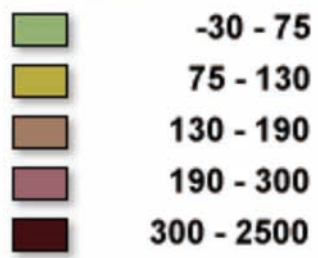
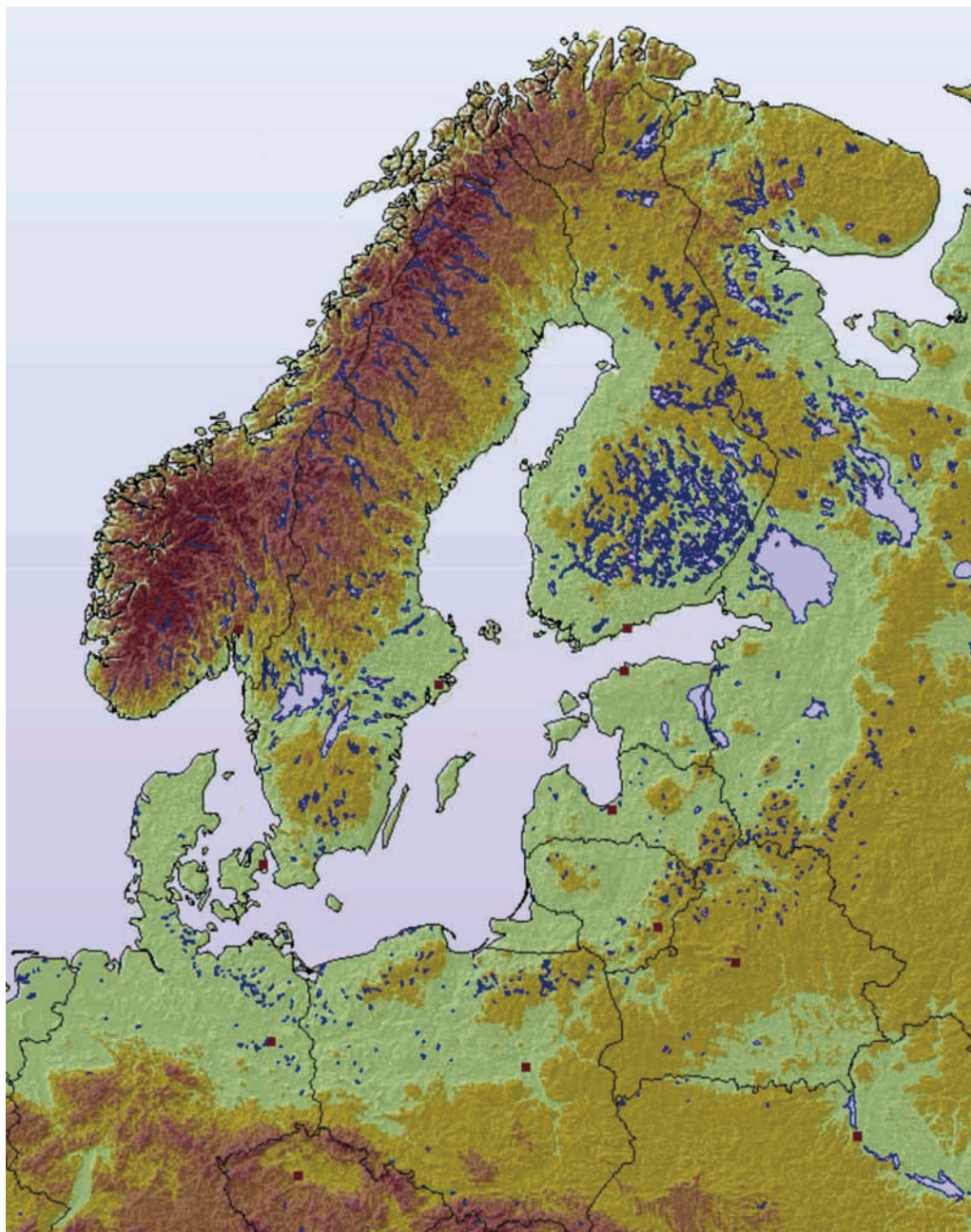


The Baltic Region

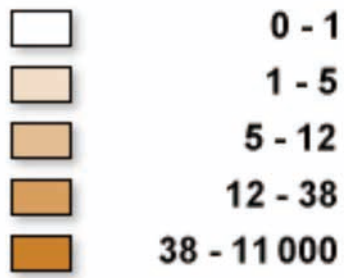
Elevation



meters above
sea level



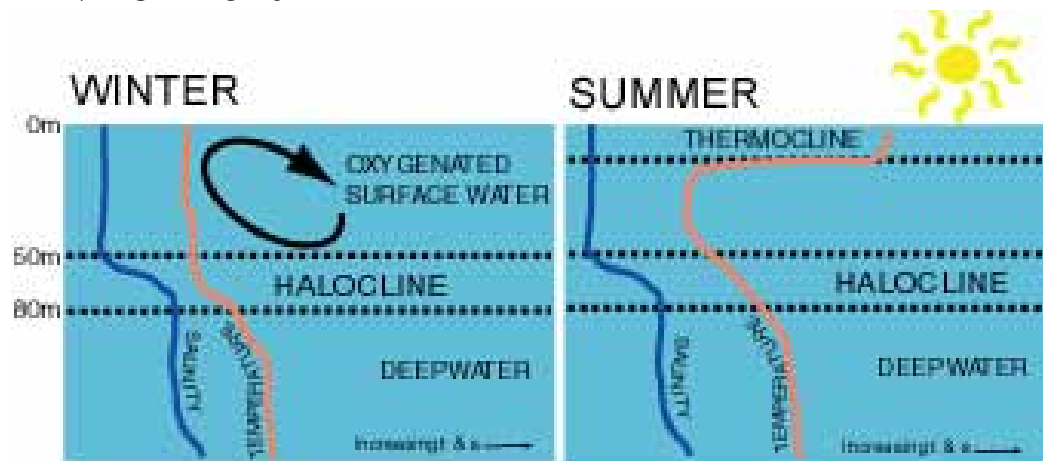
Population Density



people / km²



Environment



In oceanography, a **halocline** is cline caused by a strong, *vertical salinity gradient* within a body of water. Because salinity (in concert with temperature) affects the density of seawater, it can play a role in its vertical stratification. [REDACTED] results in an increase of [REDACTED]

In the midlatitudes, [REDACTED] leads to [REDACTED] than deep waters. In such regions, the vertical stratification is due to surface waters being warmer than deep waters and the halocline is destabilizing. Such regions may be prone to salt fingering, a process which results in the preferential mixing of salinity.

In certain high latitude regions, the surface waters are actually colder than the deep waters and the halocline is responsible for maintaining water column stability - isolating the surface waters from the deep waters. In these regions, the halocline is important in allowing for the formation of sea ice, and limiting the escape of carbon dioxide to the atmosphere. Haloclines are also found in fjords, and poorly mixed estuaries where fresh water is deposited at the ocean surface.

A halocline is most commonly confused with a thermocline - a thermocline is an area within a body of water that marks a drastic change in temperature.

Haloclines are common in water-filled caves near the ocean. Less dense fresh water from the land forms a layer over salt water from the ocean. Underwater cave explorers passing through the halocline stir up the layers.

Types of clines

- [REDACTED] - A cline based on difference in water temperature,
- [REDACTED] - A cline based on difference in water chemistry,
- [REDACTED] - A cline based on difference in water density.

A **chemocline** is a cline caused by a strong, *vertical chemistry gradient* within a body of water. A chemocline is analogous to a thermocline, the border at which warmer and cooler waters meet in an ocean, sea, lake, or other body of water. (In some cases, the thermocline and chemocline coincide.)

Chemoclines most commonly occur where local conditions favor the formations of anoxic bottom water — deep water deficient in oxygen, where only anaerobic forms

of life can exist. The Black Sea is the classic example of such a body, though similar bodies of water (classified as meromictic lakes) exist across the globe. Aerobic life is restricted to the region above the chemocline, anaerobic below. Photosynthetic forms of anaerobic bacteria, like green phototrophic and purple sulfur bacteria, cluster at the chemocline, taking advantage of both the sunlight from above and the hydrogen sulfide (H₂S) produced by the anaerobic bacteria below.

In any body of water in which oxygen-rich surface waters are well-mixed (holomictic), no chemocline will exist. To cite the most obvious example, the Earth's global ocean has no chemocline.

<http://en.wikipedia.org/wiki/Chemocline>

A **thermocline** is a thin but distinct layer in a large body of water, in which *temperature changes* more rapidly *with depth* than it does in the layers above or below. In the ocean, the thermocline may be thought of as an invisible blanket which separates the upper mixed layer from the calm deep water below. Depending largely on season, latitude and turbulent mixing by wind, thermoclines may be a semi-permanent feature of the body of water in which they occur, or they may form temporarily in response to phenomena such as the radiative heating/cooling of surface water during the day/night. Factors that affect the depth and thickness of a thermocline include seasonal weather variations, latitude, and local environmental conditions, such as tides and currents.

<http://en.wikipedia.org/wiki/Thermocline>

A **pycnocline** is a cline caused by a strong, *vertical density gradient* within a body of water. In freshwater environments such as lakes this density change is primarily caused by water temperature (thermocline), while in seawater environments such as oceans and estuaries, the rapid density change in the water column is often caused by a combination of decreasing water temperature and increasing salinity (halocline). Areas where freshwater and saltwater environments meet, such as bays and near river mouths, often have strong, well defined pycnoclines. A large amount of runoff from land of warmer freshwater can float upon colder saltwater entering an estuary forming a salt wedge. The amount of mixing from top to bottom will determine the stratification or strength of the pycnocline. With little mixing from the friction of currents, the density differences between the fresh and salt water dominate.

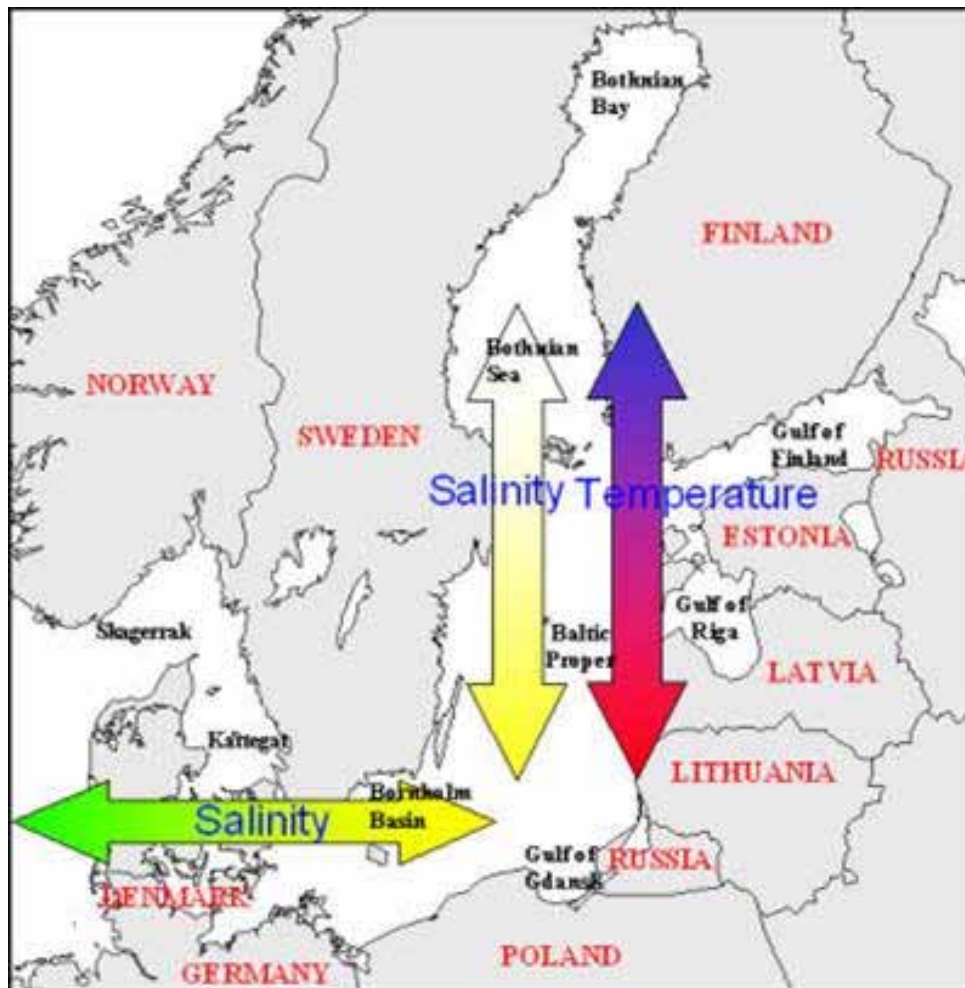
Pycnoclines tend to disappear in the open ocean at around 50 or 60 degrees North or South Latitude. This is due to lowered salinity and temperature change near the poles.

<http://en.wikipedia.org/wiki/Pycnocline>

The water of the Baltic has a very low salt content—only about one-fifth that of the oceans (brackish water). This is due to the narrow, shallow straits that restrict the inflow of salty water from the North Sea, and to the numerous rivers that drain into the Baltic.

Commercial shipping and fishing are the chief economic activities in the Baltic. Polluted water is becoming an increasingly serious problem.

Countries bordering the Baltic Sea are



http://hmapcoml.org/projects/baltic/Scientific/What_is_the_history_of_the_Baltic_Sea.html

Baltic Sea Pollution

The health of the Baltic Sea has been seriously damaged

The pollution, such as untreated human waste, toxic materials, and metal (e.g. lead), have resulted in stratification of the Baltic Sea. This process known as stratification has left certain layers of the Baltic mostly freshwater while rendering other layers saltwater. The Baltic Sea, when it is stable, is a mix of freshwater from the rivers of Europe, and saltwater from the North Sea which flows through the straits around Denmark. The source of much of the pollution was, and still is, from the countries of the former Soviet Union and East Bloc. This pollution, in turn, harms a variety of other industries, including fishing and tourism.

<http://www1.american.edu/TED/baltic.htm>

Baltic Sea fish species

http://www.helcom.fi/environment2/biodiv/fish/species_communities/en_GB/communities/

The Baltic Sea provides a good example of what happens when water conditions change. Abundances of fish and even the ability of fish eggs to hatch change as environmental conditions change.

The Baltic Sea is a semi-enclosed epi-continental brackishwater multibasin sea characterized by strong spatio-temporal gradients in the main hydrographic parameters (temperature, salinity and oxygen). The sea is also subjected to a substantial impact of variety of human activities like fisheries, pollution/eutrophication, maritime transportation, tourism etc.

The Baltic Sea fish communities consist of fish from various origins: **marine** species, **freshwater** species, **migratory** species and **glacial relicts**. Also occasional marine visitors and alien species are found in the Baltic. Representatives of these categories have different preferences for environmental conditions. For example, marine fish prefer more saline areas, freshwater fish prefer less saline areas and glacial relicts are more abundant in cold-water layers in the deeper areas. The composition of fish communities varies in different regions of the Baltic Sea in relation to different habitat characteristics of these regions with salinity, water temperature, and nutrient availability among the important factors.

The fish species found in the Baltic Sea are a mixture of marine and freshwater species adapted to the brackish (low salinity) conditions and their distribution is largely governed by salinity levels. Of the roughly 100 fish species inhabiting the Baltic Sea, about 70 marine species dominate the Baltic Proper, while some 30-40 freshwater species occur in the coastal and the innermost areas.

Marine species:

Sprat



Herring

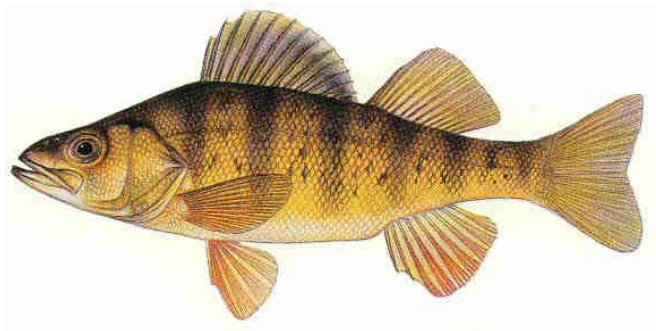


Baltic Cod



Freshwater species:

Perch



Pike



Bream



Roach



Burbot

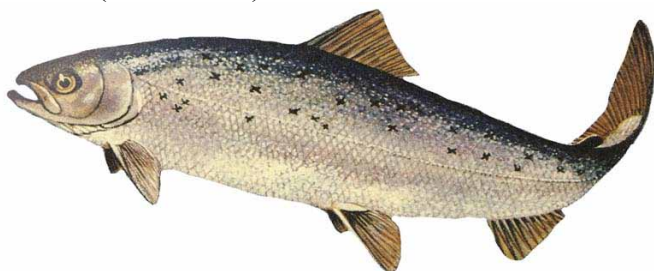


vendace



Migratory species

Salmon (*salmo salar*)



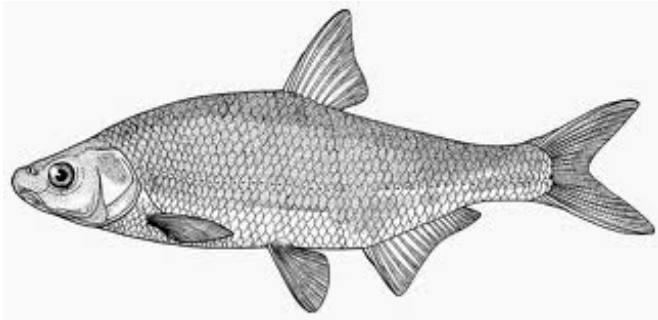
Sea trout (*salmo trutta*)



whitefish or powan (*Coregonus* species),



Vimba



smelt (*Osmerus eperlanus*)

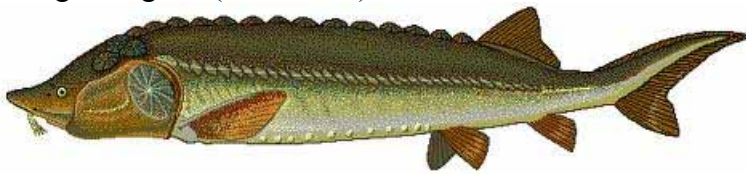


eel (catadromous)



Alien species:

beluga sturgeon (*Huso huso*)



sterlet (*Acipenser ruthenus*)



Siberian sturgeon (*Acipenser baeri*)



pink salmon (*Oncorhynchus gorbusha*)



Glacial relicts:

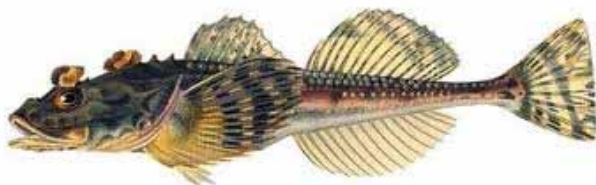
Eelpout (*Zoarces viviparus*)



lumpsucker (*Cyclopterus lumpus*)



sculpin (*Myoxocephalus quadricornis*)



AMBER



Baltic amber is found only in these places:

<http://www.amberbebe.com/Lemon-Round-Baltic-Amber-Teething-and-Adults-Necklace--free-amb-p-16214.html>



Lizards trapped in Baltic amber, found on a coastal sand dune nearby the port in Gdansk in 1997



The Amber
Butterfly Pendant



Patient search for amber



The Estonian State Maritime Museum (Meremuuseum)

Address: Pikk 70, EE-0001, Tallinn, Estonia

Opening hours all year: Wed-Sun 10 AM - 6 PM

Phone: (local) 641 14 09, (int) +372-641 14 09, Fax: +372-641 14 14

<http://www.abc.se/~m10354/mar/meremuus.htm>

The Baltic Sea is unique because it is a [REDACTED] where a sunken ship will be preserved for centuries.



Estonian archaeologists find pre-viking ship burial -Tallinn, 30.08.2010.

Ship burial has been discovered in Salme village, Estonia, this year and, as specialists forecast, it could appear a [REDACTED], LETA/ERR reports.

If archeologists' guess appears to be real, it turns out to be a unique finding on the European scale. So far, 16 skeletons of men killed in battle have been discovered on the site.

As specialists say, a fierce struggle took place some 1,250 years ago near a place where Salme village is located now, on the island of Saaremaa

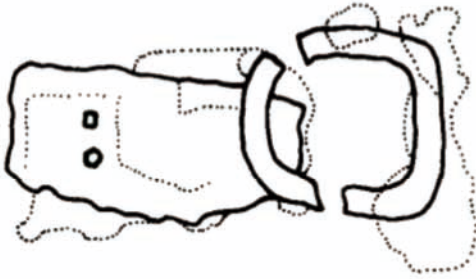
Jüri Peets, the Professor of Archaeology at Tallinn University, says: "Our estimate is 30 casualties, plus the same amount of injured. The skeletons bear sword marks. This shows the battle took place on land – you can't reach the enemy with a sword from a boat. There were also arrowheads found in the skeletons and in a shield."

Such a mass grave of warriors from that period has never before been discovered anywhere in Europe. Foreign warriors were buried on Estonian land with their belongings. For example, the findings included a gilded bronze sword handle. The archaeologists plan to extract a tooth from one of the skulls and submit it to a DNA-analysis to find out where the unwelcome visitors might have arrived from.

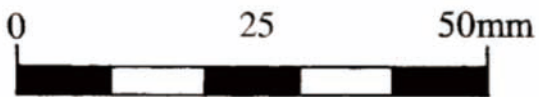
The estimated [REDACTED] and the width 3.5 meters. The excavations will continue next year by the village schoolhouse, where the bow of the ship is expected to be.

In 2008, a smaller ship with an estimated length of 10 meters was discovered during excavations in Salme.

http://www.baltic-course.com/eng/baltic_news/&doc=5758

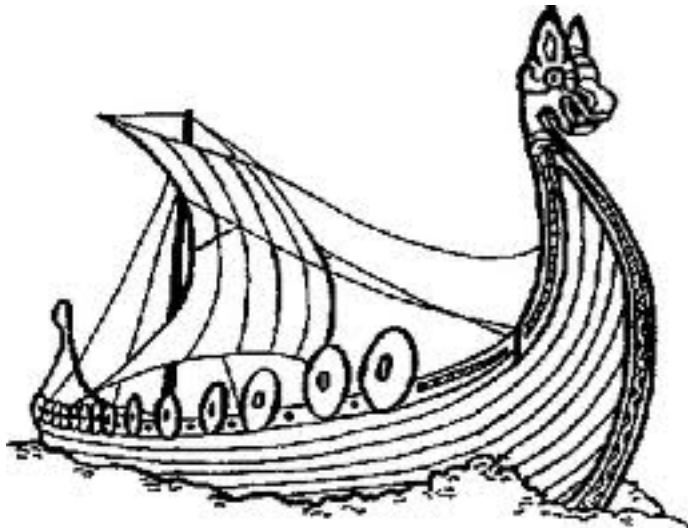


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Excavations at the [redacted] at Heath Wood, Ingleby, Derbyshire, England

<http://eprints.whiterose.ac.uk/635/1/richardsjd1.pdf>



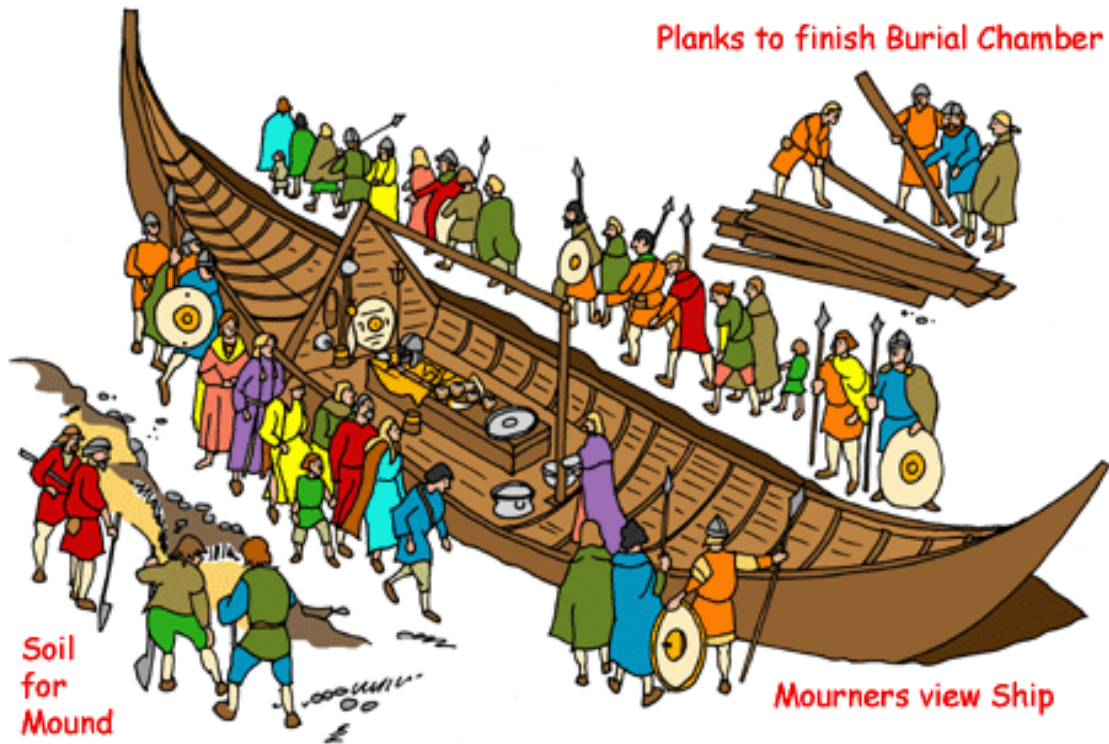
The Vasa Museum, Stockholm

On of the most extraordinary museums in Europe, the Vasa Museum is home to the royal flagship Vasa. Built to fight the kingdom of Poland [redacted] harbor before it could ever engage another ship. More than 300 years later it was successfully raised, preserved and restored by Swedish divers and scientists.



Old Rauma

<http://www.youtube.com/watch?v=1yW8z-iEIFI>



http://www.earlybritishkingdoms.com/kids/sutton_body.html



replica

[http://commons.wikimedia.org/wiki/File:Sutton_Hoo_replica_\(face\).jpg](http://commons.wikimedia.org/wiki/File:Sutton_Hoo_replica_(face).jpg)