

= Kronan ( ship ) =

Kronan , also called Stora Kronan , was a Swedish warship that served as the flagship of the Swedish navy in the Baltic Sea in the 1670s . When built , she was one of the largest seagoing vessels in the world . The construction of Kronan lasted from 1668 to 1672 and was delayed by difficulties with financing and conflicts between the shipwright Francis Sheldon and the Swedish admiralty . After four years of service , the ship foundered in rough weather at the Battle of Öland on 1 June 1676 : while making a sharp turn under too much sail she capsized , and the gunpowder magazine ignited and blew off most of the bow . Kronan sank quickly , taking about 800 men and more than 100 guns with her , along with valuable military equipment , weapons , personal items , and large quantities of silver and gold coins .

The loss of Kronan was a hard blow for Sweden during the Scanian War . Besides being the largest and most heavily armed ship in the Swedish navy , she had been an important status symbol for the monarchy of the young Charles XI . Along with Kronan , the navy lost a sizeable proportion of its best manpower , acting supreme commander Lorentz Creutz , numerous high @-@ ranking fleet officers , and the chief of the navy medical staff . A commission was set up to investigate whether any individuals could be held responsible for the Swedish fiasco at the Battle of Öland and other major defeats during the war . Although no one was officially held accountable , Creutz has been blamed by many historians for the sinking of Kronan because of his naval and command inexperience . Recent research has provided a more nuanced picture , and points to Sweden 's general lack of a well @-@ developed naval organization and officer corps at the time .

Most of the guns that sank with Kronan were salvaged in the 1680s , but eventually the wreck fell into obscurity . Its exact position was rediscovered in 1980 by the amateur researcher Anders Franzén , who had also located the 17th @-@ century warship Vasa in the 1950s . Yearly diving operations have since surveyed and excavated the wreck site and salvaged artifacts , and Kronan has become the most widely publicized shipwreck in the Baltic after Vasa . More than 30 @, @ 000 artifacts have been recovered , and many have been conserved and put on permanent public display at the Kalmar County Museum in Kalmar . The museum is responsible for the maritime archaeological operations and the permanent exhibitions on Kronan .

= = Historical background = =

In the 1660s , Sweden was at its height as a European great power . It had defeated Denmark , one of its main competitors for hegemony in the Baltic , in both the Torstenson War ( 1643 ? 45 ) and the Dano @-@ Swedish War ( 1657 ? 58 ) . At the Treaties of Brömsebro ( 1645 ) and Roskilde ( 1658 ) , Denmark had been forced to cede the islands of Gotland and Ösel , all of its eastern territories on the Scandinavian Peninsula , and parts of Norway . In a third war , from 1658 to 1660 , King Charles X of Sweden attempted to finish off Denmark for good . The move was bold royal ambition in an already highly militarized society geared for warfare , a fiscal @-@ military state . Disbanding its armies would have required paying outstanding wages , so there was an underlying incentive to keep hostilities alive and let soldiers live off enemy lands and plunder . The renewed attack on Denmark threatened the interests of the leading shipping nations of England and the Dutch Republic , who were best served by keeping the Baltic region politically divided . The Dutch intervened in 1658 by sending a fleet to stop the attempt to crush Denmark . England also sent a fleet in November the same year , to assist Sweden in keeping the Sound Toll out of Danish and Dutch control . The English expedition failed as a result of adverse winter weather and the political turmoil that ended the Protectorate , and in the end , Charles ' plans were thwarted .

Charles X died in February 1660 . Three months later , the Treaty of Copenhagen ended the war . Charles ' son and successor , Charles XI , was only five when his father died , so a regency council ? led by the queen mother Hedvig Eleonora ? assumed power until he came of age . Sweden had come close to control over trade in the Baltic , but the war revealed the need to prevent the formation of a powerful anti @-@ Swedish alliance that included Denmark . There were some successes in foreign policy , notably the anti @-@ French Triple Alliance of England , Sweden , and

the Dutch Republic . By early 1672 , Sweden had improved its relations with France enough to form an alliance . The same year , King Louis XIV attacked the Dutch Republic , and in 1674 Sweden was pressured into joining the war by attacking the Republic 's northern German allies . France promised to pay Sweden desperately needed war subsidies on condition that it moved in force on Brandenburg . A Swedish army of 22 @, @ 000 men under Carl Gustaf Wrangel advanced into Brandenburg in December 1674 and suffered a minor tactical defeat at the Battle of Fehrbellin in June 1675 . Though not militarily significant , the defeat tarnished the reputation of near @-@ invincibility that Swedish arms had enjoyed since the Thirty Years ' War . This emboldened Sweden 's enemies , and by September 1675 Denmark , the Dutch Republic and the Holy Roman Empire were at war with Sweden and France .

= = = State of the fleet = = =

By 1675 the Swedish fleet was numerically superior to its Danish counterpart ( 18 ships of the line against 16 , 21 frigates against 11 ) , but the Swedish ships were generally older and of poorer quality than the Danish , which had replaced a larger proportion of its vessels with more modern warships . The Swedish side also had problems with routine maintenance , and both rigging and sails were generally in poor condition . Swedish crews lacked the level of professionalism of Danish and Norwegian sailors , who often had experience from service in the Dutch merchant navy , and the Swedish Navy lacked a core of professional officers while the Danish had seasoned veterans like Cort Adeler and Nils Juel . The Danish fleet was reinforced with Dutch units under Philip van Almonde and Cornelis Tromp , the latter an experienced officer who had served under Michiel de Ruyter .

= = Design = =

The First Anglo @-@ Dutch War ( 1652 ? 54 ) saw the development of the line of battle , a tactic where ships formed a continuous line to fire broadsides at an enemy . Previously , naval tactics had favored short @-@ range firepower and boarding with intent to take prizes . After the mid @-@ 17th century , tactics shifted from close @-@ quarter fighting to disabling or sinking opponents through superior , long @-@ distance firepower . This entailed major changes in doctrine , shipbuilding , and professionalism in European navies from the 1650s onwards . The line of battle favored large ships that were heavily armed and robust enough to hold the line in the face of enemy fire . The increased centralization and concentration of power in the emerging nation @-@ states during the late 17th century allowed for a great expansion of armies and navies , and new government shipyards began building much much larger ships . Sweden embarked on an expansive shipbuilding program in the late 1660s .

Kronan was one of the most heavily armed warships in the world in 1672 when she was launched , a three @-@ decker with 110 guns . The ship had three full gundecks with guns from bow to stern . Altogether there were seven separate levels , divided by six decks . Furthest down in the ship , above the keel , was the hold , and immediately above it , but still below the waterline , lay the orlop ; both were used primarily for storage . Above the orlop were the three gundecks , two of them covered , while about half of the topmost gundeck was open to the elements in the ship 's middle , or waist . The bow had one deck , making up the forecastle , and the stern had two decks , including a poop deck .

During the first half of the 17th century , Swedish warships were built in the Dutch manner , with a flat , rectangular bottom with a small draft . This shipbuilding style was adapted mainly for smaller ships in the shallow coastal waters of the Netherlands , and allowed for quick construction , but these less sturdy vessels were generally unsuitable as warships and somewhat unstable in rough seas . When Kronan was built , the English approach to building had prevailed , giving hulls a more rounded bottom and greater draft , as well as a sturdier frame and increased stability . The stern was more streamlined below the waterline , which lessened resistance .

The measurements for Kronan were recorded in contemporary navy lists . Its length from stem post

to stern post was 53 m ( 174 ft ) ; this was considerably shorter than the length if the bowsprit and beakhead were included . The width was 12 @. @ 9 m ( 42 ft ) and was defined as the widest point between the frames , excluding planking . The draft varied depending on how heavily she was laden , but with full stores , ammunition and armaments it would have been about 6 @. @ 2 ? 6 @. @ 8 m ( 20 ? 22 ft ) . The height of the ship from keel to the highest mast was never recorded , but Kalmar County Museum has estimated it to have been at least 66 m ( 217 ft ) .

Kronan 's displacement ? the ship 's weight calculated by how much water it displaced while floating ? is not known precisely , since there are no exact records of the dimensions . By using contemporary documents describing the approximate measurements , it has been estimated at around 2 @, @ 300 tonnes . By its displacement in relation to the number and weight of guns , Kronan was over @- @ gunned , though this was not uncommon for the era . European shipwrights had not been building three @- @ deckers on a large scale before the 1650s ; by the 1660s , designs were still quite experimental . Contemporary records show that English and French three @- @ deckers tended to be rather unstable because they were built high , narrow and with too much artillery . Some English ships had to be reinforced with a " girdle " of built @- @ up planking at the waterline to perform satisfactorily . In rough seas these ships could be forced to close the lowest row of gunports , depriving them of their heaviest and most effective guns . In these situations they were effectively just over @- @ priced two @- @ deckers . Kronan 's construction was not inherently flawed ; the ship handled harsh weather conditions in 1675 and again only a week before capsizing , but she could be dangerous if handled poorly . Later , during the 18th century , ships with the same weight of guns had more tonnage to support their guns , usually weighing 3 @, @ 000 ? 5 @, @ 000 tonnes , which made them more stable . When Kronan was built , she was the third or fourth largest ship in the world , but as the trend moved towards ever greater ships , she was surpassed by other large warships . At the time Kronan sank , she was down to seventh place .

= = = Armament = = =

According to the official armament plan Kronan was to be equipped with 124 ? 126 guns ; 34 ? 36 guns on each of the gundecks and an additional 18 shared between forecastle and sterncastle decks . Guns were classed by the weight of the cannonballs they fired , varying between 3 and 36 pounds ( 1 @. @ 3 ? 15 @. @ 3 kg ) . The guns themselves weighed from a few hundred kg ( 400 ? 500 lbs ) up to four tonnes ( 4 @. @ 4 tons ) with the heaviest pieces placed in the middle of the lower @- @ most gundeck with successively lighter ones on the decks above . Kronan 's most lethal weapons were the 30- and 36 @- @ pounders on the lowest gundeck which had a range and firepower that outclassed the armament of almost any other warship . The guns lighter than 18 @- @ pounders were primarily intended to inflict damage on the enemy 's crew and rigging rather than the hull .

According to modern research , the number of guns was considerably less than the official armament plan . At the time , armament plans regularly overstated the number of guns available . In reality , they were ideal estimations that seldom reflected actual conditions , either because of a lack of ordnance or because they were impractical when tested . Heavy 30- and 36 @- @ pounder guns were particularly difficult to find in sufficient numbers and lighter guns were frequently used instead . Going by the number of guns salvaged from Kronan in the 1680s ( see " History as a shipwreck " ) and during the excavations in the 1980s the total comes to 105 ? 110 . The upper figure matches the calculations of the number of gunports on the remains of the wreck and the number of guns that could practically fit on the gun decks . The lower figure is the number of guns found in the 1980s excavations combined with the list of guns brought up during the salvage operations in the 1680s . The table below lists the number of guns , comparing the official 1671 armament plan to the calculations by naval historian Jan Glete .

Several types of ammunition were available , each for different uses : round shot ( cannonballs ) against ship hulls , chain shot against masts and rigging , and canister shot ( wooden cylinders filled with metal balls or fragments ) , which had a devastating effect on tightly packed groups of men . For boarding actions Kronan was equipped with 130 muskets and 80 matchlock or flintlock pistols . For

close combat there were 250 pikes , 200 boarding axes and 180 swords . During the excavations , large @-@ caliber firearms were found ? hakebössor , similar to blunderbusses ; they were equipped with a small catch underneath the barrel which allowed them to be hooked over a railing to allow it to absorb the recoil of the charges . One hakebössa was still loaded with a small canister containing 20 lead balls that would have been used to clear enemy decks before boarding .

= = = Ornamentation = = =

Expensive and elaborate ornamentation was an important part of a ship 's appearance in the 1660s , even though it had been simplified since the early 17th century . Such ornamentation was believed to enhance the authority of absolute monarchs and to portray the ship as a symbol of martial prowess and royal authority . There are no contemporary illustrations of the ornamentation of Kronan , but according to common practice it was most lavish on the transom , the flat surface facing aft . There are two images of Kronan shown from the stern by two Danish artists . Both works were commissioned many years after the sinking to commemorate the Danish victory . Claus Møinichen 's painting at Fredriksborg Palace from 1686 shows a transom dominated by two lions rampant holding up a huge royal crown . The background is blue with sculptures and ornaments in gold . Swedish art historian Hans Soop , who has previously studied the sculptures of Vasa , a prestige ship of Gustavus Adolphus 's navy that sank only 20 minutes into her maiden voyage in Stockholm in 1628 , has suggested that Møinichen may have intentionally exaggerated the size of the ship to enhance the Danish victory . A tapestry at Rosenborg Castle shows Kronan as a two @-@ decker with a crown motif that is even larger than Møinichen 's painting .

Archaeologists have not been able to recover enough of Kronan 's sculptures for a detailed reconstruction of the ornamentation . The mascarons ( architectural facemasks ) and putti ( images of children ) that were salvaged as of 2007 show considerable artistic quality according to Soop . A large sculpture of a warrior figure was found in 1987 and is an example of high @-@ quality workmanship , possibly even a symbolic portrait of King Charles . Since nothing is known of the surrounding ornamentation and sculptures , the conclusion remains speculative .

= = Construction = =

In the early 1660s , a building program was initiated to expand the fleet and replace old capital ships . A new flagship was needed to replace the old Kronan from 1632 . The felling of vast quantities of timber that were required for the new admiral 's ship had already begun in the winter of 1664 ? 65 . Swedish historian Kurt Lundgren has estimated that 7 ? 10 hectares ( 17 ? 25 acres ) of hundred @-@ year @-@ old oak forest was required for the hull and several tall , stout pines for the masts and bowsprit .

The construction of Kronan began in October 1665 , and the hull was launched on 31 July 1668 . The English shipwright Francis Sheldon frequently came in conflict with the admiralty over the project . The navy administrators complained that he was unduly delaying the project and was spending too much time on his own private business ventures . The most aggravating contention was Sheldon 's extensive and lucrative export of mast timber to England . Sheldon in turn complained about constant delays on the navy 's part and lack of funds . When the ship was launched , the slipway turned out to be too small and the rear section of the keel broke off during the launching . The admiralty demanded an explanation , but Sheldon 's reply was that the damage was easily mended and that the problem was that the timber had been left to dry too long . The conflict between the Admiralty and Sheldon dragged on for several years and caused constant delays . The sculptures were finished in 1669 , but the rigging , tackling , and arming was drawn out a further three years , to 1672 . The first occasion that the ship sailed was during the celebrations of Charles XI 's accession as monarch in December 1672 .

= = Crew = =

As one of the largest ships of her time , Kronan had a sizable crew . When she sank there were 850 people on board ? 500 sailors and 350 soldiers . Historians working with the excavation of the wreck site have compared the ship with a middle @-@ sized Swedish town of the late 17th century , describing it as a " miniature society " . On board were male representatives of both lower and upper classes . ( Women were allowed on navy vessels only within the limits of Stockholm archipelago ; before reaching the open sea , they had to disembark . ) As a community afloat , Kronan mirrored the contemporary social standards of military and civilian life , two spheres that were not strictly separated in the 17th century .

The entire crew dressed in civilian clothing and there were no common navy uniforms . The Swedish army had only recently introduced standardized uniforms , something that was still uncommon in most of Europe . Clothing was differentiated according to social standing , with officers from the nobility dressed in elegant and expensive clothing while the ordinary crew dressed like laborers . The only exceptions were the soldiers of the Västerbotten infantry regiment who had by the 1670s been equipped with the first " Carolingian " uniforms in blue and white . The crew was sometimes assigned clothing or cloth with which to prepare " sailor garb " ( båtmansklädning ) , which set them apart from the usual dress of the general populace . Officers maintained a large collection of fine clothing for use on board , but it is not known if it was used during everyday work . Quite likely they owned a set of clothes made from simpler , more durable and more comfortable fabrics which were more practical at sea .

Recruitment was done by forced musters as part of the earlier form of the so @-@ called allotment system . Sailors and gunners were supplied by a båtsmanshåll ( literally " sailor household " ) , small administrative units in coastal regions that were assigned the task of supplying the fleet with one adult male for navy service . The soldiers on board were recruited from the army equivalents , knekthåll or rotehåll , ( " soldier " or " ward household " ) from inland areas . Officers originated mainly from the nobility or from the upper middle class , and were paid through the allotment system or the income from estates designated for the purpose . Higher @-@ ranking officers most likely brought their personal servants on board . A valuable red jacket in bright red cloth that was worn by one of those who drowned on the ship could have belonged to one of these retainers .

= = Military career = =

= = = Expedition of 1675 = = =

After the Swedish loss at the battle of Fehrbellin in June 1675 , the fleet was to support troop transports to reinforce Swedish Pomerania . It had potential for success as it was equipped with several large , well @-@ armed ships : Svärdet ( " the sword " ) of 1 @, @ 800 tonnes , Äpplet ( " the orb " ) and Nyckeln ( " the key " ) , both 1 @, @ 400 tonnes , and the enormous Kronan ( " the crown " ) . Altogether there were 28 large and medium warships and almost the same number of smaller vessels . The supply organization was lacking . There were few experienced high @-@ ranking officers and internal cooperation was poor ; Danish contemporaries scornfully described the Swedish navy crews as mere " farmhands dipped in saltwater " .

With Kronan as its flagship , the fleet went to sea in October 1675 under Admiral of the Realm ( riksamiral ) Gustaf Otto Stenbock , but got no farther than Stora Karlsö off Gotland . The weather was unusually cold and stormy and the ships could not be heated . The crew were poorly clothed and soon many of them fell ill . Supplies dwindled , and after Kronan lost a bow anchor after less than two weeks at sea , Stenbock decided to turn back to the Dalarö anchorage north of Stockholm . Nothing came of the reinforcements of the North German provinces . King Charles reacted with anger and held Stenbock personally responsible for the failed expedition , forcing him to pay more than 100 @, @ 000 dalers out of his own pocket . King Charles later rehabilitated Stenbock by giving him an army appointment in Norway , but in early 1676 he replaced him with Lorentz Creutz , a prominent treasury official . Naval historian Jan Glete has explained this as a step that was " necessary in a time of crisis " due to Creutz 's administrative skills and treasury connections , but

Creutz had no experience as a naval commander , something that would later prove crucial .

= = = Failed winter expedition = = =

As the situation for the Swedish army in Pomerania deteriorated during the winter of 1675 ? 76 , the fleet , with Kronan as flagship , was ordered to sea again in a desperate attempt to relieve the hard @-@ pressed Swedish land forces . The weather was unusually cold and large parts of the Baltic were iced in . The fleet , now under the command of the seasoned sea officer Claes Uggla , was blocked by ice when it reached Dalarö on 23 January . The Privy Councilor Erik Lindschöld had been assigned by the King to assist with the expedition , and he came up with the idea of cutting the fleet out of the ice to reach the open sea . Hundreds of local peasants were ordered out to open a narrow channel through the ice with saws and picks to the anchorage at Älvsnabben , more than 20 km ( 12 mi ) away . On reaching the naval station on 14 February , three weeks later , it turned out that most of the sea outside the inner skerries was frozen as well . A storm hit the tightly packed ships and the ensuing movement of the ice crushed the hull of the supply vessel Leoparden , sinking it . A Danish force had managed to reach the open waters farther off and observed the immobilized Swedish ships from a distance . When temperatures fell even further , the project was declared hopeless and Lindschöld gave up the attempt .

= = = 1676 = = =

Early in March 1676 , a Danish fleet of 20 ships under Admiral Niels Juel left Copenhagen . On 29 April it landed troops on Gotland , which soon surrendered . The Swedish fleet was ordered out on 4 May , but experienced adverse winds and was delayed until 19 May . Juel had by then already left Visby , the principal port of Gotland with a garrison force . He headed for Bornholm to join with a small Danish ? Dutch squadron in cruising between Scania and the island of Rügen to prevent any Swedish seaborne reinforcement from reaching Pomerania . On 25 ? 26 May the two fleets met each another in the battle of Bornholm . Despite the considerable Swedish advantage in ships , men and guns , they were unable to inflict any losses on the allied force , and lost a fireship and two minor vessels . The battle revealed the lack of coherence and organization within the Swedish ranks , which soured relations between Creutz and his officers .

After the failed action , the Swedish fleet anchored off Trelleborg where King Charles was waiting with new orders to recapture Gotland . The fleet was to avoid combat with the allies at least until they reached the northern tip of Öland , where they could fight in friendly waters . When the Swedish fleet left Trelleborg on 30 May they were soon intercepted by the allied fleet , which then began a pursuit . By this time the allies had been reinforced by another small squadron and totaled 42 vessels , with 25 large and medium ships of the line . The reinforcements brought with them a new commander , the Dutch Admiral General Cornelis Tromp , one of the most renowned naval tacticians of his time . The two fleets sailed north and on 1 June passed the northern tip of Öland in a strong gale . The Swedish ships fared poorly in the rough winds , losing masts and spars . The Swedish officers formed a battle line that held together only with great difficulty . They tried to get ahead of Tromp 's ships to gain the weather gage by getting between the allies and the shore , and thereby gaining an advantageous tactical position . The Dutch ships of the allied fleet managed to sail close @-@ hauled faster than the rest of the force and slipped between the Swedes and the coast , taking up the crucial weather gage . Later that morning the two fleets closed in on each other and were soon within firing range .

= = = Sinking = = =

Around noon , some distance northeast of Hulterstad , the Swedish fleet made what the military historian Ingvar Sjöblom has described as " a widely debated maneuver " . Because of misunderstandings and poorly coordinated signaling , the Swedish fleet attempted to turn and engage the allied fleet before they had sailed past the northern end of Öland , which had been

agreed on before the battle . Sharp turns in rough weather were known to be perilous , especially for ships that had stability weaknesses . Kronan turned to port ( left ) , but with too much sail , and heeled so far over that she began to flood through the open gunports . The crew was unable to correct the imbalance and the ship laid over completely with the masts parallel with the water . Soon after , the gunpowder store in the forward part of the Kronan ignited for unknown reasons and exploded , ripping apart a large section of the starboard side forward of the mainmast . The remaining section rose with the stern pointing up in the air and the broken @-@ off front part toward the bottom . She then rapidly sank with the port side down . When the wreck hit the seabed , the hull suffered a major fracture along its side , further damaging the structure .

During this rapid sinking , a large proportion of the crew suffered severe trauma , as is shown by osteological analyses of the skeletal remains . Many of the remains had deep , unhealed lacerations on skulls , vertebrae , ribs and other limbs . There are two primary theories about the cause of the injuries . Osteologist Ebba Düring has suggested that discipline and social cohesion collapsed during the sinking . The crew would have resorted to " all the means at their disposal , both physical as well as psychological " to escape the ship , an interpretation that is echoed by historian Ingvar Sjöblom . Medical historian Katarina Villner , on the other hand , has proposed that the injuries were caused by the sudden and violent chaos of the sinking itself , which would have thrown men , heavy equipment and cannons around .

The loss of the Admiral 's flagship threw the Swedish forces into disorder , and soon Svärdet , next in line as fleet flagship , was surrounded by the allied admirals and set ablaze by a Dutch fireship after an extended artillery duel . Only 50 of the 650 @-@ strong crew escaped the gun battle and the inferno , and among the dead was the acting Admiral Claes Uggla . After losing two of its highest ranking commanders as well as its two largest ships , the Swedish fleet fled in disarray . Solen later ran aground ; Järnvågen , Neptunus and three smaller vessels were captured . Äpplet later sank after breaking her moorings off Dalarö .

= = = Aftermath = = =

According to the artillery officer Anders Gyllenspak , only 40 men , including himself , survived the sinking : Major Johan Klerk , 2 trumpeters , 14 sailors and 22 soldiers , which means that more than 800 had perished . Among them were half a dozen navy and army officers as well as the chief physician of the Admiralty and the fleet apothecary . Altogether around 1 @,@ 400 men died when Kronan and Svärdet were lost , and in the days following the battle , hundreds of corpses were washed up on the east coast of Öland . According to the vicar of Långlöt parish , 183 men were taken from the beaches and buried at Hulterstad and Stenåsa graveyards . Lorentz Creutz 's body was identified and shipped to his estate in Savolaks , Finland , where it was buried . The losses were even worse since Kronan was the flagship and was manned with the best sailors and gunners in the fleet . When Kronan and Svärdet went down , they took with them the navy 's entire stock of 30- and 36 @-@ pounder guns . Altogether over 300 tonnes of bronze guns worth nearly 250 @,@ 000 silver dalers went down with the ships , a sum that was slightly higher than the value of the ships themselves .

Within a week , the news of the failure at Bornholm and the disaster at Öland reached King Charles , who immediately ordered that a commission be set up to investigate the fiasco . Charles wanted to know if Bär and other officers were guilty of cowardice or incompetence . On 13 June the King wrote that " some of our sea officers have shown such cowardly and careless behavior [ that they ] have placed the safety , welfare and defense of the kingdom at great peril " , and that " such a great crime should be sternly punished " . The commission began its work on 7 June 1676 and finished in October 1677 , without passing any sentences . Admiral Johan Bär of Nyckeln and Lieutenant Admiral Christer Boije , who ran aground with Äpplet , were never again given a navy command . One of the accused , Hans Clerck of Solen , was promoted to full admiral by the King even before the commission presented its findings .

= = Causes of sinking = =

Inappropriate handling in rough weather was the most obvious cause for Kronan 's sinking . Unlike Vasa , Kronan 's sailing characteristics were not inherently flawed and the ship had served for several years in rough seas . During the work of the commission , artillery officer Anders Gyllenspak even made direct comparisons to Vasa . He testified that Kronan 's ballast had been lightened at Dalarö at the beginning of the campaign and that she had not replenished her supply of drink , so that the ship had a shallower draft and would have been somewhat less stable than with full stores , though he did not blame this on Creutz .

Why the Swedish fleet deviated from the original plan of engaging the allied force in home waters north of Öland has never been satisfactorily explained . According to Rosenberg and Gyllenspak on Kronan , Creutz made a turn because Uggla had signaled that he was going about . Rosenberg also believed that Bär on Nyckeln , admiral of the first squadron , was first to make a turn , and that Uggla considered it necessary to follow this unplanned maneuver to keep the fleet together . Officers Anders Homman and Olof Norman , who both survived Svärdet , claimed that only Creutz as fleet commander could have made such a decision and that Uggla was only following Kronan 's lead . Witnesses who testified before the commission claimed that conflict between the officers was the reason that necessary precautions were not taken before Kronan came about . Rosenberg testified that Lieutenant Admiral Arvid Björnram and Major Klas Ankarfjäll had openly disagreed on how much sail should be set and how close to land the ship should sail . According to Gyllenspak , senior fleet pilot Per Gabrielsson had voiced his concerns against turning in the rough weather , but no one had heeded his advice .

Several scholars and authors have blamed Creutz for the loss of his ship , and he has been criticized as an incompetent sailor and officer who through lack of naval experience brought about the sinking . Historian Gunnar Grandin has suggested that the intent of the maneuver was to take advantage of the scattered allied fleet , but that many of the officers on Kronan opposed the idea ; Creutz and Björnram urged that the ship turn quickly to gain a tactical advantage while Ankarfjäll and Gabrielsson were concerned about the immediate safety of the ship . Grandin has also suggested that Creutz may have suffered a mental breakdown after the failure at Bornholm and the open dispute with his officers , which led to a rash and ultimately fatal decision .

More recent views present the question of responsibility as more nuanced and complex ? suggesting that Creutz cannot be singled out as solely responsible for the disaster . Historians Ingvar Sjöblom and Lars Ericson Wolke have pointed out that Creutz 's position as admiral was comparable to that of a chief minister . He would have primarily been an administrator without the need for intimate knowledge of practical details ; turning a ship in rough weather would have been the responsibility of his subordinates . Sjöblom has stressed that the disagreement between Major Ankarfjäll and Lieutenant Admiral Björnram on how much sail was needed wasted precious time in a situation where quick decisions were crucial . Creutz was also unique as a supreme commander of the navy since he had no experience of military matters . The Swedish naval officer corps in the late 17th century lacked the prestige of army commanders , and seasoned officers and even admirals could be outranked by inexperienced civilians or army commanders with little or no naval background . Maritime archaeologist Lars Einarsson has suggested that Creutz 's " choleric and willful temperament " probably played a part , but that it could equally be blamed on an untrained and inexperienced crew and the open discord among the officers . According to Sjöblom it is still unclear to historians whether there was a designated ship commander on Kronan with overall responsibility .

= = History as a shipwreck = =

The total cost of Kronan was estimated at 326 @, @ 000 silver dalers in contemporary currency , and about half of the cost , 166 @, @ 000 dalers , lay in the armaments . It was therefore in the interest of the Swedish navy to salvage as many of the cannons as possible . In the early 1660s almost all the guns from Vasa had been brought up through greatly improved technology . Commander Paul Rumpf and Admiral Hans Wachtmeister were put in charge of the salvage of



Kronan 's cannons . With the help of diving bells , they were able to raise 60 cannons worth 67 @, @ 000 daler in the summers ( c . June @-@ August ) of 1679 ? 86 , beginning as soon as the war with Denmark had ended . In the 1960s , diving expert Bo Cassel made some successful descents to Vasa with a diving bell made according to 17th @-@ century specifications . In 1986 , further experiments were done on Kronan . The tests proved successful and the conclusion was that the 17th @-@ century operations must have required considerable experience , skill and favorable weather conditions . Though the conditions off Öland were often difficult , with cold water and unpredictable weather , and required a large crew , the expeditions were very profitable . Historian Björn Axel Johansson has calculated that the total cost for the entire crew for all eight diving seasons was less than 2 @, @ 000 dalers , the value of one of Kronan 's 36 @-@ pounder guns .

= = = Rediscovery = = =

The marine engineer and amateur historian Anders Franzén had searched for old Swedish wrecks in the Baltic since the 1940s and became nationally renowned after he located Vasa in 1956 . Kronan was one of several famous shipwrecks on a list of potential wreck sites that he had compiled . For almost 30 years Franzén and others scoured archives and probed the seabed off the west coast of Öland . During the 1950s and 1960s the team searched off Hulterstad by dragging , and later followed up with sonar scans . In 1971 planks believed to belong to Kronan were located , but the lead could not be followed up properly at the time . Later in the 1970s the search area was narrowed down with a sidescan sonar and a magnometer , an instrument that detects the presence of iron . With the two instruments the team pinned down a likely location , and in early August 1980 , sent down underwater cameras to reveal the first pictures of Kronan .

= = Archaeology = =

The remains of Kronan lie at a depth of 26 m ( 85 ft ) , 6 km ( 3 @. @ 7 mi ) east of Hulterstad , off the east coast of Öland . Since her rediscovery in 1980 , there have been annual diving expeditions to the site of the wreck from June to August . By Baltic Sea standards , the conditions are good for underwater archaeological work ; the wreck site is far from land , away from the regular shipping lanes , and has not been affected by pollution from the land or excessive growth of marine vegetation . The visibility , especially in early summer , is good and can be up to 20 m . The seabed consists of mostly infertile sand that reflects much of the sunlight from the surface , aiding the surveying and documentation of the site with underwater cameras . Around 85 % of the wreck site has been charted so far and Kronan has become one of the most extensive and well @-@ publicized maritime archaeological projects in the Baltic Sea .

= = = Finds = = =

More than 30 @, @ 000 artifacts from Kronan have been salvaged and cataloged , ranging from bronze cannons of up to four tonnes to small eggshell fragments . There have been several discoveries of considerable importance , and some of unique historical and archaeological value . One of the first finds was a small table cabinet with nine drawers containing navigational instruments , pipe @-@ cleaning tools , cutlery and writing utensils , which most likely belonged to one of the officers . As a flagship , Kronan carried a large amount of cash in the form of silver coins . Besides wages for the crew , a war chest was required for large , unforeseen expenses . In 1982 , a collection of 255 gold coins was found , most of them ducats . The origin of the individual coins varied considerably , with locations such as Cairo , Reval ( modern @-@ day Tallinn ) , and Seville . Another 46 ducats were found in 2000 . The coin collection is probably the largest gold treasure ever encountered on Swedish soil , though it was not enough to cover large expenses , which has led to the assumption that they were the personal property of Admiral Lorentz Creutz . In 1989 , more than 900 silver coins were found in the remains of the orlop , at the time the largest silver coin collection ever discovered in Sweden . In 2005 , a much larger cache of nearly 6 @, @ 200 coins

was uncovered and in 2006 yet another with more than 7 @, @ 000 coins . The silver treasure of 2005 consisted almost entirely of 4 öre @-@ coins minted in 1675 , which represented over 1 % of the entire production of 4 öre @-@ coins of that year .

Several musical instruments have been found , including a trumpet , three violins and a viola da gamba , all expensive objects that probably belonged to either the officers or the trumpeters . One of the trumpeters on board was a member of the admiral 's musical ensemble and it is assumed that one of the particularly fine , German @-@ made instruments belonged to him . Another remnant of the officers ' personal stores was discovered in 1997 , consisting of a woven basket filled with tobacco and expensive imported foodstuffs and spices , including ginger , plums , grapes and cinnamon quills .

Approximately seven percent of the finds consist of textiles . Much of the clothing , particularly that of the officers and their personal servants , is well preserved and has provided information on clothing manufacture during the late 17th century , something that has otherwise been difficult to research based only on depictions .