A Geologist's Adventures with Bimini Beachrock and Atlantis True Believers

Natural submerged beachrock off the island of Bimini in the Bahamas has been deemed a remnant of Atlantis by the faithful since the 1960s. In spite of geological research demonstrating the stones are natural, "true believers" continue to be drawn by the strong "force field."

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There are many stories like Champ, the Loch Ness monster, UFOs, and other popular myths that seem to acquire a life of their own. In fifteen feet of water off the Bahamian island of Bimini lie several rows of tabular limestone boulders that "true believers" adamantly contend are remnants of the mythical city/state of Atlantis. The reader has probably seen these underwater stones on numerous TV shows and documentaries. Even the History Channel recently did a piece on it. The programs follow a familiar theme: After showing and describing the wonders, the narration will end something like, "No one really knows the true origin of these stones . . ." or, "Could it really be Atlantis?" True believers, of course, have made up their minds.

As a geologist I did a thorough study of the site in the mid-1970s and must say it was one of the more unusual phases of my career and the major reason I first began subscribing to the SKEPTICAL INQUIRER. In the mid-1970s I was director of a small field station for the U.S. Geological Survey (USGS) located on Fisher Island off Miami Beach. We worked in collaboration with the University of Miami's Rosenstiel School of Marine and Atmospheric Science. Our reputation was enhanced because we had developed a diver-operated coring device that for the first time allowed inexpensive underwater core sampling. It was because of our core drill that a well-known writer, adventurer, and New Age thinker, Peter Tompkins, asked if we would go to Bimini (just fifty miles from our field station) to core and determine if the site could indeed be lost Atlantis. We refused the first request, fearing damage to our reputations. The prospect was outside our mission. After Peter contacted our headquarters in Reston, Virginia, I received a phone call. When I explained that the limestone blocks had previously been identified as natural beachrock, I was advised to make my own decision.

I knew something about the so-called "cyclopean megalith roadway" because a Miami graduate student, John Gifford, had recently completed a study of the stones sponsored by the National Geographic Society. The study was published several years later (Gifford and Ball 1980). After consultation within our group, we decided on a plan that promised to be interesting and fun yet provide a public service while at the same time not embarrassing to the USGS. Who could turn down an opportunity to dive in the clear waters off Bimini on weekends at no cost? We agreed to do the investigation on weekends, provided we could pick the boat and the captain. The first weekend trip was aboard a Florida Institute of Technology research vessel that supplied student help. Peter Tompkins also brought along his fourteen-year-old son. We cored two of the huge stones and demonstrated to our satisfaction that they were indeed beachrock.

Beachrock is rock that forms near mid-tide level beneath the sand on tropical beaches. It is a very distinctive rock that forms rapidly. Tidal fluctuation constantly forces calcium carbonate-rich waters through the sands where evaporation and off-gassing of carbon dioxide probably help stimulate precipitation of calcium carbonate. Within a few years, crystals of aragonite, a common marine form of calcium carbonate, precipitate between the grains, welding them together to form a very hard limestone. There are beach rocks around some Pacific islands that contain human skeletons and shell casings from World War II. At Bimini and along other Bahamian islands, many swimming beaches are lined with beachrock that is forming today. They contain imbedded Coke and beer bottles. When sea level rises, as it has done during the past 18,000 years, any beachrock that formed several thousand years ago becomes submerged. Such is the case with the supposed Atlantis stones off North Bimini.

When our drill cores showed the older beachrock was identical to that forming on the main swimming beach at Bimini, there was much concern. Whereas the modern rock contains discarded bottles, there were no artifacts, no wheel ruts, or any other evidence of an ancient civilization in or around the fifteen-foot-deep site. We thought the quest was over and there would be no more fun weekends in Bimini. Instead it was just the beginning of a long adventure that continues today.

When confronted with the beachrock evidence, Tompkins posed a difficult question: "What if beachrock was the only building material available for the Atlanteans?" We needed an answer, so we approached the question using forensic geology. If the stones had not been moved since they formed, they should all contain beach sand stratification dipping in the same direction as when it formed, i.e., toward deep water. If

Figure 1. Diver drilling cores on the "road to Atlantis" in fifteen feet of water off Bimini. The core lying next to pipe wrenches in foreground is four inches in diameter.

the stones had been placed by humans, then internal stratification probably would dip in different directions. We reasoned that Atlanteans, although reputed to have had advanced technology, were not aware of internal stratification within beaches and beachrock. If they fitted the stones, they surely would have selected for the best fit. Thus, some stones should contain

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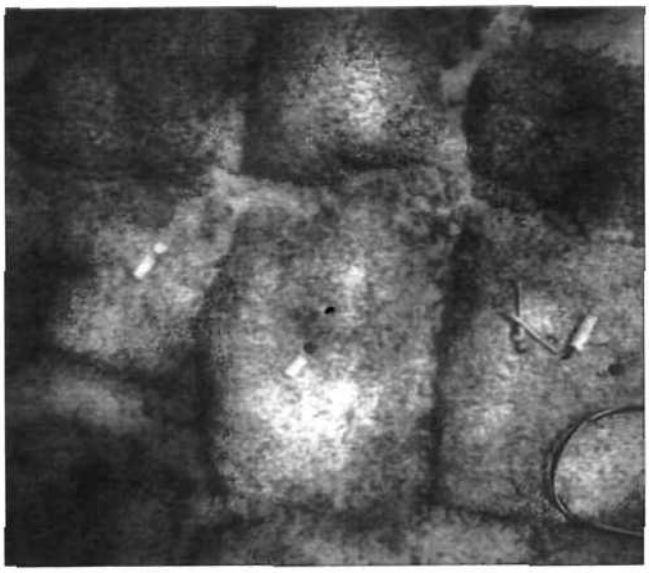

Figure 2. Vertical view of Bimini stones. Note the 4-inch-diameter core hole and oriented cores adjacent to hole. Beachrock like this can seem dramatic and artificial but in fact is a natural geological phenomenon.

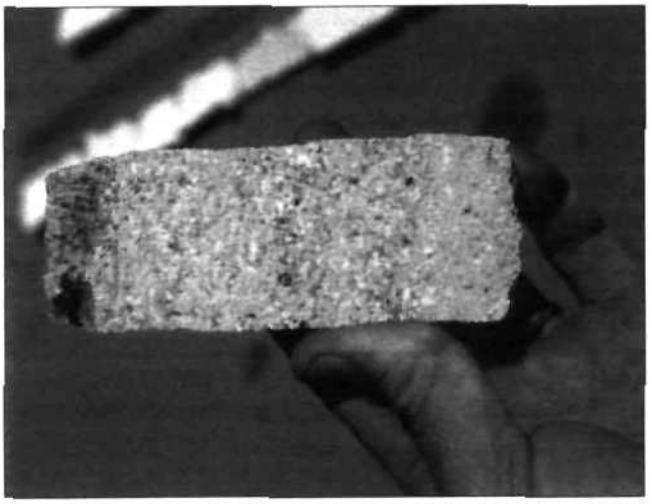

Figure 3. View of sawed surface of a two-inch-diameter core from Bimini beachrock from the first expedition. Coarse shell fragments that compose the rock are roughly the same size as those on the present-day swimming beach at Bimini.

Figure 4. Submerged beachrock at Hospital Key at Dry Tortugas. Thickness of tabular rock slabs and pattern of fractures are similar to those at Bimini.

stratification dipping the wrong way. Our plan was to take seventeen oriented cores from separate adjacent stones. Soon we had a real expedition planned, and a local PBS station was brought in by Tompkins to supervise a documentary. Tompkins is known for his well-crafted coffee table book on the Great Pyramids, his cult classic *The Secret Life of Plants*, and a thriller titled *A Spy in Rome*. Peter actually was an Allied spy in Rome during World War II.

Cayce's Stones

Why did people believe Atlantis was near Bimini in the first place? The answer lies in the predictions of Edgar Cayce, a popular "healer" in the 1930s and 1940s. Cayce, known as the "Sleeping Prophet," also believed in reincarnation. While doing a "reading," he reportedly discovered his patient was a reincarnated Atlantean. When asked where Atlantis was, the patient said "in the Bahamas near Bimini." This comment, along with others, was recorded in his writings. Cayce became so popular he went on to form a huge following including a foundation in Virginia Beach, Virginia. His story is told in the January/February 1996 issue of SKEPTICAL INQUIRER (Beyerstein 1996). Thus, when someone familiar with his pronouncements discovered the rows of stones in the early 1960s, they were linked with Cayce's revelation. One such person to make the link was Valentine (1976). Soon hundreds of snorkelers and divers descended on the site. The vista in clear water is impressive, and without specialized knowledge, most visitors would swim in awe. The Cayce Foundation funded Edward Zink to investigate. Zink, a professor of English, spent several summers examining the site. Prentice Hall published his hardcover book on the topic, titled *The Stones of Atlantis*.

Other events and circumstances added aura to the island. Bimini lies in the so-called "Bermuda Triangle," and the Berlitz books on the Bermuda Triangle and Atlantis were becoming as popular as crystal power. Berlitz's books included the stones, submerged Egyptian pyramids, whirling compasses, downed airplanes, missing boats, aliens, and anything else that seemed strange. Chief among the auras was the so-called "force field." And there were plenty of other strange happenings on Bimini that might explain the force field. Bimini had become a major drop area for drug smugglers, as it had been for liquor in the 1920s and early 1930s. The aroma wafting from boats in the harbor probably created its own force field. It was a place where Customs agents wore gold Rolexes and small machine-gunned aircraft lay in the bushes on either side of the runway at South Bimini airport. Several can still be found in shallows just off shore. Little wonder that a most unusual crop of international visitors flocked to the tiny island. One visitor was Lester Hemingway, the brother of Ernest Hemingway. He would stop people on the street and describe how the legendary Fountain of Youth, yet another facet of the Bimini aura, had healed his cancer. A tidally fed sinkhole in the mangrove swamps of North Bimini had become the true Fountain of Youth. It was said that Ponce de Leon had mistakenly searched Florida for the Fountain when it was in Bimini all the time. For about $50 local bonefish guides will take you to the Fountain for

rejuvenation. Also near the fountain are sand spits surrounded by mangroves and other vegetation. They are geological testament to the way North Bimini has formed over the past 1,000 to 2,000 years. At one spit, bare sand being encroached by mangroves outlines the shape of a 500-foot-long shark. There is also a whale shape. Because the shark and nearby whale "mega pictographs" or "zoomorphic mounds" can be seen only from the air, true believers say it is a prehistoric archaeological site built by extraterrestrials from the Pleiades. With this background, the reader can more fully appreciate the eclectic, New Age nature of Bimini in the 1970s.

Drilling for Atlantis

The day finally came to start the drilling. We loaded Captain Roy's fifty-foot trawler with our equipment and two members of Tompkins's entourage. An astrologer from California named Leon had provided funding. The local PBS station sent one of their managers to evaluate the story potential. When we docked in Bimini the next morning, the rest of the group that had flown over was there to meet us. The group included a French photojournalist, a writer from the *National Enquirer*, a woman who practices rebirth, two sisters who were to be the underwater movie photographers, and of course Peter Tompkins. His son stayed home this time. My wife, Dan Robbin, and his wife also joined the party. Captain Roy knew the site well. He had been chartered earlier to help with the filming of a fictional movie about the Bermuda Triangle. A half dozen sailboats had already assembled at the site when we dropped anchor. The people on the sailboats had dropped more than their anchors: they were all naked. One nude boater swam over and asked, "Can't you feel the force field? It's strong here." But this did not fully prepare us for what came later.

We suited ourselves in dive gear and soon found ourselves being filmed by two naked women. Apparently, humans just cannot get the feel of place while wearing clothes. In his 1997 book *Paradise Fever*, subtitled *Growing Up in the Shadow of the New Age*, Ptolemy Tompkins, the same fourteen-year-old son from our first trip in the mid-1970s, talked about life with his father and his New Age beliefs. In the book Ptolemy describes how everyone felt they had to get naked to investigate the stones. He also mentions his father's disagreements with the "clothed geologists." For further reading see "Lost Atlantis" in *Harper's* magazine (Tompkins 1997).

I should also mention that the week before our expedition Peter had rented a plane and flown over the area with two well-known diviners. I was told they first found "hot spots" by passing their hands over nautical charts. They then sat in the plane with plumb bobs and waited for "the forces" to direct them. Needless to say, nothing came of it, but it was to be part of the TV documentary.

While we were drilling, a rival New Ager was spotted on a nearby boat. Demitri Ribikoff, an inventor and developer of underwater photography equipment, was doing an underwater photographic survey of his own. I was soon to learn that the true believers, and there are many, were extremely jealous of each other because each wanted the glory of finding Atlantis. Ribikoff was coaxed over to our boat for an on-camera interview. Sparks flew.

Analyzing the Atlantis Beachrock

We survived it all, completed our weekend mission, took the cores home, and later sawed the oriented cores with a diamond rock saw. The rock slabs were x-radiographed to reveal internal stratification. Sure enough, all the cores showed consistent dipping of strata toward the deep water, and distinctive layers of rounded beach pebbles could be traced from one stone to another. To better appreciate what this means, let me explain a little about beachrock formation.

Figure 5. Fractured beachrock at Loggerhead Key, Dry Tortugas.

Beachrock forms beneath the sand in the intertidal zone. Nearly all beach sands have distinctive stratification that dips downward toward the water. When the sand is converted to rock, stratification is preserved. Usually one does not see the rock forming on beaches because it forms out of sight beneath the sand. As more sand is added, the beach builds out with the rock following just beneath. However, if conditions change and the beach is eroded, the rock is exposed. Algae grow on its surface, usually turning the rock dark grey or black. After a few years in the sun, the rock layers, usually about one-foot thick, crack much like old concrete roads and sidewalks. The pieces can be large, up to twelve feet in length and four to six feet

wide. With continued erosion by wave-driven beach sand, the cracks enlarge and take on a rounded shape. The result is rows of huge pillow-shaped stones that appear to have been fitted neatly together, much like the stone walls high in the mountains at the Peruvian ruins of Machu Picchu. If the beach makes a turn, such as when a curved spit forms, the beachrock follows. At the south end of the long row of stones off Bimini the beachrock curves to form a huge "J." True believer Edward Zink thought the J shape had special meaning. Some say it was built to form an Atlantean harbor.

Figure 6. Close-up photograph of fractured beachrock at Loggerhead Key, Dry Tortugas. A recent hurricane exposed more beach rock at Loggerhead key, revealing that a seawater pipe for the Carnegie research lab located here between 1910 and 1940 had become part of the beachrock.

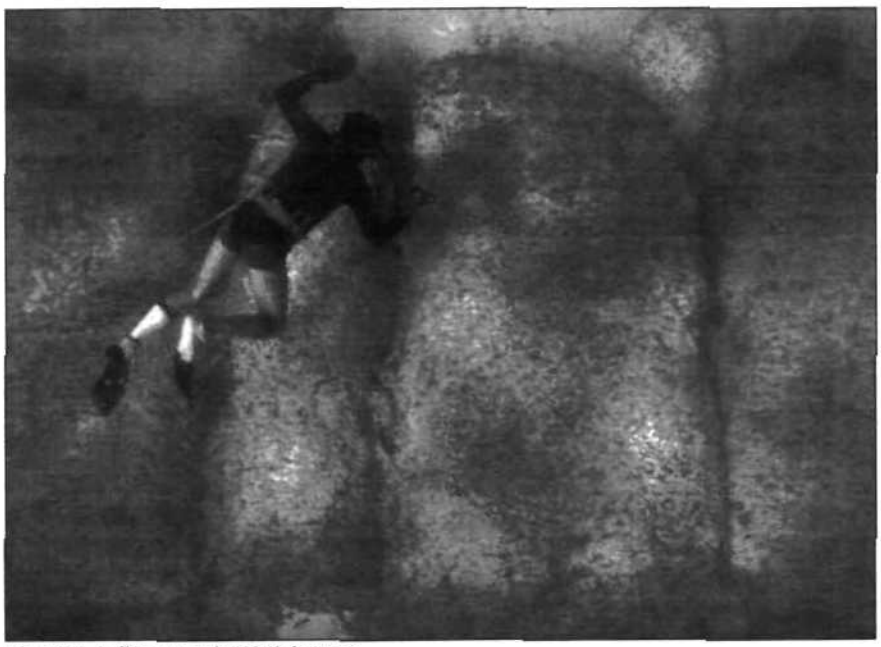

Figure 7. A diver over the Bimini stones.

We were later filmed in our laboratory cutting the cores and explaining their origin and significance on camera. It turned out that the 16-mm film both above and below water was not up to PBS standards and PBS wanted no part of this story. After all this effort—and the discoveries we had made—I decided the geological story needed telling. So I prepared an article for *Sea Frontiers* magazine, which was published by the International Oceanographic Foundation. It was called "*Atlantis: Bimini's Hoax*" (Shinn 1978). The editor was especially happy to print the geological explanation because of the constant onslaught of questions concerning the mysterious stones. Later in 1980, I co-authored a paper in *Nature* with Marshal McKusick (McKusick and Shinn 1980). We presented carbon-14 data showing that the stones (ages range from 2,000 to 4,000 years) are much too young. Atlantis was presumably a 7,000-year-old story when first told to Plato. The rock is actually younger because the material we dated consisted of conch shell fragments cemented within the rock. These materials would have been lying on the beach and predated the cementation process that produced the rock. We did not have the new mass accelerator dating methods that today allow dating of the tiny individual crystals that formed the rock. It is clear the actual time of rock formation would have been some time after the conch shell was deposited on the beach.

The Myth Goes On

There were also other items in the area. An earlier letter to *Nature* (Harrison 1971) showed that so-called columns on a site about two miles from the stones were made of Portland cement. In the 1800s, cement was carried on ships in wood barrels. When discarded, the wood rotted away, leaving a hard cement column. Needless to say, none of these publications changed the minds of "true believers." I had foolishly believed publishing the facts would put an end to speculation and the numerous expeditions that were being financed by gullible donors. Readers of the SKEPTICAL INQUIRER and those who have read of James Randi's encounters with faith healers and their followers as well as his exposé of the Bimini beachrock (Randi 1981) already know that there is no quelling the fervor of true believers.

So what has happened since the 1970s and early 1980s?

There was indeed a short period of quiescence that may be attributed to a conservative political twist in the nation and possibly the reduction of drug smuggling through Bimini. Today the boat harbor in Bimini is almost empty. In the 1970s, there were always more than 100 boats in the harbor.

In the 1990s, William Donato formed the Atlantis Organization and in 1997 initiated an aerial survey called "Project Alta." Donato received a master's degree from a California university for a critical re-evaluation of the Bimini site in 1979. In the thesis I am accused of not having an open mind. Such criticism is not new. I had been taken to task in a *Miami Herald* interview of true believer Manson Valentine. He accused me of being a "scientoid." "Scientoids are brainwashed in the scientific method which can only reveal limited information," he said. "One has to go beyond the bounds of science for true enlightenment." Valentine was on the board of the Miami Museum of Science!

The dubious expeditions have resumed, and the Bahamian government continues to promote the area for obvious tourism reasons. Edgar E. Cayce, the son of Edgar C. Cayce published a book in 1988 titled *Edgar Cayce's Wisdom for the New Age: Mysteries of Atlantis Revisited.* The book is a hodgepodge of history, geological fact, and fantasy and includes interpretations of Cayce's readings that purportedly show he learned of continental drift while in a trance long before geologists figured it out. Of course, the book discredits the work McKusick and I did.

Three years ago I was invited to give a talk about the Bimini stones to the Bahamian Historical Society in Nassau. The invitation was stimulated by two back-to-back articles in the *Bahamian Guide*, an expensive guide to doing business in the Bahamas. William Michael Donato argued that straight lines are rare in nature while geologist Paul Hearty argues straight lines are not unusual. The straightness of the stones, except where they form a "J," had bothered many observers over the years. The trip to Nassau also included a tour of the multimillion-dollar Atlantis hotel on Paradise Island. The manager led the tour, which takes one through a winding man-made tunnel called "the Atlantis digs." The tour includes an Atlantean submarine, an Atlantean diving suit, a laboratory complete with "power crystals," and hieroglyphics line the walls everywhere. The manager explained how he and others sat up one night and concocted the hieroglyphics. "True believers spend hours in there trying to decode what they say," he said. The pseudo-Atlantis site is also adjacent to an elaborate Las Vegas-style gambling casino. I concluded that anyone who thinks they will get rich gambling should certainly believe in Atlantis.

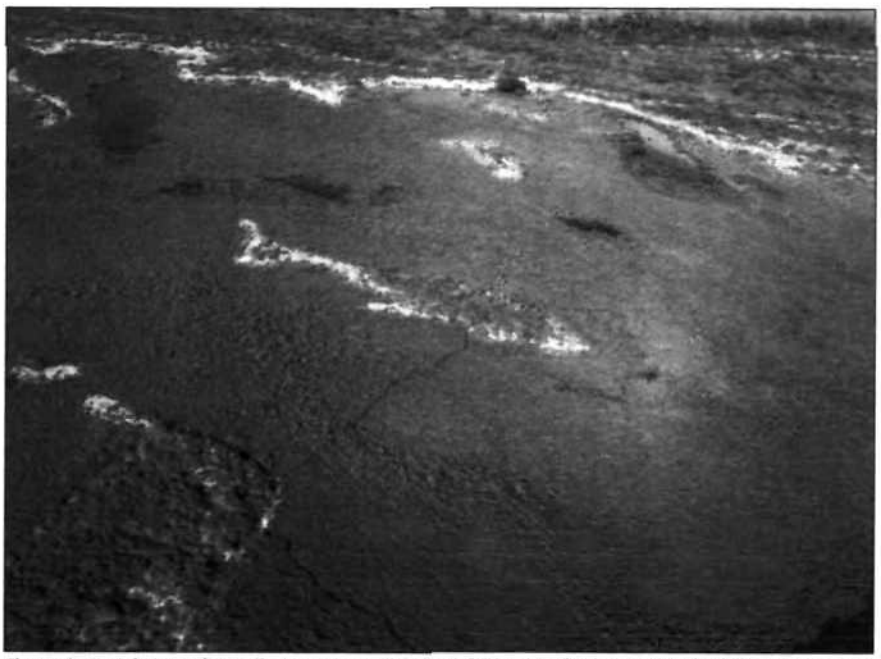

Figure 8. Aerial view of so called "zoomorphic mounds" on North Bimini with shark figure in center of photograph. Accretionary sand spits and shoreline are visible in background. The feature in lower left is said to represent a whale.

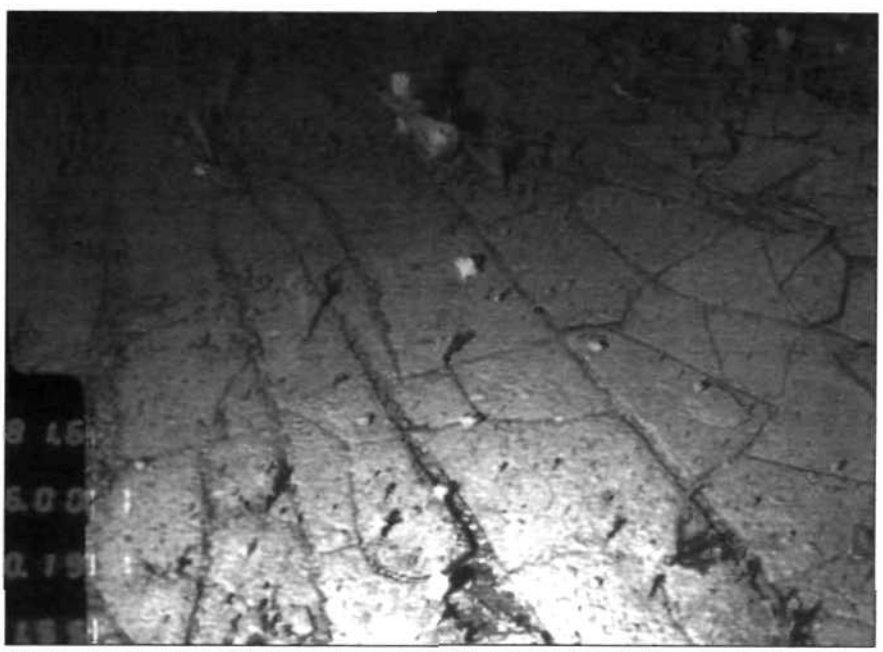

Figure 9. Road to Atlantis? Not quite. Fractured bedding plane taken by the author in 5,000 feet of water from the *Alvin* submersible off the Blake Escarpment.

Since our original adventure, I have seen similar straight lines of broken pavement-like stones and have photographed

similar features from the *Alvin* submarine in 5,000 feet of water. Many more offshore beachrock sites have been found in the Bahamas, and I have photographed a large field of the "megaliths," as true believers call them, off the western end of Vieques Island, Puerto Rico. There are exact duplicates around islands on the Australian Barrier Reef, and a geologically famous example at the Dry Tortugas off Florida in the Gulf of Mexico. I took a film team from Leonard Nimoy's *In Search Of* series to the Tortugas to film and demonstrate that the beachrock there was the same as at Bimini. That 1970s program still airs occasionally but seems not to have influenced the true believers. In fact, several of them appear in the program. One talks of finding a half-buried pyramid on the Great Bahama Bank. They claim to have entered the pyramid underwater to make films and then a storm drove them away. Not surprisingly the films were fogged by the "force field" and the site was buried and could never be located again! They did recover one of the "power crystals." It was demonstrated that when a magnet on a stick is placed near the crystal, the magnet is repelled. The program did not show the electromagnet hidden under a black cloth just beneath the crystal.

In spite of all the evidence pointing to natural beachrock, the reader should not expect to see the demise of Atlantis stories. Donnelly, who in 1882 published *Atlantis: the Antediluvian World*, surely had no idea of its ongoing effect on peoples' lives clear into the twenty-first century. Do not be surprised when you pick up the newspaper and see a small article that says, "Russian expedition finds what may be the true location of Atlantis." It happens at least once a year.

References

Beyerstein, D. 1996. Edgar Cayce: The prophet who slept his way to the top. SKEPTICAL INQUIRER 20(1), January/February: 32–37.

Cayce, E.E., G.C. Schwartzer, and D.G. Richards. 1988. *Mysteries of Atlantis Revisited.*, San Francisco: Harper & Row Publishers.

Donato, W. M. 1979. A re-examination of the Atlantis theory. (Master's thesis).

Gifford, J.A., and M.M. Ball. 1980. Investigation of submerged beachrock deposits off Bimini, Bahamas. *National Geographic Society Research Reports* 12: 21–38.

Harrison, W. 1971. Atlantis undiscovered: Bimini, Bahamas. *Nature* 230: 287–289.

McKusick, M., and E.A. Shinn. 1980. Bahamian Atlantis reconsidered. *Nature* 287: 11–12.

Randi, J. 1981. Atlantean road: The Bimini beach-rock. SKEPTICAL INQUIRER 5(3), Spring: 42–43.

Shinn, E. A. 1978. Atlantis: Bimini's hoax. *Sea Frontiers* 24: 130–141.

Tompkins, P. 1997. *Paradise Fever.* New York: Avon Books.

———. 1997. Lost Atlantis. *Harper's* magazine, January: 76–82.

Valentine, J. M. 1976. Underwater archaeology in the Bahamas. *Explorers Journal* (December):176–183.

Zink, D. 1978. *The Stones of Atlantis.* New York: Prentice Hall. □