

## **Boca Grande's Ancient Gifts from the Sea: Fossils**

*A Consultation with Robin C. Brown, M.D.*

*Introduced by Theodore B. VanItallie*

### **Introduction**

During the last several decades, Boca Grande's inveterate beach walkers and conchologists have observed that the harvest of undamaged, interesting shells has become increasingly meager. "Gifts from the sea" are still to be found on Boca Grande's beaches, but they are no longer likely to be shells—they are much more likely to be fossils!

Fossils are, perhaps, an acquired taste. One has to spend enough time looking at them and touching them to realize what treasures they can be—scientifically, of course, but also esthetically. Once you get to know fossils better you may well get "hooked." Indeed, the addiction can become quite severe, with enthusiasts ranging far and wide in search of specimens. The pictures accompanying this article show that these objects can have intriguing shapes and textures. They also have a subtle range of colors which cannot be shown in black and white. But, what makes fossils particularly fascinating is their enormous age and the reminder they provide of the creatures who roamed the land and the sea an almost unimaginable number of years ago. The fossils found on Boca Grande's beaches are—according to our eminent consultant on fossils, Dr. Robin Brown—some 1.8 to 2.0 million years old, or even much older. One definition of "fossil" (*Oxford English Dictionary*) is: "anything [including a footprint] preserved in the strata of the earth and recognizable as the remains or vestiges of a plant or animal of a former geological period."

It's not necessary to become a fossil scholar to enjoy beachcombing for fossils. Many—probably most—of the fossil fragments found on the beach are not identifiable—they have been fragmented and ground down by the action of the sea and sand. But, even these fragments are likely to retain a luster, shape, or texture that makes them interesting and desirable.

This article is concerned with the fossils most commonly found on the island's beaches. It is, at best, a primer, and not in any sense a scientific treatise. It is intended to help neophyte fossil gatherers identify and appreciate at least some of the little, often shiny black and brown objects that lie on the beach near the water's edge. They are most abundant at low tide.

Collecting fossils need not become an obsession; it can remain an agreeable diversion for beach walkers. When you get to know fossils better you will find them to be both visually and tactilely satisfying; moreover, they remind us that the earth—to say nothing of the universe—is inconceivably old, making us (in comparison) feel young and newly minted.

### **Dr. Brown's Diagnoses**

Our consultant for this article was Robin C. Brown, M.D. of Fort Myers. Dr. Brown, just retired from a long and arduous practice of surgery of the ear, nose and throat, is author of the highly readable and popular book, *Florida's Fossils: Guide to Location, Identification and Enjoyment*, Pineapple Press, Sarasota, 1988. The book was the outcome of 25 years' interest by Dr. Brown in Florida's fossils. On January 6, 2003, Dr. Brown was interviewed on the subject of fossils in his home by the editor (TV), associate editor (CB), and archivist (BE) of *Connections*. Specifically, Robin Brown (RB) was asked to comment on an assemblage of fossils collected by Ted VanItallie since 1988 during walks on the beach, mostly north of 19th Street and south of the Range Light. The record of the interview follows:

RB: First, I'm going to make a wide and comprehensive disclaimer. All these beach fossils are worn, rounded, and polished with loss of a lot of the distinguishing surface structures and shape. For this reason, I can't identify many of them. Let me start by saying that the majority of the fossils that are washing up on the beaches of Gasparilla Island may be from the past 2 to 6 million years. The most, by far, are from the last two million years—the Pleistocene Epoch.

TV: You mean younger than 2 million?

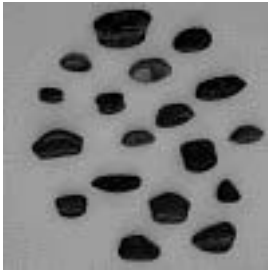
RB: The Pleistocene Epoch started 1.8 million years ago and ended 10,000 years ago—about the time humans put in an appearance in Florida. That was the beginning of the Holocene [recent] Epoch. One of the

fascinating problems is to figure out why in the world you find such a hodgepodge of different fossils of widely varying ages washing up on the beach. You find marine and fresh-water fossils shells mixed in with terrestrial fossils. Then you'll find fish and shark parts mixed in with horse teeth and other vertebrate stuff. So this wonderful conglomerate of the past several million years is the result of Florida's having been in and out of the water perhaps thirty times over that period, with sea-level rises followed by falls that occurred during glacial periods. A layer of vertebrates would be laid down when Florida was out of the water and then the sea level would rise and begin to mix the terrestrial fossils with the marine fossils. So the next deposition layer might have both in it, comprising a bewildering mixture that resulted from the sea-level changes. Florida was pretty stable; it didn't have volcanoes or earthquakes, but the sea did a pretty good job of churning up the fossils. That was one of the big problems in Florida; national paleontologists will often say that Florida has it all—especially the Pliocene [1.8 to 5 million years ago]—but it's so mixed up you can't make heads nor tails of it.

TV: It's homogenized!

RB: Yes, what you're finding is a spectrum of vertebrate and invertebrate life that represents Florida's animals over several million years. These are specimens that get tumbled and polished and then washed up on the shore in a capricious fashion.

(figure 2.1.1) **Puffer fish (*Diodon*) mouth parts.** (bghs #06-0031)



(figure 2.1.2) **Ray mouth parts (pavement teeth).** (bghs # 06-0032)



TV: Let's look at some of the beach fossils I collected in Boca Grande.

RB: These are the mouth parts of a *Diodon* [puffer fish] (figure 2.1.1) and also the pavement teeth of the eagle ray (figure 2.1.2).

This group is mostly pieces of turtle carapaces [the upper shell] called "scutes." (figure 2.1.3) They are the plates that make up the carapaces. I can't identify any of the turtles by genus except for the pitted one. This is a soft-shell turtle because it's pitted like a golf ball or peanut shell. Its scientific name is *Trionyx*. This [pointing] is a whole turtle scute. (figure 2.1.4) Its anatomy is clear; it's called the nuchal [the front middle edge of the carapace]. If you find a nuchal you can usually identify the turtle from which it came.

BE: Why do you get the different colors?

RB: The different colors of the fossils have absolutely nothing to do with the animal they came from or the age of the specimen. The color comes from the iron, sulfur and other minerals in the water. Virtually all of the organic matter in these beach fossils has been replaced by minerals.

(figure 2.1.3) **Turtle shell (scutes).** The pitted one is soft-shell turtle (*Trionyx*). The larger is a nuchal scute. (bghs #06-0033)



TV: The one in the middle of this group fascinated me with its chevron-like pattern.

RB: It's almost definitely turtle; however, I can't identify the specimens on either side of it.

BE: The pattern looks like the Sanibel Incised pottery of the Calusa Indians.

RB: Yes, it does!

TV: Could the one at the top be part of a whale's inner ear bone?

RB: It's possible.

TV: What about this?

RB: That's almost certainly a stingray spine. Put that in with the rest of the stingray parts. (figure 2.1.4)

TV: Something that big could be a stingray?

(figure 2.1.4) **Stingray tail spines.** (bghs # 06-0034)



RB: Yes, in the Pleistocene many animals were bigger. For example, the diamondback rattlesnake reached 12 feet in length. Nobody knows why.

TV: Are these sharks' teeth? (figure2.1.5)

(figure 2.1.5) **Beach-worn shark teeth.** Large ones either Great White shark or an extinct Mako shark named *Isurus histalis*. (bghs # 06-0035)



RB: Yes, they look like teeth from large sharks. There are two types of very large sharks' teeth that you can expect to find on the beaches of southwest Florida—the smooth and the serrated kind. The tooth of the *Carcharodon megalodon* (extinct giant white shark) has a saw-like edge and that of the *Isurus histalis* (extinct mako shark) has a smooth edge. These are the only two sharks which get that big in the Pleistocene. I can't tell which of the two these teeth come from because they are so worn. Both of these extinct sharks date back from the Miocene (5 million to 24.5 million years ago) to the Pleistocene. It's worth mentioning that *Carcharodon* may have reached a length of 70 to 80 feet.

BE: Why are so many sharks' teeth found on the Venice beach? Is there a deposit of them offshore?

RB: Fossil hunters used to find lots of them there, but not anymore. Since the beach was re-nourished, the supply of sharks' teeth has dried up. I don't know why they were particularly abundant in Venice.

TV: I guess it's fair to say that by far the greatest number of identifiable fossils on Boca Grande's beaches are sharks' teeth—mostly small ones. As you show in your book, it's frequently possible to identify the shark from the tooth. (figure 2.1.8) Here are some specimens that I think must be horses' teeth. (figure 2.1.9)

RB: Yes, these are horses' teeth. They are from genus *Equus*, which is anatomically indistinguishable from the modern-day horse. Horses became extinct in North America at the end of the Pleistocene and were reintroduced by the Europeans. Fossils like these are lovely things—objects of art. I've found mastodon teeth that are just beautiful.

BE: I've found fragments of mammoth teeth on Indian mounds, as well as a large extinct shark tooth that was notched to be used for adornment on Calusa Island. The Calusa also made plummets (used as weights for fishing lines) from fossil bone.

RB: They were paleontologists, too; they collected that stuff. They were curious like us.

(figure 2.1.6) **Horse teeth.** (bghs # 06-0036)



(figure 2.1.7) **Fragments of mammal teeth.** (bghs # 06-0037)



TV: These things have a remarkable polish.

RB: Have you ever seen a mammoth tooth? I have one here. This is most of a single tooth. This is the grinding surface; enamel, dentine and cementum. All three have different densities and are layered differently so, as the tooth wears down, it stays rough for grinding all that forage. It looks very much like a modern elephant's tooth only it's about twice as large. We stumbled on this object the first time we went fossil hunting—that's what got me hooked! In northern Florida they find remnants of mastodon bones and ivory that have been altered by man. They have cuts on them that look like saw marks from butchering by humans. That's how we know humans and mastodons overlapped.

BE: That's convincing evidence. Can you distinguish a mammoth from a mastodon tooth?

RB: Yes, they are very different. Actually, that's mammoth material from your Boca Grande collection. (figure 2.1.10)

TV: Here are a few more things that intrigued us. What do you think they are?

RB: These are alligator bony plates, also known as osteoderms. (figure 2.1.8)

(figure 2.1.8) **Alligator bony plates (osteoderms).** (bghs # 06-0038)



TV: These specimens seem to be teeth, but not from marine animals.

RB: They appear to be fragments of well-polished teeth from horse and other mammals. The quadrilaterally shaped one at the right top looks like a horse incisor

TV: Can you speculate on the origins of these different pieces of bone?

RB: They are clearly fragments of worn and polished bone but there's no way of telling where they originated.

(figure 2.1.9) **Fragments of worn and polished bone.** (bghs #06-0058)



TV: Robin, we are grateful to you for sharing your expertise and your enthusiasm with us and with the readers of *Connections*.

RB: Good hunting!