

The Viking Port, Trondheim, Norway

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ABSTRACT

BRABRAND, T., 1990. The Viking Port, Trondheim, Norway. *Journal of Coastal Research*, 7(1), 85-106, Fort Lauderdale (Florida), ISSN 0749-0208.

This report deals with Norway's ancient capital and its port; discussion is initiated by some facts of today's Trondheim (Nidaros). Background information goes back to the sagas and the time of Leiv Eriksson's route from Trondheim to the northern states of America about A.D. 1000. New results from archaeological excavations during the last 17 years are presented as background for the development of the town towards royal power, political administration and maritime activity in the Middle Ages. The archbishop's seat in Nidaros (1153-1537) consolidated the town's position even when it ceased being the national capital.

Special incidents from the port's history from about A.D. 1000-1200 and from the 17th, 18th and 19th centuries as well as from the two world wars are presented. Memories and atmospheres from Munkholmen, the small island just outside the entrance to the harbour are included. Finally the post-war time is mentioned, and symbolically the discussion concludes in Nidarosdomen (the Cathedral of Nidaros).

ADDITIONAL INDEX WORDS: *Archaeological excavations, Leiv Eriksson's travel route, port authorities, Norse sagas, Trondheim harbour, war sailors' monument.*

Trondheim Harbour 1989

Trondheim with its present 130,000 inhabitants is the third largest city of Norway. Trondheim is sited about 50 km inland on the fjord and by the mouth of the river Nid (63°25.6' northern latitude and 10°24.1' eastern longitude) on the west coast of the country. The waters are clear, easy to navigate and with no special perils. The fjord is always ice-free and relatively unpolluted. Mean tidal range is 1.8 metres. Wave action is moderate with wave heights up to 2.5-3 m during storms from the northwest.

The anchorage is marked by the characteristic Munkholmen about 2 km outside the harbour. In the north-west direction this island makes the only protection against the fjord. Additionally, the harbour and the city areas are protected by a rising landscape towards west, south and east. The Port of Trondheim has a good roadstead with water depth 30-100 m. By applying to Trondheim Port Authorities, one normally can get permission to dock at any time and be provided with any form of service.

Characteristic data:

Quay length *ca* 6,200 m

Max depth below M.L.W. is 11 m

Railway line *ca* 8,400 m

Harbour area *ca* 600,000 m²

Shed capacity *ca* 43,000 m²

Goods being reloaded in 1988: 1,614,000 tons

Dominating goods types: Fish products, fertilizers, grains, steel and minerals, cement and petroleum

According to the Icelandic historian Snorre Sturlasson (1178-1241) the Iclander Leiv Eriksson *ca.* A.D. 1000 started on his journey which led the first Europeans to the New World, exactly from the mouth of Nidelven *ca.* 500 years before Columbus.

The Original Harbour

Sporadic archaeological investigations have been ongoing in Trondheim for more than a century. During the last 17 years surveys have been conducted systematically. Experts and voluntary workers from different countries have participated in the work. Well-known his-

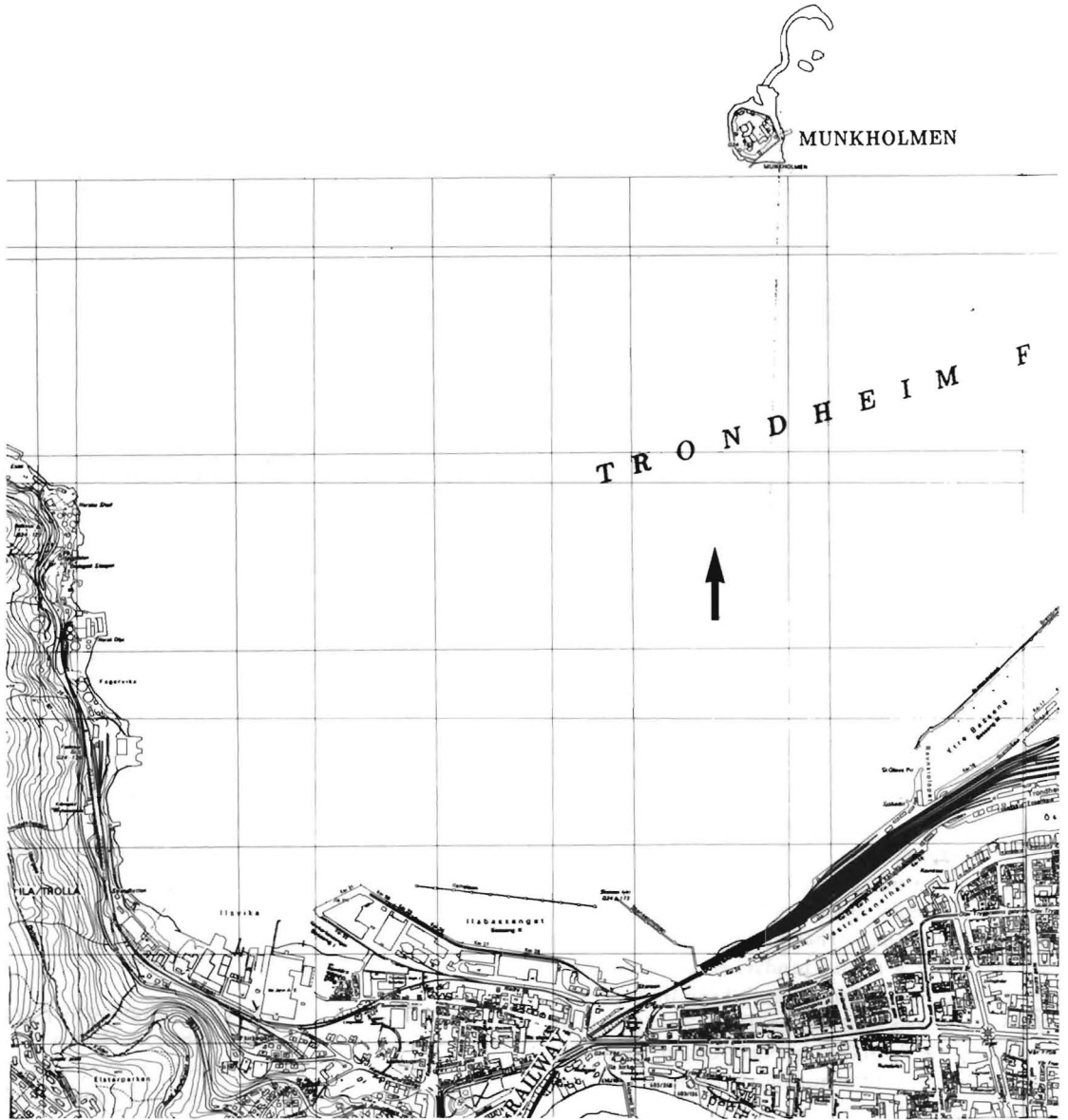


Figure 1. Trondheim harbour 1989.

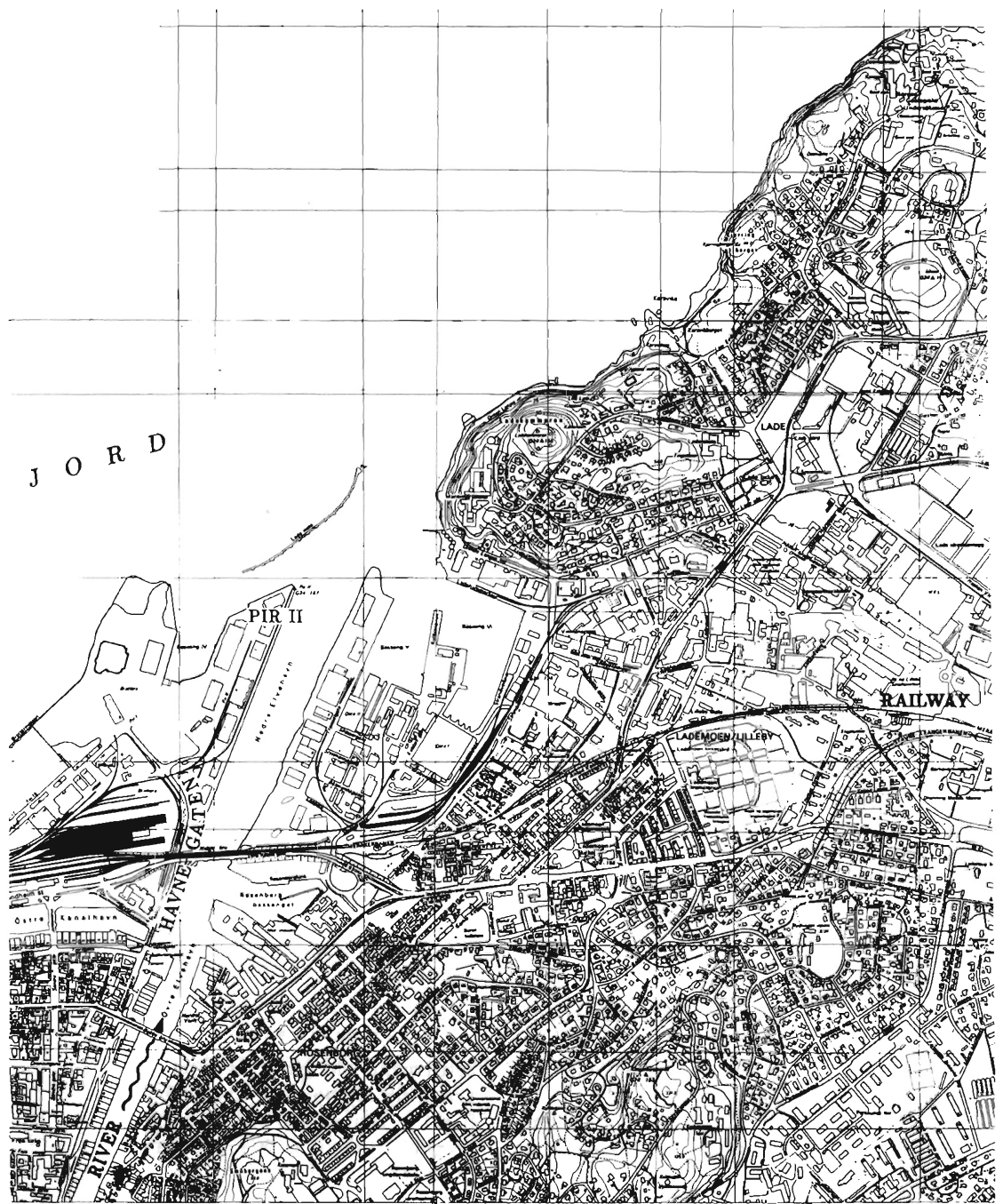


Figure 1. Continued.



Figure 2. Goods treatment in the harbour.



Figure 3. Leiv Eriksson's travel route.

torical data have thus been confirmed, and new information has appeared.

Before the results of the 17 years of systematic investigations were known, it was assumed that the town was founded in a rather unsettled area in the year 997 by the Viking King Olav Trygvasson. Figure 4 shows the development of

settlements along the sheltered, straight, western bank of the river above the outlet of the fjord. In contrast to other watercourses in the neighbouring areas this river has a favourable, rather steady flow due to the 60 km² Selbu Lake about 20 km above. The geological conditions have formed a firm, steep river bank, well

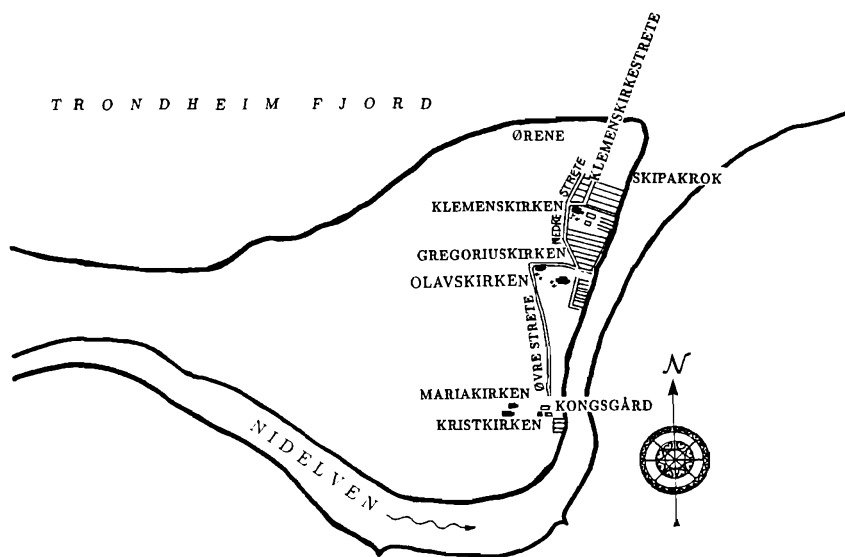


Figure 4. Trondheim (Nidaros) ca A.D. 1100.

sited also for the first settlers' ship mooring. "Skipakrok" is an ancient name from this area. However, the exact position of this harbour has been a topic for discussion.

Today the opinion is that the area was already settled. A farm probably was situated by the river curve above the outlet at that time. Besides, it has been proved that the west side was a good deal more irregular and partly less steep than previously assumed.

Figure 5 shows the most recent map of the settlement at NIDAR-nesset about A.D. 1000, worked out by the archaeologist Ph.D. Axel Christophersen. The great bay, or "lona," cutting inwards a short distance above the outlet is very characteristic.

The water depth permitted only large vessels to stay in the river outlet, but shallow drafts were allowed to enter "lona" and be dragged up on the gentle watersides without being disturbed by currents and drifting objects. The tidal range of that time was approximately as today, average 1.80 m. It shall be pointed out that the terrain in Trøndelag in the Viking Age (A.D. 800–1000) was lower than it is today. This is due to the fact that during the last glacial age the whole Scandinavia was covered by an unbroken, heavy layer of ice, pushing the land down. When the ice melted about 10,000 years

ago, the underlaying land ascended correspondingly, totally 150–170 m in Trondheim. During the latest one thousand years there has been a local rise of 4 m.

Looking at the remains from earlier vegetation it is seen that the mean high-water mark about A.D. 1000 reached a level between contour line +5.5 and 6.0—*i.e.* 5.5–6.0 m higher than average low-water mark today. There is no doubt that even if the basin in question was situated mostly on a dry low water ground, the inhabitants were able to use it. The Vikings had specialized in shallow draft, light ships being able to be easily managed onshore and into the country on shallow rivers. Loading and unloading could be done without side quays. Compare to the famous Bayeux-tapisserie (France) from the end of the 11th century (Figure 6). The "carpet" is showing details from clearing William the Conqueror's invasion fleet and landing in Southern England (1066). These descendants of the Nordic Vikings maneuvered their ships onto the shore area. The men waded ashore with both horses and equipment. From Norwegian history there are many examples of the fact that the vessels were pulled long distances across the country from one watercourse to another or between deep fjords in order to surprise the enemy or to avoid dangers. Char-

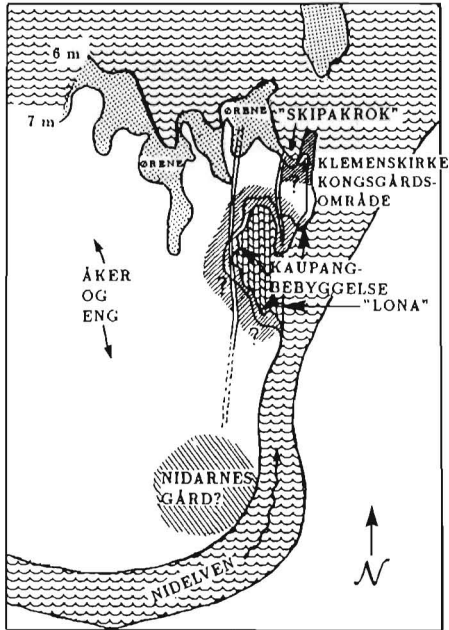


Figure 5. The oldest settlements at "Nidarneset" about A.D. 1000. The settlements are concentrated on the area around "lona." Further north and outside the settlements the oldest King's dwelling with Clements Church are situated near the river, partly on a headland. Below (northwards) the King's dwelling a creek makes a well-protected natural harbour, identified as the saga's "Skipakrok." Two traffic arteries, west and east of "lona" have connected the settlements with the area of the King's dwelling, Skipakrok and Ørene, the old thing site. Westwards the settlements were next to the home fields of the farm Nidarne. (Ph.D. Axel Christophersen—Trondhjemske Samlinger. 1988).

acteristic site names still reflect this ancient practice (Drag, Drageid, Eide *etc.*).

The Settlements of Olav Trygvasson

The Icelandic saga-teller, Snorre, writes: "And then King Olav took his men and made his way to Nidaros. And there on the banks of the Nid he let houses be built and proclaimed that it was to be a place for settlement. To his men he gave ground to build their houses, but his own dwelling was built above Skipakroken." Today this might be interpreted as follows: In A.D. 996 or 997 the King decided that the founding of the new town should be on the north-eastern nearby shore-area of the first harbour. The topographic conditions caused that the closer settlements principally were ori-

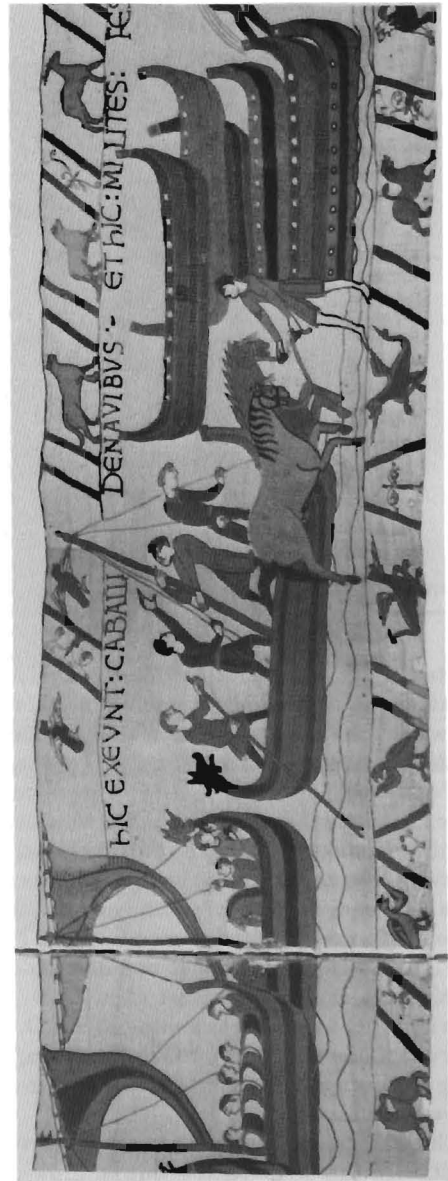


Figure 6. Details from the Bayeux-tapisserie (after Graham Campbell, 1980).

ented towards west. Apparently there has also been an early north-south-going road out to "Ørene" and the old market place.

Strategically the King's royal palace and the Clements church were situated on the north-east point towards the river. In this way the natural creek below the farm area points itself

out as "Skipakrok." Here they had an excellent outlook from the King's royal palace. The harbour had good arrival as well as departure conditions. When the open fjord of Trondheim was exposed to storms from north or north-west (the wave height might reach 2.5–3.0 m) this was the first place a seafaring man could find a shelter behind sand shoals.

The river mouth has, because of landfill, changed during the last forty years so that its direction has shifted from NW towards east. This combined with the fact that the highest waves propagate from NW, caused an adverse wave-current interaction at the river mouth. When waves and currents propagate in opposite directions, wave steepness will increase and thereby form unfavourable sailing conditions. Therefore, one can conclude that present day sailing conditions at the river mouth are better than those the Vikings had to cope with, see Figures 5 and 18.

The Norwegian historian P.A. Munch describes the following incident after the Icelandic scald Hallfred Ottarsson's visit in 996: "... and reached a harbour, but could not find room inside the anchorage because of the longships already lying there." They knew not whether these ships were the Kings'... Therefore they were forced to anchor far out at a very inconvenient place fully exposed to the ocean swell and currents such that the ship pitched dreadfully all night; each minute they expected the anchor rope to break. But as the morning passed a rowboat was seen to be approaching from the longships, steered by a tall man in a green jerkin. In a friendly manner he offered them his help to find a better and safer anchorage. At that moment the anchor rope broke. The man threw himself into the sea, caught the end of the rope and brought it up onto the ship. Then they broke ground and were shown the way into harbour by the men in the boat." (Their unknown saviour was naturally the King.) This must have happened in Skipakrok or the nearest part of the river. History tells us that Olav Trygvasson must have had about 30 longships (warships) or even bigger vessels lying here at the same time.

Shipbuilding in Trondheim has a leading position in the saga. Among other ships is mentioned the large ship "Tranen" that was built on "ørene" outside the river. However, no ship has been so frequently mentioned in heroic legends

and poems as the King's ship "Ormen Lange" (The Long Serpent) built at Ladehammeren a short time before A.D. 1000. The ship had 34 oar pairs. The ornament on the front was a golden dragon's head and on the sternpost a carved tail—both made by experts out of carefully selected materials.

Historians claim that Olav Trygvasson, on his last expedition in year 1000, had nearly 500 men onboard until he was put out of action and killed during the famous sea battle at Svolder in the Baltic. This statement is probably exaggerated, but his men were all selected, fearless warriors.

The River Harbour

Before continuing this historical report, the reader is invited to Gamle Bybro (Old Town's Bridge) where he can look down the river Nid and see how the area looks today. This part of Nidelven does not greatly influence the maritime harbour traffic, but the area is used as a marina. The buildings are used for shops, warehouses and parking. While the modern city and harbour have tried to solve their traffic problems by expanding and constructing various railway- and road bridges, there has been made a deliberate attempt at rehabilitating this row of original warehouses. After several conflagrations one has aimed at restoring the houses with the same exterior as before, but at the same time they have been adapted to modern requirements.

Consequently it is still possible to recall the atmosphere from Olav Trygvasson's days. P.A. Munch described the following incidents from A.D. 996:

(On his expeditions the Viking King had learned about Christianity and he got himself christianized. Later he introduced the new faith in a brutal and sly way as well in Norway as in its dependences—including the heathen Iceland.)

(1)... "It was just at that time that Olav had let the settlements at Nidaros be commenced, so there were many people there. The harbour and its surroundings was a lively place to behold.

One day in the autumn when the weather was fine and some of the town's people were enjoying themselves swimming, Kjartan (the leader of the Icelanders) suggested to his men to go there and watch them. This they did. Some of them



Figure 7. Upper River Harbour seen northwards. To the left "Iona" with the Viking Harbour and outermost "Skipakrok." After Aunes Forlag A/S, Trondheim.

even took part in the swimming. In particular they noticed a man who showed a greater skill at swimming than all the others. . . ."

This led to the ardent contest between Kjartan and the King, in which each strove to overpower his opponent by holding him as long as possible under the water. When there was almost a danger for one of them of losing his life, the victory finally went to the best contestant Olav Trygvasson who vanquished the Icelanders' hero, but the contest gave each respect for the other.

(2) . . . "Meanwhile construction of the town continued with great alacrity, and when Christmas was nigh, Clements Church was completed inasmuch that the Bishop could celebrate Mass there on Christmas night. Kjartan suggested to his men that they should go there and listen to the Christians. . . . Then they heard the sound of bells and fair singing and they smelt the fragrance of incense.

The King himself made a speech telling them of the importance of the festival, and said that the leader everyone should believe in was born that night." This was crucial for Kjartan being christianized with "all his ship's men."

Saurlid

The saga mentions several times a swampy area, called "Saurlid", *i.e.* the wet and muddy hillside. After some time the settlements did not have enough space between the river and "Iona" (Figure 5). By remedial actions such as platforms made by sand and clay, trellis-work, and posts the houses have been dragged to parts of the shallow basin as early as under Olav Haraldsson (the Saint) A.D. 1016–1030. In addition to the rising of the ground it is assumed that mud from the river, garbage, increasing vegetation and fouling have contributed to the build up from the bottom of the basin.

Finally, it looks as if the town in the early 11th Century had become an acknowledged center of administration and commerce around the powerful King. The Norse kingdom expanded to Iceland, the Orkney Islands, Shetland and Greenland. Consequently, the need for larger ships to maintain a stable contact and freight of more goods over exposed stretches of open sea became more and more urgent.

As frequently observed later at Trondheim harbour, reclamation of land was decided already early in the Middle Ages. Gradually Saurlid was forgotten as a harbour basin. Instead it became a town area with difficult ground conditions, "Kavelbruer" (*i.e.*, bridges constructed with top cover made of round logs) and extra drainage. The steep slope down to the river north-east of this area was strengthened with piers, timber, and stones. Outside of this bulwark the first quays in Trondheim were being constructed in the beginning of the 12th Century. At that time the town had existed for more than a hundred years. The settlements, being originally oriented westwards, were now seeking eastwards to the deeper river harbour. As far as prestige and economy is concerned, it became more and more important to have a house facing the river side where the warehouses were crowded along the western side of the river. See Figure 7.

The River Harbour and the Church

Trondheim, as a religious center, dates back to the death of King Olav Haraldsson (the Saint) in A.D. 1030. Again we deal with a former Viking chief who had been christianized and was killed in battle at Stiklestad (situated about 100 km north of Trondheim) against the overwhelming heathen chieftains. After the battle some of his faithful friends brought the coffin with Olav's body to the upper part of the harbour and secretly buried it in the river bank a short distance from Saurlid. A year later it was dug out and, according to the saga, became the object of signs and wonders. Olav was canonized a Saint. In the beginning the shrine with his body was placed on the altar in Clements Church, but about A.D. 1100 it was moved to Christ Church. This church had been built over the Saint King's first burial place, to which pilgrims from entire Europe made pilgrimages during centuries. On Figure 8 Nidarosdomen

(Christ Church) is reflected in Nidelven at the same place as the first Viking harbour had its inlet to the right in the picture. The Cathedral has occasionally been damaged by fires, wars, and lightnings, but has frequently been rebuilt. Today it is considered a national sanctuary of Norway. It is the second largest church in Scandinavia (after Uppsala, Sweden).

The Archbishop's Seat in Nidaros was established in 1153. It included six bishops outside continental Norway. Even if Nidaros was deprived of status as a capital before A.D. 1300, it kept on being a religious center for the former Norse Kingdom up to the Reformation (1537).

Strife and Storm at the Harbour

Exciting incidents on the River Harbour between the "baglers" and the "birchlegs" during the Civil War in Norway about A.D. 1200 are described in the saga.

(1) "The baglers" dominated most of the Norwegian coast, except the areas around Trondheimsfjorden. Their decisive drawback was the lack of larger vessels.

After an enthusiastic speech addressed to farmers and townsmen at the Christmas thing (legislative council) at Brattøra in January A.D. 1199 King Sverre obtained the resolution that a new fleet was to be built before the onset of spring, to meet the expected attack from the enemy.

The work started immediately, and its progress was enforced. However, when the "baglers" fleet arrived on May 7th the ships were still not completed.

The situation is illustrated on Figure 10 dating from A.D. 1681. The settlements had not developed as far towards north-west in 1199 as shown in the map. The town area was blocked by a quarterdeck westwards over the narrow Nidareid between the river and the fjord. The only connection with the land was Elgeseter bridge towards the south. The "baglers" made great efforts to conquer the bridge. However, the defenders had entrenched themselves along the river harbour on the town side. They were well equipped with small arms, well aware that on this side of the river only larger, deep-going vessels could navigate. The result was that the "baglers" left their ships at Ladhammeren, outside the harbour inlet. The bridge was attacked from the land side, supported by small



Figure 8. Nidelven with the Dome seen towards Gamle Bybro (1989). (Nidaros Domkirkes Restaureringsarbeider).



Erkebispesgården i Trondheim.

Figure 9. The Archbishop's dwelling place in Trondheim. After "Munkholmen" (Tvete & Stavseth, 1973).

boats sneaking upwards the eastern part of the river.

After two days of heavy fighting the "baglers" had to interrupt the battle because their fleet was threatened by a suddenly rising onshore wind. Consequently the "birchlegs" had 10 days to recover. The 25 new ships were set afloat, and

King Sverre won a total victory in the final sea battle.

(2) In April 1206 the birchlegs' King, Inge Bårdsson was celebrating his sister's wedding in Nidaros. By considering the defenders being dead-drunk on the wedding night, the "baglers" attacked. The King escaped because he spent the night with one of his mistresses. Nevertheless, he was in a rather miserable state when he swam over the river in his underwear. The town was exposed to great damage and a terrible massacre.

What Happened Later to Elgeseter Bridge?

Until 1814 Norway had been in union with Denmark for more than 400 years and Copenhagen was the capital. At this time there were wars going on with Sweden. Swedish troops also occupied Trondheim for ten months in 1658. During the siege and the reconquering the

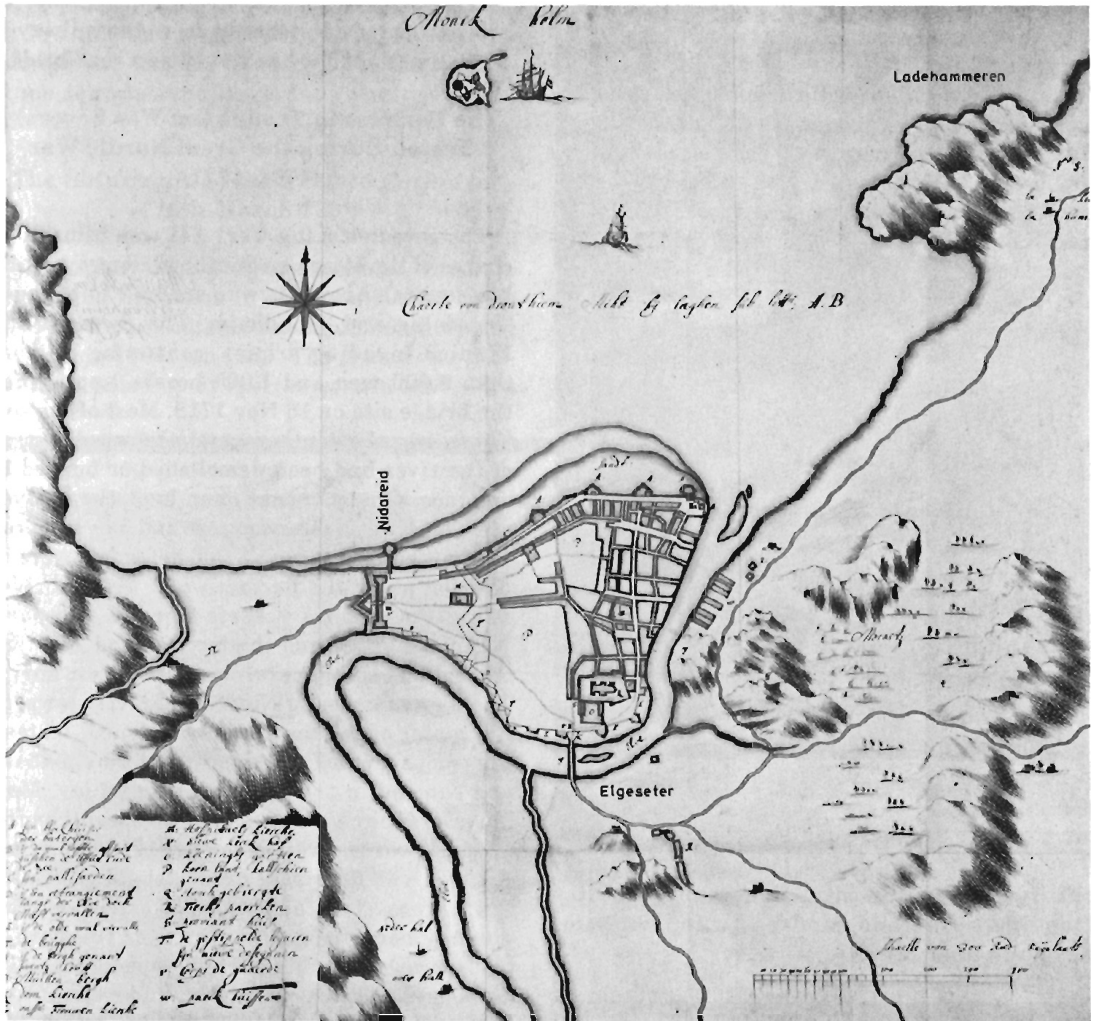


Figure 10. Anthony Coucheron's map of Trondheim after the conflagration of 1681.

bridge was roughly treated, and it turned out to be difficult to defend it. Consequently it was quite natural that the attention was focused on Elgeseter bridge when the King in 1681 sent his planning expert, general Cicignon, to Trondheim after the town had been destroyed by an accidental fire. Now the bridge was removed and replaced by "Gamle Bybro" (Old Town's Bridge) about 600 m downstream. Here it was possible to hoist a span. On the top of a steep slope, Kristiansten fortress was built. Thus it

was possible to defend the new bridge with guns. Figure 12 shows that the bridge was placed just above the original Viking harbour and the row of warehouses along the river harbour. These surroundings were not to be too much disturbed.

According to the general's advice the outlet of the river was narrowed by piers and stones, if not... "stones and sand will be thrown up in the harbour mouth in stormy weather, and then the harbour might easily become unfit for use." For



Figure 11. The monument of King Sverre. Ilevollen. Trondheim.

the rest, note the situation in Figure 10. Obviously clay and sand had a tendency to block the inlet.

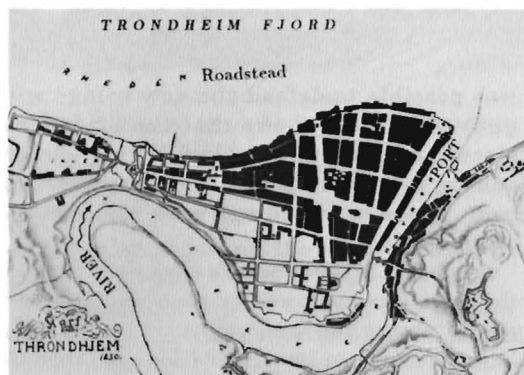


Figure 12. Map of Trondheim about A.D. 1830.

In order to limit future fire disasters, straight and broad roads were constructed. This characterizes the town also at present. Elgeseter bridge was reestablished to serve the railway in 1863. Since 1885 it has served as a road bridge.

The Fortress in Trondheim Was Severely Tested During the Great Nordic War (1701–1721)

The Swedish King Carl XII was himself in charge of the attack on Southern Norway, while his general Armfeldt was ordered to conquer Trøndelag and Trondheim. The Swedish and Finnish invading armies, consisting of more than 5,000 men and 1,000 horses, approached the bridge site on 16 Nov 1718. Most of the settlement in the southern and eastern direction of the river had been demolished or burned in advance. One thousand men kept themselves ready at Kristiansten fortress and four hundred at Munkholmen. About 3,000 defenders were in position along the northern and western river bank. Four naval vessels were in the port. When the guns from the fortress and Brattøra opened fire the general decamped in a hurry. The plan of crossing Nidelven directly towards the center of the town was abandoned. Instead the troops crossed the river about 10 km above and camped in the neighbouring valley, Melhus. Here they were preparing an assault on the town. However, on 10 December 1718 King Carl XII was killed outside Fredrikshald in Southern Norway. The campaign was cancelled. The journey back in mid-winter over the border mountains was a disaster, and most of the soldiers perished in snow, storm, and frost.

The Landslide at Arildsløkken, Nidareid, in 1722

The year after the official peace settlement the river was on the point of breaking through the shortest way to the fjord after a big clay landslide in the curve at Nidareid, Figure 10. The repairs became a military affair because of the importance of maintaining the town's natural moat. An impressive work was done by 300 soldiers from Southern Norway under the command of general quartermaster lieutenant Fabian Frost. 6,200 logs and 8,000 loads of stones were used for the repair work. The following year all the inhabitants of Trondheim

(ca. 5,000–6,000), already suffering from heavy loads after the war, had to pay a special tax to cover board and lodging for the military troops. At low tide the remains of the logs and stone foundations can still be seen. Up to this day the stone foundations have done their job adequately.

The Shipwreck of the Frigate *Perlen* on 16th March 1781

While the “bagler” fleet succeeded in escaping during the storm in 1199, conditions worsened for *Perlen* outside Ladehammen during a storm on 16 March 1781. The drama was accidentally rolled up by sportsdivers in 1967. This

led to marine-archaeological excavations in 1975–76. Findings of objects like bricks, grain, malt, chalk pipes and paint could be compiled with well conserved ship documents.

The previous history is as follows: During its War of Independence (1776–83) the States of North America were supported by France. Captured vessels were waiting in the North Sea and the Norwegian Sea. Nevertheless, when the English vessel *Delamare* went on its audacious journey from Liverpool to neutral Russia it was captured by a French ship and brought to Bergen. The ship and its cargo were sold on the open market according to the rules of that period. A shipowner in Trondheim bought the ship that was given the name *Perlen* (“The

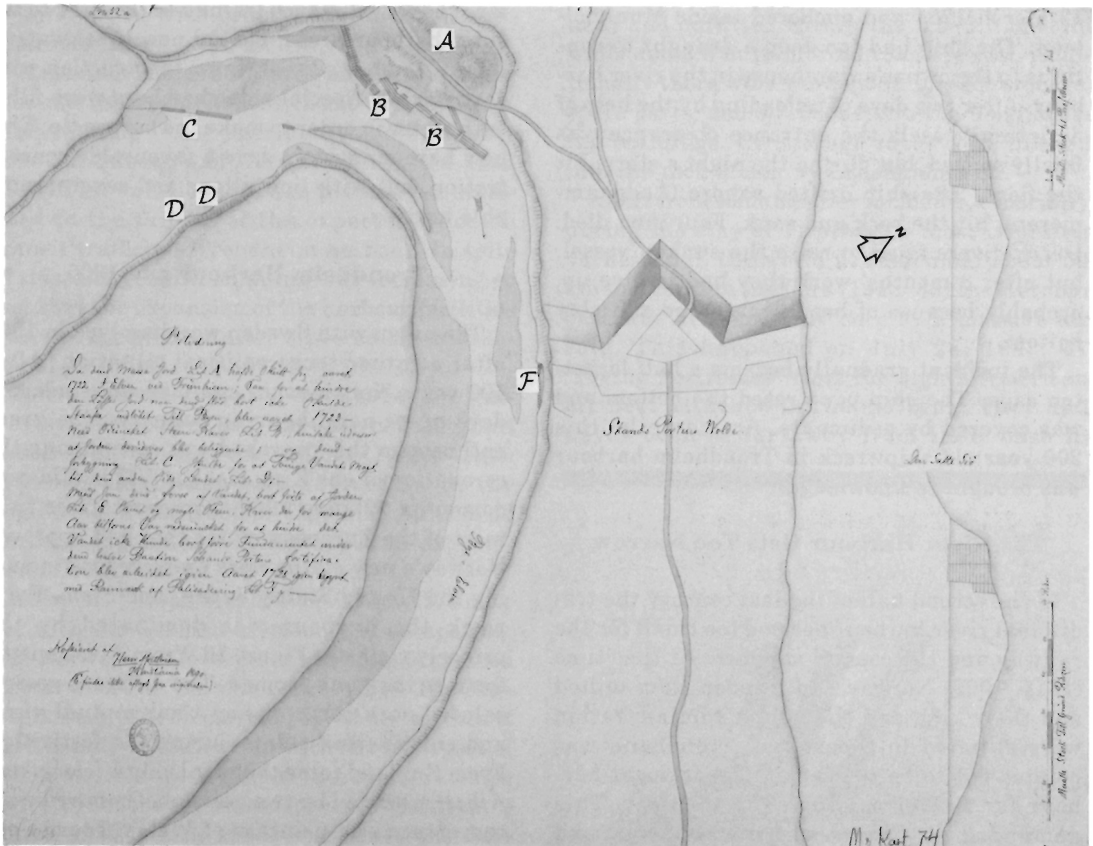


Figure 13. Military embankment works at Arildsløkken, Nidareid in 1722. (Vitenskapsmuseet, Trondheim). Works along the riverside at Skansen associated with the land slide (A) in 1722. The stone jetty (B) was lowered to stop the land masses, and secure open river flow towards the city as before. In addition, wooden pile bulworks (C) were set up to guide the water flow towards the opposite river bank (D). To prevent erosion downstream at Skansen fort (F) piledriving was initiated in 1728.

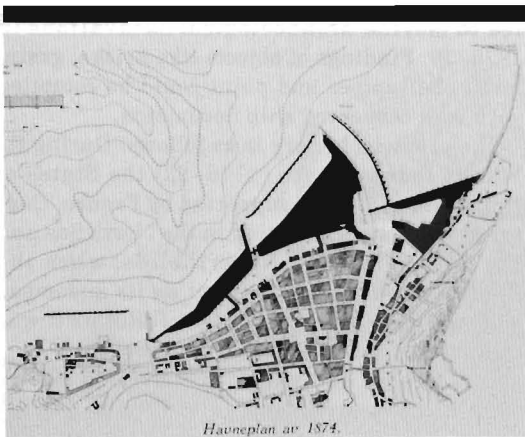


Figure 14. Harbour scheme of 1874.

Pearl"). Carrying a new cargo, among other things 57,000 Dutch bricks, the ship arrived on 13 March 1781 and anchored inside Munkholmen. The ship had too deep a draught to continue to the owner's warehouse in the river harbour. After two days of unloading by the help of assisting vessels the entrance clearance was finally settled, but during the night a storm hit the fjord. The ship drifted ashore (Ladehammeren), hit the rock and sank. Four men died. Dutch divers tried to raise the sunken vessel, but after 3 months' work they had to give up, probably because of heavy cargo and soft clay bottom.

The incident gradually became a half forgotten saga. The ship penetrated the bottom and was covered by sediments. Accidentally, this 200 year old shipwreck in Trondheim harbour was brought to knowledge.

The River Harbour Gets Too Narrow

In the second half of the last century the traditional river harbour became too small for the railway and the coastal steamer. At that time (1814–1905) Norway and Sweden were united and their king and the public administration were situated in Stockholm. Trondheim was pointed out to be the central debarkment harbour for timber coming from the east. This demanded new areas which were reclaimed from outside the center of the town. Figure 14 shows how the railway connection from the south of Norway was connected with the new international railway from Sweden (1881). Within these artificial islands the local ship-



Figure 15. Construction of breakwater. Stone load being emptied.

ping was given enough space towards the center. The long distance traffic was directed to the outer harbour areas, behind new breakwaters. Figure 15 shows breakwater construction with deck barges. Special side chambers were filled with water in order to make the barges tip. This new harbour system gave a favourable concentration, but with limitations and several movable bridges.

Trondheim Harbour and 1905

The union with Sweden was dissolved in 1905 after a rather tense political situation. After 500 years Norway once again became independent of its neighbouring country. The great enthusiasm this provoked was seen during the coronation of our King Haakon VII in Nidarosdomen on 22 June 1906. Representatives from most of the European states that had approved Norway's new status were present; also including the United States, Japan, and Siam. For a week the harbour was dominated by the princely visit, see Figure 16. From Kristiansten fortress the guns boomed. The different vessels saluted each other during their mutual visits and culminating points during the festivities. From England came the royal ship *Victoria and Albert*, escorted by two cruisers. On board were the prince and princess of Wales. From Denmark, the royal ship *Dannebrog* was escorted by two armour-plated ships with the Crown Prince and the Crown Princess. From the Netherlands, came the armour-plated ship *Amiral Tromp*, and from Germany, the armour-plated cruiser



Figure 16. From the Harbour on 22 June 1906. (Photo: Schröder A/S, Trondheim).

Prinz Adalbert with Prince Heinrich of Preussen, as well as from Russia, the emperor's yacht *Polarstjernen* with grand duke Michael Alexandrovitch.

It is remarkable that the Swedish royal house was not represented. This is one typical situation during the unfriendly relationship between Sweden and Norway that lasted until 1914. This relationship has probably contributed to the failure of the expected Swedish transit traffic via Trondheim harbour. In spite of this, the general shipping was increasing so fast that the expansion of the harbour facilities was started in 1914 after a preceding international planning competition in 1909.

During the First World War (1914–18) Norway stayed neutral, but the war caused great losses of ships (824) and sailors (1,180). Then followed stagnation and depression in the beginning of the 1930's. This also influenced harbour expansion which stopped in expectation of better times.

Then the Second World War (1940–45) broke out with the German invasion and occupation. The Norwegian Government in exile organized its war effort on the side of the Allies. The Norwegian mercantile marine played an important part, mostly in connection with the transport of war materials from USA to Europe. 861 ships and 4,047 Norwegian sailors were lost from 3 March 1939–8 May 1945. From 1941 the Germans organized the main part of their submarine war in the North Sea from Trondheim. Later their submarines were directed towards the convoys in the Arctic Ocean. In Trondheim the entire harbour area east of the river was



Figure 17. The war sailors' monument in Trondheim.

requisitioned for military purposes; the land side being an enclosed and guarded place and the other side being open waters. *Dora I* and *Dora II* were dominating submarine bunkers. Each of these measured about 150×100 m. Here the submarines could be docked for overhaul and outfitted within the 2.5–3.0 m solid walls and 3.5 m reinforced concrete roof. Additionally there were workshops, torpedo storage, spare parts, and storehouses in the neighbouring buildings. Oil storage covers were blasted into the rock of nearby Ladehammeren.

Apart from some smaller incidents, especially during the stay of Tirpitz (the most imposing battleship in the world at that time) about 50 km further into the fjord (1942–43) the German base was attacked only once by a massive air raid. This happened on July 24, 1943: 41 "Flying Fortresses" from the eighth American air fleet attacked in the morning. They had never been so far away from their base in

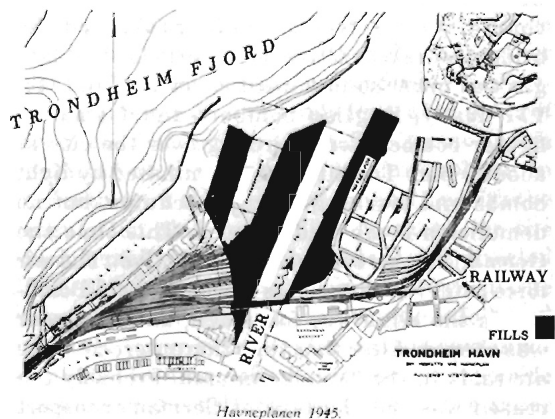


Figure 18. Harbour scheme in 1945.



Figure 19. Quay of Ladehammeren after the bomb attack in July 1943.

Northern England. At air-raid warning the Germans usually effected a screen on the entire area by means of their special acid barrels. This time, however, the smoke only troubled the defenders, while the attackers easily could orient themselves above the low smoke screen. Figure 19 (illegally taken as photography was prohibited) shows the situation shortly after the attack. Considerable damage was done on storage and works, but nobody on the actual submarine bunkers was hurt (this probably was not expected either). 31 Germans and 8 Norwegian civilians were killed. All the American aircraft returned to their bases in England.

In the last phase of the war after the turn of the year 1943/44, Trondheim was especially exposed to the attention of the Allies because the Germans tried to draw their reinforcements southwards via the Norwegian railway net. The harbour and station areas at Brattøra, of course, were extremely vulnerable, and the bridges were attractive bomb targets. The danger was never so imminent as on 22 Nov 1944. 171 heavy, English bombers and 7 smaller fighter bombers were circling over the city at about 9 p.m. The city was illuminated by light bombs and marking from parachutes, but no demolition bomb was dropped. This time the German fog screen was too effective. The air force chief was not able to orient himself. Bombing in the blind was forbidden, and the order was obeyed. After that time there were no more air raids in the Trondheim area. Probably the reason was the shortage of German transport capacity by sea route southwards from Norway across Skagerrak.



Figure 20. Munkholmen with the fortress tower (1988).

Munkholmen—Nidarholm

The first time this place is mentioned is in the history of Olav Trygvasson (995). He used the strategically situated island in his own way: The heads of the Viking chief Håkon Jarl and his bondsman were placed on tall stakes turned towards the fairway. Probably this was usual practice at that time. For a long time the gallows were also placed here—easily visible—for horror and warning. However, Christianity made its entry. Already before A.D. 1100 a Benedictine monastery was founded at the island. This monastery existed until the Reformation. The monks were enterprising and educated people, often in charge of important, official commissions; one of them was even appointed bishop. The monastery possessed estates and several income possibilities. The monks owned their vessels themselves and did considerable business with England. After a fire in A.D. 1531 the monastery was falling to pieces and the place was converted into a for-



Nidarholm klostres segl fra 1280.

Figure 21. The seal of the Nidarholm Monastery from A.D. 1280. After "Munkholmen" (Tvette & Stavseth).

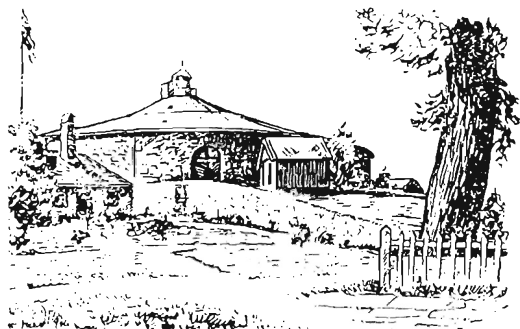


Figure 22. From Munkholmen. The fortress tower with the fire station about 1890. After "Munkholmen" (Tvete & Stavseth).

tress and State prison. This still characterizes Munkholmen. During summer 1989 archeological excavations have surprisingly disclosed parts of the monastery church.

During the last World War new batteries for anti-aircraft guns were placed there. The top of the fortress tower was removed. For a period the place was inhabited by soldiers all the year. Today Munkholmen is lying quietly and peacefully centered in the mouth of the fjord, just 2 km from the newest port facilities in Trondheim. During a few sunny days of the short Trøndelag summer the commuter route takes 10 minutes from the town's fish market. The beach and the restaurant are always crowded with people. Late in the evening people fish from their rowboats, patiently waiting for the fish to strike. But most of the year flocks of sea-birds rule the area undisturbed. Typical is the cormorant that usually rests on the sea beacon. The tower helmet is restored, and with the dreary grey stone walls down by the rocks it forms a characteristic silhouette. To those who care to listen, it is telling about forgotten times.

Epilogue

Today Trondheim harbour is enlarged and modernized after a hectic, but optimistic post-war period. Investments in new facilities are still being done. The aim of the Port Authorities has been spacious and safe operating facilities and service for all types of actual traffic on sea and on land. Between new sheds and silos, refrigeration plants and special installations required for small and big units, future pros-

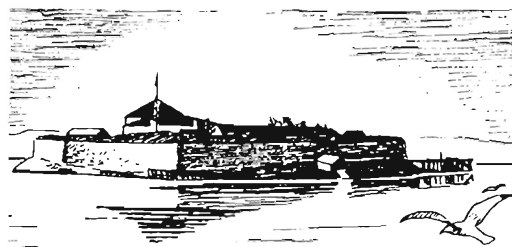


Figure 23. Munkholmen.

pects for industries like aqua culture and salmon export, offshore activity, and marine high technology have also been taken into account. At the same time, however, it is hoped to preserve the special old Nidaros atmosphere among new constructions of concrete, steel, and glass.

Typical is Havnegaten (Harbour Street) with its four lanes leading from the town westwards to the harbour area: The street is overpassed by the new movable railway- and road bridges also crossing Nidelven. The lower course of the river has been changed to provide bigger areas and more sheltered dock space. Railway tracks and cross streets are oriented towards northeast onto PIR II. Among other things the Port Authorities' high control tower for traffic surveillance is situated here. During the summer the cruisers are usually mooring at the northern quay. There is also a Roll-on/Roll-off quay for ships with bow and/or stern gate. Farthest out on PIR 1 towards north-east is dominating the characteristic new building of the Pier-Center where many marine activities are located, including also the Port Authorities' office. Close by the casting of quay lengthening and further fillings into the sea are proceeding. But Havnegaten is not intended only for traffic. Rows of trees are framing the street. The center axis is pointing at the tower tip at Munkholmen in order to mark the historical connection with the regulation plan from 1681. At that time the town's main street (Munkegaten) was directed from the same point of departure towards the tower of Nidarosdomen. If this route is followed directly towards the center, idyllic surroundings like leaning, old wharves can be seen side by side at the fish market lying in the inner canal harbour together with fishing boats and yachts. The statue of Olav Trygvasson at the



Figure 24. Trondheim Harbour 1989. (Fjellanger Widerøe A/S Trondheim).

market place is pointing in the direction upwards Munkegaten to the Cathedral. Under its western tower arch inside the cathedral a 2.60 m high silver cross is towering. This was a gift from Norwegian-Americans at the 900th anniversary of the memory of the martyr death of Olav the Saint in A.M. 1030 at Stiklestad.

During the Middle Ages streams of pilgrims from the whole of Europe arrived on foot to visit the miraculous sarcophagus of the Saint. Today tourists in thousands are seeking the special atmosphere below the vaults of Nidarosdomen. A considerable number of the visitors are Americans searching for their roots. Here they simultaneously recover the point of departure of Leiv Eriksson. On orders from the Viking King the cross should be brought to the Norse rural districts in Greenland which led the first Norseman to the new continent. Symbolically it is just an American cross in precious metal which today is symbolizing human contact by modern methods along the same daring and long sailing route as nearly a thousand years ago.

ACKNOWLEDGEMENTS

The author expresses his gratitude to Per Bruun, Ole Gunnar Houmb, Axel Christophersen and Trygve Lysaker for helpful discussions and advice. Doris Bowers, Hilton Head Island, South Carolina, edited the manuscript. Trondheim Port Authorities and The Oceanographic Company of Norway A/S (OCEANOR) gave significant economic contributions. Wenche Riststad Forbord and Kirsti Ottem Mittet of Oceanor assisted with translation and drawings respectively.

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Figure 25. The Harbour Area with Havnegaten and Munkholmen, 1989.

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□ RESUMEN □

Este ensayo sobre la antigua capital de Noruega y su puerto se inicia con algunas características del Trondheim (Nidaros) actual, El lector se verá transportado hacia el pasado, a las sagas y época de la ruta de Leiv Eriksón desde Trondheim a los Estados del Norte de América alrededor del año 1000 DC.

Se presentan los nuevos resultados obtenidos de las excavaciones arqueológicas efectuadas en los últimos 17 años como base del estudio del desarrollo de la ciudad con el poder real, la administración política y la actividad marítima en el Edad Media.

El Arzobispado de Nidaros (1153–1537) consolidó la posición de la ciudad aún cuando dejó de ser la capital nacional. Se presentan los incidentes especiales de la historia del puerto entre los años 1000 y 1200 DC, en los siglos XVII, XVIII y XIX y asimismo en las dos guerras mundiales. Se incluyen las memorias y ambientes tomados de Munkholmen, la pequeña isla justo a la salida de la boca del puerto.

Finalmente, se menciona la época de la postguerra y simbólicamente los ensayos finales en Nidarosdomen (la catedral de Nidaros).—*Department of Water Sciences, University of Cantabria, Santander, Spain.*

□ ZUSAMMENFASSUNG □

Dieses Essay über Norwegens Wikingerzeit und seine Häfen beginnt mit einigen Informationen über das heutige Trondheim (Nidaros). Der Leser wird dann zurückversetzt in die Zeit der Sagas und Leif Erikssons, der von Trondheim aus um 1000 den Norden des amerikanischen Kontinents entdeckte. Neue Ergebnisse archäologischer Grabungen der letzten 17 Jahre dienen als Hintergrundinformation für das Verständnis der Stadtentwicklung hin zur Königsresidenz, der politischen Verwaltung und der maritimen Aktivitäten im Mittelalter. Der Erzbischofssitz in Nidaros (1153–1537) sicherte die Position der Stadt auch in der Zeit, als der Regierungssitz verlegt wurde. Spezielle Einflüsse der Hafenentwicklung zwischen 1000 und 1200, im 17. bis 19. Jahrhundert und der Zeit der beiden Weltkriege sind immer noch vorhanden. Dargestellt werden auch Erinnerungen und Stimmungen von Munkholmen, einer kleinen Insel in der Hafeneinfahrt. Abschließend wird die Nachkriegszeit erwähnt und symbolisch endet das Essay im Nidarosdom.—*Reinhard Dieckmann, WSA Bremerhaven, FRG.*



Figure 26. Centre of Trondheim. Munkholmen (Munkegaten) Nidarosdomen (1989). The Archbishop's Palace in the front. (Fjellanger-Widerøe A/S, Trondheim).



Figure 27. Ravnkloa fish market. Nidarosdomen in the background (1989).



Figure 28. Silver cross in Nidarosdomen. Gift from Norwegian-Americans at the 900th anniversary of the martyr death of Olav the Saint in A.D. 1030. (Nidaros Domkirkes Restaureringsarbeider).