

Report on the British Barque LADY ELIZABETH in Stanley Harbour, Falkland Islands

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Photographs by courtesy of Nicholas Dean*

I. Introduction

In February and March 1983, an expedition of six members travelled to the Falkland Islands to do archaeological work on the remains of the 1851 American clipper ship SNOW SQUALL, and also to conduct a preliminary survey of the British iron-hulled barque LADY ELIZABETH. The expedition was sponsored by the Peabody Museum of Archaeology and Ethnology at Harvard University. We had been asked by Mr. Frank Carr, Chairman of the World Ship Trust in London, to gather data (mainly in the form of measurements, photographs, and general observations on the condition of the wreck) needed for the preparation of a set of plans of the LADY ELIZABETH and also for a proposal which the World Ship Trust is preparing for the possible restoration of the vessel as a permanent monument in Port Stanley.¹ A list of desired measurements and photographs was supplied by the noted marine architect, Mr. George F. Campbell, M.R.I.N.A., who will be drawing up the plans. This provided a useful framework for our data collection. The survey work was continued in the following year, when in June of 1984 a two member expedition returned to the Falkland Islands for further work on the SNOW SQUALL, and to examine more thoroughly the condition of LADY ELIZABETH's hull structure and to consider alternative conservation programs for her.²

The principal investigators in 1983 were the six members of the SNOW SQUALL team: A. Fred Feyling (engineer, draftsman), Prof. David C. Switzer of Plymouth State College (nautical archaeologist and former Director of the DEFENSE project in Maine), Sheli O. Smith (doctoral student in Nautical Archaeology at the University of Pennsylvania), Nicholas B. Dean (photographer and veteran of four expeditions to the Falklands), J. Huston Dodge (draftsman and master carpenter), and Dr. E. Fred Yalouris of Harvard University (nautical archaeologist; Director, SNOW SQUALL Project). The actual survey work was organized by Mr. Feyling. The data collection was carried out by all the members of the SNOW SQUALL Project. In total, our team spent about 53 hours working on the LADY ELIZABETH in Stanley, and 239 hours in the United States, for a total of about 37 working days of 8 hour length. To this should be added the work done by Mr. Carr and Mr. Campbell before and after the expedition, and also the laboratory testing work on the iron samples from the vessel. The 1984 survey team included Prof. Switzer and Bruce M. Lane (engineer and metallurgist).

The 1983 report contains all the measurements, photographs, and related data requested by Mr. Campbell on behalf of the World Ship Trust and necessary for the preparation of the preliminary plans and a draft proposal for her restoration. The results of our measuring effort are shown in the plans included in the report (Figs. 2-4). While the original request from the World Ship Trust was to provide vessel dimensions and a few photographs, we have taken the liberty of gathering additional information and making suggestions that may be of value in future salvage and restoration decisions. It is hoped that once the plans are finished, all the photographic material and other data will be presented to the Falkland Islands Archives in Stanley.

II. Brief History of the Vessel

Launched on 4 June, 1879 by Sunderland shipbuilder Robert Thompson, Jr., at his Southwick yard, LADY ELIZABETH (Official No. 81576) was an iron barque of 1208 gross

tons and 1155 net tons. She was classed by Lloyd's as 100 A1, and her registered dimensions were length: 223 ft., breadth: 35 ft., depth of hold: 21 ft. 4 in. She had a 36 ft. poop and a 21 ft. forecastle³ and could load 1810 tons of cargo on a draft of 19 ft. 8 in. About 200 tons of ballast were needed to stand and 450 tons to sail.⁴ She was bought soon after launching by London shipowner John Wilson, and was first registered at the port of London on 21 August, 1879.⁵ Wilson operated a fleet of eight or nine sailing ships,⁶ mainly Sunderland built, of which the LADY ELIZABETH was the largest. Wilson gave her the name of an earlier 673 gross ton composite barque built in Sunderland in 1869, which on settling out on a passage from Freemantle, Australia for Shanghai with sandalwood, put back due to bad weather, only to go ashore off Rottneest Island on 30 June, 1878 and become a total loss.⁷

LADY ELIZABETH's first master was 68 year old Alexander Findlay⁸ of Montrose who later (March 1881) purchased three shares in his ship. The first voyage⁹ took her from North Shields (sailed 11 September, 1879) to Bombay, where she arrived on 30 January, 1880 with 1,760 tons of coal. After unloading, she sailed on 10 March for Madras, then Cocanada and back to London (arrived 30 October, 1880). Outbound she passed Dover on 18 September, 1879 and homebound was reported at 4 degrees north 95 degrees east on 7 June, 1880 by the CANOPUS, and at 6 degrees south 17 degrees west on 25 August by the AGNES OSWALD. Her agent at North Shields was John Heppell, and she sailed for Bombay with a crew of 21 and returned to London with a crew of 19.¹⁰ Her agents in London were H.D. Blyth and Co., and she berthed at the West India Dock to discharge the cargo that had been loaded at Madras and Cocanada,¹¹ all of which was consigned to 'Order', and listed as follows:

- Madras- 9,760 bags of jaggery, 126 bags myrabolams, 45 bags turmeric, 37 bags nux vomica, 21,593 pieces redwood, 72 bales goat and 5 bales sheep skins, and 14 bundles of deer horns.
- Cocanada- 68 bales hemp, 48 bales hides, 12,635 bags jaggery, 705 bags myrabolams, and 63 bundles of deer horns.¹²

On her second voyage, also under Capt. Findlay, she sailed from London on 13 January, 1881 to Middlesbrough in ballast (London agents: H.D. Blyth and Co.), and proceeded on 31 May via Reunion Island to Mauritius, Galle in Ceylon, and then Cittagong (at that time part of British India). She left Chittagong on 21 January, 1882, probably with a cargo of rice or jute, and headed back to Mauritius (arrived 13 March), where a charter was arranged for a voyage to Australia. She left Mauritius on 22nd April for Melbourne, Newcastle NSW, and back to Mauritius, arrive on 15 October. She left on 8 December for Bombay, Gopaulpore in India, and finally arrived back in London on 6 November with a cargo of 23,400 bags of rice, loaded at Gopaulpore and consigned to order (Agents: Mechant Banking Co.). She arrived with a crew of 20 and again berthed at the West India Docks.¹³

Throughout his five years of ownership, John Wilson retained 61 (out of 64) shares in the LADY ELIZABETH,¹⁴ using them as collateral for various loans. In September 1879 (before Wilson sold the three shares to Findlay), R.S. Guinness lent him £4,000 and then £8,600 the following month, both at 12% interest. This was followed in September 1882 by another loan for £8,000 at 5% from Mr. G. Oliver. A final mortgage was signed in favour of the Merchant Banking Company of London, Ltd. as security for his current account. Not long after, Wilson petitioned the High Court of Justice in Bankruptcy on 15 March, 1884;¹⁵ and Receiving Order 198 under the Bankruptcy Act of 1883 was granted on 3 April, 1884. However, previously the LADY ELIZABETH had been sold by the Merchant Banking Company, who presumably had foreclosed.¹⁶ Captain Finlay had sold his three shares in November 1883 to B.G. Gray who, with the bank, sold her on 5 January, 1844 to George Christian Karran, aged 30, of Castletown, Isle of Man.

G.C. Karran was one of a well-known family of seamen from Castletown. He obtained his certificate of competency in Liverpool in 1879.¹⁷ Initially taking command of his newly acquired ship, he later acted as her manager. He also managed the MANX KING (an iron ship of 1751 gross tons built in 1884), the IMBERHORNE (an iron ship of 2042 gross tons built in 1882), both of which had previously been managed by Robert Gick Karran, and the MACDIARMID (an iron ship of 1625 gross tons built in 1883).

Owner G.C. Karran sailed as master of the LADY ELIZABETH for the next four major voyages, spanning a period of seven years, after which he commanded the MANX KING until retiring in 1904. For the next ten years until 1893 LADY ELIZABETH was engaged primarily in liner trade, carrying general cargo from the United Kingdom to Australia, and then a variety of tramp voyages back to Europe. On her third voyage, she cleared London on 29 January, 1884 and sailed to Sidney (25 May), then Newcastle NSW (probably loading coal) to Valparaiso (23 September), and then further up the Chilean coast to Taital, where she loaded 2,672 bags of nitrate of soda for Glasgow, where she arrived on 15 June, 1885 with a crew of 19. The cargo was consigned to A. Cross & Sons, and her agents were Crane, Colvil & Co.¹⁸ There is an interesting account of damage to the ship reported in Melbourne on 3 June, 1884: "THE LADY ELIZABETH, from London, at Sydney, reports: In a hurricane on February 23 the mainsail, foresail, two lower topsails, foretopmast and mizzen staysails were blown away, the bullwarks on both sides of the poop were stove in, and other damage done to the deck; was then hove to under close-reefed canvas. On March 24 the starboard side of the front of the poop was stove in, and the cabin and lazarette flooded."¹⁹ Also on this voyage, six seamen deserted in Sydney and one, William Leach of Belfast, fell from aloft and later died from his injuries shortly before arriving at Valparaiso.

On her fourth voyage, under Capt. Karran, she left Glasgow on 17 August, 1885 with a crew of 22 and general cargo for Melbourne, arriving there on 29 November (Agents: Aitken, Lilburn & Co.).²⁰ Leaving Melbourne on 16 January, 1886, she sailed to Newcastle NSW where she loaded coal for San Francisco, where she arrived on 29 June. There she loaded wheat and departed on 16 September "bound Queenstown for orders" (11 March, 1887), finally arriving at Liverpool on 20 March with a crew of 19 and a cargo of 28,058 bags of wheat, consigned to order (Agents: Lowden, Edgar & Co.).²¹

On her fifth and similar voyage, LADY ELIZABETH left Liverpool with general cargo, under Karran, on 27 April, 1887 for Melbourne (3 August), Newcastle NSW for coal, and then to San Francisco, arriving 24 November. On 17 January, 1888 she left San Francisco (possibly with a load of lumber) for Lima and Pisagua (loading nitrate), and then to Dunkirk, arriving on 20 October (Agents: Trinder, Anderson & Co.). She then was towed to London in ballast on 9 November, arriving with a crew of 11 at the Thames Iron Works Dry Dock.²²

Her sixth voyage was the last one under Capt. Karran. She left London on 4 December, 1888 for Brisbane (16 March), Newcastle NSW, San Diego (arrived 8 August), Astoria (loading flour), and then to "Queenstown for orders", Londonderry, and then to Liverpool, where she arrived on 15 April. Her agents were Green & Co. On her seventh voyage, she sailed under a new master, Capt. H.A. Lever. She left Liverpool on 10 May, 1890 and sailed for Sidney, Newcastle NSW, San Francisco, Astoria, Sligo, and back to Liverpool in December, 1891. On her eighth voyage, also under Lever, she left Liverpool in March, 1892 for Melbourne and returned to London in January 1893 with a general cargo including hides, bones, tallow, leather, peas, and wool, all consigned to order (Agents: Trinder, Anderson & Co.) She arrived with a crew of 20 and berthed at the London Dock.²³

For the next two decades, LADY ELIZABETH continued to be engaged in active commerce throughout the world. She was used principally in liner trade and tramping, and continued to make long passages to North and South America, Australia, and various ports in the Far East.

Having passed her Special Survey No. 3 in 1904, the early weeks of 1906 saw LADY ELIZABETH sold for about £3,250²⁴ to Norwegian owners who were later identified as a company called Skibasaktieselskabet LADY ELIZABETH. The company was managed by L. Lydersen of Sundet, in Boroen. They registered her at the port of Tvedestrand, southwest of Oslo, and proved to be her third and last owners.

LADY ELIZABETH sailed on her last passage on the 4th of December, 1912 with lumber from Vancouver for Delagoa Bay in southern Mozambique. Photo 1 (courtesy of the National Maritime Museum in San Francisco) may well have been taken shortly after her departure from Vancouver, probably as she went through the straits of Juan De Fuca. Passing down the Pacific she was not reported until arriving at Stanley, Falkland Islands in distress on the 14th of March 1913. She had encountered bad weather and had lost four men overboard; also two boats and part of the deck cargo were lost, as well as damage to the wheel, rigging, bulwarks and deck fittings. Finally, two days prior to her arrival, she struck the Uranie rock off Volunteer Point, about 15 miles northeast of Stanley sustaining a 6 ft. break in her keel and a foot long hole in her bottom. After examination she was condemned early in June 1913²⁵ rather than face the heavy costs of repairs in Stanley.

LADY ELIZABETH'S history since arriving in the Falklands reflects the sad plight of the other decaying hulks in Stanley. For many years she was used as a floating warehouse in the harbour. Finally, on the 17th of February, 1936, during a particularly fierce gale, she broke from her mooring, drifted east across the harbour and went aground in Whalebone Cove near the Stanley airport. There she rests today, listing slightly to port and facing north, with a small natural sandbar built up around her. Although it is possible at low tide to wade out to the vessel from the nearby beach to the east, access to the LADY ELIZABETH is best made from the west by small boat from Stanley (about 2 1/4 miles away). The shore to the east is believed to have been mined during the Argentine occupation in 1982, and as of this writing the area has not been cleared for public access.

III. General Observations

HULL AND DECKS

The vessel is inclined at an angle of 12 degrees to port. Measurements made with a bubble transit forward, amidships and aft on the main deck all measure the same 12 degrees. All three masts are in alignment, so the hull appears not to be hogged or twisted. All iron above and below the water line is heavily corroded, with only small amounts of paint still on the iron inside of the forecabin, deckhouse, and after cabin. Above the weather deck, the iron structures generally are covered with blisters of rust, some of which measure 4" across. These blisters are the result of a corrosion process that is slowly consuming the iron plates used to construct these structures. Beneath the larger blisters corrosion already has perforated the plates in some areas. Visual examination and the various tests in Lane and Switzer's 1984 report suggest that all the hull plates are the same composition. Metallurgical examination indicates that all hull plates are wrought iron with a tensile strength of about 48,000 pounds per square inch. The plates making up the masts are the same hardness; they presumably are the same composition and tensile strength as the hull plates.

The starboard bulwark is sprung outward, and about ten of the starboard stanchions are broken where they were riveted to the main deck beams. Apparently, this condition was

caused by the deck load when LADY ELIZABETH went aground in 1913. The results were described in a contemporary dispatch from the FIC office in Stanley to London headquarters: "all stanchions on the starboard side (are) gone (and the) deck load of timber (was) all lost." While the stanchions remain, they certainly provide little structural support for the bulwark plates. The sprung part of the bulwark is badly deteriorated with the plates rusted through in many places. Repair of this bulwark would require new stanchions and virtually all new plates, since those that are not corroded through are badly distorted. Overall, the bulwarks do not appear to be in danger of collapsing at this time.

The wrought iron hull plating is badly flaking, but with an apparent plate thickness of 1/2 inch there still may be sufficient solid metal to withstand a careful salvage operation. The location of the hulk in the Falklands, with no industrial pollution or acid rain has been a prime factor in preserving the metalwork. Plate thickness measurements were made at six locations along the lower deck below the aft hatch. No measurements showed a thickness of less than 1/2 inch. In strakes (rows of hull plates) measure 3' 10", out strakes measure 3' 0". Rivet bodies are 3/4" in diameter and are spaced in a double row, 3 3/8" between centers. Frames are spaced 23" and beams 46" apart (photo 5). Above the high-tide mark, the rivets fastening the hull plates to the frames seem in good condition. Below the high-tide mark, while the hull plates and frames appear to be in good condition, the rivets seem so badly corroded that no metallic iron remains, only a relatively coherent iron oxide corrosion product. Mr. Lane reports that although no hull plates have become loose, it seems likely that this will begin to happen in the near future.

In an attempt to identify frames and hull plates that had deteriorated, Lane and Switzer tested the entire hull at intervals by tapping various locations with a hammer. Below the bulwark, nearly all the frames and hull plates appear to be sound and less corroded than expected. In fact, between decks some hull plates still retain much of their original paint. An exception to this generally sound condition is found on the port side near the bow. Here, the rain water has collected along the after end of the forecabin and fresh water draining from this pool has resulted in severe corrosion of the hull plates lying immediately below this area.

To test their condition, three rivets were selected in different parts of the hold and hit with a hammer. In each case, the head broke off when hit with relatively light blows, leaving the remains of the shank flush with the hull plate. All three heads were found to be completely oxidized, probably as a result of galvanic corrosion caused by a slight difference in the composition of the rivets and hull plates. It was decided not to drive these rivets out of the plates, fearing that doing so might ultimately lead to premature failure of surrounding rivets. However, it is almost certain that the shanks of these rivets also are oxidized. If so, the submerged hull plates contribute relatively little to the structural integrity of the hull, and it is only a matter of time before these rivets fail, allowing the hull plates to fall off gradually.

The loss of a few hull plates should have little immediate effect on the integrity of the basic skeletal structure of LADY ELIZABETH. However, unless some action is taken, the ultimate mode of failure seems inevitable. First, one hull plate will break loose, which could occur as early as the next time gale-force winds happen to coincide with a relatively low tide so that waves repeatedly hit the weakened area of the hull. The stress that the loss of a single plate will put on the surrounding plates likely will cause a relatively rapid progressive failure of the surrounding plates. The sequence will be repeated and eventually most of the hull plates located between the high-tide mark and the sand could be lost.

If all of the approximately 25,000 rivets in the hold have decomposed to the extent of the three tested, the hull should have deteriorated more than it has. Possibly the rivets joining the frames to the backbone of the ship continue to maintain their structural integrity and did not

succumb to the galvanic corrosion that affected those used to fasten the hull plates. Possibly the metallurgy of these components is different, or perhaps galvanic corrosion has been inhibited by the poured-in-place concrete floor.

To insure against the possibility of floating free from her location in Whalebone Cove, a number of holes (approximately 12" - 18" in diameter) were cut in her hull. Because the hull was not compartmented or partitioned by bulkheads, these seven small holes were sufficient for flooding the hull. Fortunately, these are located on the port or windward side; had they been cut through the leeward side, wind and current conditions would have caused a large amount of sand to go into the hull. There are no other known holes that were cut deliberately.

The 1913 Lloyd's report states that before arriving in Stanley she struck a rock off Volunteer Point, 15 miles northeast of Stanley, which broke off a section of her keel and put a hole in her bottom. In 1984, Messrs. Lane and Switzer located the original report of the diver who, at the request of the owners, had travelled from Montevideo to Stanley to examine the damage and recommend if repairs were possible. The diver concluded that the 200 tons of pouted-in-place concrete that constituted this ship's permanent ballast was all that was keeping her afloat and that repairs were possible only if she could put into a dry dock, which did not exist in Stanley.

A number of dispatches relating to the purchase of LADY ELIZABETH were found in the archives of the Falkland Islands Company in Stanley. None of these records suggested she had been repaired after being acquired and, in fact, those writing from the FIC office in London were quite convinced she could be sailed home without being repaired since they knew of other instances in which similarly damaged vessels had done so. While it seemed unlikely that any repairs had been made, Lane and Switzer were concerned that work on her keel could have led to severe galvanic corrosion in the area of the damage. Therefore, it was important to determine first hand what, if anything, had been done in this regard during the 23 years (1913-1936) that the hull served as a floating warehouse in Stanley.

We assumed the damaged section of the keel would be buried deep in the sand and therefore could be examined only with great difficulty. While this undoubtedly was true when the hull first stranded in Whalebone Cove in 1936, in the intervening years the currents have shifted the sand so now only the middle half of the hull is supported by the sand. For a distance of about 40 feet at both the bow and the stern, the hull is unsupported, with a space of two to three feet between the keel and the sand. The damaged portion of the keel, which originally led to condemnation of the vessel, is free of the sand, and examination proved it is exactly as described 71 years ago by the diver from Montevideo.

Examination of the inside of the hull underwater also showed no evidence of repair, suggesting that the FIC officials in London were correct when they postulated that this concrete could survive considerable stress, for it apparently acted as an effective water barrier as long as LADY ELIZABETH served as a floating warehouse. Examination of this concrete revealed no deterioration, and it would be essentially as watertight as when high winds drove the vessel onto the beach in 1936.

Because of the composition of the 19th-century iron plate, normal welding patches over the scuttle holes may be difficult or impossible. Temporary patches of wood over rubber gaskets may be adequate for salvage, although longer lasting patches of iron plate bolted in place over gaskets could be made. To repair the original damage to the keel the cement floor in that location would have to be removed, which would require extensive time and effort under water on the part of several divers. Rivets could be used to fasten the new keel plates only if the hull were in a dry dock, but nuts and bolts could be used. The vessel's iron frames and beams

(photo 5), while rusted (especially under the main deck beams), appear to be sound enough for salvage and for supporting new deck planking. Waterways are rusted but not holed. Some cement patching has been done to either patch holes or to fill low spots for better drainage.

WOODWORK

The main deck planking, which appears to be Oregon pine 2 1/2 inches thick and 5 inches wide, is in good condition over at least 50% of the surface (Photo 9. Note the diamond-shaped plugs used to cover the fastenings.) The remaining deck planking is either missing or badly decayed. The entire deck probably should be replaced. Planking that is still in sound condition could be salvaged and used for lower deck planking, which has been completely removed.

Most of the teak poop deck hand rail and the bulwark cap rail has been removed, presumably by vandals and souvenir hunters. However, sufficient sections of rail remain to provide the pattern for restoration (photo 9).

FORECASTLE

In the forecandle there is no clear indication that the area was used for living space. A hand operated winch, anchor hardware and racks for supporting eight wood-staved barrels were the major objects noted (photo 4). There was no easily recognizable clue as to what these barrels may have contained. Possibly the barrels contained oil for running lights and cabin lanterns. The vessel has no propulsion engine and no signs of a donkey engine, although it would not be unusual to have had one. The vertical shaft geared to the winch could be rotated by the windlass shown in photo 7.

The foc'sle deck appears to have been double planked. The under planking runs fore and aft, and the upper layer ran port to starboard. Only about eight feet of the upper layer remains, all aft of the foc'sle windlass (photo 8). It is possible that it was added on later.

DECKHOUSE

The interior structure is sufficiently complete to determine how the space was used. The forward galley is in disarray and the cooking stove is missing. Coal was found in the galley, and two large iron tanks in the bilge most likely carried drinking water. Standing water was found in the main cabin. This was drained by clearing a blocked drain hole in the aft port bulkhead. The winch with the wire cable on the top of the deckhouse (photo 7) does not appear to belong to the original gear of the vessel, as no matching mounting holes could be found.

The deckhouse has 12 bunks still in place, with considerable amounts of paint intact. As mentioned above, LADY ELIZABETH set off on her maiden voyage with a crew of 21 (although she was considered fully manned with 15 hands), so she must have had bunk space for 9 more crew members. No signs of this space were found in the forecandle, and it is assumed that the remaining bunks were probably in the aft cabin.

POOP DECK QUARTERS

This area has been completely vandalized and most of the useable wood removed. From the debris that remains and the teak spiral staircases on either side between the main and poop decks, it is apparent that these quarters were quite elegant and not as spartan as the rest of the vessel. By studying the debris and differences in color and texture on the floor, walls, and ceiling, it should be possible to reconstruct the original layout.

MASTS AND SPARS

The lower masts appear to be sound and should not require reinforcement other than installing wood mast wedges at both deck levels. These wedges have disappeared as souvenirs, with the exception of those around the mizzen mast on the main deck. The mast wedges between decks are largely intact and it is these that appear to provide most of the support to the masts at present. Trestle trees and topmast doublings are still in place in all three masts. When LADY ELIZABETH was converted to a floating warehouse, the lower mast shrouds were left in place, but over the years many of these were broken and today none of the masts is adequately supported. Originally, each mast had six shrouds on each side. Now, the foremast has five shrouds to port and six to starboard, the main mast has six port shrouds but only two to starboard, and the mizzen has only one port shroud and none to starboard. Since the hull lists to port, only the starboard shrouds provide support.

The main lower yard-arm is the only spar left on the vessel and should be removed before salvage is attempted. The missing topmasts and spars probably were discarded somewhere in Stanley. They are not expected to be useful for anything other than checking dimensions. The integrity of the bowsprit is questionable, as it has suffered from considerable corrosion, and it may have to be removed or strengthened before salvage. The 1 1/2", 6 x 7 wire rope rigging is badly deteriorated. There is no evidence that it had ever been coated or served.

RUDDER

The rudder is set turned to port and shows substantial corrosion. We were unable to determine if the rudder was bound or free. The original Lloyd's survey of 1879 states that rudder is capable of being unshipped while the vessel is afloat. Any towing effect would be hampered if the rudder could not be centered. The steering gear on the poop deck (photo 9), although badly corroded, appears intact except for the missing wheel.

ANCHOR AND CHAINS

Local citizens remember LADY ELIZABETH breaking loose during an extraordinary Cape Horn gale, drifting east, and then beaching in Whalebone Cove. It is unlikely after so many years afloat in Stanley Harbour, that she dragged anchor or mooring. Most likely she was secured with her own anchor and chain and that chain parted. Noting the remaining chain on board and observing no signs of mooring cable seems to confirm this. The anchor may still lie at or near the original anchorage in the harbour. Old photographs may show the anchorage, so if there is interest in recovering the anchor, the search area can easily be reduced.

MISCELLANEOUS OBSERVATIONS

A dramatic indication of the basic structural integrity of the hull was the completely independent observation by several members of the expedition team that the hull rolls from side to side in a moderate wind, and it does so without making any noise. The hull can move in this manner because it is supported only in the middle, and the fact that the hull shows no sign of hogging under these conditions is another indication of its structural integrity. While this hull motion appears to have done no damage so far, once physical deterioration does start, such movement will tend to accelerate that deterioration. Therefore, if the hull is left in its present location, it should be stabilized as much as possible.

Referring to photo 6, a wooden tower approximately 9 feet tall is fixed on the deck. This tower is located amidship, 6 feet forward of the aft hatch. Local citizens said that when the vessel was at anchor the tower supported a windmill that powered a bilge pump. Observations confirmed this; however, the windmill and pump have been removed.

IV. Conclusions

LADY ELIZABETH, while not an unique vessel, is very special because of her simplicity. The design is spartan, yet elegant and straightforward. She can be said to be the 1870's equivalent of the sturdy and versatile victory or Liberty type general cargo vessel. She is unusual because of her state of preservation and the absence of modifications or overhauls. Her salvage, restoration and preservation in the Falklands is a challenge. Her lower deck has the potential for about 6,000 square feet of exhibit space with 7 feet of headroom. Full restoration may be unwarranted or too costly, and maybe only enough work should be done to reduce future deterioration. Perhaps a minimum amount of work could be done to present a more complete visual image of the ship, life on board, and the effort required to sail her.

With the barracks nearby and the knowledge that the vessel can be reached by wading in at low tide, a sign should be erected designating her an historic vessel and requesting that no material or artifact be removed. This is not an overwhelming problem at present in that most removable gear has already been taken. Another problem to consider is the presence of mines on the beach, around the vessel, and possibly in the bilge. We were told that the vessel had been cleared but we could not obtain authoritative confirmation. We are certain that above the waterline there are no mines or booby traps.

There has been much discussion over the past few years about developing a proposal to rescue and restore the LADY ELIZABETH as a monument and possibly a museum in Stanley. Many theories have circulated on the best way to do this, and these have been discussed and evaluated extensively in Lane and Switzer's report. The preferred plan would be to patch the holes, pump out the water, refloat the vessel, and tow her to a berth closer to the centre of town. No doubt it would not be this simple, as the sand shoal under the vessel would have to be dug out. Although no reliable estimate was made of the amount of sand in her bilges, it appears to be minimal. As noted above, she needed 200 tons of ballast to stand and 450 tons to sail. Consideration would have to be given to her reduced rigging, and it is likely that the sand and any other ballast now in her bilges should be satisfactory for a short tow. If sealing the hull and lifting her out of the sand present problems, military Maxi Float pontoons (now plentiful in Stanley) could be used to aid in the flotation and movement. As of this writing, the equipment necessary for dredging round LADY ELIZABETH exists in the Falklands. We would recommend this work only if it were part of a full salvage effort. Removal of her sand cradle could place a serious strain on her hull and in other ways accelerate deterioration.

Most of the manpower and equipment required to salvage the LADY ELIZABETH now exists with the construction companies and military forces in the Falklands. With a proper plan and competent supervision, the restoration work could be carried out at least in part by the military as a training and recreational project. Berthing space could be provided for the vessel at an existing jetty in the town, a newly constructed facility, or a channel excavated to accept her hull and then backfilled to provide the earthen environment. In any case, consideration must be given to a cathodic protection system to prevent further deterioration.

The LADY ELIZABETH requires considerably more study before viable plans for restoration can be developed. A continuation of the survey work is recommended, with principle emphasis on determining more precisely the condition of the iron (degree of corrosion, structural integrity of the hull) and the general state of the hull underwater. For this we suggest an ultrasonic survey of the hull plates to determine thickness of the metal and the existence of flaws, obtaining more iron samples from various key locations on the hull for metallurgical testing in a laboratory to determine hardness and degree of corrosion, and a fatigue/stress testing of riveted joints.

Below the waterline, we suggest using divers to examine further the general state of the hull, collect iron samples for metallurgical tests and look for more holes or possible structural problems. It also would be useful to examine any other documents in Stanley that may show records of repairs to the hull or any other useful information. The vessel lies very near the runway of the present Stanley airport, and the many Royal Air Force aircraft that take off and land there daily usually pass low over the vessel, sending regular and powerful vibrations throughout the hull. It would be useful to try to assess the short term effects of this on the structural integrity of the hull. Further, a considerable number of additional measurements should be taken to contribute to the historical record of the vessel as well as the completion of detailed drawings.

The SNOW SQUALL expedition team undertook the LADY ELIZABETH surveys as a service to the World Ship Trust and the people of the Falkland Islands. As we plan further expeditions to Stanley, we would be more than happy to continue this process of survey, data collection, and metallurgical study as a contribution to the planning effort for the restoration of this important vessel.

FOOTNOTES

- 1 We are very grateful to Sir Rex Hunt, Civil Commissioner of the Falkland Islands for helping to make the survey possible and for his strong support of all our archaeological work in the Falklands. We also were aided greatly in our work by Major General David C. Thorne and Major General Keith Spacey, Commanders of the British forces in the Falklands, and various other military personnel in Stanley. In addition, we are grateful to the following people, among others, for their kind support: Mr. David Britton and the Falkland Islands Company, Mr. Alastair Cameron of the Falkland Islands Government, Mr. Sydney Miller, and Mr. John Smith. Thanks also to Mr. David Burrell for his excellent research help, Mr. George Campbell for his advice, Mr. Bruce M. Lane of Arthur D. Little, Inc. for the iron analysis, and Ms. Catherine Gallant for her help in the preparation of the manuscript.
- 2 See Yalouris and Feyling, "Preliminary Survey of the British Barque LADY ELIZABETH in Stanley Harbour, Falkland Islands" (February, 1984); and Lane and Switzer, "Report on the June 1984 Expedition to Examine LADY ELIZABETH" (August, 1984).
- 3 Lloyd's Register of Shipping (1879).
- 4 Fairplay; Weekly Shipping Journal (London, 1883-present), 22 February, 1906.
- 5 London Port Register (H.M. Customs & Excise), No. 108 (1879).
- 6 Lloyd's Register of Shipping (various editions).
- 7 Lloyd's List (1878): J. Loney, "Australian Shipwrecks", Vol. 3 (1871-1900).
- 8 Lloyd's Captains' Register.
- 9 Lloyd's List (1880).
- 10 Tyne Bill of entry and Shipping List, No. 3757 (13 September, 1879).
- 11 London 'A' Bill of entry, No. 256 (30 October, 1880).
- 12 Definitions:

Jaggery: Course dark brown sugar made in India by evaporating palm sap.
Myrabolams: Nuts from maple-like tree, often used as medicine, in dyeing (calico printing), tanning, and ink making (black).
Nux vomica: Seed of a tree found in East India which produces strychnine poison.
Turmeric: Yellow powder from plant roots, used in dyeing and condiments, especially curry powder.

- 13 London 'A' Bill of entry, No. 262 (7 November, 1883).
- 14 London Port Register (H.M. Customs & Excise), No. 108 (1879).
- 15 London Gazette, pp. 1636, 1866, and 2635 (1884).
- 16 London Port Register, op.cit.
- 17 Lloyd's Captains' Register.
- 18 Clyde Bill of Entry and Shipping List, Vol. XLIV, NO. 73 (18 JUNE, 1885).
- 19 *ibid.*
- 20 Clyde Bill of Entry and Shipping List, Vol. XLIV, No. 104 (29 August, 1885).
- 21 Liverpool Customs 'A' Bill of Entry, Vol. LXIX, No. 21071 (21 March, 1887).
- 22 London 'A' Bill of entry, Vol. 72, No. 265 (10 November, 1888).
- 23 *op. cit.*, Vol. 77, No. 19 (23 January, 1893).
- 24 Fairplay, 22 February, 1906.
- 25 Lloyd's List (1913). See also Falkland Islands Harbour Master's Register, 1913.