]

Schlanger[7] has reported on several zones of solution features, several hundred feet thick, as one drills down through Enewetak Atoll. He suggests that these were caused by fresh water from rain when the atoll was above sea level. Others point out that reefs above sea level representsd time when the coral would not grow, hence would add to the time problem the atoll poses for a recent creation. However, the validity and cause of solution features reported is subject to further study. Cementation of carbonates in sea water, that would involve some carbonate transport, is well established. To my knowledge, the amount of time for solution feature to form at Enewetak has not been defined, but we do know that limestone is quite easily dissolved by fresh water. The interpretation that a lot of time is involved is complicated by the fact that in these atolls, lenses of fresh water several hundred feet thick form from rainwater. These are called Ghyben-Herzberg lenses, and there the less dense fresh water literally floats on top of the denser seawater through the atoll matrix. In these lenses, fresh rainwater filtering through the limestone atoll would continue to facilitate the solution process. Hence, producing thick solution features may not take very long, even in the context of thousands of years since the Genesis Flood. Unfortunately, firm data is sparse, and to my knowledge, the argument that lots of time is needed for these solution feature to develop has not been established.

It may well be that coral grew faster in the past. Man's persistent pollution of the oceans may have reduced present growth rates of these delicate organisms. Furthermore, the rapid rates of degeneration of the genome[8] by detrimental mutations can suggest another reason for more robust coral growth in the past.

In conclusion: Because our information about these reefs is so incomplete, and because some coral can grow quite fast, it does not appear that living reefs provide a significant argument against the Bible.

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[1] Roth AA. 1979. Coral reef growth. Origins 8:88-95.
[2] Roth AA. 1998. Origins: Linking science and Scripture. Hagerstown, MD: Review and Herald Publishing Association.
[3] Sylvia AE. 1976. Life springs from death in Truck Lagoon. National Geographic 149:578 (May 1976, p 583).
[4] Slides 23-29 of DISCUSSIONo. 8 at www.sciencesandscriptures.com
[5] April 15, 2008. Bikini corals recover from atomic blast. http://www.physorg.com/news12743368.html. Viewed Nov. 7, 2013.
[6] Shinn AE. 1974. Coral reef recovery in Florida and the Persian Gulf. GSA, Abstracts With Programs 6(7):953.

[7] **Schlanger SO. 1963. Subsurface geology of Eniwetok Atoll. USGS Professional Paper 260 -- BB**

[8] **Sanford JC. 2008. Genetic Entropy, & the Mystery of the Genome. Waterloo, NY: FMS Publictions.**