MAGNETIC SEARCH FOR BERMUDA WRECKS

By Mendel L. Peterson

MENDEL L. PETERSON

Commander Peterson, FNR, is Chairman, Department of Armed Forces History, Museum of History and Technology, Smithsonian Institution. After schooling in several institutions of higher learning, and a period of Pacific war service, he explored areas in Antarctica, then held curatorial positions with the U. S. National Museum. He is author of numerous articles on naval and military history, numismatics, and on his present field of interest in historic underwater sites in the Florida Straits, West Indies, and Bermuda. After much underwater exploration, he is now an outstanding expert in the field.

Mr. Peterson was our banquet speaker at the Washington meeting, this being the second time that he has favored us with his presence, and narrated a film on the diving operations at Bermuda. As the fine film could not be used in THE BULLETIN we are using an article written by him for THE EXPLORERS CLUB "EXPLORERS JOURNAL" December 1968. This article follows closely his narration of the film which was exceedingly interesting.

* * * * * * * *

The Bermuda Islands, lying 800 miles off the coast of North Carolina, have for centuries been a key point on the great trade routes to and from Europe. In the earliest days of Spanish domination of the New World ships frequently sailed out the Bahama Channel, lying between Santo Domingo and the southernmost Bahamas Islands, but by the last decades of the sixteenth century the Florida Straits had become the standard exit from the Caribbean and Gulf of Mexico. This route had been known from the early 1520's but was not systematically surveyed until the great Pedro Menendez did so in the 1560's. As the Florida Straits became the normal route for Spanish shipping and that of other nations to leave the Greater Antilles, and Caribbean and Mexican ports, Bermuda became a signpost marking the jumping off point for the long voyage across the Atlantic. In the heyday of colonialism in the New World hundreds of ships sailed by the Bermudas every year. The waters of Bermuda were especially hazardous in the days of sail. During bad weather mists enshroud the islands making them virtually invisible. When these conditions prevail, it is possible for a ship to run aground on the reefs, which jut out as far as ten miles, before the crew is aware that they are near land. With modern navigation aids the hazards to ships is greatly reduced but, in the days of sail when no such scientific aids were to be had, the Bermudas presented a death trap which claimed many victims. As the English established flourishing colonies in North America, and as the commerce expanded, new direct routes from Europe were established. Bermuda became a port of call on these routes to and from Europe. Again, many of these ships came to grief on the sharp coral reefs of the islands, and added their remains alongside those of vessels which were wrecked going to Europe from the Caribbean Basin. As a result, the reefs of Bermuda contain some of the richest deposits of shipwreck to be found anywhere in the New World, and these deposits are concentrated on the comparatively limited area of the reef flats of the islands. These wreck sites represent an invaluable opportunity for the newly emerging science of marine archaeology, and the proper study of them can lead to an expanding knowledge of marine architecture, naval warfare, maritime commerce, and social history.

Serious diving on wreck sites in Bermuda commenced after World War II. The leading exponent of the new field of shipwreck exploration in Bermuda is Mr. Edward Bolton Tucker. Mr. Tucker in 1955 recovered a very important find of late sixteenth century treasure and artifacts from a ship which is not yet positively identified, but which is believed to be the San Pedro which sank in 1595. The site yielded gold cakes, bars, jewelry, and an emerald-studded pectoral cross. The collection of artifacts represented every activity aboard the ship including the work of the navigator, clerks, doctor, the seamen, and the passengers. It included ship fittings, armament, and other objects which enable us to reconstruct life aboard as it was being lived when the disaster occurred. Later discoveries by Tucker include the San Antonio which sank in 1621, an unidentified late sixteenth century vessel believed to be Spanish, a nineteenth century merchantman, the Caesar, which sank in 1819, and several others dating from the seventeenth century through the nine-

Reprinted from the American Society of Arms Collectors Bulletin 20:16-20
Additional articles available at http://americansocietyofarmscollectors.org/resources/articles/

teenth. This activity increased with the entry of other divers into the field, with the result that the site of the Sea Venture was discovered. The wrecking of this ship led directly to the settlement of the islands and represents a great historical first. Others including several seventeenth, eighteenth, and many nineteenth century sites, have been turned up, including the sites of the ships Virginia Merchant, sunk in 1660, and Eagle, in 1659, discovered by Tucker in the years succeeding his initial discovery. Today, interest in underwater exploration is very high in the islands.

This interest, and the necessity to channel it into the proper paths to protect national historical treasures, led the Bermudian Government to establish controls over diving activities on shipwreck sites in Bermuda waters. The law there is a very enlightened one, which in effect controls the exploration on sites but gives the discoverers rights to exploration and recognition for the discovery, reserving to the Government of Bermuda the right to purchase at a mutually agreed price any treasure or artifacts which the government feels is required for the national historical museum. The law also provides for the cooperation of scientific agencies with Bermudian divers in the exploration of such sites subject to the approval of the Receiver of Wrecks. In the past years, the Government of Bermuda, through his office, has given permission to the Smithsonian Institution to work with Mr. Tucker under grants from private persons and agencies. This work has been carried on every year since 1960. During this period shipwreck sites dating from the late sixteenth century through the neinteenth century have been investigated, working in cooperation with Mr. Tucker. These include the following:

Unidentified Spanish	ca. 1560-80
San Antonio	1621
Eagle	1659
Virginia Merchant	1660
Unidentified Spanish	ca. 1700
Sir George Arthur	1778
Unidentified French	ca. 1767
Unidentified merchantman	ca. 1783
Caesar	1819
L'Herminie	1839

Results of Past Exploration

From these sites significant collections of artifacts have been recovered and added to the Bermuda and Smithsonian collections. Several papers have been written by me on recovered artifacts, including:

"The Significance of the Bermuda Treasure Find," Life, January 9, 1956.
"Un Historiador Explica El Significado del Hallargo," Life (Latin-American edition), February 13, 1956.
"An Authority Evaluates the Find," Saturday Evening Post, December 5, 1959.
"Ordnance Materials Recovered from an Early Seventeenth Century Wreck Site," Journal of the Company of Military Collectors and Historians, Vol. XIII, No. 3, Fall 1961.
"Additional Notes on Ordnance Recovered from an Early Seventeenth Century Wreck Site," Journal of the Company of Military Collectors and Historians, Vol. XV, No. 3, Fall 1963.
"Forms of New World Treasure," The Numismatist, January 1964.
"The Condition of Materials Found in Salt Water," Diving into the Past, St. Paul, 1964.
History under the Sea, (Smithsonian Publication, 4538), Washington, 1965.
Preservation of Material Recovered from Water, Washington: Office of the Chief, Naval Operations, 1965.
"The Spanish Plate Fleet," Proceedings Fifth Annual Convention of the Underwater Society of America, Mexico City, June 1964. pp. 162-169, 1965.
"Underwater Thesaurus," Antiques, September 1965.
"Wired Ball for Small Arms," The Military Collector and Historian, Vol. XVIII, No. 3, Fall 1966.
"Ordnance Materials Recovered from a Late Sixteenth Century Wreck Site in Bermuda," The Military Collector and Historian, Vol. XIX, No. 1, Spring 1967.

A new Hall of Underwater Exploration, based to a great extent on the Bermuda explorations, has recently been opened in the Museum of History and Technology, Smithsonian Institution.

In December of 1966 it was indicated to me that the Explorers Research Corporation, of The Explorers Club, might be a possible sponsor of underwater exploration on historic sites. At a luncheon meeting with Mr. George R. Wallace, President and Treasurer, and several other officers of the Corporation, the idea of an underwater exploration project was explored.

At a meeting of the board on January 10 a proposal for an electronic exploration of Bermuda waters was presented. After a consideration of the many ramifications of the proposal the board approved a grant of $23,600.00 to cover an intensive two-month survey and recovery effort. In making the grant it was indicated

that good photographic coverage of the project, including complete motion documentation of all phases, was to be made.

I immediately began preparations in the United States and in Bermuda. A contract was signed for the lease of the most advanced type of proton magnetometer then available.* This instrument, designed by Mr. Fay Field, had been examined and tested by engineers of General Precision Corporation, who pronounced it the most advanced in design and performance of any with which they were familiar. The contract specified that Mr. Field would come to Bermuda with the instrument and instruct expedition members in its use.

Mr. Edward Tucker, a diver of Bermuda, was contracted and an agreement for charter of his diving boat Brigadier was made. Mr. Robert Canton, also of Bermuda, was retained as engineer. Mr. William Byrd of the Graduate School, Massachusetts Institute of Technology, was retained as the electronics engineer of the expedition. Later, Mr. Peter Stackpole, former Life magazine photographer and specialist in underwater work, was retained to make a complete photographic coverage of the operations, working with Mr. Alan Albright, Museum Specialist of the Department of Armed Forces History of the Smithsonian Institution.

During the course of the operations the expedition was honored to have Mr. George Wallace join in the operations and dive on two sites to watch the progress of the work. Mr. Wallace dived on the site of L'Herminie, a French frigate which sank in 1838, and examined, under water, guns of the Virginia Merchant which went down in 1660. Other observers looking in on the work were Dr. Daniel Nelson of St. Catherines, Canada; Dr. David Ashdown of Bermuda; Mr. Hugh O'Brien, President of A. P. Smith Manufacturing Co., and Mr. E. W. Edmund, President of M & E Marine Supply Co., of Camden, New Jersey.

Plans called for a comprehensive sweep of the western reefs of Bermuda with the proton magnetometer. Those areas of greatest promise, such as the edges of the fringing reefs, area by-passes through the reefs, anchorages along the north coast, and the areas around the site of the Virginia Merchant (sunk on the south coast, 1660) received priority. It was evident that a detailed magnetic examination of the whole reef area in one season was not possible, therefore, these prime areas received first attention. Other prime targets lay in Castle Harbor where the Sea Flower (sunk in 1621) and the Warwick (sunk in 1619) were known to have gone down.

During a preliminary week of fitting the equipment in the Brigadier, and comprehensive testing of this equipment, Mr. Field was on board, and his instructions on the use of his instrument were of the utmost value. Mr. Byrd very quickly grasped the details of construction of the instrument and its manner of operation, and the shakedown phase proceeded on schedule. Actual sweeping and diving operations began July 4 in the Great Sound along the edges of the passes leading into that area from the reefs. From this date, sweeping continued on the reefs to the west, along the south coast in the area of the Virginia Merchant site and in Castle Harbor.

Byrd and Tucker devised a method of precise detection of underwater deposits of magnetic materials by using the magnetometer as a hand-held underwater detector. This was accomplished in a jury-rigged, but effective, assembly in which the magnetometer capsules were lashed to each end of a board seven feet long. This assembly was carried over a site by Tucker who walked in a consistent pattern in order to cover every square foot of the area. When the read-out apparatus on the boat indicated the presence of magnetic material, Tucker was signaled, and he dropped a marker on the spot. In this manner several deposits of iron were detected in the new area of the Virginia Merchant. A sudden change in the weather drove us from the site and we were not able to return. These deposits can be investigated in the future, since Tucker holds a license for this site and is protected from unauthorized diving here by other persons.

The operations on the water lasted until September 13. Two of the four prime targets were located—a new area of material associated with the Virginia Merchant and the Warwick. Found were ordnance materials including bar shot, solid shot, and objects of personal use such as brass buttons, ivory combs, and clay pipes. The deposit could not be completely worked because of a change in the wind which prevented work on the south coast during the last weeks of the expedition and much remains to be done here. The Virginia Merchant is one of the more historic wrecks in Bermuda. The ship was bound for the Virginia colony with passengers and supplies. The incident is recorded in an anonymous document of the period on the subject of trade and navigation in Bermuda—

> "14. Uppon Tuesdaie night, about midnight, being the 26th. of March Ano Dom 1660/1, was a shipp cast awaie of about 300 Tonns called the Virginia Marchant, bound for Virginia Captn. Robert Burke Comandr. thereof, right against and neere unto Mr. Richard Hunts House standing at Port Royall, wherein was one hundred and eightie persons, all which were then sodainlie drowned

*A magnetic field meter based on proton resonance effects, and records presence of iron.

except tenn persons, the which with great difficultie and eminent perill of their liues did recouer the said shore."

Port Royal has been identified as the area in which the Carlton Beach Hotel now stands and the small bay on which Mr. Hunt's house stood lies directly to the west of the hotel. The ship was badly broken up in the wreck and parts were scattered from the reef on which it first struck toward the rocky shoreline and then along the coast. Further unknown deposits from this ship are expected to be found in future operations.

In the sweeping operations on the western reefs several new wreck sites were discovered, including an early nineteenth century merchantman loaded with iron. This was a large copper-fastened ship which apparently went down before 1850. It is not yet definitely identified but should be looked into sometime in the future. A study could yield valuable information on merchant cargoes of the period. Two wreck sites were brought to the attention of the expedition by a young fisherman, William McCallan. Mr. McCallan is an accomplished diver with an intense interest in marine exploration. During the past several years he has joined the expeditions as a volunteer and has shown the locations of several significant wreck sites. By the very nature of his work, bottom fishing and fish trap work, Mr. McCallan looks at the ocean bottom many hours in a work week. This year he discovered two wreck sites which he generously allowed the expedition to examine. One of these was marked by an iron cannon which dates from the first half of the seventeenth century. The other site contained cast iron pigs inscribed "Patuxent, 1761" and "Pensy." These ingots are of high historical interest and the site should be further investigated, as should the wreck bearing the iron gun.

The discovery of primary importance during the summer operation was the site of the Warwick. This ship arrived in Bermuda from England on 20 October 1619, bringing the new governor Nathaniel Butler to his post. The ship anchored in Castle Harbor and unloaded passengers and stores. Toward the end of November, while still at anchor, she was struck by a severe norther and swept onto rocks and sunk. The event is mentioned in contemporary accounts—

"Towards the last of this month of Novemb. there arose a most terrible storm or Hericano, that blew up many great trees by the roots: the Warwick that brought the Governor was cast away[1]. ."

The next year several attempts were made to recover the guns and stores from the Warwick. Early in the year "with an infinite toil and labour" the governor "got three pieces (guns) out of the wracke Warwicke."[2] The remaining guns of the ship were badly needed in the fortifications of the islands and efforts continued to recover more of the Warwick's ordnance. During the year "many triall they made againe about the Warwicke, but to small purpose, her ordnance being lashed so fast they could not be unloosed, till the ropes and decks were rotten, yet some few buttes of beare (beer) being flotie (floating in the hull) they got, which thought it had lien six months under water was very good."[3] The next year, 1621, five pieces of ordnance were recovered. Later Governor Butler "With twenty chosen men and two excellent divers . . . went himself to the wracke Warwicke, but they could recover but one murderer (small swivel gun which was mounted on the gunwales)."[4]

For three hundred and forty-five more years the Warwick lay in her grave, the exposed timbers rotting or being eaten by worms, and the bottom silt covering the rest. As those who were alive during the disaster passed on, the actual site of the wreck was forgotten. The literature, as quoted above, was so general as to furnish little useful evidence to the actual spot where she lay. The answer was a thorough survey with our instruments. The accounts did provide two valuable clues. First, the ship was blown ashore by a norther which, of course, indicated that the rocky coast border, the south shore of Castle Harbor, was the most likely spot in which to find the remains. The account obliquely indicated that all of the guns of the Warwick were not recovered. Therefore, there should be a sufficient mass of iron on the site to offer a good target for the magnetometer. It is known from charts of the period that three principal anchorages were used in Castle Harbor. With this evidence in hand the search for the site began. On July 25, sweeping operations showed the presence of iron off Frick's Point, which describes the western side of the pass into Castle Harbor from the open sea to the south. Early charts indicated that the waters some hundreds of yards north of this point were one of the three preferred anchorages in the harbor. A preliminary dive showed no visible remains on the bottom where the reading was indicated. The next day a probe with the airlift* some six feet into the light silt on the harbor bottom revealed fragments of rotted wood! During the subsequent thirteen days of pumping, evidence accumulated that the site was indeed that of the Warwick. This evidence included small black flint gravel ballast characteristic of English ships of the period, timber remains of the proper size for a ship of the displacement of the Warwick, remains of numbers of barrels of flour, which still clouded the water as it was pumped, and remains of boxes which had held supplies. When the work on probing the site had been completed, an application for a license to work the wreck was filed with the Honorable W. W. Davidson, Receiver of Wrecks and Colonial Treasurer for Bermuda. The application, in the name of

1, 2, 3, 4, Lefroy's Memorials, Capt. John Smith.

*An open tube into which air is pumped. As the air rushes up the tube a suction is created at the bottom, lifting sand and mud up the tube with the flow of air and water.

Mr. Robert Canton (a Bermudian must be the principal licensee) received a favorable response, and a license permitting work for two years on the site was issued.

The preliminary survey for identifying the site revealed extensive timber remains, much more complete than had been expected, and more complete than any wooden hull of the period yet found in salt water in the Western Hemisphere. By good fortune, the ship had settled on one side and the subsequent burying of the lower side by silt in the harbor bottom preserved the ship from the keel to the gunwale. Here, then we have half a ship of the period preserved and, by extension, the whole vessel, since the hull was symmetrical. This find is of real importance to the historian of the English colonial period in America. The further detailed study of the site will yield useful data on ship construction of the period, and of the trade which was carried on with the colonies.

Future studies of the wreck are expected to yield, not only valuable information on ship construction of the period (ships' plans of that period were infrequently used and few have survived) but many additional artifacts including cannon.

Using Bolex and Kodak K-100 motion picture cameras and Pentax and Nikonos still cameras, complete photographic documentation was made of the sweeping, diving, and recovery operations, and the objects recovered. A documentary motion picture film has been prepared by Mr. Stackpole from film shot by Mr. Albright and himself. In general, photographic conditions under water in Bermuda are good in comparison to other areas. The site of the Virginia Merchant, lying on the south coast and exposed to the open sea, presented clear water except for those times when pumping operations tended to cloud the water. The site of the Warwick, lying in a protected harbor with a fine silt bottom, presented difficulty to the photographers. Visibility there when pumping operations were proceeding was from four feet to zero, generally on the lower end of the scale. However, by shooting the site each morning before pumping began, good shots of the area were obtained. During pumping operations the photographers moved to within a few feet of the divers and obtained footage on the actual recovery work. By the proper use of the air lift it was possible to clear the water in small areas.

The operations indicated that the best instrument for shallow water sweeping was the light proton magnetometer by Mr. Fay Field. Powerful enough to pick up relatively small masses of iron, yet light enough to be carried in personal baggage by air, the instrument is probably the best available today. During the operations, the heavy fluxgate magnetometer, which had been spar-mounted last year for testing, was put under water on new towing gear. The heavy instrument offered difficulties in handling off the boat, which were not compensated in the resultant effectiveness. Further, this type of gear, running comparatively deep, was ineffective in the shallower reef areas. The proton instrument, on the other hand, ran at a depth of some four feet, and the underwater units were light and easily handled from the boat. The heavier instrument would be of value in search for deep water sites, where the sensitivity of the instrument and its greater power would be more effective.

The discovery of two of the four primary targets is considered a substantial result in a field which is highly speculative. The discovery of these two new sites offers a further opportunity for the study of seventeenth-century ships and shipping, and the recovery of further significant historical materials for preservation by the Smithsonian and the Government of Bermuda.