# The Mystery of the *C.B. Lockwood*

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*On 13 October 1902, the steamer C.B. Lockwood was one of the largest wooden ships to sink in Lake Erie. The wreck was surveyed by the US government, marked with a buoy, and its location was annotated on navigation charts. Remarkably, for the past forty years, researchers have been unable to locate it. In 2010, research into earthquakes and soil liquefaction revealed that the ship might be completely buried, and results from a sub-bottom profiler survey prove that it is covered by more than 15 ft. of soft silt.*

## Introduction

On Wednesday, 25 June 1890, ship number 141 was launched from the upper yard of Thomas Quayle's Sons, shipbuilders in Cleveland, Ohio (Marine Review 1890:1). Built for B.L. Pennington and other owners, ship number 141 was christened *C.B. Lockwood* (Marine Review 1890:1). As stated in the press at the time, "The *Lockwood* is the largest wooden boat ever built in Cleveland, her dimensions being 303 feet overall, 285 feet keel, 45 feet beam, and 21 feet depth of hull" (Marine Review 1890:1).

*C.B. Lockwood* was built for bulk cargo and had a rated capacity of 2,323 gross tons and 1,918 net tons (Marine Review 1890:1; Navigation Bureau 1902:212) (Figure 1). It was powered by a 900 horsepower Hodge triple expansion engine built by S.F. Hodge & Company of Detroit, Michigan (Marine Review 1890:1). The engine operated at a steam pressure of 160 pounds per square inch and turned a 16-foot lead or propeller shaft, and 13-foot, 6-inch wheel or propeller (Marine Review 1890:1). Steam was provided by three "11 1/2 by 12 Lake Erie boilers" built by Lake Erie Boiler Works of Buffalo, New York (Great Lakes Register:1901; Marine Review 1890:1). *C.B. Lockwood* had eight hatches, and the absence of main deck planking was helpful when loading and unloading cargo during the ship's 12 years career hauling coal, iron ore, and grain throughout the Great Lakes (Marine Review 1890:1)."

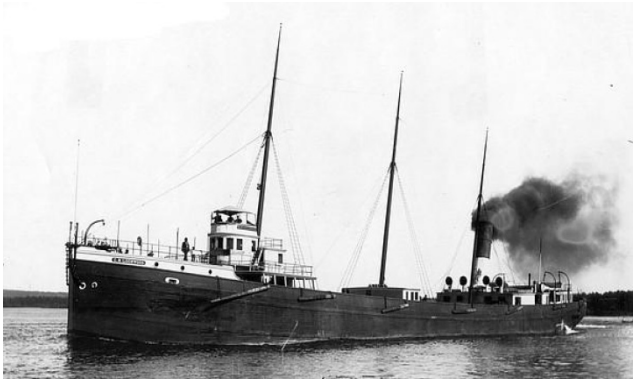


*Figure 1. The steamer C.B. Lockwood (Jim Paskert Collection)*

In November 1891 the ship set a speed record for wooden boats traveling from Sault St. Marie, Michigan, to Duluth, Minnesota. It made that run at an average speed of over 13 mph. loaded with 1,650 tons of coal (The Plain Dealer 1901:5). "It was thought by some that the Lockwood would not show speed on account of her extreme breadth of beam of 45 feet, but she has proved a fast wooden boat" (The Plain Dealer 1901:5). *C.B. Lockwood* also had its share of accidents. On 11 November 1893 while downbound with a cargo of iron ore, it collided with the schooner *Elizabeth A. Nicholson* in the Detroit river off Amherstburg, Ontario, and sank (The Plain Dealer 1893:5). It was raised, repaired, and returned to service in 1894 (The Marine Record 1894:2). Six years later, it was involved in another accident off Amherstburg, Ontario. On 28 July 1900, *C.B. Lockwood* sank after colliding with the schooner *Breck* (Maritime History of the Great lakes 2012a). It again was raised, repaired, and returned to service, only to run aground twice during 1901: on 21 August in Buffalo, New York, while delivering a cargo of iron ore; and on 31 August in the Straits of Mackinaw, Michigan, while carrying coal (Maritime History of the Great lakes 2012a, 2012b, 2012c). The next season would be the ship's last.

## The Last Voyage

On 13 October 1902 *C.B. Lockwood* was downbound from Duluth, Minnesota, to Buffalo, New York, with a cargo of approximately 100,000 bushels of flaxseed, and fought fierce seas during a storm on its passage down the length of Lake Erie (The Plain Dealer 1902a:1-2). Around 4:00 P.M. about 15 mi. west of Ashtabula, Ohio,

its engineer, Burns, reported to its Captain, Saph, that he was not getting sufficient steam and suspected a line pipe might have burst (The Cleveland Leader 1902:3). Engineer Burns believed if steam was let off the boilers "the break in the pipes might be gotten at and repaired" (The Cleveland Leader 1902:3). Captain Saph ordered *C.B. Lockwood* anchored, and steam was let off its boilers (The Cleveland Leader 1902:3). The repairs were not successful, and without steam to run the pumps, the ship was at the mercy of the storm (The Cleveland Leader 1902:3). Burns soon reported water was filling the vessel, and Saph "told all members of the crew to prepare to leave the steamer in the lifeboats" (The Cleveland Leader 1902:3). At 6:40 P.M. two lifeboats were lowered, and at 7:15 P.M. the ship was observed sinking (The Cleveland Leader 1902:1).

Nine people, including Captain Saph and his wife, left the ship in a 13-person wooden yawl (The Cleveland Leader 1902:3). The remaining crew, including engineer Burns and nine others, left in a larger, better equipped 20-person steel lifeboat (Cleveland Press 1902a:2; The Plain Dealer 1902a:1-2). The survivors in the smaller yawl recounted a harrowing night spent on the lake in the storm "buffeted about by waves that rolled mountain high. . . . Every wave seemed the last that the boat could weather" (Cleveland Press 1902b). One person was washed overboard but was recovered (The Cleveland Leader 1902:1-2). There was only one oar left in the boat, and a shawl from one of the women was used as a sail (The Cleveland Leader 1902:1,3). Finally, after ten hours in heavy rain and seas, the crew in the yawl was rescued by the steamer *G.J. Grammer* about 1 mi. off Ashtabula, Ohio (The Cleveland Leader 1902:1,3). The steel lifeboat remained missing, and Captain Saph waited in Ashtabula hoping to hear word of the crew's rescue (The Plain Dealer 1902b:8). Unfortunately, four days later the empty lifeboat was found floating upside down a mile off Ashtabula by the *G.J. Grammer* (Maritime History of the Great lakes 2012d; The Plain Dealer 1902c:8).

## The Wreck Is Located

The wreckage of *C.B. Lockwood* was first reported by Captain George Haywood of the steamer *North Star* on 17 October 1902 about 9 mi. north-northwest of the Fairport, Ohio harbor light (The Plain Dealer 1902d:8). He spotted a black mast with a ball on top which stood 10 ft. out of the water and a floating spar held by rigging 60 ft. away (The Plain Dealer 1902d:8). The next reported sighting was from Captain Rudd of the steamer *Niagara* on 17 October 1902 where a spar was spotted protruding 8 or 9 ft. out of the water with a floating spar held nearby by rigging (Hydrographic Office 1902a:1-2). His estimated position was northwest by north, 5 to 6 mi. from the Fairport pier light about on the course to Buffalo in 10 fathoms of water (Hydrographic Office 1902a:1-2). Finally, again on 17 October 1902 the captain of the steamer *Alaska* reported passing wreckage believed to be from *C.B. Lockwood* (Corps of Engineers 1902). A spar standing about 6 ft. out of the water was found about 79 mi. from the Presque Isle light and about 2 mi. south of the course from Erie, Pennsylvania to the Southeast Shoal near Pelee Point (Corps of Engineers 1902). In response to these reports, the Hydrographic Office dispatched the former gunboat USS *Michigan*, which had already found and surveyed other wrecks that season, to ascertain the location of *C.B. Lockwood* and determine if it was a hazard to navigation (Marine Review and Marine Record 1892:26). It found the wreckage of *C.B. Lockwood* on 25 October 1902 in 72 ft. of water. Soundings over the wreck showed "not less than 50 feet on the Western end of the wreck," and the general orientation of the wreck was described as "Easterly and Westerly" (Lieutenant Commander, USS *Michigan* 1902:1-3). The wreckage was marked with a black and white flag tied to the main topmast (Lieutenant Commander, USS *Michigan* 1902:1-3). USS *Michigan* described the location of *C.B. Lockwood* in detail:

> *The Lockwood is situated as follows: Fairport, (Pier-head Light) bears S. 23 degrees E. (True); Dist. 11 ¼ knots (12.9 miles). The bearing was taken from the Michigan anchored on a line between the wreck and Fairport Light. The distance from the ship was estimated by ten shots from a service rifle, and found to be 600 yards. The distance to Fairport was measured by two Pat[ent] logs. The compass was corrected twice for deviation on the heading on which the bearings was taken, and once on the run into Fairport. The chronometer was compared at Erie, Oct. 22nd, and again at Cleveland Oct. 28th (Hydrographic Office 1902b).*

On 31 October 1902 the Corps of Engineers US Steamer *Visitor* also discovered the wreckage and reported its position as "N.N.W. 13 ½ miles from the Fairport Pier-head Light [and] N.E. by N., 3/8 N., 34 ¼

miles from the Cleveland Break-water Light" (Stevenson 1902a:1-2). Within a week after the survey by the USS *Michigan*, the mast and attached flag had disappeared, and all that remained at the surface was a floating spar about 30 ft. in length held to the wreck by some rigging (Stevenson 1902a:1-2). US Steamer *Visitor* took soundings above the wreck; 55 ft. of water was found over the main deck, 75 ft. to the lake bottom, and the broken mast was found to be within 7 ft. of the surface (Stevenson 1902a:1-2). The wreck was marked with four small red buoys; one with a white flag near the bow and one with a red flag at the stern (Stevenson 1902a:1-2).

US Steamer *Visitor* returned to the wreck on 3 November 1902 with a cedar telegraph pole to mark the wreck in a more permanent manner (Stevenson 1902b:1). The pole measured 32 ft. long, and 7 in. in diameter at the small end and 14 in. in diameter at the large end (Stevenson 1902b:1). This spar buoy was placed 75 ft. south of the eastern end of the wreck using "3/8 [in.] chain attached to two car wheels of about 350 lbs. each and one gear wheel of about 300 lbs." (Stevenson 1902b:1). It was painted with red and black alternating horizontal stripes measuring 2 ft. wide, and a thorn bush was attached to its top. The buoy projected 12 ft. out of the water and was "visible to the naked eye on a clear day about two miles distance" (Stevenson 1902b:1).

Almost exactly a year after its sinking, the *C.B. Lockwood* was visited again by the US Steamer *Visitor* on 12 October 1903 (Chief of Engineers 1904:607). The buoy was found to still be in place, but the broken submerged mast was gone (Chief of Engineers 1904:607). The ship reported the bottom was covered with grain, and depths over the wreck ranged from 47 to 60 ft. (Chief of Engineers 1904:607). The spar buoy is known to have remained in place for at least 7 years marking the wreck to passing ships. The location of *C.B. Lockwood* first appeared on the Lake Survey LS3 nautical chart in 1906 and again in 1910, and it showed the wreck as being marked with a spar buoy (Corps of Engineers 1906, 1910). The 1915 LS3 chart continued to show the wreck but without a spar buoy being noted (Corps of Engineers 1915). The wreck continued to be on the LS3 chart until 1934 when it was removed (Corps of Engineers 1934).

## Modern Search for the Wreck

In 1986 the modern search for *C.B. Lockwood* began. A group of Lake Erie divers consisting of Jim Paskert, presently the Chief Researcher for the Cleveland Underwater Explorers, CLUE, Bob Tindal, and Rob and Rudy Reutschle began searching for the wreck. Extensive historical research was undertaken, and a search area was defined. Early in 1989 a small sonar target was located near where historical accounts and nautical charts indicated the wreck should be, and on 27 May 1989 this target was dived. It was in 78 ft. of water, and the bottom consisted of fine silt. Divers discovered two far-separated davits, a third broken davit, and a bollard. A depression was noted near one of the davits with an apparent wooden cabin roof mired in silt at the bottom of the depression. There was a 10 to 12 in. diameter hole in the roof, which was believed to be the exit for a cook stove exhaust. Shining a dive light through the hole revealed only a large empty void, and large depressions in the soft silt were evident in the area. It was commented that the the depressions looked like the work of a dredge.

Post-dive discussions led to the speculation that the cabin and other debris came off *C.B. Lockwood* during its sinking, and these items were probably some distance away from the wreck. The davits were assumed to be attached to the cabin roof, and it was hard to believe it was possible for an entire ship, especially one with three large boilers and a powerful triple expansion steam engine, to become completely buried. An expanded search of the area was performed, but no additional wreckage was found.

Another group searched for *C.B. Lockwood* in 1997 using a marine magnetometer. Brothers Jim and John Koch lead this group, and on 2 July 2001, they found two large magnetic anomalies in their search area. No observable bottom structure or targets were visible on their boat's depth sounder, and inspection by divers revealed no observable wreckage. In 2006 John Koch contacted David VanZandt of CLUE with a request to perform a side scan sonar survey of the site to determine if any wreckage was present. On 24 June 2006, a side scan sonar survey was conducted by David VanZandt using the Koch's boat, and several small targets were identified. They were inspected and found to be a davit and bollard. Probing the surrounding area with a 6-ft. pole produced no solid structure under the silt around these objects.

David VanZandt and Kevin Magee of CLUE returned to site on 8 July 2006 to obtain higher resolution side scan sonar images and perform additional diving on the site. The sonar images recorded by VanZandt and Magee show an interconnected system of V-shaped trenches near the davit and bollard. When they were inspected,

the trenches measured approximately 4 ft. wide and 2 ft. deep. When they were probed with a 4-ft. pole, no buried structure was found. The bollard was examined and found to consist of two individual round bitts with a small crossbar between them with flared ends. The davit was examined and found to stand 5 to 8 ft. high with a small bollard at its base. Probing with a 4-ft. pole failed to find any structure around the objects.

Like previous groups, CLUE believed the wreckage found was merely debris from the wreck and began re-evaluating historical data in order to expand the search area. The group took into account wind and currents at the time *C.B. Lockwood* was lost and adjusted their search area based on true versus magnetic headings. An expanded side scan sonar survey of an area encompassing 3 mi.$^2$ was performed by CLUE on 18 September 2007, but no additional wreckage was found; however, large elaborate trench systems with branching patterns were observed in the search area. One trench was inspected and found to measure approximately 10 ft. wide and 3 ft. deep with nearly vertical walls. The side walls and bottom of the trench consisted of very soft silt, and it was believed the trenches were recently created geologic features that would eventually collapse into sloping depressions due to the soft nature of the sediments.

## Where is the Wreck?

Despite *C.B. Lockwood* being a very large vessel measuring nearly 300 ft. long and having excellent locational data derived from historical research, CLUE could not find anything other than the small scattered wreckage previously found by Paskert, Tindal, and the Reutschles in 1989 and the Kochs in 2001. After two years of work CLUE decided to once again reassess the data and determine why this large vessel remained elusive. The first possibility was the wreck might be completely buried in soft silt and is actually located exactly where data indicate it should be. This hypothesis was not purely speculative since several Lake Erie shipwrecks previously discovered by CLUE are at least partially or mostly buried in the soft lake bottom at other locations. The wreck of the side-wheel steamship *Anthony Wayne* is completely buried, except for its paddlewheels and a small part of its bow off Vermilion, Ohio. The unknown wreck dubbed the "Buried Schooner" is almost completely buried off Cleveland, Ohio, with only its port railing, windlass, and bowsprit exposed at the bottom of a small trench. The current flow across the wreckage is probably the only thing that keeps it scoured and partially uncovered. Finally, the barkentine *Cortland* off Lorain, Ohio, is almost completely buried with only its bow and stern visible. While no wreck found to date has been completely buried, it is not outside the realm of possibility that a wreck could become buried, thus making it extremely difficult to locate. A second possibility was the engine and boilers of *C.B. Lockwood* may have been salvaged, leaving only a flattened hull, which could easily be buried by the silt; however, research conducted to date has not revealed any evidence that salvage work was performed on the wreck.

## Earthquakes

A third possibility that seismic activity was somehow responsible for the disappearance of *C.B. Lockwood* was proposed after the epicenters of several earthquakes in 2007 and 2009 were reported in the vicinity of the scattered wreckage identified by CLUE and others. This

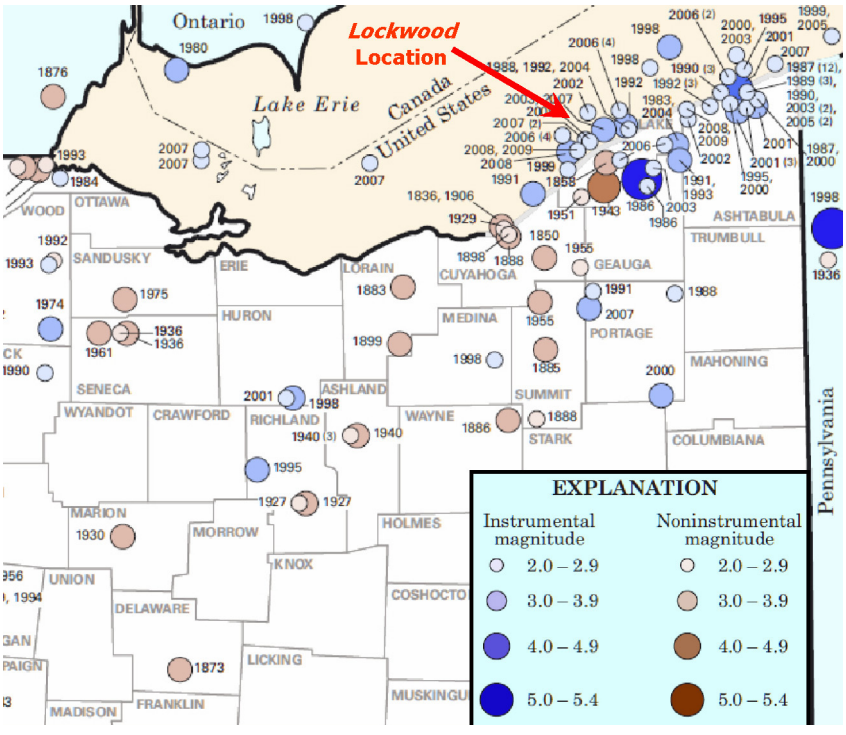



*Figure 2. Earthquakes in Ohio (Adapted from Ohio Department of Natural Resources 2012 Earthquake Map)*

was reinforced by the many strange and apparently fresh trenches observed in side scan sonar images. A possible mechanism that would cause a vessel to sink into the bottom became evident during the Society for Historical Archaeology 2010 Conference, when a paper was presented that documented the disappearance of beached shipwrecks due to soil liquefaction during hurricanes.

Investigation into seismic activity in Ohio determined there is a regular occurrence of earthquakes under the lake in the vicinity of the suspected location of *C.B. Lockwood*. These earthquakes occur almost every year and range in size from magnitude 2 to 4. Figure 2 depicts earthquake epicenters and strengths in relation to the suspected location of *C.B. Lockwood* (Ohio Department of Natural Resources 2012). The trenches at the wreck site and surrounding areas were speculated to likely have been caused by earthquake activity shaking the soft silt of the lake bottom. It was also speculated that this seismic activity may cause shipwrecks to sink beneath the lake bottom at an accelerated pace due to soil liquefaction.

Liquefaction occurs when soil suddenly turns into a water-like substance when shaken by an earthquake or hurricane. The friction between the soil particles holds the soil together as a solid substance, and water fills the pores between the particles; however, when the soil is shaken, the spaces between the particles expand and water completely surrounds them. The soil then flows like a liquid and loses its structural integrity. This process is called liquefaction, and is a well-documented phenomenon on land.

During earthquakes major structural damage to buildings and other structures often occurs due to soil liquefaction. This happened during the 11 March 2011 earthquake and tsunami in Japan (Livescience 2011). Despite strict building codes in Japan that require buildings to be engineered to withstand earthquakes, many were destroyed during that earthquake when they simply sank or fell over due to liquefaction of the soil beneath them (Livescience 2011). Engineers were surprised at the severity and widespread occurrence of the problem, and recent studies have determined that young geologic deposits, or those deposited in the last 10,000 years, are especially vulnerable to this problem (Livescience 2011).

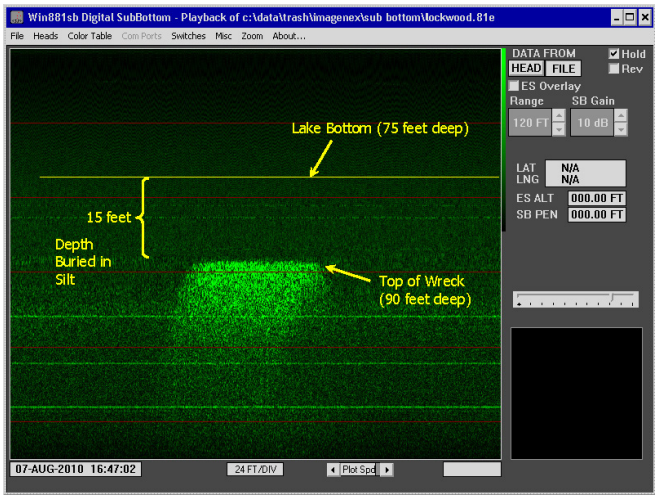
## Lake Erie Bottom Geology

Geological studies undertaken off Fairpoint, Ohio, were consulted to investigate if a large ship like *C.B. Lockwood* could become completely buried in the lake bottom (Carter et al. 1982:52-53). There are two well-known shipwrecks in the same area, *Queen of the West* and *Cleveco,* both sit high above the bottom, so it was unknown why *C.B. Lockwood* would be buried while the other two nearby wrecks would not. One study that involved seismic reflection and vibracoring identified significant variability in strata within 6 mi. of shore. For example, 4 mi. offshore in 58 ft. of water the vibracore encountered resistance at about 10 ft., and was stopped by the density of bottom material at a depth of 15 ft. (Carter et al. 1982:52-53). The resultant core consisted of many distinct layers of silt, mud, clay, sand, and gravel. Another core taken just 6 mi. offshore in 67 ft. of water showed a very different result (Carter et al. 1982:52-53). The vibracore penetrated to its full length of 20 ft. and encountered no resistance at all (Carter et al. 1982:52-53). The composition of that core revealed mostly silt with a little sand and mud. *C.B. Lockwood* was lost about 14 mi. off Fairport, Ohio, so it is conjectured the lake bottom at that distance from shore might have a substantially thick layer of soft silt covering the hard bottom of the lake.

To better understand the lake geology below the silt layer, research uncovered a report that contains a study of the underlying geology of the lake off Cleveland, Ohio, to the west of the suspected *C.B. Lockwood* wreck site (Dames & Moore 1974:14). The geology of Lake Erie in this area consists of a bedrock layer of shale, which was carved by glaciers during the last Ice Age (Dames & Moore 1974:14). This bedrock is covered by a thick layer of glacial till, which is sand and gravely rock that was left behind when the last ice sheets retreated. The till layer is covered by a layer of clay and silt. Both the underlying shale bedrock and glacial till layers are irregular in profile, resulting in varied depths of the hard lake bottom below the silt layer. The actual bathymetry of Lake Erie shows a smooth bottom due to the recent deposition of sediments filling and smoothing out the underlying strata during the past 14,000 years. It is possible for some shipwrecks to be in areas where the silt layer is thin and for other shipwrecks to be in areas where the silt layer is thick. The *C.B. Lockwood* could have sunk in a deep pocket of silt.

## Wreck Discovered

With knowledge that there was a good possibility *C.B. Lockwood* is completely buried in soft silt, CLUE decided to revisit the suspected wreck site and perform a different type of remote sensing survey. To determine if



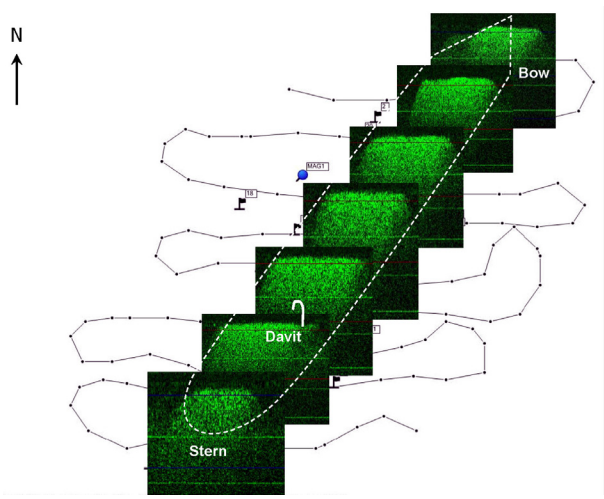




*Figure 3. Sub-bottom profiler image of the suspected wreck site (by David Michael VanZandt)*

*Figure 4. Composite image of vessel tracklines and sub-bottom profiler images (by Kevin Scott Magee and David Michael VanZandt)*

the wreck was truly buried, a new survey was undertaken using a sub-bottom profiler.

CLUE borrowed an Imagenex DF-1030 sub-bottom profiler from Imagenex Corporation. It is a very good tool for recording images of buried geological features, but using it to record images of buried shipwrecks is problematic. The sub-bottom profiler has very coarse spatial resolution in the X-Y data plane. It cannot produce detailed images of buried objects; however, it can be used to determine the locations of large buried objects and shipwrecks located up to about 160 ft. below its transducer.

CLUE returned to the suspected location of *C.B. Lockwood* on 7 August 2010 and surveyed the area along closely spaced transects. A large object buried 15 ft. below the lake bottom was discovered, and multiple passes were made over it to create an image of what lies below the silt (Figure 3). Once the survey was completed, data were corrected for offsets and plotted using Site Recorder 4 provided by 3H Consulting Ltd (Holt, this volume). The map reveals a ship-shaped object buried 15 ft. below the lake bottom situated along a northeast/southwest axis. This generally agrees with the "Easterly and Westerly" direction described in historical records (Lieutenant Commander, USS *Michigan* 1902:1-3). The locations of the davit, bollard, and magnetic anomalies from previous surveys were added to the map and found to correlate well with the location of the sub-bottom anomaly. A plot of sub-bottom profiler data, vessel tracklines, and the davit are shown in Figure 4, which shows what appears to be a large ship buried under about 15 ft. of silt. An additional sub-bottom profiler survey was performed in the area surrounding this location, but no further anomalies or structures were detected.

## Conclusions

Based on review of published historical sources, inspection of extant visible structures, and analyses of sub-bottom profiler data, it appears that the wooden steamer *C.B. Lockwood* has been located in Lake Erie off Fairport, Ohio, buried under 15 ft. of silt. Locations calculated from first-hand accounts and the location of wreckage discovered by CLUE vary by only 1,000 to 3,000 ft., which is well within the margin of error for navigational positioning in 1902. The finding that such a large ship can be completely buried and concealed in Lake Erie also has implications for other shipwrecks in the lake. It is now within the realm of possibility that other missing shipwrecks of very large size, such as the 338-ft. steel car ferry *Marquette & Bessemer No. 2*, could lie below the lake bottom, making them difficult to locate. *C.B. Lockwood* was found because of the excellent quality of first-hand accounts that allowed the search area to be focused to a small area. The findings could also have implications for currently known shipwrecks that appear to be sinking into the lake bottom.

The discovery that seismic activity can greatly increase the rate and depth that a shipwreck can sink into a mud bottom may cause rethinking of the likelihood of finding shipwreck sites in other geologically active areas. Certainly for the Fairport, Ohio region of Lake Erie, this needs to be considered when determining the viability of searching for suspected shipwreck locations.

Furthermore, the elaborate and geologically fresh trench systems observed on the lake bottom around the wreck site are possibly the only earthquake-caused surface features seen in Ohio, which is not known for its earthquakes and has no land-based equivalents. For geologists, this may be a surprising and controversial result which could lead to future studies.

## Acknowledgements

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