

An Early Search for Vigias

In the era before the global positioning system and other reliable navigation aids, many imaginary and sometimes real features whose positions were grossly in error were found on charts of the world's oceans. This is the story of an early cruise devoted solely to expunging these features from charts of the Atlantic Ocean.

"Vigia – A rock or shoal the existence or position of which is doubtful." Such is the definition of this term in the glossary of the 1958 edition of the *American Practical Navigator*. It might be added that at least 200 supposed islands were also classified as vigias at various times. Between 1958 and 1995, when an extensive revision of the venerable *Navigator* was published, apparently the decision was made to delete 'vigia' from the new glossary. (There is a note under 'position doubtful' to see 'vigia', but the term is not to be found.) Perhaps this is a reflection of new technologies that scan our whole planet looking for indications of subtle changes in water colour, changes in slope of the sea surface as observed by satellite altimetry that could indicate the existence of shoal areas, and widespread use of electronic navigation systems that, if not precluding, certainly greatly reduce the probability of large navigational errors. It seems to this author that the elimination of 'vigia' from our hydrographic lexicon in some ways lessens the romance and sense of danger of going to sea.

Throughout the 18th and 19th centuries, vigias plagued the charts of the world. Their existence on charts lasted well into the 20th century and PD (position doubtful) and PA (position approximate) are still to be found on many charts. Vigias were sometimes the result of poor navigation resulting in incorrect positions of real features (oftentimes longitude was out by hundreds of miles); sightings of icebergs; floating fields of pumice following volcanic eruptions; rafts of intertwined logs, trees and other vegetation; undersea earthquakes mistaken for striking on shoals; unique meteorological conditions; areas of discoloured water caused by either biological or geological phenomena; tide rips; and even huge schools of various marine animals disturbing the water surface. In addition, the occasional rascal would report fictional islands or shoals to gain notoriety or perhaps to obtain financing for a voyage of exploration. For all of these reasons and more, vigias would find their way onto charts. Mariners would divert from their course to avoid these 'dangers' and hydrographers cumulatively spent years disproving them. The following is the story of a cruise devoted to the expunging of vigias as well as being one of the foundation cruises of modern oceanography.

On 8 October 1851, the US surveying brig *Dolphin*, under the command of Lieutenant Samuel Phillips Lee, set sail from New York on a cruise that was to last almost nine months. The results of this cruise are found in Senate Document 59, Volume 12, of the first session of the Thirty-third Congress. The cruise was conducted for the purpose of "*testing new routes, and perfecting the discoveries made by Lieutenant [Matthew Fontaine] Maury in the course of his investigations of the winds and currents of the ocean*". Given Maury's interests, data to be collected included hourly weather observations, hourly sea surface temperatures, observations of currents when practicable, deep-sea soundings and, most important to the mariner of the day, "*An examination of all dangers about which there are doubts as to either existence or position*". At that time there were 56 vigias, "which disfigure(d) the best charts of the Atlantic Ocean" that were to be investigated by the *Dolphin*. Over the next nine months, the *Dolphin* investigated 23 of these vigias and spent all but 39 days at sea as it traversed the Atlantic Ocean from New York to the Cape Verde Islands, thence to Brazil, and finally back to New York.

Searching for vigias was tedious work as the ship would proceed to a reported location and run a grid pattern while casting the lead from the ship with about 20 fathoms of line out. Lookouts scanned the horizon for signs of shoaling while running the grid. At least one full-depth deep-sea sounding, or at least one pre-set depth measurement between 250 and 1,200 fathoms, would be made at each location. This was done to assure there was no shoal water in the immediate vicinity of the given position of the vigia. A total of 47 deep-sea soundings (greater than 1,000 fathoms) were taken and well over 100 pre-set depth soundings were made while searching for vigias. Relatively light flax line was used for deep-sea sounding. The deep soundings were made from the ship's boats as they could be manoeuvred to maintain a vertical sounding line for the duration of a sounding. Each 100 fathoms of line was timed as it came off a reel and bottom was ascertained to have been reached when a significant increase in time of 100-fathom intervals was observed. Although many of the deeper soundings made during this cruise were subsequently shown to be in error by hundreds of fathoms, many of them were used in the development of the very first bathymetric map of an oceanic basin. This map was published by Maury in 1853.

During the nine-month period that the *Dolphin* was engaged in this work, no vigias were found. Among the more interesting reports of vigias that were investigated were the Aquila Reef and Le Pacifique Shock. On 3 October 1771, Le Pacifique "*felt ... a shock, or extraordinary trembling, similar to that which is felt on a vessel's grounding ... They put back immediately and sounded without finding bottom... The sea was greatly agitated.*" On 12 April 1831, the ship *Aquila* was experiencing "*light winds and fine pleasant weather. At 40 minutes p.m., the water being very smooth, and the ship going at the rate of five knots, a loud rumbling noise was heard under her bottom, and a sensation was felt exactly like that of a vessel sliding over a rock; the rudder was so much agitated that the man who was steering could scarcely hold the wheel. No difference could be observed in the colour of the water, nor the smallest rippling.*" The captain concluded that it must have been a rock, but after arriving in London and inspecting the underside, it was concluded that there must have been "*a volcanic eruption, the shock of which did not exceed 15 seconds*". Although separated in time by 60 years, *Le Pacifique* and the *Aquila* reported positions within 100 miles of each other in the vicinity of what is now known to be the Romanche Fracture Zone on the Mid-Atlantic Ridge (MAR). What they probably experienced were undersea earthquakes, the first recorded accounts of seismic activity on the MAR.

The only real feature that was searched for and found was Rocas Reef, known today as Rocas Atoll. Lee had been instructed to determine a good position for this well-known hazard to navigation. On 13 March 1852, Lee and a group of surveyors went ashore on Sand Island (known today as Farol Island), made astronomic observations for time, azimuth and position, measured a baseline and conducted a survey of the atoll. This was the first actual map made of this feature. The position of the centre of the atoll was determined to be 3° 51'27"S and 33° 48'57"W. This differed by up to 40 miles from some of the contemporary published positions for this feature. The accepted

position today is 3° 51'38"S and 33° 49'11"W, which speaks well for Lee's abilities as a surveyor/astronomer. The *Dolphin* searched for a few more vigias before returning to New York on 30 June 1852. It helped disprove the existence of a number of vigias during its cruise, developed several methods for deep-sea exploration and determined the true position of the Rocas. It was also possibly the first vessel to observe the Atlantic Equatorial Undercurrent. While searching for Aquila Reef, the crew of a sounding boat under the command of Lieutenant Hall "was astonished ... to see the nipper bags going to windward against wind and sea and surface current at so rapid a rate" (1.2 knots E by S).

Upon return, Samuel Phillips Lee relinquished command of the vessel to Lieutenant Otway Berryman, who was the first to discover and sound on the MAR the following year. Lee became a rear admiral in the United States Navy during the American Civil War. After 1853, the *Dolphin* was never used for ocean mapping or hydrographic surveying again, although Sir John Murray of the Challenger Expedition commemorated the vessel by naming the northern segment of the MAR the Dolphin Rise in the late 19th century. Both Lee and Berryman should be remembered as oceanic explorers and surveyors of the first rank while the *Dolphin* should be remembered as a pioneer in oceanic exploration.