

SHIPWRECKS- A DEEP LOOK

The Rise of the Self-Unloading Freighter

**AN EDUCATIONAL GUIDE TO SHIPPING
AND TECHNOLOGY ON THE GREAT LAKES**



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Acknowledgements

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Introduction for the Educator

Shipwrecks make fascinating stories. The discovery of a shipwreck is an exciting event. After the initial excitement of the find, the study of a shipwreck by maritime archaeologists reveals important information about maritime life and trade. The study of two shipwrecks featured in this guide, the *Rockaway* and *Hennepin*, reveal much about Great Lakes history. This guide contains two main lessons: one on technology used in Great Lakes shipping and one on using primary sources to learn about history. A glossary, shipping timeline, parts of a ship identification, and information sheets on Great Lakes vessels complete the guide.

Shipping on the Great Lakes

Following the tradition of the Native Americans and French Fur Traders who set up a vast trade network, European settlers continued using the Great Lakes to ship goods. In the late 1800s, shipping on the Great Lakes rivaled that of the East and West seaboards and led to the economic development of lakefront towns along these inland coasts.

Sail vs. Steam

In the 19th century, sailing ships and steamships moved the heavy cargo that is more often carried by trucks and rail today. Although the first steamship appeared in 1817, sail ships called schooners were still used for shipping into the early 20th century. Steamships offered more power but schooners, well-adapted for lake sailing with barge-like bottoms and sails rigged for unpredictable lake winds, continued to outnumber steamships until the 1860s. Schooners were an economical choice; they were less expensive to build, to operate, and to replace if lost at sea.

During this time, ships carried lumber, packaged goods like crates of Michigan fruit, and loose, unpackaged bulk cargo, such as coal and iron ore. Once a ship reached its destination, crew members had to unload the cargo. Buckets and wheelbarrows were used to unload bulk cargo, a time-consuming and laborious process.

World's First Self-Unloader

In 1902, the steamship *Hennepin* was converted to the world's first self-unloading vessel. It was fitted with a conveyor belt system that brought bulk cargo out of the hold, much more quickly than through human labor. The *Hennepin* became the world's first the model for all the self-unloaders used in the world today.

Shipping Today

Today's self-unloading bulk freighters measure up to 1000 feet in length. Canals and the Saint Lawrence Seaway connect the Great Lakes with the Atlantic Ocean. Powered by diesel fuel, they are called "Lakers" if they travel only on the lakes and "Salties" if they also travel on the ocean. The rate of shipping on the Great Lakes has been reduced in recent years but is looked to more and more today as an alternative to truck and rail transport.

Maritime Archaeology

Maritime Archaeology has taught us much about the history of Great Lakes shipping. Study of the *Rockaway*, a sailing schooner, demonstrated how these vessels were effectively constructed for lake travel. The discovery of the *Hennepin* has confirmed that the world's first self-unloader originated on the Great Lakes.

Through the use of this guide, students will learn about:

- Amazing technology applied to Great Lakes shipping
- Maritime vocabulary and parts of a ship
- The real story of the *Hennepin* shipwreck-as researched through primary sources

Michigan Content and Benchmark Standards addressed (Later Elementary and Middle School)

Shipping Technology:

Social Studies IV. Economic Perspective: 2. Compare various methods for the production and distribution of goods and services;

Science: Reflecting on Scientific Knowledge II.1 3. Describe the advantages and risks of new technologies (technological systems for transportation)

Language Arts 3. *Debating Issues*

Investigating a Shipwreck: Social Studies 3: Use primary sources

Language Arts 3. Use text to identify and research issues of importance

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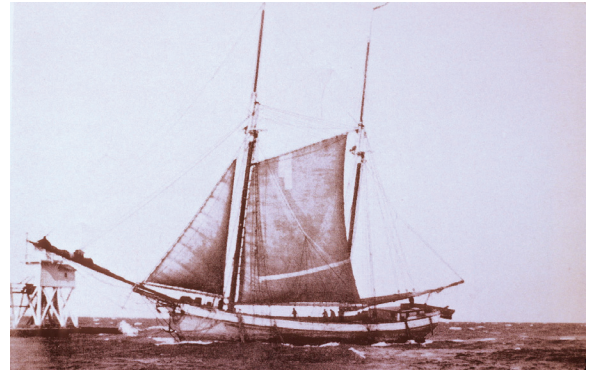
Student introduction

You've probably heard of the *Titanic*, one of most well-known shipwrecks, but there are many wrecks that happened right here on the Great Lakes. Marine Archaeologists study shipwrecks to learn about the past. Here are two ships that teach us about the history of Great Lakes shipping.

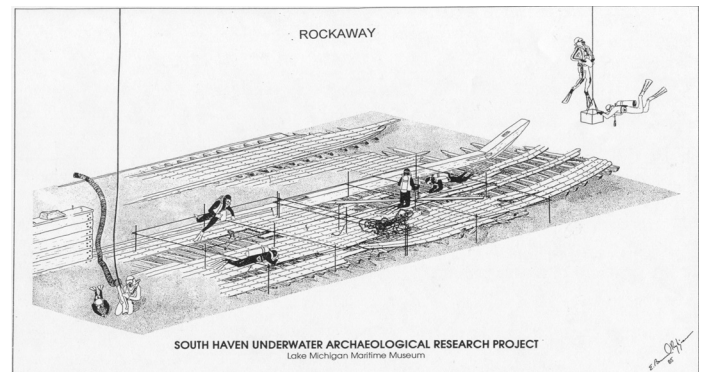
The Rockaway

The *Rockaway* was a **scow schooner** built in **Oswego, New York** in 1866. Scow schooners are sailing ships adapted for Great Lakes travel with a special sail pattern, flat bottom, and a boxy hull to hold a lot of cargo. The *Rockaway* was built to carry lumber but could also carry coal, iron ore, and grain. After many voyages, the *Rockaway* was moved to **Muskegon, Michigan**.

On November 16, 1891 the *Rockaway* set sail from **Ludington, Michigan**. Heavily loaded with lumber, the vessel was delivering wood to **Benton Harbor**. Off the coast of **South Haven**, the *Rockaway* ran into a storm with strong, freezing winds that battered the ship and its six-man crew for more than 19 hours. Captain Ole Thompson's desperate attempts to ride out the storm bought enough time for a member of South Haven's Life Saving Service Station to spot the distressed ship. The Station's "sufmen", in their 26-foot row boat, rescued the crew. The following day, the *Rockaway* slipped beneath the waves of Lake Michigan, and was not seen again until its discovery in 1983. Archaeological study of the wreck revealed new knowledge about Great Lakes scow schooners.



Although no pictures of the *Rockaway* are known to exist, this scow schooner, the *Helen*, is similar in appearance.



A drawing of maritime archaeologists investigating the wreck of the *Rockaway*.

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The Hennepin



The *Hennepin*, after its conversion to a self-unloader.

The *Hennepin* began its life in 1888. Built as a **steamship** by Wolf and Davidson of Milwaukee, Wisconsin for Davidson Steamship Company, it was originally named the *George H. Dyer*. It could haul up to 1600 tons of cargo. In 1898, the ship was sold to a Michigan partnership to transport freight through the Great Lakes. It was renamed the *Hennepin*.

On June 27, 1901, the *Hennepin* caught fire. The upper parts and machinery of the ship were destroyed. The ship was repaired and fitted with a conveyor belt, converting it to the world's first self-unloading **steamer**. The *Hennepin* provided the model for virtually all future self-unloading vessels.



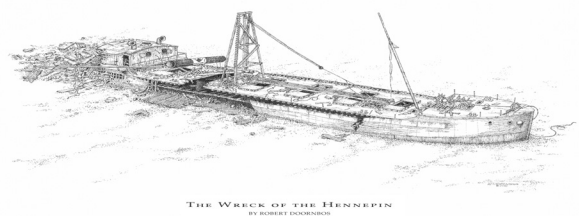
A modern bulk freighter self-unloads bulk cargo

After carrying gravel and other cargo for many years, the *Hennepin* became worn and weakened. To extend its service, the engine was removed. Since the newer self-unloading equipment still worked, it now served as a barge, towed by another boat.

On August 18, 1927, while being towed by the tugboat *Lotus*, the *Hennepin* began leaking. When it became clear that it would not make it back to Grand Haven, the *Hennepin* crew set out in a lifeboat and the *Lotus* released the barge to be swallowed by the lake.

Upon returning to shore, the *Hennepin*'s captain, Ole Hanson, blamed a storm, a "stiff nor'wester" for the sinking of the ship. The circumstances and location of the *Hennepin* shipwreck remained unknown until Michigan Shipwreck Research Associates (MSRA) began searching in 2001. In 2006, the ship was found in good condition, with its self-unloading equipment still in place.

A drawing of the *Hennepin* wreck

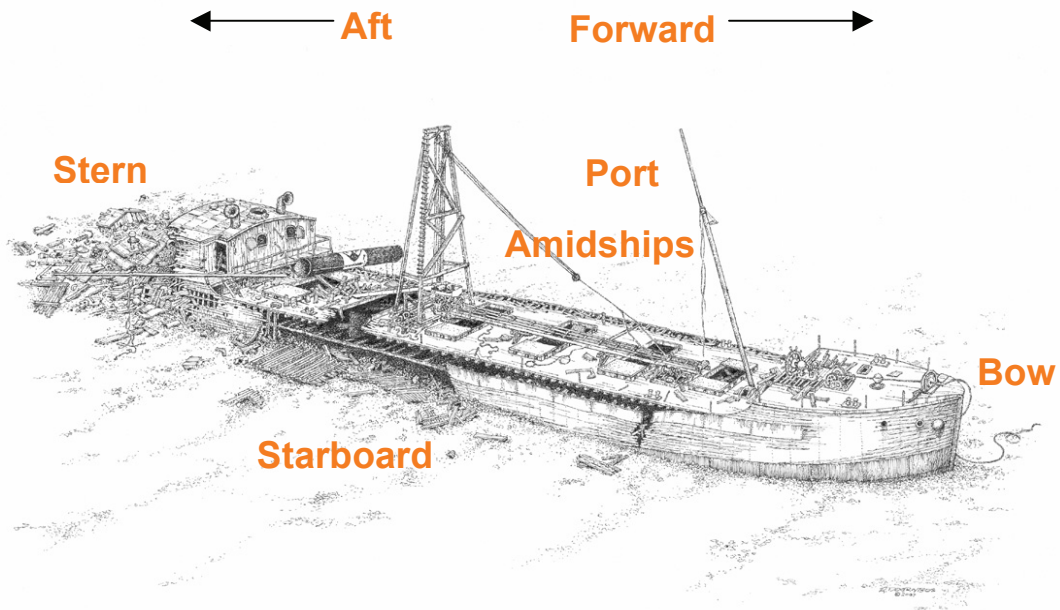


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SHIP SPEAK

Ship crews use special terms to describe parts of a ship.



THE WRECK OF THE HENNEPIN
BY ROBERT DOORNBOS

Bow: The front of a ship

Stern: The back of a ship

Port: When facing the bow, the left side of the ship

Starboard: When facing the bow, the right side of the ship

Amidships: The middle of the ship

Directions

Aft: Toward the stern

Forward: Toward the bow

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Glossary of maritime terms

Birch Bark Canoe: A canoe made using bark of birch trees. Native Americans made birch bark canoes and later showed French fur traders how to make them.

Bow: The front of a boat

Bulk Cargo: Unpackaged cargo that is carried on a ship. Some examples are coal, iron ore, grain, sand, gravel, and cement.

Bulk Freighter: A large ship, powered by steam or diesel, up to 1000 feet long, that carries bulk cargo

Crew: The people who work on a canoe, boat, or ship. Depending on the type of vessel, crew might include the captain, engineer, and people to unload cargo or operate sails

Hull: The body of a boat or a ship

Lakers: Large, bulk freighters that carry cargo on the Great Lakes but do not travel on the ocean.

Salties: Freighters that travel on the ocean and parts of the Great Lakes. They are usually larger than lakers.

Scow (rhymes with *now*) **Schooner:** A sailing vessel with a flat- bottom and sails adapted for travel on the Great Lakes.

Schooner: A vessel powered by wind and sails

Steamer: Another name for a steamship, powered by steam engines.

Stern: The back part of a boat.

Surfmen: The service men of the United States Life Saving Service.

Watercraft: Any type of vessel that travels on water: a canoe, steamer, schooner, or freighter.

Great Lakes Shipping Timeline

1600s

Native Americans and French Fur Traders use **birch bark canoes** for trade.

1679

The first sail ship on the Great Lakes, the *Griffon*, carries trade goods.

Early 1800s

European settlers use **schooners**, a type of sail ship, for Great Lakes shipping.

1800s

Scow schooners on the Great Lakes carry bulk cargo, lumber, and agricultural products.

1818

The first **steamship** travels on the Great Lakes.

1870s

For the first time, **steamships** outnumber **schooners** on the Great Lakes.

1869

First **bulk freighter** travels on the Great Lakes

1902

The *Hennepin*, a **steamship**, is converted to the world's first **self-unloading** vessel.

Today

Self-unloading bulk freighters, up to 1000 feet in length, are used for Great Lakes shipping.

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Shipping technology on the Great Lakes

This lesson explores four different types of watercraft on the Great Lakes: **birch bark canoes**, used by Native Americans and French Fur Traders; **scow** (rhymes with now) **schooners**, a type of sailing ship adapted for use on the Great Lakes; **steamships**, larger ships powered by steam engines; and today's diesel-powered, self-unloading **bulk freighters**, which can measure up to 1000 feet in length.

This lesson focuses on their use in shipping trade goods and the advancements in technology they show concerning:

1. How the ships were powered

and

2. How they carry and unload cargo.

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Activity # 1

High Tech

Using new technology has advantages and disadvantages. For this activity, you will work in groups. Each group will be assigned a different type of watercraft. Read about your assigned watercraft using the information sheets found on **pages 10-13** and make a list of advantages and disadvantages. You will then present your group's findings to the class.

Consider: how the watercraft is powered, room for cargo, high or low building and operating costs, and how it unloads cargo.

Advantages

Disadvantages

Activity # 2

Scow Schooner or Steamship?

Assignment: You are the owner of a 19th century shipping company and you have to decide whether to ship your goods using **A) a scow schooner** or **B) a steamship**. Consider the advantages and disadvantages of each and make a list of arguments. Your teacher may have you write out your arguments or have a class debate explaining and defending your choice. Use persuasive language.

List the advantages and disadvantages of scow schooners and steamships. Cost, power source, crew requirements, and amount of cargo are a few things to consider.

Scow Schooner

Advantages

Disadvantages

Steamship

Advantages

Disadvantages

Activity # 3 Technology today

By now, you understand that new technology offers both risks and benefits. In our society, we are surrounded by technological advances like hybrid cars, global positioning systems (GPS), and cell phones. Choose one example of a new technology commonly used today and brainstorm about both its advantages and disadvantages. Write an essay explaining your thoughts.

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Birch Bark Canoes

When French traders and explorers arrived in North America, they used birch bark canoes for travel. Native Americans had been making canoes out of birch bark, a strong material that was also flexible enough to be worked into water-tight canoes. Birch trees were plentiful in Canada and the northern states, and a skilled builder could create a canoe with a few simple tools.

French traders followed the Native Americans' lead and adapted birch bark canoe for their own trade and travel. Watercraft had to be strong enough to travel through rapids, but light enough to be carried (portaged) between rivers and inland lakes. The French changed little about the Native American canoe design, but created different sizes for different needs. The largest canoe was the 36-foot "Montreal," which was able to carry 10-12 crew members and 5000 pounds of cargo. The 26-foot "North" was shorter and could not carry as much cargo, but was better able to handle rapids.

Canoes operate through manpower and strong paddlers were needed to keep a canoe on course through strong lake and river currents and rough winds. The open design of a canoe offers no protection for crews caught on the water during a storm.

The introduction of schooners and steamships ended the use of canoes for shipping on the Great Lakes. Today, there are special craftspeople who still build birch bark canoes. These canoes are mainly used for recreation, display, and education.



Source: "Reviving an Ancient Craft." Fort Miami Heritage Society Newsletter, Vol. III, No. 1, Winter 2003, pp.6-7.

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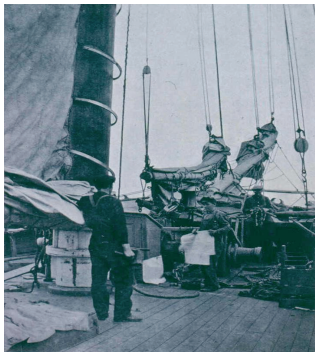
Scow Schooners

A schooner is a sail ship. A scow schooner is adapted for travel on the Great Lakes. Instead of having a deep, curved bottom which extends far beneath the ship, they have a flat, barge-like bottom. Their barge-like, square construction leaves more room for cargo, making hauling freight economical. Their sail design accommodates lake winds which can quickly change speed and direction. A flat bottom allows for easier passage into harbors, along coast ways, and through narrow, man-made canals.

Because of their box-like design and lack of machinery, scow schooners cost less to build than steamships. Lower building costs meant less risk for the shipping company and its investors, in case the ship is wrecked. Scow schooners could be operated with a smaller, though highly skilled sailing crew of 4-8 men.

Wind speed and direction on the Great Lakes changes often and sailors must prepare for and adapt to sudden changes. A shallow bottom makes the boat less stable in sudden storms. Tugboats were often used to tow schooners into port. With no steam power, scow schooners travel more slowly than steamships. Lacking self-unloading equipment, crew members had to unload cargo.

The *Rockaway* was a 106-foot scow schooner. It was built mainly for shipping lumber but could also transport coal, iron ore, and grain. Studying this shipwreck taught us about its adaptations for sailing on the Great Lakes.



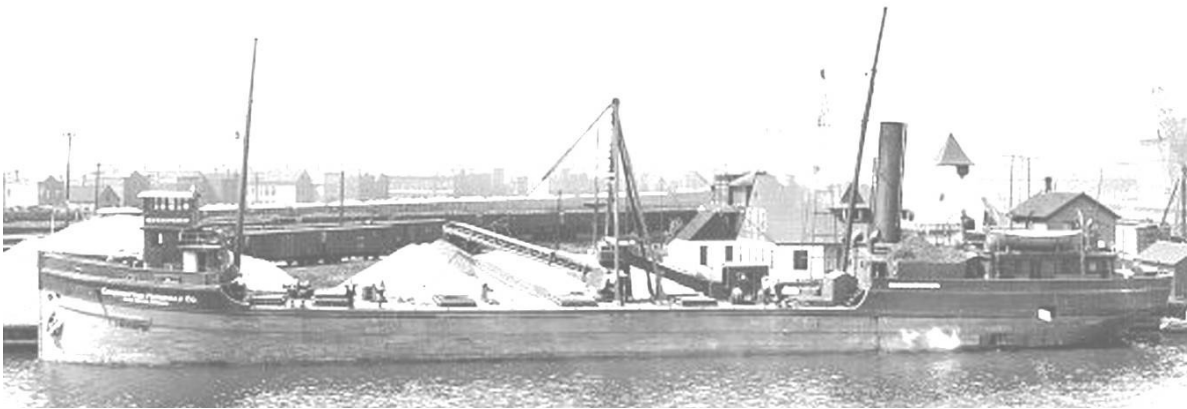
Source: Pott, Kenneth. "Underwater Archaeology in Michigan." 359-367.

Steamships

Steamships are also called steamers and sometimes have the abbreviation SS (Steamship) in their names. The first steamship appeared on the Great Lakes in 1818. Steamboats are powered by steam, generated by steam engines, burning coal or wood. Paddle wheels or propellers move the ship forward. Steamships are generally bigger than schooners and able to carry more cargo. Since they do not depend on the wind as schooners do, steamships are much faster and travel more safely in poor weather conditions. They are easier to maneuver than sail ships.

Because of their specialized engines and equipment, steamers are more expensive to build and repair. An engineer is required on board, as well as a crew of up to 40 men, to maintain the steam engine equipment. Fuel, wood or coal, was an extra cost. If a steamship is lost on the lakes, it is costly to replace.

The *Hennepin* was built as a steamer in 1888. After a fire in 1901, it was repaired and fitted with self-unloading equipment. Conveyor belts below the deck moved bulk cargo and deposited it on land. This cargo could be easily unloaded in a small harbor, along a river, or into trucks.



The *Hennepin* in Chicago at the dock of Construction Materials Corporation
Historical Collections of the Great Lakes, Historical Collections of the Great Lakes,
Bowling Green State University

Source: van Heest, Valerie. "Telling the Whole Truth." [Michigan History](#) Jan/Feb (2008): 12-19.

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Self-unloading Bulk Freighters

Most of the Great Lakes commercial shipping vessels today are self-unloading bulk freighters powered by diesel engines. Diesel engines run on diesel fuel, which is also used to power many cars and trucks. These large ships are called “lakers” (those that travel on lakes) or “salties” (even larger vessels that also travel on the salt water ocean).

In the 1920s, the Ford Motor Company began building lakers with diesel engines. Diesel engines are more efficient than steam engines and operate better in cold weather, extending the shipping season. This allowed for bigger ships that carried even more cargo than steamships.

These large ships became known as bulk freighters. They were equipped with self-unloading technology, based on the *Hennepin's* conveyor belt system. This allows for easy and quick loading and unloading of cargo. No special equipment and little manpower are needed at a harbor where a bulk freighter unloads.

Although their large size carries more cargo, bulk freighters have deep bottoms and need to travel in deep water and have access to deep harbors. Bulk freighters cannot visit the ports of smaller towns. Harbors for bulk freighters need dredging, which is the clearing of mud and sediment from the lake's bottom. Dredging is expensive and can cause problems for the ecosystem of a river or lake.

Shipping on the Great Lakes has decreased in recent years. Today more goods are shipped by truck than on ships. However, one bulk freighter can transport the same amount of cargo as 1200 trucks and for this reason, the benefits of shipping on the Great Lakes are being reconsidered.



A bulk freighter at St. Joseph's cement terminals.

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Investigating a Shipwreck

Before their underwater dive, maritime historians from MSRA did research on land to learn everything they could about the *Hennepin*.

Primary sources are first hand accounts of historical events. A primary source is written in the time period being studied. They are materials directly related to a topic. Some examples are letters, speeches, diaries, newspaper articles from that event, oral history interviews, photographs, artifacts, documents, or anything that provides first-hand accounts about a person or event.

Secondary sources are second-hand accounts of past events. Examples are newspaper articles or history books written after the event. Historians usually consider secondary sources somewhat less reliable than primary sources. Primary sources, when available, are preferred.

Activity-Using Primary Sources

When MSRA decided to investigate the *Hennepin*, they looked at three primary sources. Read about the three primary sources and answer the questions about each.


A. A newspaper article from the Grand Haven Tribune

1. Look it up: What is a nor'wester?

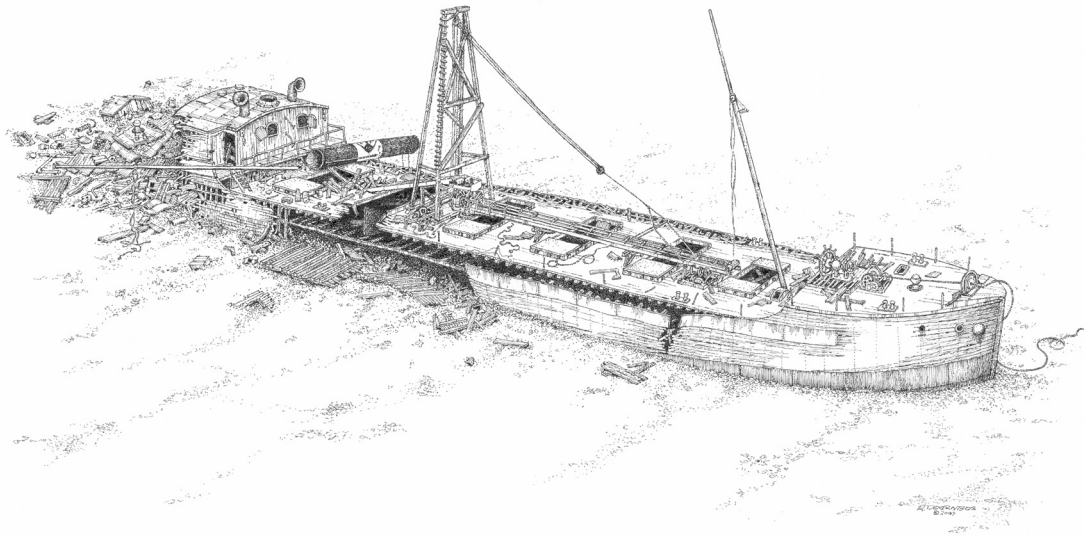
2. What clues are provided in the article that can help MSRA locate the ship?

Grand Haven Tribune
August 18, 1927

Hennepin sinks
Captain Ole Hanson blames a “stiff nor’wester” for sinking the *Hennepin*. He said that the ship sank in 203 feet of water off the coast of South Haven, Michigan. According to Captain Hanson, “she died a hard death.”



3. Captain Hanson said the ship died a “hard death.” When MSRA discovered the ship, they made a drawing of the wreck, as it was found underwater. Describe the condition of the ship and where damaged occurred, using the terms found on page 4. You can also read about the ship at MSRA’s website: <http://www.michiganshipwrecks.org/hennepin.htm>



THE WRECK OF THE HENNEPIN
BY ROBERT DOORNBOS

Description of the *Hennepin*:

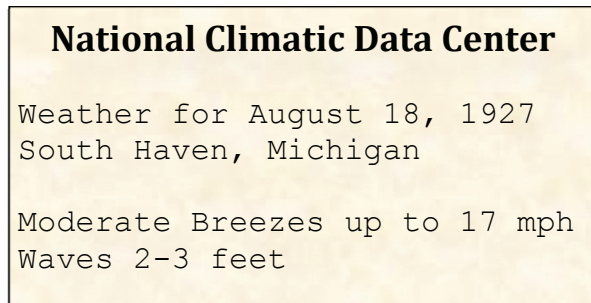
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B. Another primary source MSRA checked was weather records from the National Climatic Data Center, an archive that records weather reports.

<http://www.ncdc.noaa.gov/oa/ncdc.html>

Here is the record for August 18, 1927, the day the *Hennepin* sank.



Wind speed and its effects are measured on a scale called the Beaufort scale. You can look up the scale at http://en.wikipedia.org/wiki/Beaufort_scale#The_modern_scale

How does this record compare to Captain Hanson's weather report given in the *Grand Haven Tribune*?

C. When a historian interviews someone about the past, it is called an oral history. An oral history is another example of a primary source.

Vern Verplank was a *Hennepin* crewmember aboard the *Hennepin* or *Lotus* the day it sank.

The following page has a transcript of his oral history.

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"On a tow-barge, none of the officers had to be licensed. In fact, most had lost their licenses after an accident." Ole Hanson may not have been licensed, but he could have found employment on the tow-barge *Hennepin*. That day the old hull was taking on water as she typically did and all ten of her bilge pumps were running. Chief Engineer Abe Lyons, notorious for slacking, must not have kept the pump filters cleaned. Abe Lyons grabbed the distress whistle and blew it four or five times to get the tug's attention. Captain Hanson called out to abandon ship. Ernie Casperson, the cook, took quarters of beef out of the cooler. Lyons went down to the engine room and took off the big brass clock. Everyone watched from the tugboat *Lotus* as the *Hennepin* finally sank beneath the waves."

-Vern Verplank

1. What do we learn about the condition of the *Hennepin* from Mr. Verplank?
2. What do we learn about the various crew members?

Final report

Based on all the primary sources, what do you think caused the *Hennepin* to sink?