Medieval Lighthouses
Part 9 -The Baltic Sea

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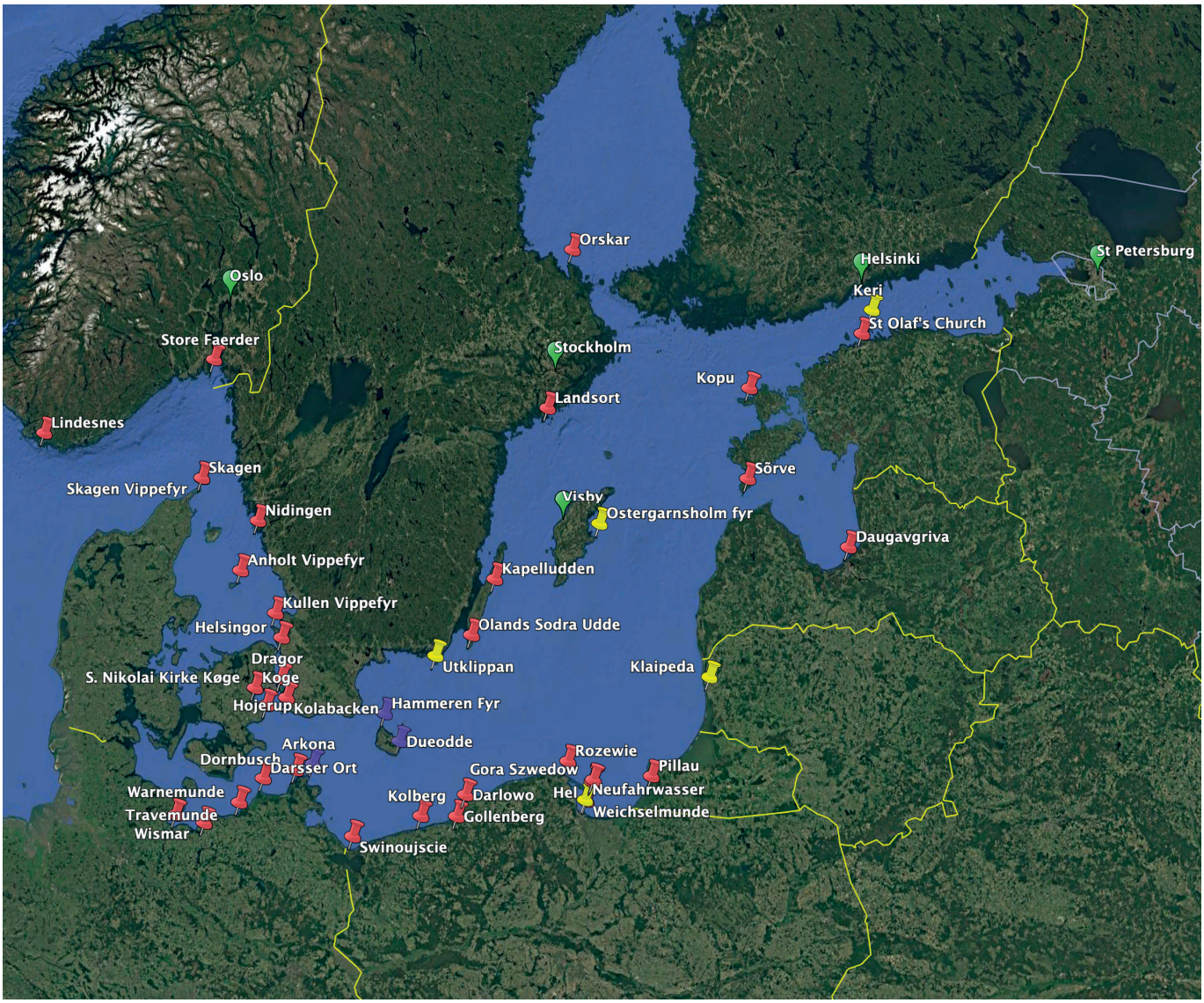
Extracted from Medieval Lighthouses (2026) ISBN 978-1-9993273-3-0 https://www.medievallighthouses.info



Before 1700, navigational lighting in the northern Baltic Sea was characterised not by purpose-built lighthouses but by a dispersed system of open fire beacons, typically consisting of wood or coal fires maintained on elevated headlands, skerries, or timber platforms near harbour approaches. Such lights are intermittently documented from the later Middle Ages onward in port ordinances, customs records, and sailing directions associated with major commercial centres such as Stockholm, Tallinn (Reval), and the approaches to Åbo/Turku, where difficult rock-strewn waters made pilotage essential. Responsibility for lights lay primarily with urban authorities, merchant guilds, or the Crown, rather than with ecclesiastical institutions, and the fires were generally seasonal, unstandardised, and dependent on local labour and fuel supply.

Northern Baltic lights remained primitive in execution and structurally diverse, a condition reinforced by sparse coastal settlement, prolonged winter ice, and the high cost of permanent construction. Only in the late seventeenth century, under expanding state administrative control - particularly in Sweden - did these pragmatic fire signals begin to evolve toward permanent light stations, marking the conceptual transition from ad hoc beacons to an integrated system.

Above: The modern lighthouse at Daugavgriva.
Below: The Kópu lighthouse in Estonia was originally built in 1531 and is one of the oldest working lights in Europe.

Above: The site at Sõrve was first lit in 1646.
Below: St Olaf's Church in Talinn was built in the 12-14th c. Clearly seen from many miles away it served as a vital beacon to the port.

Above: On the small island of Ostergarnsholmen are some remains of efforts in earlier centuries to provide lights at night. The flat-topped cylindrical stone tower is typical of an early fire tower.
Below: Landsort, Sweden (1651).

Above: The old lighthouse called Hammeren Fyr on the island of Bornholm represents a firm tradition of showing fire lights.

Bornholm

The island of Bornholm is often thought to be Swedish but actually now belongs to Denmark. Here we find a strong tradition of the use of fires in medieval times but there is little proven detail. Under Danish medieval law there was an obligation to maintain *båke* (beacons) and *søtårne* (sea towers) at key points on the coast. Around 1300 - 1400 Bornholm was ruled by the Danish crown, and its harbours at Rønne, Svaneke and Nexø were used for trading by ships in the employ of the Hanseatic League. A 16th century Danish description notes that " ... fire beacons are kept on Bornholm's high ground to warn and guide ships." This is clear evidence that despite its apparent remote position, the island was part of the same maritime culture that we find throughout this chapter. And similar issues are present too, that we are rarely certain about the locations and the history of showing lit aids to navigation.

As in other countries we can look at place names in the local language to hint at possible sites of beacons. Words like *Båke Bakke* (Beacon Hill) is one such. *Bakke* or *Båkhøj* in Danish coastal regions usually indicates sites of historic beacons. At Hammeren on the northwest tip of the island there is evidence of medieval lookout sites. For example, a stone platform called Salomons Kapel (chapel ruin) is thought to have doubled as a lookout. Early cartography and pilot books in the 16th and 17th centuries, as well as sailing directions for the Baltic, also mention beacons on Bornholm's coast. One example states: "A fire is shown on the high ground east of Nexø in winter seasons." Some charts mark "*Baken*" near Rønne or Svaneke. Although these are references on charts that were made in later centuries, these indications are usually a good indication of a tradition of finding a light shown from that location over many years. Such references are likely to represent the continuation of earlier practices, because Bornholm was already an important Danish outpost as early as the 13th and 14th centuries.

As we now know, a fire beacon was usually just a wooden frame or stone cairn on a hill on which a coal or wood fire was lit at night, sometimes watched by monks or dedicated employed keepers, possibly funded by harbour dues. Today Dueodde is famous for its enormous 1962 lighthouse - the tallest in Denmark, built on shifting dunes. Dueodde is a very low, sandy point on the south coast. Its waters are dangerous because of extensive sand banks extending far offshore. For centuries seafarers avoided coming too close at night. There are no known remains of a medieval tower at Dueodde, yet early pilot books warn of "the sands of Dewed" and mention beacons kept along the south coast. Local oral traditions collected in the 19th century say fires were lit on dunes near Dueodde as warnings, maintained by local farmers or fishermen in exchange for tax relief.

Nexø is an old fishing and trading town with a natural harbour on the east coast of Bornholm. It was active in the Hanseatic trade by the 14th century and hosted seasonal markets. It is logical to conclude that the port was indicated by fire lights such as "Nexe Baake" a fire mark maintained for seafarers approaching from the east and mentioned in pilot books from the 1500s. A formal lighthouse was eventually built near Nexø in the 19th century.

Above: At Kapelludden on the Swedish island of Öland there is archeological evidence that a medieval lighthouse was constructed in the 13th c, assisting mariners sailing to the Hanseatic port of Visby. The presence of a nearby chapel supports this because of the association of religious settlements with showing lights in these centuries.

Above: Örskär was the most northerly medieval lighthouse. Originally of wood (1684) this structure dates from 1740. [Peyman Zehtab Fard 2014]

Sweden

Stockholm is situated at the narrow strait between Lake Mälaren and the Baltic Sea, surrounded by archipelago waters, rocks, and shoals. Approaching the city from the sea was treacherous, especially in poor weather or darkness. Safe navigation was critical for merchant ships from Lübeck, Danzig, Visby, and Tallinn, which frequently traded with Stockholm. While not a full Hanseatic League member, Stockholm had a strong Hanseatic presence, as German merchants from Lübeck and Visby established a permanent community there by the late 13th century. Stockholm had no stone lighthouse in the medieval period but a system of fire beacons, visual landmarks, and pilot-guided signals almost certainly existed, especially by the 14th–15th c when Hanseatic trade peaked. Thus, there is strong circumstantial evidence for the use of ancient lights or beacons including signal fires, torches, and church towers to help Hanseatic and other traders safely approach the port. Fires were probably kept burning on small islands just outside the harbour on Skeppsholmen or Kastellholmen or on Stadsholmen's southern cliffs where Stockholm's old town rises from the sea. These fires were simple navigational aids, wood or pitch fires in iron baskets or on masts, lit by watchmen. This was a common practice in the medieval Baltic, as seen in places like Gdańsk, Visby, and Arkona. Of course, the use of Church Towers as daymarks was important too. The tower of Storkyrkan (the Great Church) and later Riddarholmskyrkan probably served as visual navigation aids, visible from a distance. These towers were among the tallest structures in Stockholm and often painted or tiled in distinctive ways. Though not lit, they helped sailors align their vessels with the harbour entrance. Medieval sailing into Stockholm followed narrow routes through the Stockholm archipelago. Some of these routes, such as those past Sandhamn or Fjäderholmarna, may have had fishermen or pilots who lit fires to guide ships through narrow passages. Local pilots called *lotsar* were active from at least the 14th c and were often responsible for maintaining these beacons or signals.

Above: The lighthouse at Falsterbo, Sweden (1635) marks the strategic point of land where ships change course into the western Baltic Sea.

Falsterbo Lighthouse

The sea route past the Falsterbo headland has always been dangerous because of the moving sand banks hidden under the sea. In 1230 members of the Dominican Fraternity from Lübeck sent a letter to the Danish king Valdemar with a request that a "mark" should be build to warn seafarers. However, there is no evidence that it was ever built. It is likely, however, that a domestic house at Falsterbo was used as a seamark. In 1636 a lever or swape light was built at Kolabacken (Coal Hill). Towards the end of the 18th century the lever light was moved to the site of the present lighthouse, closer to the new shoreline. The lighthouse shown here was built in 1793-96 and the light provided by a coal fire at the top. This is an example of a situation in which a 13th century request for a seamark did not result in a lighthouse, but probably did result in an 'ecclesiastical' light. It took 400 years before a swape light was erected, so, even then, the building of a lighthouse did not follow until a further 150 years had passed.

Above: The two lighthouses at Nidingen in Sweden occupy the site of a very early medieval light shown from around 1230.

Nidingen

Nidingen is a small rocky island off the coast of Halland, Sweden, in the Kattegat. It lies along one of the busiest medieval sea routes in Scandinavia, used by ships traveling between Denmark, Norway, and the ports of the western Baltic. Nidingen has long been known for its "double beacons." As early as the 13th and 14th centuries, Scandinavian sources mention two coal-burning lights here. These open braziers or iron baskets were mounted on wooden structures and kept alight at night when weather and traffic demanded. The use of two lights was deliberate and is a fine example of a principle we shall find used elsewhere. From certain approaches, if the two lights appeared one above the other, you were in the safe channel. If they appeared side by side then you were off course and heading toward dangerous shallows. This is one of the earliest known examples of what we now call a leading light system or range lights. It was a very advanced idea for the Middle Ages and this is one of the earliest examples.

Above: The lighthouse of Daugavgrava stands at the southern bank of the entrance to the river Daugava, a vital artery leading past the Latvian city of Riga and deep into the heartland of eastern Europe. As such, it was a significant site for merchants of the Hanseatic League. On the norther bank opposite once stood a Cistercian abbey founded in 1205 and the showing of an ecclesiastical light almost certainly began the long tradition of navigational lights shown here.
Below: A similar lighthouse stands at the port of Klaipeda, once known as Memel in today's Lithuania. This was another important entry point to waterways used by Hanseatic League merchants and there is good reason to believe that a medieval beacon was set here to help them find their destination.

Poland Is Not Holland

The shape of a coastline is not just a geographical fact but deeply affects the kind of maritime culture that develops. We have noted how Poland has a fragmented, lagoon-rich coast, full of spits, lagoons, and shallow estuaries. Good harbours were rare and often difficult to access because shifting sandbars and narrow channels blocked larger seagoing ships. Instead of many natural deep-water harbours, the coast had river mouths feeding lagoons. These were excellent for fishing fleets and small coastal traders, but not for big, long-range vessels.

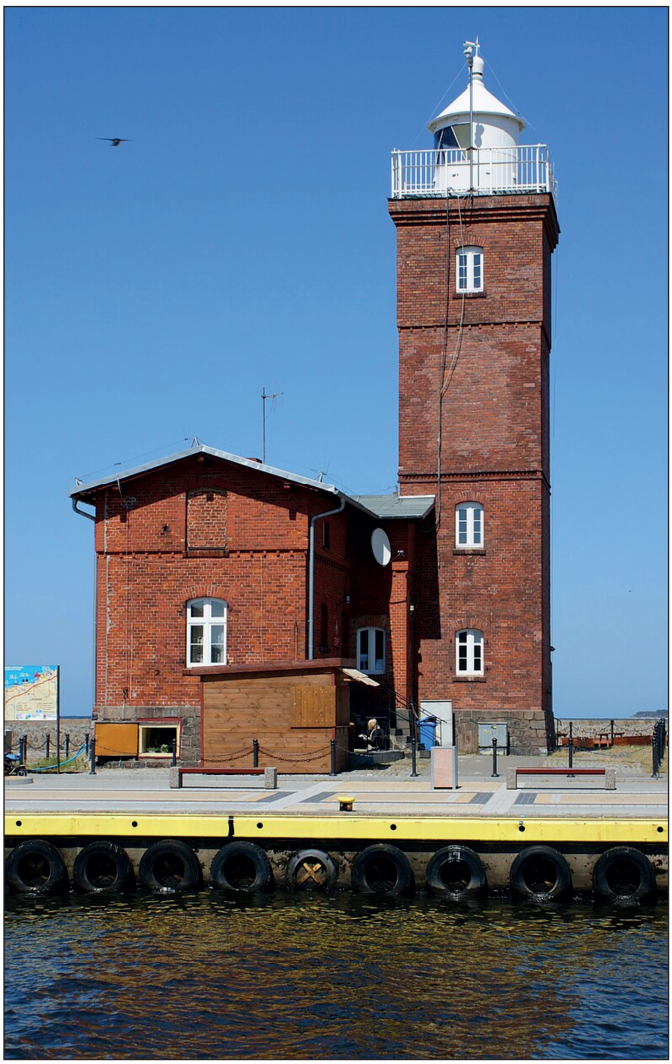
Generally speaking, major trading centres developed where inland trade routes met the sea, as at Gdańsk (Danzig) at the mouth of the Vistula where a deep estuary gives access far inland; at Elbląg (Elbing) in the Vistula lagoon; at Kołobrzeg (Kolberg) in West Pomerania; at Szczecin (Stettin) at the mouth of the Oder. Each of these cities relied on river navigation to draw grain, timber, and amber from the interior. These ports were active in the Hanseatic League, trading with Lübeck, Visby, Bruges, and London, but Poland's political core was inland and maritime policy was often delegated to Pomeranian dukes or Prussian administrators. We must also remember the climate. Most shipping was seasonal because the Baltic froze in winter and ships made mostly short-haul trips to Lübeck, to Scandinavia, rather than long oceanic voyages.

So how does this compare with the Netherlands? Holland also had a complex, lagoon-rich coast: the coast in the Middle Ages was also full of estuaries, tidal inlets, and shifting sands. Like Poland, Dutch ports of Amsterdam, Hoorn and Enkhuizen started as riverside settlements behind barrier islands. However, the Dutch had direct access to the North Sea and the Atlantic. Large tidal ranges allowed development of harbours and sailing expertise. Furthermore, Dutch maritime cities dominated the nation's politics and invested in fleets. In Holland there was a dense urban network relying on overseas trade in goods like fish, herring, wool, grain, while Poland made agricultural products such as grain and timber and was less reliant upon shipping by sea. The Dutch were early builders of ocean-going ships and made direct Atlantic ventures from the 15th c. onwards, whilst the Poles used mainly Baltic coasters (cogs), oriented toward Hanseatic trade rather than oceanic exploration.

So both regions had barrier coasts and lagoons that initially encouraged small craft, fishing, and regional trade. The Dutch solved their shallow-harbour problem by becoming experts in harbour engineering (canals, dikes, dredging) and building ships adapted to shallow waters (fluyts, herring busses) and then went beyond the North Sea into the Atlantic. Poland's ports remained river-mouth gateways rather than centres of maritime innovation. The complex spits and lagoons actually restricted large-scale port growth, except where major rivers broke through.

None of this implies that the Polish mariners did not respect or desire lights in medieval times, but merely indicates why there might appear to be a strong concentration of medieval fire towers in the Netherlands compared to Poland.

Below: The harbour light at Darlowo is another location where firelights were probably used.



Above: This lighthouse (1945) at Kolobrzeg in Poland is on the site of a medieval lightstructure (1666).

Above: The lighthouse at Baltiysk was built on the site of a medieval lightstructure of 1306 called Pilau.

The Unusual Polish Coastline

The southern Baltic coast (Poland's coastline from Szczecin to the Vistula delta), has many long, narrow sandspits and barrier spits like the Hel Peninsula, the Vistula Spit, or the Łebsko spit. They are the natural result of coastal geomorphology in a low-energy, low-tidal sea with strong currents along the shore. The Polish coast is fed by rivers such as the Oder, Parsęta, Wieprza, Łeba and Vistula that deliver huge amounts of sand and silt into the Baltic. During the last Ice Age, glaciers left behind enormous deposits of loose sand and gravel. Post-glacial rivers and waves have been redistributing that material for the last 10,000 years. Now, with a strong longshore drift in the Baltic, prevailing winds are westerly to north-westerly and waves driven by those winds hit the shore at an angle creating a longshore current that sweeps sand eastwards along the coast. Over time, that current piles up sand into elongated ridges. But the Baltic has almost no tides so waves and currents dominate. The seabed is shallow for many kilometres offshore, which means sand can accumulate and build outward without being removed by deep tidal scouring. Once a spit starts to grow, it shelters the water behind it, forming a lagoon or lake like Jamno, Łebsko and Gardno. Calm conditions behind the spit allow more fine material to settle, helping the spit grow even more. Much of the Polish coast is a young post-glacial landscape, still adjusting after the last Ice Age. Rising sea levels after the glacial period drowned river mouths, creating bays that spits could gradually close off. The spits are, in effect, moving dunes formed by the constant reshaping of these spits.

It might seem to be a diversion to consider the geography in this way, but in the study of how lights were considered to be necessary in these regions, we might consider for a moment how the story we have unfolded in the southern North Sea might be related to the story of the southern Baltic Sea? After all, the peoples of the low countries became world-leading mariners and in medieval times were strong supporters of navigational aids ...

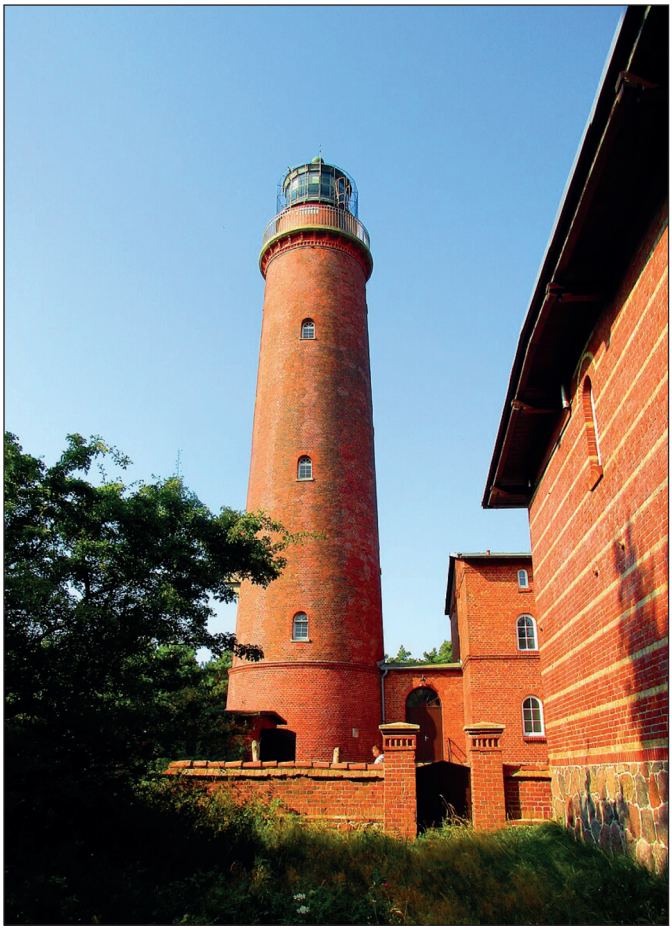
Above: The tower of Weichselmunde is the oldest site of the Danzig light (1482) and slightly farther from the sea on today's coastline. However, it marked an important location for the Hanseatic League traders. Below: The more recent Neufahrwasser lighthouse of 1893 is close to the port entrance, built when Danzig was in Germany.

Above: The lighthouse at Hel in Poland is at the end of a long peninsula that protrudes into the Gulf of Gdansk.

The history of Poland (aka Pomerania and Prussia in the past) is too complex to be described here and there are many changes of names involved with the oldest confirmed lights at the mouth of the Vistula river. Here, the major city (once German) of Danzig (now Gdansk the capital of Poland) was a leading member of the Hanseatic League and therefore needed navigational aids to enhance its trading success. Inspection of the maps provided show that the Gulf of Gdansk is partly enclosed by an extensive peninsula ending at the Point of Hel. As a member of the Hanseatic League, there has been a strong medieval incentive to provide lights to assist navigators into Danzig dating from the 15th c. Evidence exists for the presence of lights in 1482,[1] but it is believed that ancient fires in important locations were shown much earlier than that.

Below: In Poland, the old light (right) at Rozewie (1822) was in a strategic location for mariners seeking the Gulf of Gdansk. Again, incentivized by Hanseatic trading, there is good reason to believe that fires were kept alight here in medieval times. A more modern lighthouse is in the left of the picture.

Above: At Cape Arkona there was probably a fire.



Above: At Darsser Ort there may not have been.

To Light Or Not To Light?

Any inspection of the maps provided in this chapter must conclude that where there are headlands around which ships must sail to reach a destination we might expect to find a lighthouse. The images I offer here are proof that it is the case today. But what of the past? Surely it was always true? Yet we have also come to realize that in the centuries of interest there was no other method of signalling from shore to ship than by means of a fire. As we pass in our mind's eye along the coast, transiting from country to country, we recognize the same principles at play no matter what the nationality or geography. The difficulty is that in our world today we expect to find history in great detail. Surely the writers and archaeologists have studied all of this? Sadly, the answer is no. A fire on a beach or a hilltop will have left almost no trace, but surely a built structure would remain for later inspection? Well, not if made of wood, unless there were very special circumstances. And if a site proved so useful that a series of structures were built then they were often renewed using foundations of the old ones.

This page holds two locations in eastern Germany. Cape Arkona is of such importance to navigators that two modern lighthouses are to be found here. The older square tower dates from 1828, whilst the newer taller tower was built in 1902. But the location is of such significance that medieval lights were shown here. In pagan Slavic times before the 12th century, Arkona was the site of the temple fortress of Svantevit, a major cult center. Fires were reportedly kept burning on the temple hill, possibly functioning as signal or beacon fires for sea travelers. Then, after the Christianization of Rügen in 1168 by Danish forces under King Valdemar I, the temple was destroyed, but the hill remained a strategic signal point. A beacon fire or signal was probably maintained from the 13th century onward, especially given the site's prominence on Hanseatic routes between Lübeck, Stralsund, and Copenhagen. Unfortunately we do not have direct evidence of medieval lights at Darsser Ort. It is an important headland on the route out of Lübeck to the eastern Baltic Sea and given the frequency with which lights were shown elsewhere it is a good candidate for a medieval beacon of some kind.

Above: Travemünde lighthouse in 2025. This was a most important site for it marked the entry to the Hanseatic League's leading city of Lübeck.

Travemünde

Lübeck became increasingly reliant on the success of its marine traffic and it was clear from an early stage that a lighted aid to navigation was vital at Travemünde, the entrance to the River Trave, the arterial route to the city. The earliest year when a light was shown from Travemünde was in 1226 and the first official record of its existence was in 1330. Unfortunately, when conflict with Denmark came into play, Danish troops destroyed the first lighthouse in 1534. The lighthouse we see today is almost the same as the rebuilt second tower lit in 1539. It is the first lighthouse in Germany and a good candidate for the oldest surviving[2] medieval lighthouse.[3] First lit with an open wood fire, it was later changed to lamps burning hemp oil and magnified with gold-plated reflectors. The upper part of the tower was badly damaged in a fire from a lightning strike in 1827 and then repaired and fitted with petroleum lamps. The lighthouse was electrified and lit by arc lamps in 1903, the transition to incandescent lamps being made in 1937.

The Teutonic Order

The Teutonic Order was a Catholic military and monastic order founded around 1190 in Acre during the Third Crusade. Over time, it transformed into a powerful crusading and state-building force in the Baltic region, playing a major role in shaping medieval northeastern Europe. Its original purpose was to care for Christian pilgrims in the Holy Land, but it later took on a military role. By the early 13th century, the Order waged a series of Christianization campaigns against pagan peoples. Having gained power over them, and in more peaceful times, the Order promoted German settlement in conquered areas and built churches, monasteries, and schools. It then established laws and administrative structures and engaged in Hanseatic trade through its ports like Königsberg, Memel, and Elbing. There is reason to believe that its civilizing influence and desire for trading across its extensive sphere of influence played a significant role in the maintenance of lighted aids to navigation throughout the medieval - especially the Hanseatic, period.

Above: The site of a medieval light at Kullen (1230) is now occupied by this modern structure.

Across the North and Baltic Seas, the high towers of churches were commonly used as landmarks. Medieval sailing instructions and later studies stress that pilots often "used conspicuous artifacts … such as church towers, chapels on the shore, castles, windmills, gallows, etc." as navigation marks.[4] For example, a 17th c. Dutch source notes that Rostock's St. Petri Church (about 132 m high) was visible from roughly 30 nautical miles at sea, and a lost church tower in Vlaardingen (Holland) once guided ships into the Maas. Although most were not lit as beacons, at least one chronicler[5] speculated that Hanseatic cities built their great spires with nautical utility in mind. Where fires were lit, they were often "assigned to pilots or stations" by the late Middle Ages. For instance, Travemünde's "signum" tower was reported to have a *custos lucernae* (guardian of the light) in 1316, suggesting an official lantern keeper was paid.

Although it is recorded that the oldest lights in Denmark date from 1560, there is a tradition that lights were shown from a window in the Church of St Nicholas from the 14th c.[6]

Just north of Gammelkjøgegaard are visible remains of an old church in Køge. The church is named after the patron saint Saint Nicholas. In 1288, "Royal Køge" was moved on a royal initiative to the coast. Around 1300 there was a church without a tower. The tower, on the other hand, is the oldest preserved building of the present church, which was built around 1324. In the 14th century a further piece of woodwork was added, namely the present bell chamber with five clocks. The oldest is from 1470. With the clock tower, the tower is 43m high. The tower has served as a fortress and lighthouse for the seafarers. The eastern side of the tower's top logs is equipped with a walled carnival, a fog lamp from around 1400. The oldest still existing lighthouse. Today a light cross is mounted outside. The wall of the first church is preserved in the west wall of the church. The church's length with the tower is 57.5m and the width is 22.75m. The tree-lined long house was inspired by the brick Gothic in the northern German Hanseatic cities.

Skaggerak And Kattegat

The northernmost tip of Denmark is essentially the meeting place of the North and Baltic Seas. All shipping travelling between the two seas must pass through the Skagerrak with its 50 km width of water where strong currents offer challenges to mariners. Besides the two later stone towers, visitors can find a fine reproduction of a vippefyr, swape or lever light.[7] The vippefyr shown is a reconstruction of the original vippefyr which was built in 1626. Stevenson[8] attributes a Dane called Jens Pedersen Groves with the invention of a wooden construction that incorporated a lever mechanism by which burning coals in an iron brazier could be elevated to make a navigation light. Such devices were also sometimes called bascule lights.[9] The name is derived from the French for 'seesaw' and refers to the counterbalancing of the lever, which facilitates raising and lowering the basket; when one end is lowered the other is raised. Some have concluded that the vippefyr system was generally ineffective as it produced little light and was usually unreliable. However, there were a number of advantages. Not only was it simple and cheap to make, but it could be maintained and operated by a man working on the ground. Furthermore, when mounted on wheels, it could be moved to a different position, an act that was necessary at locations with shifting sandbanks.

In 1560 Frederick II of Denmark ordered the erection of beacons at Skagen, Anholt and Kullen to mark the main route through Danish waters from the North Sea to the Baltic.[10] This is the earliest recorded instance of lighted aids to navigation in Denmark. The exact design of these lights is not known, but we can expect that such a basic mechanism had been used in far earlier times. Perhaps Grove's invention had something to do with the mechanism for hoisting the light and exhibiting it with greater efficiency. Again, there was a system of light dues to be paid by passing ships and the proceeds of these "Sound Dues" for the use of the "Øresund", which King Eric of Pomerania introduced in 1429 remained in effect until 1857. The vippefyrs at Skagen, Anholt and Kullen were not the only such lights. For instance, in 1705 the Danish postal service established a bascule light on the island of Bågø in the Little Belt on the mail route between Assens and Årøsund. Another replica light can be seen at Verdens Ende, Norway on the southernmost tip of Tjøme on the west side of the entrance to Oslofjord.

Above: An example of a swape light or vippefyr, is located at Skagen in Denmark. Made of wooden beams, the design was based on a simple lever mechanism to elevate a brazier burning wood or coal (if it was available) to sufficient height for it to be seen by navigators.

Above: It may be that the avoidance of routes around the Skaw of Denmark where the confluence of ocean currents caused dangerous conditions led to the development of the cog-type of ship, a design better able to cope with the difficult sea conditions here.
Below Left: Skagen was not lit with a fire-tower until 1747.
Below Right: It was followed by a modern lighthouse in 1858.

Above: On the mainland at the entrance to the fjord leading into Oslo, (Verdens Ende - the End of the World) a reproduction (1932) vippefyr has been created to represent a medieval navigational aid. Unlike the case at Skagen, we have no evidence that there was ever a beacon at this location. In the far distance centre left we can see the modern lighthouse called Faerder on the small island of Tristein. An original medieval fire beacon was lit on another nearby island called Store Faerder in 1696. It no longer exists.
Below: The latest Lindesnes lighthouse (1915) is at the southernmost tip of Norway in the Skagerrak. A medieval lighthouse was built here in 1656, the first in Norway.

Conclusions

From the 12th and 13th c the idea of making elevated lights using the lever principle proved to be a popular solution in these waters. Criticism of these lights as being ineffective was unwarranted in view of the absence of anything better.

Though it appears that the setting of fire beacons was common throughout the maritime routes of the eastern European countries, there are very few firm documents in support of their locations.

The provision of navigation lights never improved beyond simple fire baskets until the earliest stone towers appeared in the 16th c, for example at Kõpu.

In this chapter we have come close to the central idea of the period which was to assist the mariner with highly visible daymarks but to supplement the navigational aid with occasional fires atop the structures.

The Hanseatic League provided a stimulus for the creation of a network of medieval lighthouses to facilitate maritime trade between the Baltic and the North Seas through the narrow waters of the Skagerrak and Kattegat separating Norway and Sweden from Denmark.

We have no confirmatory evidence that the Hanseatic League actually built or commissioned lights directly. However, there seems no doubt that the incentive to enhance trading practices was a motivation for maintaining ecclesiastical lights already in existence or for building new ones.

The evidence of this chapter is that there were a great many fire lights shown along the coasts of the North and Baltic Seas, and that the principle of assisting mariners by means of lights at night was well established into the 12th and 13th centuries. The only retardation to the expansion of the network was the provision of suitable resources.

Notes

1 Zemke, p27.

2 When I use the word 'surviving' I am taking into consideration the fact that renovations have been made, but that the basic form of the structure is the same as when it was originally built.

3 It is in close competition with the Lanterna of Genoa.

4 kon_geo-20140623112115

5 Vogel 1915

6 http://koegekirke.dk/kirken/kirkens-historie

7 Vippefyr: Wiki Vippefyr 20181031

8 Stevenson (1959), p274.

9 Wiki Vippefyr 20181031

10 Hahn-Pedersen, Morten (2003) "Reports on Baltic Lights - Denmark", in Jerzy Litwin (ed.) Baltic Sea Identity: Common Sea – Common Culture? Centralne Muzeum Morskie w Gdańsku. Also Hermansen (2001).