

VLIZ directs, supports and informs

The Flanders Marine Institute was established by the Flemish government, the province of West Flanders and the Research Foundation – Flanders (FWO) in 1999. Within the scope of a management agreement, it receives an annual subsidy from the Flemish Community and from the province of West Flanders.

The central task of VLIZ is to support and give visibility to scientific research in the coastal area. To this end, it has developed a coordination forum, an oceanographic platform and the Flemish Marine Data and Information Centre. In addition, the institute serves as an international point of contact and provides advice at the request of the government or on its own initiative. VLIZ also ensures science popularisation, awareness raising and the further development of a marine multimedia centre.

VLIZ serves as an interface between scientific circles, governmental bodies and the general public.

On the basis of these responsibilities and the enthusiasm of its staff, VLIZ wishes to be a catalyst for integrated coastal zone management. After all, providing information about the coast, facilitating contacts between users, scientists and policy makers, and helping to direct and support the research community are all essential ingredients for integrated coastal zone management.

Anyone who is interested in coastal area research can individually or collectively join as a supporting member. Extensive information about the Flanders Marine Institute is available on the website (<http://www.vliz.be>) or at the secretariat (e-mail: info@vliz.be).

The Great War and the Sea

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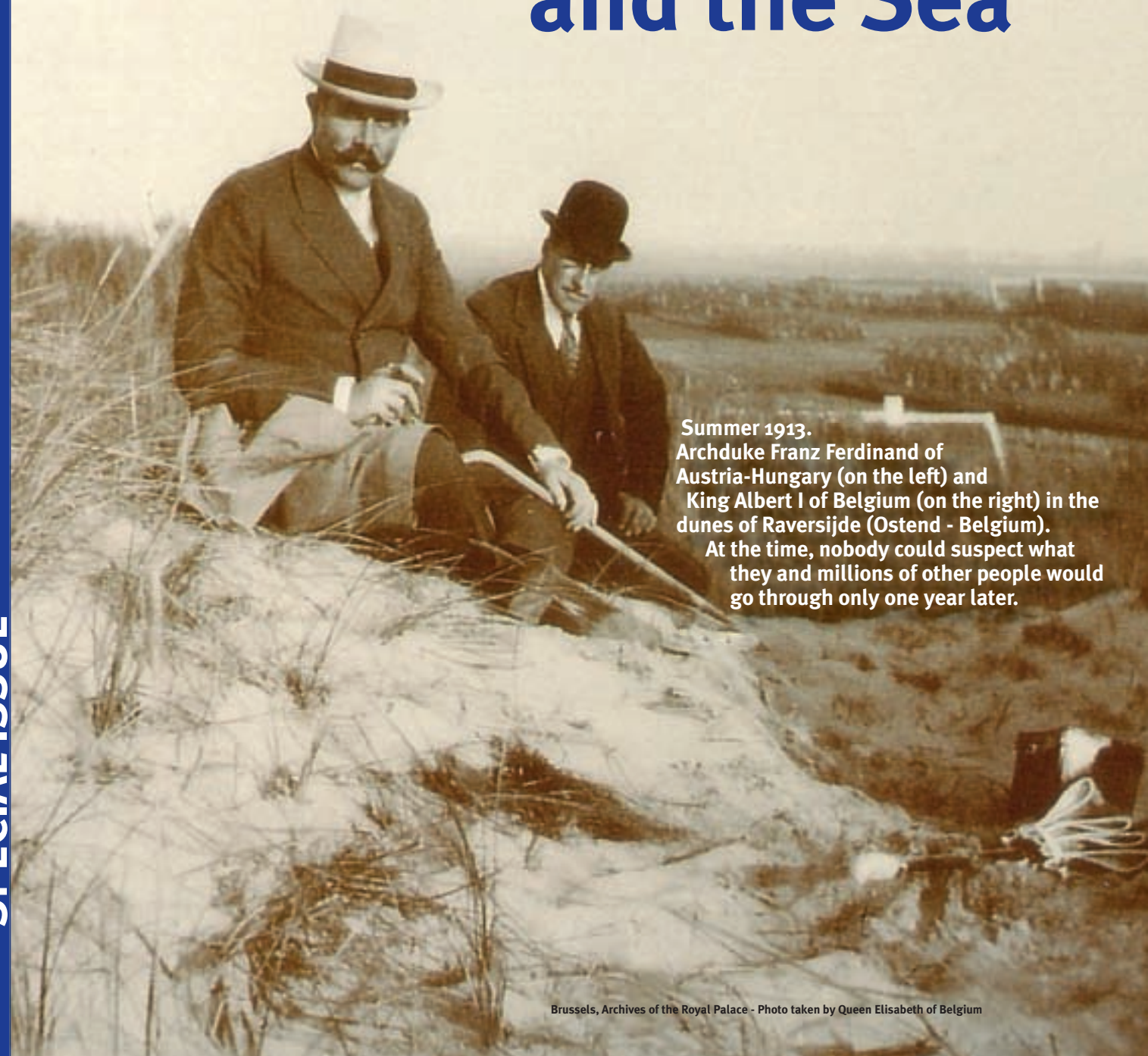
A forum on integrated
coastal zone
management

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DE GROTE REDE

NEWS
ON OUR COAST AND SEA

The Great War and the Sea



Summer 1913.
Archduke Franz Ferdinand of
Austria-Hungary (on the left) and
King Albert I of Belgium (on the right) in the
dunes of Raversijde (Ostend - Belgium).
At the time, nobody could suspect what
they and millions of other people would
go through only one year later.

Brussels, Archives of the Royal Palace - Photo taken by Queen Elisabeth of Belgium

SPECIAL ISSUE

It has given me great pleasure to write the preface for this issue of 'De Grote Rede', for several reasons.

First and foremost, maritime history and war ships from the 19th and 20th centuries are my passion. In addition, the scene of battle on the North Sea during the Great War has been somewhat underexposed in the numerous commemorations of the 100th anniversary of the war of 1914-1918.

Another reason is that there are only few people left who know that Admiral von Schröder, who commanded the German naval forces in Bruges, moved into the governor's official residence and that the Provincial Palace on the market square became the headquarters of Marinekorps Flandern. These German fighting units, including its U-boats, made many victims on the North Sea.



U-boats operating from Ostend and Bruges sank 2554 Allied ships during the Great War. The Marine Corps lost 80 submarines, 145 officers and over 1000 sailors.

As far as I know, this special issue is currently the second Flemish publication on the occasion of the war centenary. The book "14-18, op zee. Belgische schepen en zeelui tijdens de Grote Oorlog" (1914-18 at sea. Belgian ships and sailors during the Great War) by Freddy Philips was published earlier this year.

This preface is also a tribute to British captain Charles Fryatt. He was sentenced to death at the Provincial Palace and executed by a German firing squad in Bruges on 27 July 1916 because he had rammed the U-boat U-33 at sea with his ship, SS Brussels, in 1915. Few people know that one of the objectives of the Battle of Passchendaele in 1917 was the liberation of the ports of Ostend and Zeebrugge, since German U-boats were a nightmare for Allied ships in the North Sea. When this plan failed, the British tried to take the ports from the sea with the Zeebrugge Raid (23 April 1918) and the Ostend Raids. To little or no avail, as the ports could still be used by U-boats afterwards. The recently restored bow of HMS Vindictive on the east bank of Ostend harbour is a rare silent witness to the war in the North Sea.

This special issue provides a unique insight into the various episodes and facts of the war in and around the North Sea.

I am convinced that this special issue of De Grote Rede will become a collector's item. Finally, I wish to thank all authors for their contribution; it certainly is worthwhile to inform the public at large of this piece of unknown history. In doing so, VLIZ has again performed its educational task in a unique manner.



Carl Decaluwé
Governor of the Province of West Flanders



What do WWI and the sea have in common?

Introduction to the special issue “The Great War and the Sea”

Jan Mees
VLIZ director

The sea played a particularly important part in the First World War. A part to which too little attention has been paid. This is one of the reasons why the Flanders Marine Institute (VLIZ) thought it appropriate to devote a special issue of the *De Grote Rede* magazine to this topic on the occasion of the centenary of the First World War. In addition to thirteen leading articles and seven one-page sections, this issue also contains a few explanatory maps, a glossary and the etymological explanation of the principal toponyms of the Flemish front area (see: “**Sea-related words**”).

Initially it did not appear as if the North Sea and in particular the Flemish coast and Flanders Fields would be of great importance. After all, when Chief of the German General Staff Helmuth von Moltke inherited the strategic plan of his predecessor Alfred von Schlieffen, he stuck to the latter’s central idea: in the early stages of the war, an offensive had to eliminate the French land forces as quickly as possible. The coastal area therefore fell completely outside the scope of his plan. Besides, he reasoned, once the Germans would be victorious, the Belgian territory, including its seaports, could obviously be considered as permanently acquired. All options for further military use were then open.

However, he had not reckoned with the Kaiserliche Marine (Imperial German Navy). The latter, under the command of Admiral Alfred von Tirpitz, envisaged a much broader war scenario and was therefore highly interested in the Belgian coast (see: “**The Imperial German Navy wants to conquer the Belgian Coast**”). Possession of the Belgian ports would considerably improve its strategic position with regard to the British navy. It is no wonder then that, after no more than a few weeks, a sizeable German infantry division consisting of marines and seamen entered the Belgian territory to join battle. Their commanders had not set their sights on the French land forces, but on the major seaport of Antwerp. However, the Belgian army initially stood in their way. The Belgian troops were therefore their first and foremost adversaries.

The British Royal Navy was also quick to understand that the Belgian territory was more than just a corridor to Paris for the main body of the German land forces. First Lord of the Admiralty Winston Churchill sent the Royal Marines to Antwerp. Their intervention was improvised and their numbers were too small to make more than a symbolic contribution. But the trend had

been set: the admiralties had all set their sights on the Belgian ports and the coastal area. From late September 1914 onwards, the Germans advanced further to the north. The French admirals feared Germany had in the mean time set its eye on the coastal area. To avert the danger, the French admiralty formed a force of 6000 seamen and marines, and sent it to Flanders. They had to prevent the Germans from reaching the ports.

The Belgian high command had no tradition of maritime thinking (see: **“Belgian ‘naval’ force?”**). The coast therefore did not play any part in their military strategy. However, the Belgian army did have a few armoured vessels at the fortified city of Antwerp to control the river Scheldt. Specialised engineering companies had a thorough command of the construction of pontoon bridges. Their engineers also studied the hydrology and the tides on account of their potential importance in defensive warfare. As a result, defensive inundations already took place in the earliest stages of the war. Yet after the first week of October 1914 the fortified city of Antwerp had to be abandoned and the Belgian army sent its mobile unit to the coasts across the pontoon bridges. The hope of establishing a new base and line of defence there would be realised only in the second half of October, with the inundation of the Yser plain as an important strategic tool (see: **“The inundation of the Yser plain”**). Partly because the Belgian army controlled the complex of floodgates and sluices of the river Yser and other watercourses and canals at Nieuwpoort, they were able to halt the German advance at the Yser by flooding the area with seawater. In the meantime, French navy troops or fusiliers marins fought alongside the Belgians near Diksmuide. During this battle, the troops were supported by heavy artillery from French and British navy units positioned close to the beach.

This did not prevent the German marine division from taking the ports of Zeebrugge and Ostend. Commanding Admiral Ludwig von Schröder was delighted to hear that the harbour facilities were virtually intact. Nevertheless, it would take time to turn the narrow coastal strip into a safe haven for German warships. That was only possible by installing numerous heavy coastal batteries with guns of battleship size (see: **“Concrete in the dunes: German coastal defences during the First World War”**). As a result, it became very risky for French and British surface ships to shell German bases. Meanwhile, the German marines had the Belgian and French troops within range in the sector between the sea and Diksmuide. Especially at Nieuwpoort the presence of French marines was strikingly strong, as French Admiral Ronarc’h feared a German breakthrough in the direction of the naval base of Dunkirk and the key port of Calais.

But what about the Belgian civilians, the inhabitants of the coastal area, the fishermen and the crews of the dozens of Belgian freighters and passenger ships? Those who had a seaworthy boat at their disposal usually had been able to escape in time. As a consequence, unoccupied Belgium had quite a lot of shipping capacity. This was a blessing for the Belgian government in exile, based in the French city of Le Havre. They were accompanied by a few senior officials from the Marine Affairs Administration, who provided the necessary know-how. Flemish fishermen were able to contribute to the food supply from French and British ports (see: **“Fisheries and the First World War”**). And a large part of the freighters were deployed to supply occupied Belgium with essential food aid from other continents via the Netherlands, that had remained neutral.

Once the German *Kaiserliche Marine* had converted its part of the coast into an impregnable fortress garrisoned with several

tens of thousands of troops, the time was ripe for equipping the harbours as bases of operations. The German occupying forces used new types of U-boats and torpedo boats, specially designed for these shallow coastal waters, to take aggressive action against the French and British navy as well as the merchant fleet (see: **“German U-boat development during World War I”**). U-boats would play an absolute key role in the German strategy to bring the Allies to their knees. Losses forced the Belgian headquarters to create a *Dépôt des Equipages* (Crew Depot). In this way reserves of seamen could be made available to replace the neutral crew members who pulled out and the sailors who had drowned. These included gunners on merchant ships who had to repel attacks from German U-boats. Belgian military engineer Pierre Van Deuren even transformed his recently designed trench mortar into a version suitable for engaging U-boats, even when they were submerged (see: **“The Belgian cavalry, a German U-boat and the Van Deuren mortar”**).

The increasing German threat at sea was a thorn in the flesh of the British in particular. In 1917 Field Marshal Haig decided to put everything at stake to dislodge the Germans from the Flemish coastal area. The main offensive was planned from Ypres, but the Nieuwpoort sector was also a starting point of a push that had to eliminate the German coastal defences. However, the enemy was able to eliminate the British threat at Nieuwpoort through a pre-emptive operation code-named *“Strandfest”*. When the offensive from Ypres subsequently got bogged down at Passchendaele, the battle appeared to be over. The positions of the *Kaiserliche Marine* on the Flemish coast were now stronger than ever.

For the civilian population this was an unprecedented catastrophe, partly because the food supply left a lot to be desired (see: **“Fish consumption during WWI”**). In the early stages of the war, it was still possible for soldiers to relax in the coastal town of De Panne. The town was out of reach of the German heavy artillery, which allowed the construction of recreational facilities, barracks, hospitals and nursing facilities at this site. It also served as the temporary Belgian capital, since the head of state and commander-in-chief King Albert I resided there. But the peace and quiet in De Panne did not last. The hostilities gradually reached the rear of the front sectors in the Yser plain. In addition, the commanders increasingly imposed restrictions. This was the case in the area occupied by the Germans as well as in the zone where Belgian and French troops were active (see: **“War child in occupied Blankenberge”**). Beaches, dunes, polders and ports were fully militarised (see: **“The accessibility and the role of the beach during WWI”**). It became very difficult for civilians to survive there. This militarisation did not just consist of bunkers in the dunes and defensive barriers on the beach (see: **“Coastal defence by the Allied forces behind the Yser front: about arms, water, sand and patients”**). Dunes were also levelled and the white sand was used for making concrete and constructing railways and roads. Groundwater from the dunes was pumped up to serve as drinking water and the dunes were also used as drill grounds, where infantrymen practised military drills and learnt to advance through difficult terrain in a methodical fashion.

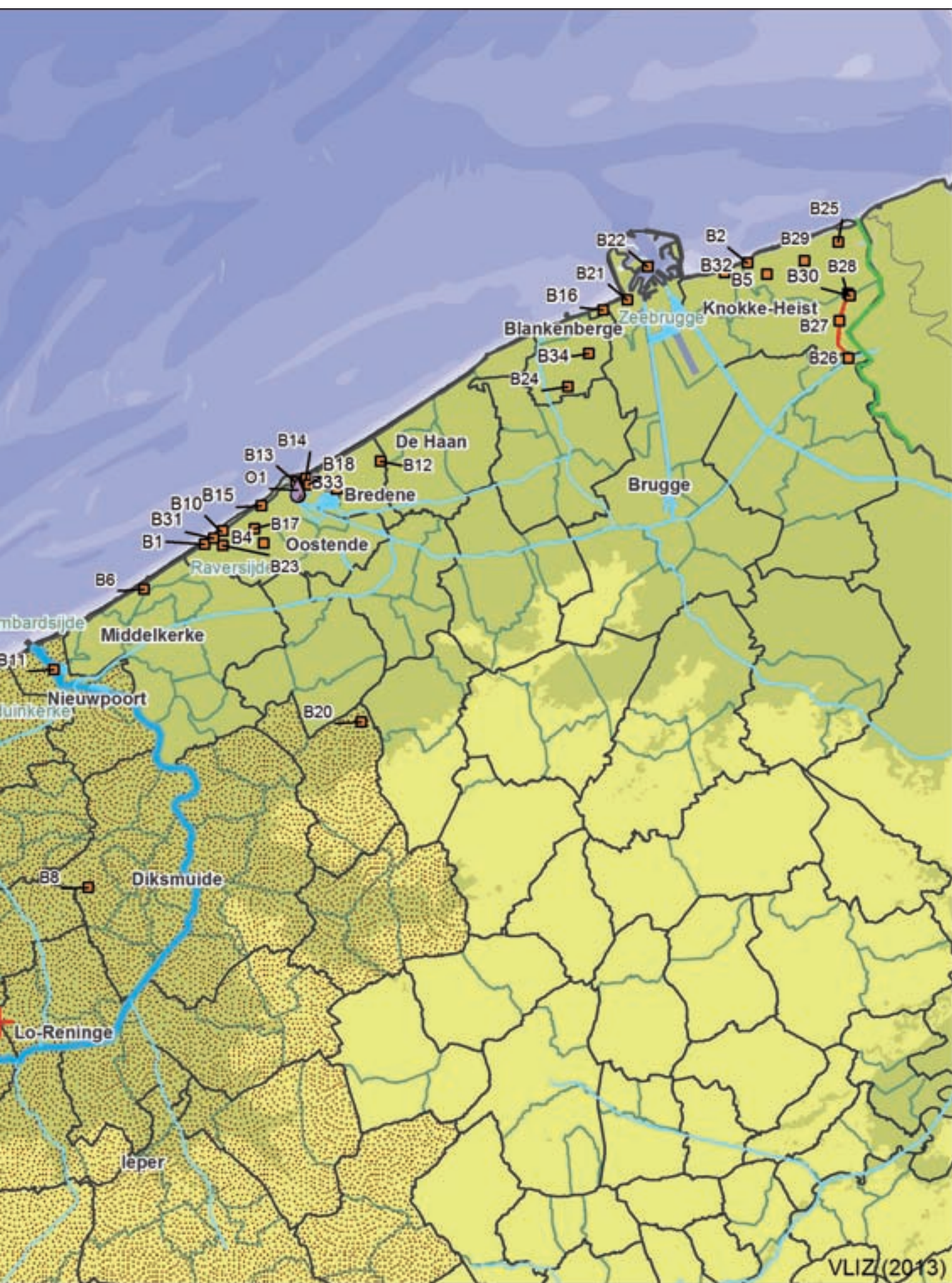
At first, the year 1918 did not bring any improvement. During the previous winter, Russia had ended its participation in the war, as a result of which the German supreme command could drastically reinforce their troops on the western front. From the early spring onwards, the German army therefore took the offensive on a massive scale. One of these offensives was aimed at taking the base of Calais, an essential link in the rearguard for the French, British and Belgian armies. Yet the advance came to a standstill near Kemmel Hill (Kemmelberg) and Merkem. Reaching the coast

turned out to be unfeasible and the offensive was abandoned. That same spring the British navy attempted to deny the German war ships use of the ports of Ostend and Zeebrugge by blocking the channel with ships (see: **“The Zeebrugge and Ostend Raids”**). These raids had little permanent effect. It was not until August 1918 that the military preponderance shifted to the Allies. From late September onwards the Allied troops in West Flanders were ready to take the offensive. Their advance was relatively slow due to fierce German resistance and in particular the difficult terrain. As a result, the *Kaiserliche Marine* managed to withdraw the *Marine Corps* and the *Flanders Flotilla* in an orderly manner. After four years, German control of the Flemish coast east of the Yser estuary had ended.

What remained was explosives lying around, spiked pieces of artillery, and inaccessible harbours and beaches (see: **“Naval mines, “decorative” and deadly”**). A form of battlefield tourism soon developed in the ravaged war zone (see: **“Battlefield tourism on the coast after WWI”**). The marine scientists who had fled during WWI or had carried on one way or another could resume work (see: **“Belgian marine scientists during WWI”**). In addition, the seabed was littered with wrecks and naval mines (see: **“The UNESCO convention on the Protection of the Underwater Cultural Heritage and maritime WWI heritage in the Belgian part of the North Sea”**). Clearing and reconstruction took many years and huge sums of money. Incidentally, the sea itself also played an important role in this ‘cleanup’. The thousands of tonnes of chemical shells left behind by the German army all over Belgium were collected and transported by boat from Zeebrugge to a sandbank off the coast of Knokke-Heist, where they were dumped. At present we are still burdened with the notorious ammunition dump site on Paardenmarkt Bank (see: **“Paardenmarkt Bank, a WWI ammunition dump site off the Belgian coast”**). Although the Great War has been largely wiped from our collective memory and filed away in archives, it has not disappeared. We still find traces everywhere, visible ones but particularly many invisible ones, as they are hidden beneath the sand or the water surface (see: **“What is the present impact of WWI on the coast?”**; **“The First World War in the classroom”**).

The Flanders Marine Institute is very pleased that it was able to provide its services and bring this multifaceted war history of the Belgian coast and territorial waters back into the limelight while revealing a great deal of unknown or ‘forgotten’ facts thanks to the disinterested and enthusiastic effort of numerous authors and experts. This was made possible by dozens of helpful people who contributed to this project. Their names and their special, original contributions can be found on the following pages. We are convinced that the results of their work will open a door to an unknown and unexpected past for many people. Without a doubt, this special issue of *De Grote Rede* will in turn be a starting point for further groundbreaking research. We are in any case delighted with the result and excited about this perspective.





The Imperial German Navy wants to conquer the Belgian Coast

Luc Vandeweyer

In the years prior to 1914 the German supreme command drew up a comprehensive and detailed plan of attack. The central idea was that a massive sweep through Belgium would allow the Germans to defeat the French land forces in the early stages of the war. Afterwards, the German army could concentrate on defeating the Russian army in the east.

This was essentially a continental strategy aimed at eliminating the principal enemy forces. The German Empire also had a war fleet at its disposal, however, which was only surpassed by the British Royal Navy. Nevertheless, it did not play any significant part in the attack plan. The German admiralty did not intend to leave it at that. They looked for opportunities and were therefore highly interested in the sweep through Belgium since this could give them control of the Belgian and Northern French coast. Control of the Belgian ports would considerably improve their strategic position with regard

to the British Royal Navy.

The view the admiralty had on the forthcoming war therefore differed completely from the view of the generals of the land forces.

The strategy of the German admiralty

The German supreme command only assigned a purely defensive task to the navy. It had to protect the German coast and nothing more. The admiralty, on the other hand, thought in terms of a colonial empire as well as the supply of food and raw materials, so that shipping routes had to be kept open. Consequently, they considered not France but the United Kingdom the enemy that was to be feared most, as the British fleet was able to blockade the North Sea. To avert this danger they had to be

enabled to break British control of the sea. In addition, *Grand Admiral* Alfred von Tirpitz, who played a key part, had Pan-Germanic convictions. He considered this war not to be a final point, but a first step on the way to the “*Bid for World Power*”.

The offensive started on 4 August 1914. The main force of the German army entered neutral Belgium on its way to France. The British government reacted immediately with a declaration of war and sent troops to France. London realised all too well that if the German land forces conquered the continental coast facing England, the strategic balance of power at sea would shift in favour of the German navy. So the British were prepared to do anything to prevent the defeat of the French land forces. But did the German generals want to go to the coast? According to the attack plan they did not. However, circumstances would soon be different.

March to the Flemish ports

A few weeks after the invasion, the German forces clashed with British troops for the first time near Mons in Hainaut. The British had reinforced the French left wing, which the German attackers had to overpower as quickly as possible.

In the mean time, the navy protected the German coast. However, the admiralty was of the opinion that they had to play a much more active part. In late August they merged their marine regiments into one division and sent it to Belgium. The men in their blue uniforms were welcomed, as the invasion force had been experiencing difficulties on its north flank due to the fierce resistance by the Belgian army, which made large-scale sorties from the fortified city of Antwerp. The marines had to help secure the German north flank.

Admiral Ludwig von Schröder was appointed commander of this division on 23 August. Several years earlier, he had drawn up a plan under the authority of Tirpitz to take the port of Antwerp by means of a surprise attack. He was among



■ Alfred von Tirpitz
(Bibliothèque National de France)



■ Ludwig von Schröder
(VLIZ, www.vliz.be/wetenschappen)



■ This painting by Willy Stöwer shows the flight from Antwerp across the river Scheldt at the end of the siege in 1914 (Wikipedia)

the naval officers who were well aware of the importance of the Belgian ports. It was no coincidence, then, that his men were positioned just south of the belt of fortifications around Antwerp. It was of course important to the German admiralty's maritime strategy that one of the largest ports of Europe was thus within reach.

The fact that the British realised this as well soon became clear when members of the "Royal Marines" were spotted. First Lord of the Admiralty Winston Churchill had these troops transported by bus to Antwerp via the port of Zeebrugge in order to visibly support the Belgian army.

This drastically changed the living conditions of the German marines. Instead of preparing for military assignments in the colonies or the defence of the German ports, they were now suddenly deployed as a unit "in the field", just like ordinary land forces.

Ostend in German hands

The focus shifted to the north after the attack plan of the land forces failed during the First Battle of the Marne on 8-9 September. Since the French army had survived the deathblow, it became important for the Germans to occupy strategic areas in the north. The fortified city of Antwerp and its port had to be taken.

The German marines were assigned to a newly established army corps under the command of General Hans von Beseler. He had to take the fortifications around Antwerp and, if possible, eliminate the Belgian army. He had a good chance of success thanks to the heavy siege artillery put at his disposal. When Antwerp fell on 10 October, the Belgian field army was already heading for the coast. In the mean time, French headquarters also realised they had to send more troops northward, since this was the only region where the Germans were still trying to conquer territory. A brigade of marines, the "pompons rouges", were among the French troops who entered Belgium. Their first confrontation with the German invasion force took place at Melle, southeast of Ghent.

This did not halt the German advance, however. The focus of the battle shifted to West Flanders. As a result, the Allies did not succeed in enabling the Belgian army to re-establish a base in the Ostend region. The troops had to continue towards the French border. At the eleventh hour they decided to stand their ground at the river Yser. There they were able to stop the German advance in late October after intense fighting. Both



■ The German occupiers at the Smedenpoort gate in Bruges (Bruges City Archives – col. J. A. Rau, FO/B00133)

the French and the British navy played an important part in this. The French fusiliers marins stubbornly defended Diksmuide. British monitors entered the coastal waters and shelled the advancing German regiments with their heavy guns. This made it clear to the German navy that the British and French admiralities would put everything at stake to keep the Germans away from the French coast.

The advancing German troops included marines. Von Schröder's troops did not just take control of the port of Antwerp. Some of them were transported to Bruges via Brussels by train. From there they marched to the front line in the Yser plain. However, the main part occupied Bruges and the coastal municipalities. One of the battalion's medical officers ended up in Ostend, a fashionable seaside resort which he already knew from before the war.

Instead of wealthy tourists the city was full of German soldiers who were on their guard. With good cause, as the city was heavily shelled by British war ships on 23 October. From then on, no one was allowed on the beach so as to avoid unnecessary losses in case of another shelling. As a result, the beach and the promenade looked totally different than in times of peace. Over the following weeks and months it became clear that the danger had not passed. British war ships continued to venture inshore and the German occupiers were shelled more than once.

Meanwhile, the Allies were able to prevent the Germans from occupying the ports of northern France. However, Ostend and Zeebrugge did fall irrevocably into German hands. Moreover, the harbour facilities were virtually intact. This was also the case in Antwerp. But since the Netherlands remained neutral and closed the river Scheldt to war ships, Antwerp was only of limited importance to the subsequent war at sea.

It was now crucial to develop a strategy for a long-drawn-out war. The German navy firmly intended to fully exploit the narrow coastal strip in West Flanders. Nowhere were they this close to the British coast and to the ports from which the British troops set off to the western front. The Belgian coast had to enable them to inflict severe losses on the enemy.



■ A picture of Ronarc'h in *Le Petit Journal* of August 1917 (Bibliothèque Nationale de France)

The seaports as bases of operations

All headquarters had realised the importance of the shipping routes in the English Channel for the build-up of military force on the western front. Both the British and the French established headquarters to create a line of defence in the Strait of Dover which could prevent the German naval forces from intercepting vessels in the Channel. The French established headquarters in Dunkirk and Calais, the British in Dover. The French put Vice-Admiral Ronarc'h in command. He commanded the *Brigade de fusiliers marins* which had fought at Diksmuide to halt the advance of the German army. Now he could concentrate on the protection of the shipping routes to England. His "*pompons rouges*" had been stationed at Nieuwpoort and the Yser estuary where they faced the German marines. Ronarc'h immediately realised that this coastal area with its many sandbanks and narrow channels was the ideal terrain

for small vessels, i.e. small submarines, minelayers, destroyers and torpedo boats. He expected the German navy to count on torpedoes and mines to engage the enemy.

The German navy had not forgotten the shellings by British war ships in October and November 1914. Von Schröder was aware that he first had to make the newly acquired harbours unassailable. To do so, large numbers of heavy batteries were transported to the Flemish dunes and installed in bunkers. This made it much more dangerous for the British Royal Navy to deploy ships off the Belgian coast. The military force in blue uniforms grew steadily. The Germans established a real *Marinekorps* (Marine Corps) on 15 December 1915. The Imperial Navy now had a very strong position in West Flanders, where they closely collaborated with their neighbours to the south, the 4. *Armee* (4th Army) of the land forces. Von Schröder's command became equal to the commands North Sea and Baltic Sea. He commanded tens of thousands of men. The German admiralty gave von Schröder the required elbowroom. After the construction of the defences, the ports had to become a safe base from which attack operations could be conducted.

The threat of the German fleet

As early as 9 November 1914 the first German U-boat arrived in the port of Zeebrugge. Yet the tactical value of large submarines was limited in naval warfare in this region. The French-British minefields in the Strait of Dover were considered such a menace that the German admiralty ordered their large U-boats not to sail through the Channel anymore in April 1915. Other vessel types were required.

The Harbour and Canal Construction Division assigned to von Schröder did its best to improve the harbour facilities as well as the inland navigation routes as quickly as possible, since supplies were to a considerable extent shipped via inland waterways. Small UB and UC-type U-boats were designed for this area. UB boats carried torpedoes while UC boats were specialised in laying mines on enemy shipping routes. The *Flanders U-boat Flotilla* became an



■ Components of UB-10 are shipped by rail from Antwerp to the coast (Tomas Termote)

autonomous unit in April 1915.

The Germans made use of the shipyards in Antwerp to build these small U-boats in sufficient numbers. On 27 June 1915 the Belgian division headquarters on the Yser front received a report from the intelligence service that included a letter from Hoboken.

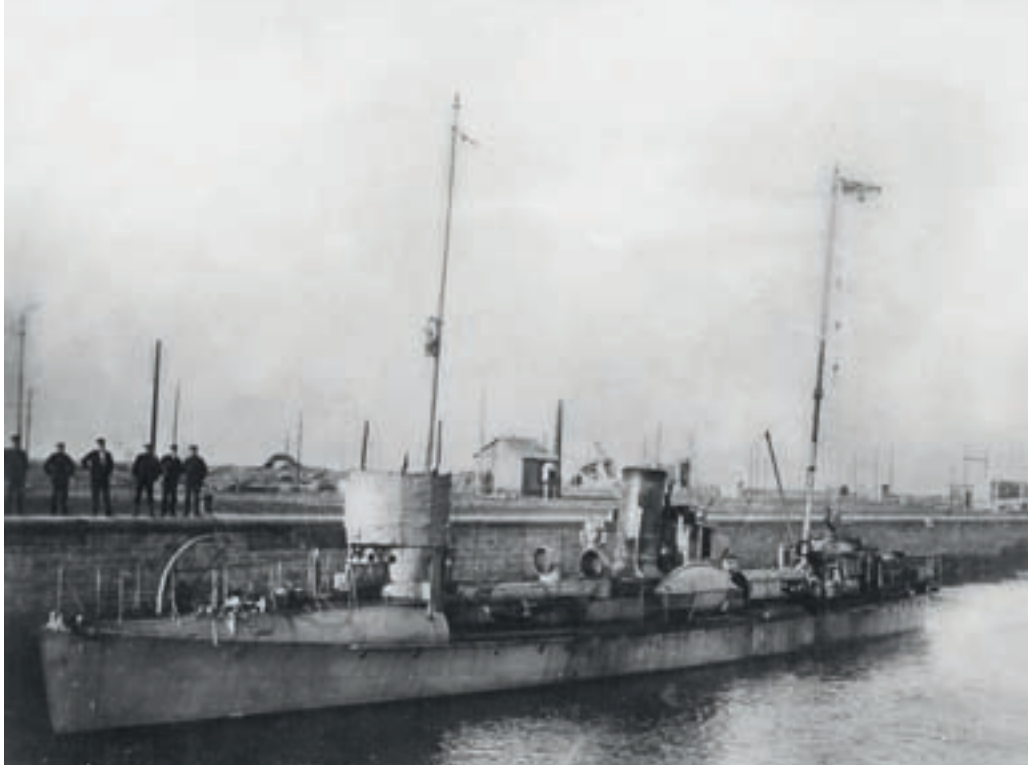
The letter read that the enemy imported U-boat components by rail from Germany and assembled them at the Cockerill Yards site. After assembly, the vessels were towed via canals to the coastal ports, where their crew came on board.

UB boats were equipped with two bow torpedo tubes and a machine gun. Firing torpedoes was a hated tactic and public opinion reacted very negatively to it, also in the countries that had remained neutral. The Germans therefore exercised restraint at first, but this did not last. On 1 February 1917 the limitations on the use of torpedoes were lifted and so-called “unrestricted submarine warfare” was declared. At that time 37 U-boats were stationed at bases along the Flemish coast. In 1917 a large number of UC-type minelayers were commissioned. They laid mines off numerous British and French ports from the Spanish border to deep into the Irish Sea.

The first *torpedo boats* were small A1-class boats, also specially designed for the shallow coastal waters. The components of these boats were transported to Hoboken, where they were assembled, and then they continued their journey via the canals. Sixteen units were supplied in 1915 alone. In 1916 the slightly larger A2 class was introduced, followed by four units of the still larger A3 class in 1917. In each case it meant a significant reinforcement of German control of the sea.

In March 1916 even larger ships arrived, which formed the *Z-Flotille Flanders* (“Z” stands for *Zerstörer* or destroyer). There were ten of them by the spring of 1917. Since they were equipped with artillery, these ships were able to shell the Belgian troops in the coastal area. Instead of an idyllic haven, De Panne soon became a front line town where safety was far from guaranteed. Early on, the British high command promised to place an observation balloon near the coast to warn against possible German naval bombardments of Belgian targets behind the front.

These German warships had to protect the coastal waters so that U-boats could safely enter and leave the ports of Zeebrugge and Oostende. In other words, they served as an extension of the coastal batteries. In addition, they had to clear British mines and net barriers. The *Zerstörer* (destroyers) were deployed four times to fire on Calais. The Germans also installed long-range guns with which they could shell the French port and stronghold of Dunkirk. The Germans realised that the presence of their navy in Ostend and Zeebrugge was hard to take for the British. Even though their *Flanders Flotilla*



■ An A1-class torpedo boat by the quay in Zeebrugge (Tomas Termote)



■ G and S-class destroyers are ready to set off in a dock at Zeebrugge (Tomas Termote)

never really succeeded in disrupting the provisioning and reinforcement of the British troops on the continent, the threat hung over the Allies’ heads like the sword of Damocles. Eliminating this threat was only possible by means of a large-scale operation on land, however.

Passchendaele and Nieuwpoort in the summer of 1917

The British forces on the western front had in the mean time been drastically reinforced. Commander-in-Chief Sir Douglas Haig wanted to improve the strategic position of the British by obtaining control of the Belgian coast. He adopted a step-by-step

approach. Thanks to a series of successive, vigorous attacks he gained control of the ridge south of Ypres, which was a better point of departure. Meanwhile he continued to bring in troops and supplies.

The German commanders realised that West Flanders would once again become an important battleground. The German admiralty formed the 3rd Marine Division on 1 June 1917. This gave von Schröder more means for the war on land. The British had in the mean time claimed Nieuwpoort and replaced the French troops there. Over the next few weeks, the British built up an impressive artillery capacity. However, the Imperial Navy’s heavy coastal batteries were capable of shelling Nieuwpoort whenever they wanted thanks to their rotating gun

Consequences of the presence of the Imperial German Navy for the civilian population

What consequences did the German military presence have for the civilian population? Firstly, they hardly had any freedom of movement and many civilians were only able to survive by working for the enemy. Secondly, these people were increasingly in danger of falling victim to the ever greater fire power the Allies brought to bear against von Schröder's troops. The German bases were repeatedly bombed by aeroplanes, but the British fleet put up a good fight as well.

Finding Flemish eyewitnesses is quite difficult due to the strict censorship the Germans introduced. Those who were allowed to write letters had sided with the Germans via Flemish nationalism. This was the case for the Ostend municipal librarian Eugene Everaerts, the leader of *Vereeniging Vlamingen der Noordzeekust Oostende* (Association of Flemings of the North Sea Coast in Ostend). In May 1918 he sent a letter to the Council of Flanders in Brussels with an unmistakable appeal for help. *"For several months not a week has gone by without the city being shelled aimlessly and randomly from the Yser front or from the sea by the heaviest artillery of the French or the English. The civilian population suffered casualties each and every time. The situation is growing worse and has become unbearable. Fear and dismay prevail among our population day and night. Today, Thursday 16 May, the city has been bombed from sea in the morning and in the afternoon, and numerous inhabitants of Ostend have fallen victim to these shellings in the very centre of the city."*

He emphasized the fact that the Association of Flemings of the North Sea Coast appealed to the Council of Flanders, the precursor of a Flemish parliament. The Council had to urge the German authorities to give every civilian who wished to leave the city the opportunity to do so and allow them to settle elsewhere. The letter stated this was a gesture *"to offer our sorely tried population a helping hand and to save them in these circumstances. [The Germans] will thus perform an act of humanity, which will ensure the gratitude of the entire city of Ostend."*

The secretary of the Council of Flanders immediately asked the German authorities what they could do. The problem was put on the agenda for the next meetings with the occupation government. We do not know whether this appeal for help had any short-term effect. What we do know is how



■ Ostend suffered terribly under the bombardments. This is a picture of Christinastraat in 1917. As was the case all over the city, a large part of the houses lie in ruins. (Ostend image archive)

serious the consequences of the presence of the Imperial German Navy were for the civilian population of Ostend. And Bruges did not fare any better.

turrets. The morning of 10 July 1917 promised a foul weather day. This meant the British could not count on the heavy artillery of their fleet. In the evening, the German *Marinekorps* took advantage of the situation by shelling the British positions between Nieuwpoort and the sea for hours. This was followed by a gas attack. Subsequently, the German marines rushed forward under cover of darkness and captured the British trenches with flamethrowers. The German troops crossed the dunes and reached the water of the Yser estuary. The British scarcely managed to retain a small stretch of land near the city. The sluice complex where the Belgian Engineering Corps was stationed was in great danger. But at that moment the German advance came to a halt. As a result, Nieuwpoort was not taken but the British did lose their points of departure for a coastal offensive. The territory gained by the Germans was therefore of strategic importance.

This was followed by the British offensive known as the Battle of Passchendaele. It was a total failure. Haig's plan to eliminate the German navy on the Flemish coast had failed miserably.

1918, the year of the final offensives.

In the course of 1917 the Russian Empire collapsed and an armistice was concluded after the Bolshevik takeover in the autumn. This enabled the Germans to transfer a large number of troops to the western front. They would provide the necessary fire power to launch an offensive in spring.

One of the principal offensives was aimed at forcing a breakthrough south of Ypres in the direction of the Channel coast. This attack was smothered in blood during intense fighting at Kemmel Hill (Kemmelberg). Meanwhile, the British had realised they would have to defend their base near the port of Calais. The French had made similar preparations at Dunkirk. The British hoped to use these two heavily defended strongholds with their back to the sea to hold the Germans back for a long time.

The Belgian government in Le Havre seriously took into account the possibility that they may be forced to cross the Channel to England. Eventually, they did not have to. The German spring offensives slowly petered out and in August 1918 the balance of power had shifted back to the Allies. Now the time had come for them to plan the final offensives. In the north, an international "Army Group Flanders" was formed, formally under the command of King Albert I. The Belgian divisions formed the northernmost force. But the coastal area and the polders were left out of the attack plan. The Belgian push started from the area south of Diksmuide. The aim was to advance systematically over a wide front. This way the coast would come under Belgian control.



■ Sir Douglas Haig (Wikipedia)

However, the advance progressed relatively slowly. This enabled the German navy to save the troops of *Marinekorps Flandern* from being surrounded so that Admiral von Schröder was able to return home after four years. In the mean time, a mutiny had broken out in the German High Seas Fleet in Kiel. The end of the war was in sight. It would also be the end of the Imperial Navy.



■ Kemmel Hill, located 1.5 km from the village of Kemmel, was a strategic site during the First World War and heavily fought over by both parties. German troops occupied Kemmel Hill during the 1918 spring offensive. The next day a French counterattack took place, but the German troops advanced to Dikkebusvijver. The fighting continued until the end of July 1918. With the help of the Americans, Kemmel Hill was reconquered by Allied troops on 5 September. After the battle the hill was bare. Afterwards, it was replanted with broad-leaved trees. (Wikipedia)

German U-boat development during World War I

Tomas Termote

When we take a look at the current nautical charts of the Flemish Banks, we notice numerous depth figures, names of sandbanks, shipping routes and buoys. The most striking and perhaps the most intriguing features are the obstructions, foul areas and wrecks marked as navigational warnings to shipping. The Belgian territorial sea contains the remains of 277 shipwrecks, most of which have been identified. Nearly one third (32%) of these remains are military wrecks dating from both world wars. These mainly include small units such as *Vorpostenboote* (patrol boats), *Sperbrecher* (pathfinder vessels), *Kriegsfischkutter* (armed trawlers), *motor launches*, harbour tugboats, destroyers as well as submarines. A total of 8 wrecks, making up nearly 3% of all known wrecks, are sunken U-boats. The following article is a typological study of WWI German submarines by means of the archaeology of U-boat wrecks discovered in Belgian waters (see map p. 25).

The lifespan of a wreck

The influence of man and nature

Man-made materials such as sunken ships which have been scattered over the seabed decay over time. This process takes place under the influence of biofouling, the occurrence of tides and storms, and chemical processes such as corrosion ("rusting"). Human influences such as dredging, salvaging, fishing and sand extraction uncover wrecks and speed up their eventual disintegration. Each type of wreck has a certain lifespan, after which it collapses and the remains are buried. The remains of wooden ships and aircraft have suffered the most, especially in the period after World War II. Bottom trawling (i.e. towing a beam trawl along the sea floor) became popular in this period, which destroyed many wrecks. The lifespan of steel ships such as merchant ships is approximately half a century. This varies depending on the extent to which a wreck is covered by sand and the depth at which it is located. The deeper it lies, the more it is protected from the effects of swell and storms. The author's father, Dirk Termote, witnessed this decay process through many decades of diving on various



■ Sketch of the wreck of cross-channel ferry *MV Queen of the Channel* (Tomas Termote)

wrecks on the Flemish Banks. The wreck of cross-channel ferry *MV Queen of the Channel*, sunk at Middelkerkebank in 1940, was relatively intact when it was discovered in 1987. The bow was in an upright position, with secured anchors, winch and mast foot as identifiable parts. The author can confirm that nearly 20 years later, the sides of the bow of *MV Queen of the Channel* had collapsed and the winch, anchors and superstructure lay scattered and buried.

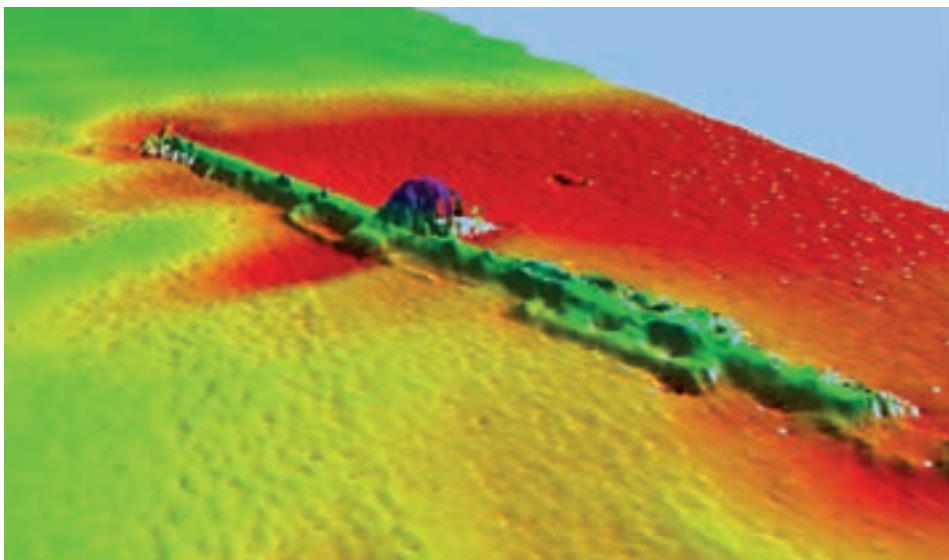
Submarine wrecks: strong but not invulnerable

Thanks to their tough construction, usually consisting of a double hull, U-boat

wrecks are among the most resistant to natural and human impacts. These wrecks can have a lifespan of 100 years or more. They are easily recognisable too. Even on acoustic images created by means of a side-scan sonar or multibeam echosounder, the prominent 'cigar shape' and the central conning tower are very striking (see below).

That U-boat wrecks are not invulnerable either was proven in the summer of 2005.

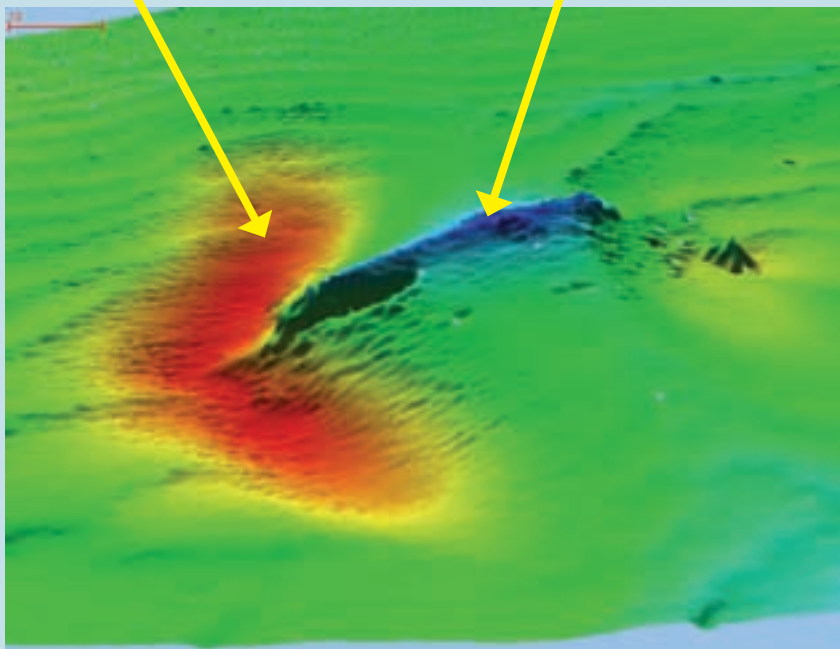
At that time, the net of a Eurokoter from IJmuiden got snagged onto the wreck of a UC-II type U-boat near Fairy Bank. The wreck became so entangled in the net that it took eight hours to disentangle it. With this in mind, the author got the unique



■ The typical 'cigar shape' and the central conning tower make a submarine wreck easily recognisable. This is the wreck of UB-59 near Zeebrugge, visualised by means of acoustic (multibeam) techniques (MDK – Coastal Division)

Not every U-boat wreck dates from WWI

Various characteristics and distinguishing marks are used to identify submarine wrecks. These may help to determine the wreck's origin (period and nationality), since not all U-boat wrecks date from WWI. A few U-boats from the Second World War were sunk in the southern North Sea, and even possible post-war wrecks need to be taken into account. For instance, a Russian submarine headed to be scrapped was lost in stormy weather near Bruine Bank in 1998.



■ A multibeam image of the location of UC-62 (below). The red area indicates scouring as well as the deepest point of the wreck (below the stern). This is the location of the port propeller featuring the U-boat number.

The elevated blue area in the middle is the remains of the conning tower. The picture (top right) clearly shows the three holes in the conning tower hull which indicate shell bursts. The fragment (top left) is the broken bow of UC-62

(Photographs: Tomas Termote; Multibeam image: MDK - Coastal Division - Flemish Hydrography)

U-boat numbers were painted or welded onto the hull and the conning tower, but these usually quickly disappear when the outer hull starts to decay. Information concerning the vessel type can be found on the propeller hubs. This information has to be treated critically as well, as available propellers were sometimes reused in shipyards in wartime, despite having a different vessel number. Submarine wrecks usually remain upright, or heel over to starboard or port. A site can also be linked to the First or Second World War on the basis of the nature of the decay. The actual identification can take place on the basis of the dimensions of the hull and conning tower as well as the presence or absence of torpedo tubes, deck guns or mine chutes. The eight U-boat wrecks in Belgian territorial waters include all five U-boat types deployed by Germany. In case of a typological identification of the site, a U-boat number can be looked up after checking the damage to the wreck. Was the U-boat mined, torpedoed, bombed or was she lost due to an internal explosion? The location of a wreck can be compared to historical sources so as to reach a final identification.

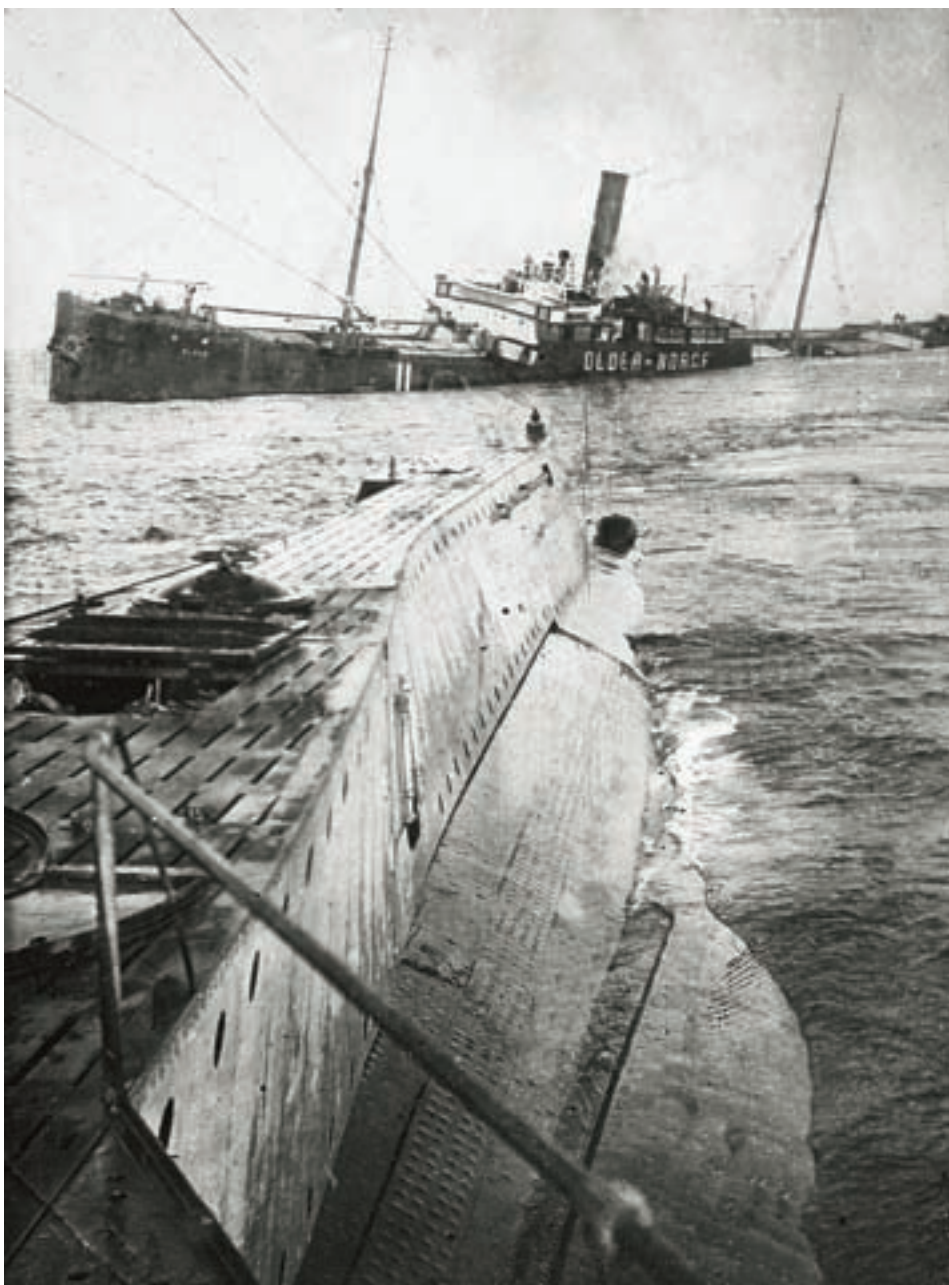
The case of the wreck of UC-62 on Thornton Bank proves that fieldwork can confirm but also refute the historical facts. In 1993 the remnants of a large mine-laying submarine were found in deeper waters north of Thornton Bank, approximately 1 mile from Dutch territorial waters. The wreck showed heavy damage at the mine chutes; the bow had been ripped off and was lying some distance away. It was clear that the damage had been caused by a torpedo impact. The most intriguing aspect was the presence of three irregular holes in the pressure hull of the conning tower. When the hubs of the three-bladed propellers were cleared, the U-boat number turned out to be UC-62. Both German and British historical sources state that UC-62 disappeared around Portland – St Albans Head during her ninth mission in mid-October 1917. The U-boat was supposedly sunk by an enemy mine. During the time of the disappearance of UC-62, British submarine HMS E-45 was able to hit a surface-running enemy U-boat near Thornton Bank. In the log of HMS E-45, the captain mentioned firing two torpedoes from a distance of 400 m and hitting the U-boat in front of the conning tower, after which she sank immediately. The three irregular holes in the conning tower hull were probably caused by gunfire impacts incurred earlier on. As a result, UC-62 was unable to submerge and fell victim to HMS E-45.

opportunity to closely investigate the impact of 3000 HP of traction on a wreck. The net had clearly been stuck on the stern area near the U-boat's engine room. As only few protruding parts were still present on the hull, the net and the trawl chains got stuck on the back torpedo loading hatch. This hatch weighs 300 kg, measures 2m by 1m, and is fitted with two heavy hinges and eight double fastening bolts (diameter: 4 cm) to ensure watertight sealing. However, this did not prevent the oval steel hatch from being pulled loose; it was found in the scour pit behind the wreck near the propellers. Inside an untouched world could be glimpsed at, including two diesel engines, a stowed torpedo in the central compartment and a workbench with all sorts of tools. Nature quickly preserved the vessel and after just three months the engine room was filled with sand to the brim of the hatch.

U-boat types during WWI

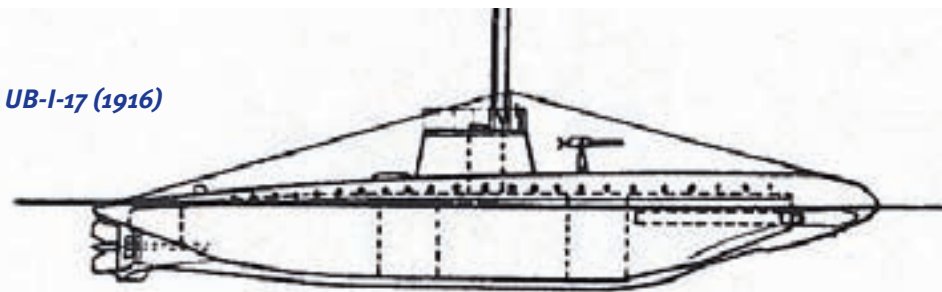
In August 1914, on the eve of the Great War, the Imperial German Navy only had a small fleet of 28 U-boats. These were large, double-hulled vessels that spent most of their time at sea on the surface and only submerged in case of danger or when an attack had to be carried out. Technically they were torpedo boats that could submerge.

When the Flemish coast fell in German hands in October 1914, this resulted in the development of a new kind of submarine. It had to be easily manoeuvrable so that it could be operated between the treacherous shallows and sandbanks, and be able to approach an enemy port without being noticed. It also had to be produced faster than pre-war U-boats, which took a full year to build. This way the UB-I type or *Küstenpatrouille* U-boat was developed, afterwards replaced by the medium-sized UB-II and the large UB-III types.



■ A German submarine sinks a ship at the beginning of WWI (Tomas Termote)

UB-I-17 (1916)



The UB-type

UB-I

The first UB-I was laid down in Kiel in February 1915 as the first of a series of 17 similar U-boats. The boat had a length of 28.10 m and a beam of 3.15 m, and displaced 127 metric tons. Because of her size, this U-boat was fitted with a single pressure hull and a single propeller. The vessel could attain a speed of 6.5 knots surfaced and 5.5 knots submerged. Even with single propulsion, the submerged speed was

remarkable: 22 seconds to reach a test depth of 50m. The armament was limited to two 45-centimetre bow torpedo tubes and one 8-millimetre machine gun. Living and working conditions on board UB-I vessels were very basic; there was one berth for every two members of the crew, which consisted of 1 officer and 13 men. These small U-boats became well-known not just because they were the smallest U-boats produced during the First World War, but also because they were transported to the front by rail. After finishing at a German shipyard, UB-I submarines were dismantled

and their fifteen components were loaded onto different flat wagons. The four biggest components were the bow section, the mid section, the conning tower and the stern section. After a five-day journey they arrived at the Hoboken naval dockyard, where they were reassembled.

Their limited horsepower, limited range and supply of only two torpedoes also limited their operational capacity. The UB-I submarines attacked vessels in an area stretching from Noordhinder Bank to the British east coast, from the mouth of the Thames to the region of Calais. Despite a patrol time of maximum three days, high demands were made on the crew. A UB-I submarine spent an average of 150 days at sea during a service time of 7 months. A total of six vessels from the UB-I fleet were lost, two of which in Belgian waters. The best known and most successful one was *UB-10* under the command of *Kapitänleutnant Otto Steinbrinck*, who sank a total of 37 ships. *UB-10* was also the only submarine from the UB-I fleet that survived four years of war and was scuttled off Heist in October 1918 in the face of the German retreat. *UB-10* was rediscovered off Heist when dredging took place to expand the port of Zeebrugge in 1980. The association *Tijdelijke Vereniging voor Bergingswerken* managed to bring the nearly intact wreck to the surface by means of salvage vessel *Norma*. Only the conning tower and the outer hull were missing from the wreck, but otherwise *UB-10* was remarkably intact. Due to time constraints and lack of interest, the wreck had to be disposed of as quickly as possible and was buried under 15m of sand outside the old Zeebrugge seawall. At present a project is under way to relocate *UB-10* and salvage and conserve her as soon as possible.

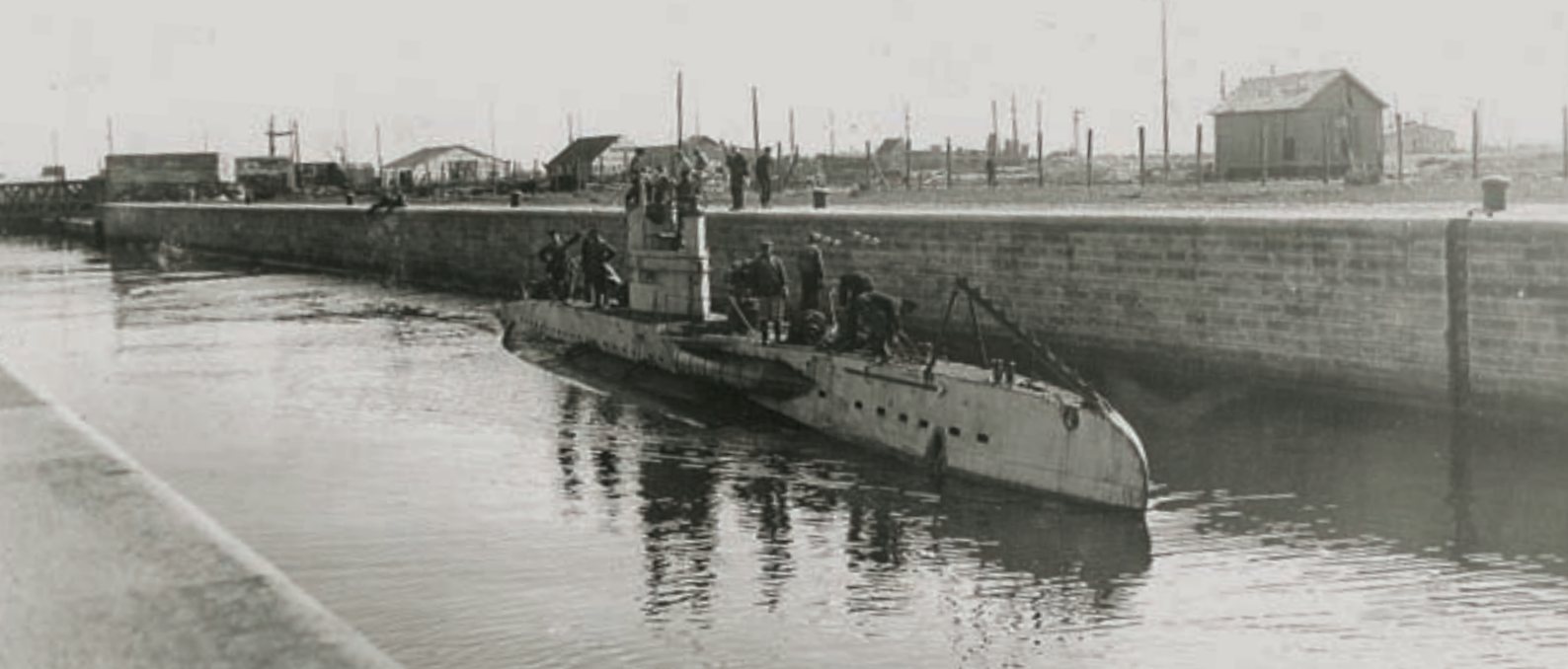
UB-I submarines were rather vulnerable, often suffered engine and compass problems, and had a tendency to break



■ A UB-I type submarine at the Hoboken naval dockyard in 1915 (Dirk Termote)



■ Left: Salvage of the wreck of *UB-10* by salvage vessel *Norma* (Piet Lagast). Right: *UB-13* and *UB-10* by the quay at Zeebrugge in 1915 (Tomas Termote)



■ A UB-II type submarine in a lock at Zeebrugge (Tomas Termote)

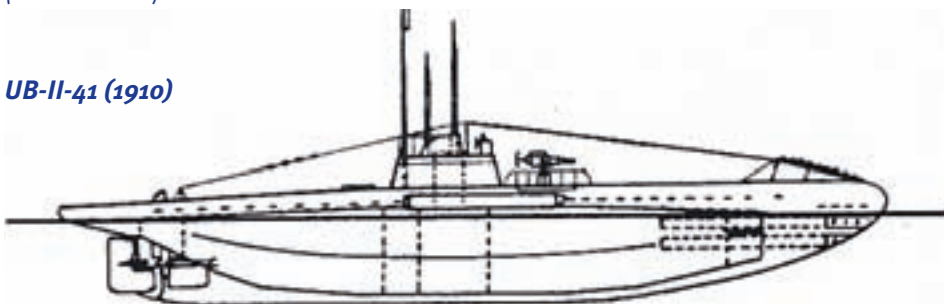
trim after the firing of torpedoes. They were usually equipped with a compensating system to offset the loss of the torpedo's 770kg weight after firing, but this system did not always function properly. As a result, the bow could broach if the tube was filled too late, or plunge to the depths if too much water entered the tube. One commander compared the erratic behaviour of the UB-I submarine to a "sewing machine" when a "tin tadpole" (i.e. a torpedo) was fired.

Life on board must have been hell, especially in the unpredictable and turbulent weather on the North Sea. *Oberleutnant zur See* Werner Fürbringer, commander of UB-2, described the conditions when his U-boat ran into a north-westerly force 10 storm off Den Helder. The U-boat pitched and rolled violently, and at times the top of the conning tower broke the surface at an angle. Both compasses were out of order and Fürbringer had no other option than to take UB-2 to the bottom until the storm had blown itself out before he could continue his journey. Even at a depth of 28m the submarine still rolled due to the effect of the groundswell.

UB-II

The German admiralty realised the use of developing a larger UB type with better armament, more space and a bigger range. One year after the commissioning of the first UB-I submarine (on 16 February 1916), *UB-18* was the first UB-II type U-boat to enter the port of Zeebrugge. The arrival of this new type was a real boost for the Flanders Flotilla. *UB-18* had a length of 36 m and a beam of 4.36 m, and displaced 263 metric tons. Thanks to her double propulsion she could attain a speed of 9 knots surfaced and nearly 6 knots submerged. The main armament continued to consist of two bow torpedo tubes and an 8.8 cm deck gun mounted in front of the conning tower. Although this submarine was nearly twice as

UB-II-41 (1910)

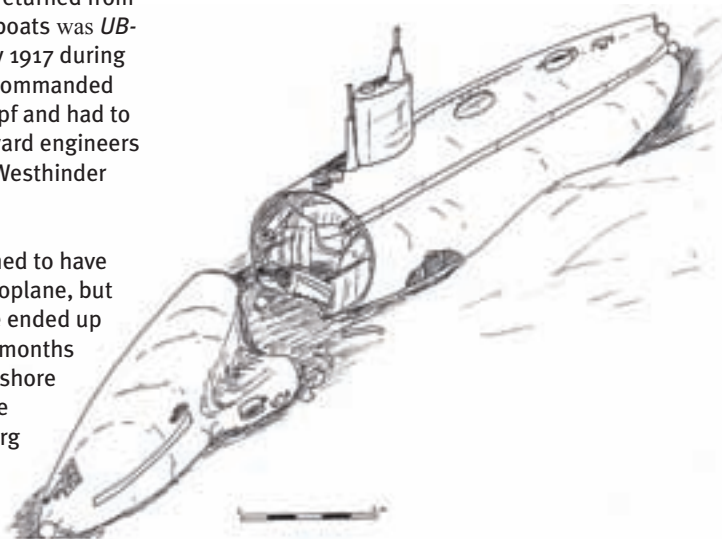


large as the UB-I type U-boat, it still had a 30 second diving time. The 23 crew members had a little more space and their own berth. Nearly 30 units of this U-boat type had been commissioned by the middle of the war. From their Flemish bases, the range of the U-boats now stretched to the Scottish coast and the western end of the Channel.

The UB-II type scored major successes, mostly against merchant ships and troopships sailing from Britain to France and vice versa. However, these U-boats also had their limitations in terms of distance and were hit hard by Allied countermeasures. Out of approx ten UB-II submarines stationed at Flemish ports, eight never returned from their patrols. One of these U-boats was *UB-20*, which was sunk on 28 July 1917 during trials off Ostend. *UB-20* was commanded by *Oberleutnant zur See* Glimpf and had to make 4-hour trials with dockyard engineers and a few army officers near Westhinder Bank.

Initially *UB-20* was presumed to have been bombed by a British aeroplane, but later on she appeared to have ended up in an enemy minefield. Three months later, Glimpf's body washed ashore on the coast of Jutland, and he was buried next to Loddenbjerg church (Denmark). In 1989 the wreck of *UB-20* was found north of Kwinte

Bank, near the "A-zuid" buoy; she was identified on the basis of the number on the starboard propeller. The wreck has been fairly well preserved, although the stern section was completely ripped off near the engine room as a result of the mine blast.



■ Sketch of the wreck of UB-20 at the "A-zuid" buoy (Tomas Termote)

UB-III

The U-boat inspectorate ordered the UB-III type submarine in the spring of 1916. This was a better and more manoeuvrable version of the pre-war U-type and displaced 300 metric tons. In comparison with the U-type, this type was more lightweight, it was constructed in six months and it had the same diving time as the UB-II type. It had a length of 55 m, a beam of 5.8 m and a complement of 34 men. *UB-III* also had double propulsion and was capable of attaining slightly faster speeds than the medium-sized *UB-II*. Its range had increased as well: it could easily reach the Irish Sea, the northern British Isles and the Bay of Biscay. The armament was remarkable: five torpedo tubes and one deck gun. *UB-54* was the first UB-III type U-boat to enter the port of Zeebrugge and was followed by nearly 30 other UB-III type submarines. *UB-57*, under the command of *Oberleutnant zur See* Johannes Lohs, was the most successful one and succeeded in destroying 17 ships over the course of five patrols. Eventually this fleet also suffered heavy losses: a total of 16 vessels never returned, including *UB-57* and *UB-54*.

One of the most remarkable wrecks is located on top of Fairy Bank. The site itself is limited to a large conning tower protruding from the seabed and part of the upper hull as well as a few stowed bottles of compressed air. On top of the conning tower there are periscope standards with retracted periscopes and an open hatch. The site is remarkable because it contains a large UB-III type submarine, 90% of which has been covered by sand. The U-boat has not yet been identified with certainty, but possible candidates are *UB-54*, *UB-56* or *UB-58*.

The UC-type

U-boats were not just developed to carry conventional torpedo tubes. Since shallow waters along shipping routes and at the entrance of harbours saw most activity, the German admiralty thought mines would have the most effect. However, surface minelayers could not reach their targets in enemy territory without being noticed, which constituted a major problem. The only solution was the development of a mine-laying U-boat, the UC type.

UC-I type submarines had a length of 34 m and a beam of 3.15 m, and displaced 168 metric tons. They carried a complement of 14, and the conditions on board were comparable to those aboard UB-I type submarines. A total of 15 units were laid down. Their bow was equipped with six internal mine chutes with a carrying capacity of two mines each. *UC-11* was the first minelayer to enter the port of Zeebrugge on 26 May 1915. Another eleven U-boats of this type would operate from Flemish bases after being transported from Germany by rail. The impact of this small minelayer was significant: the Allies lost no fewer than 284

UB-III-142-153 (1918)



■ *UB-III type U-boats at Heligoland (Tomas Termote)*



■ *A diver explores the conning tower of a UB-III type U-boat on Fairy Bank (Harry Klerks)*

ships due to their mines. All twelve UC-I type submarines were eventually lost: five in Dutch waters, six in British waters and one was scuttled off Zeebrugge: UC-4.

The UC-I type proved its value in 1915, but these U-boats did not have any secondary armament, much to the frustration of their commanders. As a result, a more effective U-boat type was developed which combined all elements of the previous designs: the UC-II type. These submarines had a length of 53 m and a beam of 5.2 m, and displaced 417 metric tons. They were able to dive to a depth of 50 m in 40 seconds. Moreover, the bow

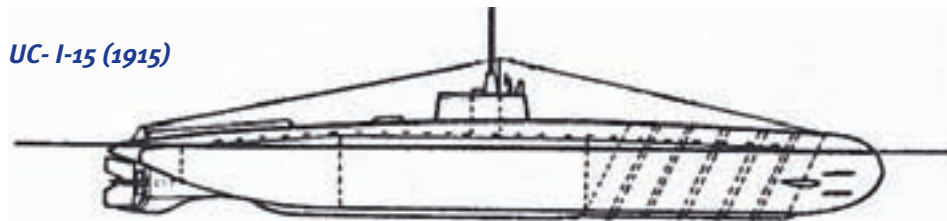
featured an elevation fitted with six vertical mine chutes with a total carrying capacity of 18 mines. This had the advantage that the mines were stored dry, contrary to the UC-I type submarines, where mines were located outside the pressure hull. The UC-I type required the depth to be set in the harbour prior to departure and this setting could not be adjusted afterwards. In case of the UC-II type, it was possible to adjust the depth setting during the voyage so as to determine where and at what depth a minefield should be laid on site. UC-II type submarines were also equipped with three torpedo tubes and

an 8.8 cm deck gun. The first UC-II U-boats were deployed in Flanders in 1916 and about twenty would eventually operate from Flemish bases by the end of the war. Losses were heavy with 17 UC-II boats lost in the last two years of the war. Most were mined or sunk by British warships, e.g. UC-62 on Thornton Bank.

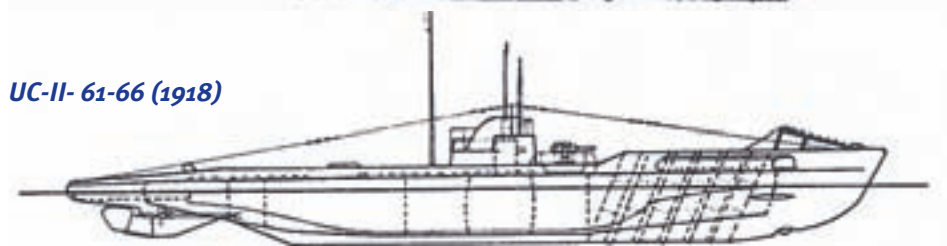
Conclusion

During the First World War, U-boats evolved from insignificant vessels to fearsome weapons which nearly brought Britain to its knees. They very quickly evolved from experimental vessels into effective weapons equipped with torpedo and mine chutes as well as deck guns of various calibres. The occupation of the Flemish coast and the development of a large base played a crucial part in this. Wartime actions left many U-boats wrecked in Belgian waters. These sites still provide us with a unique insight into the different types of submarines. The combination of research at sea and the study of numerous reference works has confirmed, refuted and refined several theories. Maritime archaeology will enable us to solve new mysteries concerning lost U-boats in the future. This is possible thanks to a joint effort on the part of private individuals, such as divers, and public services (Flanders Heritage Agency, Flemish Hydrography).

UC-I-15 (1915)



UC-II- 61-66 (1918)



■ A UC-II type submarine at sea. This type of U-boat carried 18 mines in 6 internal chutes as well as a gun in front of the conning tower (Tomas Termote)



■ A torpedo boat passes a few moored UB-I type submarines in the Bruges inner harbour. They were somewhat protected against possible air raids by means of concrete and wooden lean-to constructions (Tomas Termote)

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The UNESCO convention on the Protection of the Underwater Cultural Heritage (Paris, 2001) and maritime WWI heritage in the Belgian part of the North Sea

Marnix Pieters

2014 marks the centenary of the First World War (WWI). All over the world this has rekindled the interest in underwater cultural heritage linked to this cataclysm. This kind of heritage is covered by the UNESCO convention on the Protection of the Underwater Cultural Heritage (Paris, 2001). This convention entered into force on 2 January 2009, and its 10th anniversary was celebrated with a scientific colloquium in Brussels in late 2011. At present (August 2013) it has been ratified by 45 countries, and a growing number of other countries are considering giving up the objections they initially had to this convention. Belgium acceded to the treaty on 5 August 2013. France and Belgium are currently the only two nations in Northwestern Europe to have ratified the convention. It is hoped that other countries bordering the North Sea such as the Netherlands, the United Kingdom, Germany and Denmark will follow the French and Belgian example in time.

The UNESCO convention defines underwater cultural heritage as *"all traces of human existence having a cultural, historical or archaeological character which have been partially or totally underwater, periodically or continuously, for at least 100 years"*. As a result, all wrecks of ships sunk in the Belgian part of the North Sea during WWI will progressively be covered by the scope of this convention in the course of the commemoration period (2014-2018).

This new situation undoubtedly raises all sorts of questions. Did WWI have a significant maritime component? What does the convention basically say? What does this mean for the Belgian part of the North Sea? How much and what kind of heritage dating from WWI is present there and how well has it been preserved? Below we will try to formulate an answer to these and other questions.



■ These British war graves are located at Saint Donatian's church in Zeebrugge. No graveyard existed here at the beginning of the First World War. When 44 Germans were killed by a tram accident on 26 September 1915, they were buried outside the church. The 'Deutscher Ehrenfriedhof' (German cemetery of honour) would steadily grow during the war. Another 40 Germans who had died on two torpedo boats (S15 and S20) during a naval battle were also interred here on 5 June 1917. The monument in the picture is a memorial to them. (Marnix Pieters, Flanders Heritage Agency)

The UNESCO convention and WWI

None too soon

Even though the First World War was mainly fought on land, the maritime component was never far away. A few examples concerning the western front are the initial phase of the war dubbed the ‘*Race to the Sea*’, the flooding of the Yser plain (Van Pul 2004) and the British raids from the sea on Zeebrugge and Ostend in an attempt to block both U-boat harbours. In addition, numerous important naval military actions (Bennett 2005) took place throughout the world, such as the battles of Coronel and the Falkland Islands at the end of 1914, the Gallipoli Campaign in 1915, aimed at keeping the entrance to the Black Sea open, the Battle of Jutland in 1916, etc.

Yet the maritime component of the archaeological heritage of WWI threatens to fade into the background. This is to a large extent due to the rather inaccessible character of this heritage, often located on or buried in the seabed. Until recently, this heritage was sometimes compromised by ignorance or even profit motives. Shipwrecks were salvaged and scrapped without adequate registration, research or consultation with the flag state involved. In addition, many scuba divers visit the war wrecks within the scope of what could be called a ‘souvenir hunt’, to put it mildly. This way the collective memory with regard to both world wars is gradually being erased without a metaphorical ‘backup’ being made. Especially now when fewer and fewer eyewitnesses of WWI remain, archaeological heritage is becoming ever more important as a physical point of contact with or a last witness of this crucial period in world history. It is therefore laudable that Belgium acceded to the above-mentioned UNESCO convention

in 2013 – even before the start of the WWI commemoration – and thus committed itself to progressively take care of this heritage. Belgium may only have a small area of the North Sea under its supervision, but throughout history this part of the North Sea has been a very busy shipping area, as was shown by the discovery of a 3500-year-old boat in Dover (Clark 2004).

Protection and cooperation, the pillars of the convention

What are the key elements of this convention? The first basic principle is the protection of underwater cultural heritage for the benefit of humanity. As in the case of archaeological heritage on land, the preservation of underwater heritage in its original location is considered as the first option. The convention distinguishes two kinds of threats from which heritage needs to be protected. From this point of view, the most serious threat is posed by specialised salvage companies that specifically search for archaeological ‘treasures’ all over the world and bring them to the surface in order to make a profit from their sale. Often they do not care about the fact that this heritage actually belongs to the collective memory of humanity, that it deserves to be properly investigated and that everyone should get the opportunity to “experience” it. It is estimated that 98% of the world’s seabed has currently become accessible to this kind of salvage activities as a result of the rapid development of all sorts of equipment, which makes the ratification of this convention more urgent by the day. In addition to the protection against salvage companies, the convention also states that the sale, irretrievable dispersal and commercial exploitation of underwater cultural heritage is absolutely forbidden.

The convention also includes a general article on protection against all manner of human activities in marine areas which are not specifically directed at underwater cultural heritage but may incidentally affect it nonetheless. The convention stipulates that member states shall use all available means to protect this heritage against this type of activities. Although it is clear that such activities include dredging, natural resource exploitation, construction activities, trawling, etc., the text does not contain any list thereof. Not listing these activities has the advantage that future activities are not excluded in advance. The protective measures are firstly aimed at the cultural heritage present in marine areas controlled by the member state concerned, and secondly cover all marine areas around the world via the member state’s jurisdiction with regard to its own residents and the ships flying the flag of the member state. If in situ preservation is not possible or desirable and an underwater site nevertheless has to be excavated, this activity has to comply with the rules annexed to the convention. These rules do not differ fundamentally from the standards of archaeological research on land.

In addition to protection, cooperation between member states is the second basic principle of the UNESCO convention. Through ratification, states join a club, so to speak, of countries willing to commit themselves to the conservation of underwater cultural heritage and wishing to support one another in this if need be. This cooperation can assume different shapes. Member states are encouraged, for example, to conclude mutual agreements within the scope of specific situations/cases. Information exchange is an important aspect of this cooperation, and the UNESCO Director-General plays an intermediary part in this. The member states of the convention meet at least once every two years. A ‘verifiable link’ with underwater cultural heritage in the territorial waters of another member state is sufficient grounds for a member state to formally enter into cooperation with the other member state. The convention does not regulate the rights of ownership, allows salvage under certain conditions and is also fully applicable to wrecks of state-owned vessels (e.g. WWI shipwrecks).

For more information regarding the convention, please refer to the UNESCO website: www.unesco.org/new/en/culture/themes/underwater-cultural-heritage.



■ The UNESCO headquarters in Paris (UNESCO)



■ *In situ display of underwater heritage is possible, as has been shown in China. Left: the museum building which provides access to the Baiheliang inscriptions, 40m beneath the water surface of the Yangtze river. Bottom: part of the inscriptions on the Baiheliang sandstone outcrop (Baiheliang Museum, pictures by courtesy of UNESCO)*



The North Sea and WWI heritage

The context

What does this convention actually imply for the protection of underwater cultural heritage dating from WWI? Protection can have two different meanings in this context. On the one hand, WWI underwater heritage of significant value can be physically protected *in situ*. On the other, more general measures can be taken to prevent the WWI underwater heritage present in the Belgian part of the North Sea from being damaged without having to take mitigating actions.

In any case, the collection of adequate documentation as to the heritage in question is a minimum requirement. This should ensure that this part of our collective memory is not erased just like that, and that this information is added to the knowledge database regarding this period. The physical protection of underwater sites is not easy from a technical and practical point of view. However, a great deal of expertise has been developed throughout the world, several methods have been tried out and their usefulness in this area has been proved (Richards 2012). China even boasts a real underwater museum located at a depth of

40 m in the Yangtze River, built to display the Baiheliang inscriptions *in situ*. Baiheliang is a sandstone formation in the Yangtze river where as from 763 AD inscriptions were used to mark 72 low water levels during the Tang dynasty. These inscriptions are of considerable scientific and cultural interest and can be considered the world's oldest hydrometric station (Ge Xiurun 2010).



■ SMS Prangenhof was salvaged in 2001 (Etienne Rathé, Maritime Access)

Protection against various kinds of human activities is mainly a matter of policy and management. Strategic basic research, funded by the agency for Innovation by Science and Technology (IWT), was started up in early 2013 to provide solutions to the authorities involved and the stakeholders in Belgium. Entitled 'Archaeological Heritage in the North Sea', this project will make proposals for sustainable management of archaeological heritage in the Belgian part of the North Sea. It goes without saying that the various stakeholders (fisheries, dredging, aggregate extraction, renewable energy,

tourism, different authorities etc.) are closely involved.

So far, little scientific research has been conducted and published with regard to Belgian maritime archaeological heritage from WWI. The available material sources relating to WWI have therefore hardly been covered by the historical and social debate. The best documented shipwreck from the First World War is undoubtedly that of the salvaged and scrapped *Vorpostenboot* S.M.S. Prangenhof (Termote 2003). The wreck of this patrol boat was landed in its entirety and completely dismantled. In the

process, archaeological observations were also carried out, which provided a good insight into the way in which a former fishing boat could be turned into a warship.

WWI wrecks in the Belgian part of the North Sea: an overview

Despite the limited research conducted into maritime archaeological heritage linked to WWI, it is possible to sketch an overall picture of the number of sites as well as the importance and distribution of shipwrecks from this period in the Belgian part of the North Sea. This is based on three available databases (www.vlaamsehydrografie.be/wrakkendatabank.htm; www.maritiemearcheologie.be; www.wrecksite.eu/) as well as various overview publications on shipwrecks such as Hepper 2006 and Termote & Termote 2009.

These sources show that 40 wreck sites can currently be attributed to WWI. In addition, there are a few dozen wreck sites which are possibly linked to WWI. These have not been included in the present overview. A number of them probably have to be linked to ships which are known from written sources to have sunk in Belgian waters during WWI but whose wreck site has not yet been identified. In addition, the sites of ships sunk in the ports of Zeebrugge and Ostend during raids in the spring of 1918, notably HMS *Vindictive*, HMS *Thetis*, HMS *Intrepid*, HMS *Iphigenia* and HMS *C3*, have not been taken into account either, as these were salvaged very shortly after the war, presumably without leaving many traces at the site where they were sunk. At a rough estimate, the number of wrecks could therefore be doubled or even tripled,

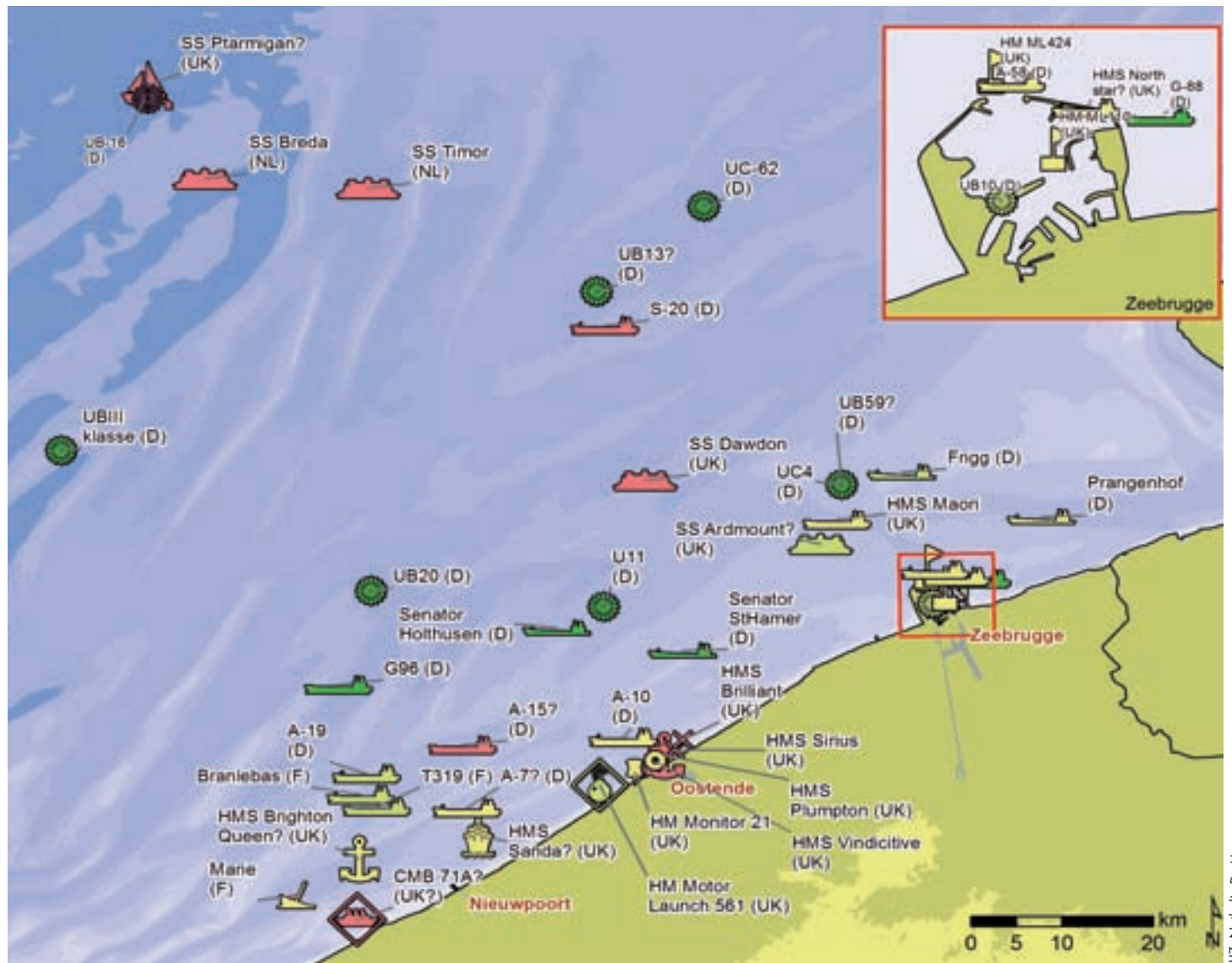
especially if you assume that some WWI wreck sites have not yet been mapped, for instance because they are not clearly visible or even invisible on the seabed.

If we classify the 40 known wreck sites in the Belgian part of the North Sea by nationality, we notice that German (20) and British (15) wreck sites in particular are well represented. There are also 3 French and 2 Dutch wreck sites.

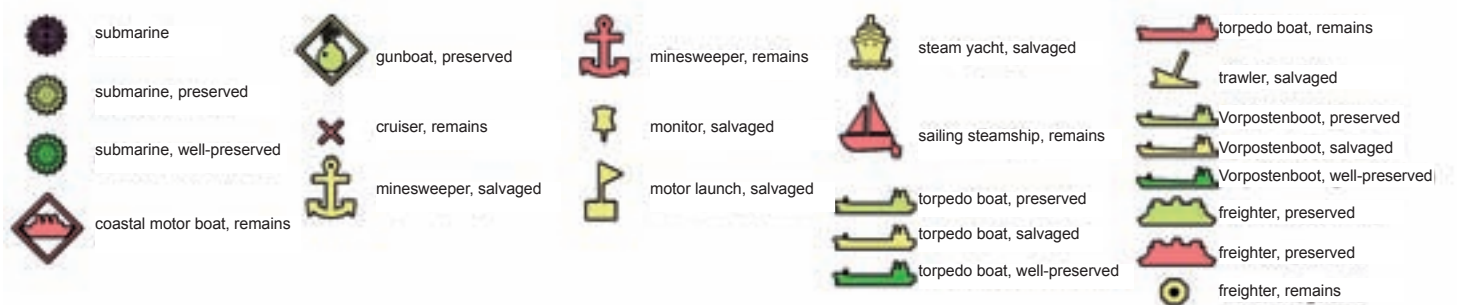
Many of these ship wrecks have been partially or completely salvaged or 'levelled' over the years. Only 18 out of 40 wreck sites (2 British, 14 German and 2 French) escaped this fate, and the British heritage has been hit hardest. The reason for this is not exactly clear, although the share of

German submarines seems to play a part, as these rarely hinder shipping traffic due to their location as well as their nature. As a result, they do not compromise the safety of navigation much and are not usually salvaged.

At present, about a hundred years after the Great War, about half of the known and documented shipwrecks from WWI are still present in the archaeological record of the North Sea. So it is not too late to deal with this heritage in another manner. Moreover, several unidentified wreck sites undoubtedly exist that have probably been well preserved precisely because they are unknown and – as far as we know – have never been 'visited' as a result.



Map of the Belgian part of the North Sea featuring all 40 wreck sites from WWI. Some of these wrecks have been salvaged (VLIZ)





■ British Coastal Motor Boat 33A, stranded in Ostend, spring of 1918
(Royal Museums Greenwich)

If we consider the state of preservation of the 18 known remaining wreck sites from WWI, we immediately notice that mostly German ship wrecks have been well-preserved. German ship wrecks are the most numerous and about 2/3 of them have been well or relatively well preserved. These include several U-boats, which have a better chance of weathering the ravages of time thanks to their sturdy structure: U-11, UB-10, UB-13, UB-20, UB-59, a UB-III type submarine, UC-4 and UC-62. In addition, 2 torpedo boats (G-88 and G-96) as well as 3 *Vorpostenboote* ('Senator Holthusen', 'Senator Sthamer' and 'Frigg') have been preserved fairly well.

As far as the distribution of WWI wreck sites in the Belgian part of the North Sea is concerned, it is striking that the vast majority of them, 33 out of 40 wreck sites, is situated within the Belgian territorial sea, so relatively close to the coast. Three out of seven wreck sites located outside the Belgian territorial sea are or were situated on or just north of Thornton Bank. Furthermore, the distribution of these sites appears to be linked to the location of the three Flemish ports, with three clusters near Nieuwpoort, Ostend and Zeebrugge. Only the concentration near the port of Nieuwpoort is somewhat strange in this respect since the harbour was not used during WWI. The three French wrecks are located in the western part of the Belgian territorial waters, relatively close to the French territorial sea, while the two Dutch wrecks were situated in the eastern part of the Belgian North Sea, relatively close to the Dutch territorial sea.

Conclusion

This summary overview demonstrates that valuable underwater heritage from WWI, in particular German shipwrecks, still exists in the North Sea. This heritage needs to be treated with sufficient care. It is not very extensive, which is conducive to the manageability. The story of these material sources should on no account be neglected if we want to approach WWI holistically. Further research is also essential to better determine the historical interest of certain shipwrecks. In addition, this overview, and especially the question marks behind the names of some ships, clearly show that a number of identifications of wreck sites are uncertain and that many wreck sites are still unidentified. In other words, there still is a lot of work to be done in the field of identification and inventory of located maritime heritage in the Belgian part of the North Sea. Finally, many of these wrecks are also to be considered as maritime or war graves, an additional reason why these sites deserve appropriate attention and respect.

Major parts of two former WWI shipwrecks can also be viewed on land. Part of the bow of HMS Vindictive is set up at the Oosterstaketsel pier in Ostend, and the propeller and an anchor of HMS Maori are on display in the DAB Fleet building, also in Ostend.

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The Zeebrugge and Ostend Raids

Benoit Strubbe

The Belgian ports of Zeebrugge and Ostend posed a serious threat to the Allied forces during the First World War. Their location, near the mouth of the Scheldt and the English Channel, would make these ports the best-situated operating bases for the German U-boat and torpedo boat fleet. Moreover, Bruges was connected to both Zeebrugge and Ostend via a canal. This way a good hiding place for the vessels of *Marinekorps Flandern* could be developed out of range of the British guns. During the war, German ships operating from these Belgian ports were responsible for one third of the tons of shipping lost by the Allies. At the same time, connections across the Channel were essential to the Allies, not just as a supply line to bring in fresh troops but also for communication and the provisioning of the British Isles. In response to the German naval threat, the British Dover Patrol tried to block the ports of Zeebrugge and Ostend in the night of 22 to 23 April as well as the night of 9 to 10 May 1918.



■ To protect their U-boats, the Germans built a U-boat bunker in the Bruges harbour. It was demolished in the 1950s (Bruges City Archives, Zeebruggefonds)

Prelude

Zeebrugge and Ostend initially not targeted

The activities of *Marinekorps Flandern* conducted from the Belgian ports had the potential of being strategically decisive. Yet it took the British until late 1917 to realise the seriousness of the threat and decide to blockade the ports of Zeebrugge and Ostend from the sea. To explain this hesitancy it is necessary to take the overall development of the Great War into consideration.

When WWI broke out in 1914, the optimistic idea was prevalent that the war would be short. Both sides were convinced of a swift and glorious victory. The goal of the German Schlieffen Plan to eliminate the French land forces by sweeping through Belgium and Luxembourg, and to take the Channel ports in France to facilitate an attack on Britain was not achieved. The German advance was halted by flooding part of the Yser plain, among other factors. The Germans had only succeeded in taking Zeebrugge and Ostend. At first, the British did not wish to destroy these ports as they assumed they would soon be recaptured.



■ The entry of the Navy Division in Brussels (Imperial War Museums, Q49147)



■ A few German torpedo boats of the Flanders Flotilla heading for the English coast (Tolhuis Provincial Library)

Zeebrugge and Ostend could then be useful for supplying the Allied troops. The Germans also considered these ports to be only a temporary stopover. Zeebrugge and Ostend had fallen into German hands relatively intact, but no defences were present and the ports were not equipped for mooring, repairing and maintaining a war fleet.

Flemish ports become crucial

The initial optimism wore off as manoeuvre warfare gave way to trench warfare in late 1914. Many British ships shelled the Belgian coast to prevent the Germans from using the harbours of Ostend, Zeebrugge and Bruges. The Germans understood that the conquest of the Channel harbours in France would not come soon. The well-equipped port of Antwerp, captured by the Germans, could not be used since using the Scheldt river would violate Dutch neutrality, which the Germans wanted to avoid. For this reason, and for fear of an Allied landing, *Marinekorps Flandern* started to expand the coastal and port defences in and around Zeebrugge and Ostend. From 1915 onwards, several batteries were built to repel the British shellings. It became increasingly difficult to shell the ports from the sea. The German U-boats and torpedo boats could now be deployed more often and more efficiently from Zeebrugge and Ostend. The British, to whom Channel shipping was crucially important, were in favour of attacking the left flank of the front, close to the coast, to be able to shell the Belgian ports from land. The French, on the other hand, wanted to focus on the inland front. The more experienced French got their way, the British plan was not implemented for the time being.

The threat of the Flanders Flotilla

Up to 1916 the Imperial German Navy had mostly invested in the High Seas Fleet (*Hochseeflotte*) and the naval forces in the Baltic, while *Marinekorps Flandern* was subordinated. This attitude gradually changed after the Battle of Jutland (31 May – 1 June 1916). Although the Germans had gained a tactical victory at this battle, the British blockade of the High Seas Fleet was maintained. Germany now realised that this blockade would probably never be broken and decided to invest part of the resources earmarked for the main fleet in the Belgian coast. They temporarily added two torpedo boat flotillas to the *Marinekorps Flandern* fleet. This enabled the corps to take the offensive. This increased and more aggressive activity from the Belgian ports gave rise to concern among the British general staff. This concern grew when Germany announced it would engage in unrestricted submarine warfare in early 1917. The German U-boats wreaked havoc and spread panic in the North Sea and the English Channel. In 1917 alone, half of the total tonnage of Allied ships was sunk. It was not just U-boats that sunk more and more ships. In late 1916 and early 1917 the Germans organised several torpedo boat raids in the Channel. The *Flanders Flotilla* was now capable of disrupting the vital communication and supply line between Britain and the Continent. This ever greater threat made the British realise that a final solution had to be found for the ports of Zeebrugge and Ostend.

A new attempt was made to break out of the trench deadlock at the Battle of Passchendaele or Third Battle of Ypres (31 July – 6 November 1917). The British high command aimed at breaking through the front near Passchendaele in order to eventually retake the Belgian ports. This

offensive failed, however. The front line had only advanced a few kilometres at the expense of hundreds of thousands of casualties. The plan to capture the Belgian ports from land was consequently abandoned. It was equally impossible to destroy the German submarine bases from the air due to the U-boat bunkers the Germans had constructed in Bruges. By the end of 1917, British Vice-Admiral Roger Keyes therefore laid plans to close off the ports of Zeebrugge and Ostend from the sea.

The plan

The British planned to block the ports of Ostend and Zeebrugge by sinking obsolete warships filled with concrete across the harbour channel. This way, the German submarines and torpedo boats would be temporarily or permanently trapped in the Belgian ports. It took a great deal of time to draw up the plans for the raids. Especially the old mole at Zeebrugge was a source of great concern to the British. The Germans had fortified this two kilometre long arched jetty enclosing the harbour with a series of batteries that protected the entire port. To make sure the blockships would enter the harbour channel smoothly, it was crucial to divert the batteries on the mole. This required British troops to land on the mole. Three ships were converted to transport these troops: the obsolete cruiser HMS *Vindictive* and the ferries HMS *Iris* and HMS *Daffodil*. While the troops were landing, an old submarine had to blow itself up under the viaduct connecting the mole to the shore. This would prevent German reinforcements from coming to the rescue of their fellow combatants on the mole. The three blockships HMS *Thetis*, HMS *Intrepid* and HMS *Iphigenia* would in the meantime enter the harbour channel more or less undisturbedly and be scuttled at the entrance. Of course, the Germans would see these ships coming from a great distance. For this reason the British planned to use small fast boats to create a smoke screen.

At first sight, the situation in Ostend was much simpler. Several batteries and machine gun nests protected this harbour as well, but there was no arched mole. It therefore seemed unnecessary for troops to land. It seemed sufficient to scuttle the blockships HMS *Sirius* and HMS *Brilliant* across the harbour channel.

A few crucial factors for the success of the attack plan were the weather, the tide and the timing. Calm weather was required for the optimal deployment of the small boats and for the success of the landing on the mole in Zeebrugge. A landward wind had to keep the smoke screen in front of the ships. High tide was required for the troops to scale the high mole and for the heavily laden blockships to enter the harbour channel smoothly. Finally, all these conditions had to be fulfilled around midnight to optimally use

the cover of darkness. The changeable weather resulted in two cancelled attempts. The fleet put out to sea for a third time in the evening of 22 April 1918.

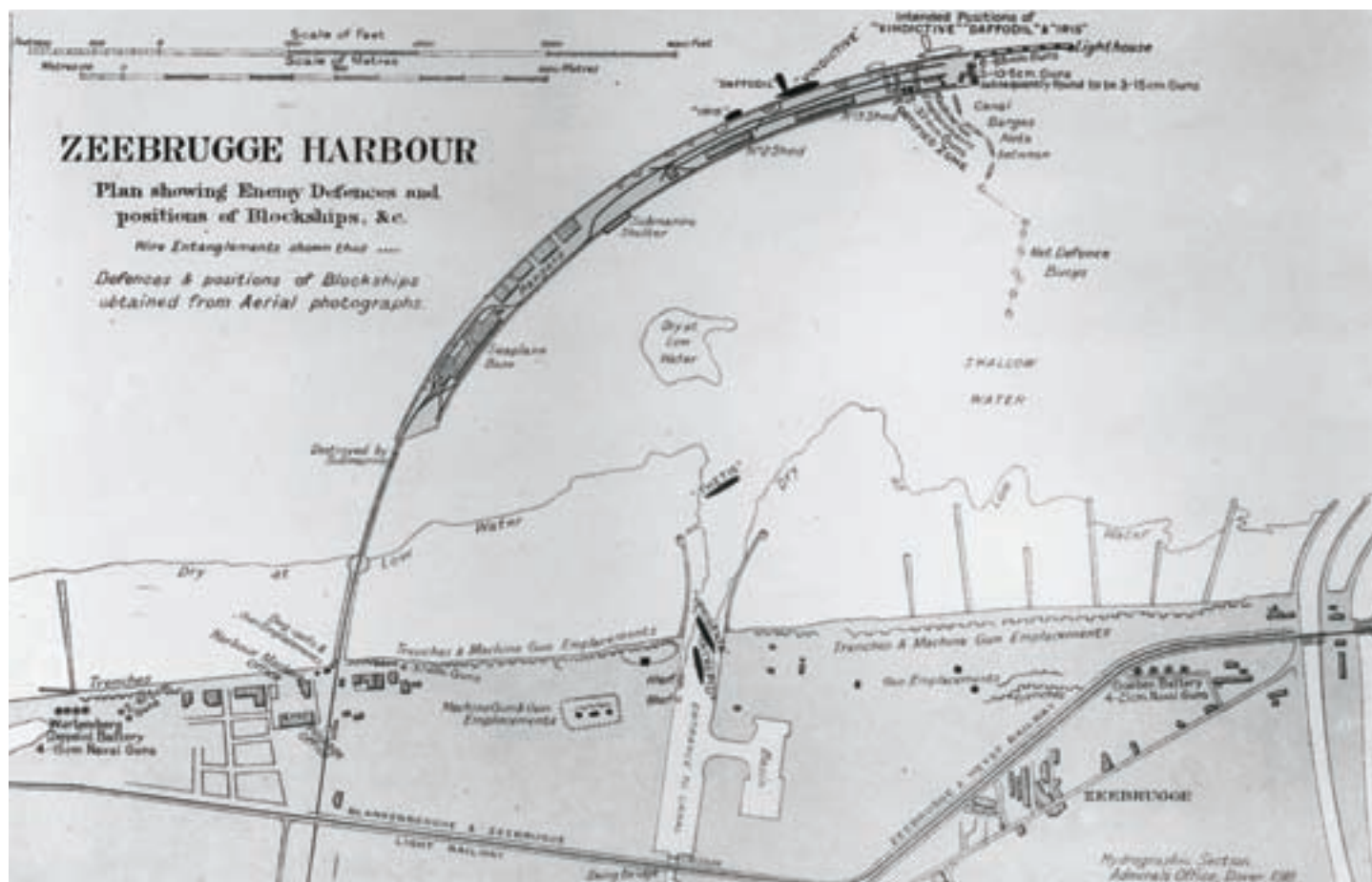
The Zeebrugge Raid: 22 April 1918

The two fleet segments sailed together for a few miles and then their paths parted. Both fleets were planned to arrive at Zeebrugge and Ostend simultaneously so that the Germans would not have time to warn each other, since the plans for the raid had already fallen into German hands during a previous attempt. When the Germans heard the ship engines in Zeebrugge, they initially thought an airborne attack was coming. After a while they realised that what they thought was fog was actually a smoke screen, and they sent up a few flares. They subsequently spotted the British funnels and immediately sounded the alarm throughout the coastline. Flares and searchlights illuminated the entire mole. The ship engines were now clearly audible, but the approaching fog veiled the vessels. British monitors now began to shell the German positions.

Just before midnight a sudden gust of wind blew away the smoke screen. The contours of HMS *Vindictive* were now clearly visible. The German batteries were in combat readiness and opened fire. By the time HMS *Vindictive* had reached its position alongside the mole, most of the gangplanks specially



■ Position of the blockships HMS *Iphigenia* and HMS *Intrepid* in Zeebrugge harbour after the raid (Bruges City Archives, Zeebruggefonds)



■ Plan of Zeebrugge harbour with the position of the blockships that were to close off the port (Bruges City Archives, Zeebruggefonds)

mounted for the landing had been destroyed. Half of the soldiers who had waited on deck for the landing had already been killed or wounded. Yet the ship continued her course. HMS *Iris* and HMS *Daffodil* were also approaching the mole. At about a quarter past midnight the first troops landed on the mole, while the British submarine blew herself up and destroyed the viaduct almost simultaneously. The landing force destroyed a few machine gun nests and artillery pieces. At about half past midnight the blockships passed the mole. HMS *Thetis*, which led the way, immediately came under heavy fire. When entering the harbour, the ship got entangled in the nets the Germans had installed and ran aground. The crew scuttled the ship prematurely. HMS *Intrepid* and HMS *Iphigenia* succeeded in reaching the harbour entrance without being noticed. Their crews tried to position the ships across the harbour channel as best they could before detonating the charges. The raid appeared to be successful and the British pulled out.

Ostend, an attack in two episodes

HMS *Sirius* and *Brilliant* encountered more difficulties when they approached Ostend. The smoke screen was unexpectedly blown away, so that the two ships were an easy target. British monitors shelled the German batteries but were unable to eliminate them. Heavy rain obstructed their view and the Germans had moved the navigation buoy that marked the harbour entrance. As a result, the two ships did not find the entranceway and were eventually

scuttled outside the port, towards Bredene. The First Ostend Raid was a complete failure.

A second attempt was made on 9 May. This time HMS *Vindictive*, hastily repaired after the Zeebrugge Raid, and HMS *Sappho* had to block the harbour channel. HMS *Sappho* never reached Ostend due to a mechanical breakdown. HMS *Vindictive* did make the journey, but once again finding the harbour entrance was not easy. After steaming back and forth near the harbour, the ship eventually made it to the entrance. HMS *Vindictive* entered the harbour under heavy German fire. The damage sustained during the first raid was exacerbated and one of the propellers broke down. Because of the broken propeller, *Vindictive* had difficulty manoeuvring. It soon appeared to be impossible to position the crippled vessel across the harbour channel. The commander then scuttled the ship on site. The harbour channel was only partly blocked. This made the second attempt not an unqualified success either.

Mission accomplished?

The two raids together claimed the lives of over 200 British soldiers. The Germans only sustained a few casualties. In light of the losses suffered on the Yser front, this number was acceptable to the British. But had the operation been successful? How was this raid perceived by both parties? What effect did this operation have on the further course of the war? To find an answer to the question whether the British had achieved their goal, it is sufficient to check whether the harbour mouths of Zeebrugge and Ostend had indeed

been closed off. In Ostend this was not the case. HMS *Vindictive* had been unable to position itself across the harbour channel due to a broken propeller. In Zeebrugge, HMS *Intrepid* and *Iphigenia* were better positioned, yet a new channel was created behind the blockships after only a few days. U-boats and destroyers could therefore leave the ports again soon after the raid. However, the raids were a moral victory for the British. They had not achieved the anticipated goal, but the raids were promoted as a British victory. The British propaganda machine depicted the entire operation as an unqualified success. For weeks it was claimed that the Belgian ports had indeed been closed off, although numerous photographs proved the contrary. The participants were honoured for their bravery. No less than eleven Victoria Crosses, the highest military decoration in the United Kingdom, were awarded for the exploits of the British troops during the raids. Moreover, this operation had proved that the British could breach the German coastal defences. The raids certainly boosted Allied morale after the disillusionment of the Battle of Passchendaele. The Germans, on the other hand, minimised the results of the raids. The official report by Grand Admiral Alfred von Tirpitz states that little damage had been done to the port infrastructure and that there hardly had been any casualties. German propaganda represented the British failure as proof of their superior defence of the ports. It was pointed out that vessels could already leave the ports after a few days. In reality, German self-confidence took a terrible knock. The aim of the raids had not been achieved, but the British had succeeded in breaking



■ The sunken *Vindictive* against the Ostend pier (collection of Freddy Hubrechtsen)

through the German coastal defences several times and had temporarily set foot on land. As a result, the Germans constructed additional fortifications afterwards, particularly at the ports.

The threat eliminated

After the raids, the number of Allied ships sunk by the Marine Corps dropped significantly. If this was not due to the raids, what was the reason for this decrease? The answer to this question is complex. Several British bombings caused the floodgates to function only sporadically until the end of June. But this only caused a temporary delay. However, the depletion of raw materials in Germany after nearly four years of war resulted in the production of new ships falling behind. In 1918 the Allies also applied a few tested as well as new techniques on a structural basis to counter the submarine danger.

The Allies had reverted to using escorted convoys in 1917. Convoying had proved its usefulness many centuries before. The idea is simple: merchant ships travelling together under the protection of a naval escort. It is surprising, then, that the Allies initially did not use this technique during the First World War. The arguments against convoys were diverse. If a convoy ran into an enemy battleship, it did not have the ghost of a chance unless it was protected by a battleship as well. Having every convoy escorted by a battleship was much too expensive, however. Sailing in convoy also meant that the group could only go as fast as the slowest ship. Moreover, ships had to wait in port until a new convoy put out to sea. The Allies believed this would lead to loss of time and efficiency. Finally, the British thought unloading an entire convoy would exceed the capacity of many ports.

These arguments were refuted one by one, however. The British blockade of German battleships prevented them from moving freely to attack convoys. The loss of efficiency and time turned out to be greater when a ship was sunk. And timely notice prior to the arrival of a convoy ensured that the port in question could prepare for unloading the ships. Convoys were gradually introduced and with success. Several new techniques also showed great promise. In late 1917 the British developed ASDIC, the world's first active sonar technology. This apparatus emits acoustic pulses which reflect off submerged objects and these echoes are then received by the apparatus. The apparatus determines the depth (distance) of an object by measuring the time between emitting and receiving a pulse. The First World War also saw the development of the depth charge, designed for detonation at a preset depth. Sonar and the depth charge would both turn out to be very powerful anti-submarine weapons.



This painting in Zeebrugge Community Centre depicts the Zeebrugge raid in a dramatic manner (Decler)



A British convoy of the Royal Navy zigzags through a danger area in the Atlantic Ocean (Imperial War Museums, Q19954)

Vice-Admiral Roger Keyes did not just plan and lead the Zeebrugge and Ostend raids, he also took numerous other measures to hinder German shipping in the English Channel. For instance, he had additional anti-submarine nets with mines installed and introduced search-and-destroy patrols. U-boats were then faced with the risk of being sunk by the patrols or getting entangled in mine nets. All these measures and circumstances made it increasingly difficult for the German submarines and torpedo boats in the Channel to disrupt Allied supply lines.



■ Left: the original monument on the corner of De Maerelaan and Zeedijk in Zeebrugge was pulled down during the Second World War and taken to Germany. The current monument dates from 1984.
Right: fragments of the mole with which HMS *Vindictive* collided, now located on Admiraal Keyesplein in Zeebrugge (Tolhuis Provincial Library)

A boost to Allied morale

The Zeebrugge and Ostend raids certainly boosted the morale of the Entente Powers. The bravery of the men who took part and the subsequent reports in the press renewed the faith of the soldiers in trenches in victory. This boost came just at the right moment after the failure of the battle of Passchendaele and especially after the frustrations and concern caused by the German spring offensive. At the same time, the actual effect of the raids was at first greatly overestimated by the Allies, intentionally or unintentionally. The sunken ships only caused moderate interference. After a few days, the German warships were able to put out to sea again. The decreasing number of torpedoed Allied ships was mostly due to the depletion of raw materials, the introduction of convoys, the application of new techniques and Roger Keyes' anti-submarine measures. In any case, the example of the Zeebrugge and Ostend raids was followed in the Second World War. On 28 March 1942 the British conducted a successful raid on Saint-Nazaire. This destroyed the dry dock of the principal port on the Atlantic coast and the only dry dock large enough to repair battleships. From then on, German warships had to return to Germany for repairs.



■ Top: the *Vindictive* memorial in Ostend has recently been moved (Tolhuis Provincial Library).
Bottom: the bow of HMS *Vindictive* at the new location near the Oosterstaketsel pier in Ostend during the solemn inauguration on 24 May 2013 (Marnix Pieters, Flanders Heritage Agency)

Current memorials to the Zeebrugge and Ostend raids

Nowadays, several memorials, both in Britain and in Belgium, remind us of the operations that took place in April and May 1918. In Zeebrugge, on the corner of Zeedijk and Baron de Maerelaan, a monument to Saint George's Day can still be seen today. The look of the monument has remained unchanged since 1984. A plan of Zeebrugge harbour at the time of the raid is flanked by commemorative plates for the blockships and the submarine. On Admiraal Keyesplein, also in Zeebrugge, a memorial has been erected with fragments of the mole with which HMS *Vindictive* collided during the landing of troops.

And the bow of HMS *Vindictive* as well as the masts of HMS *Thetis* and *Intrepid* were located at Graaf de Smet de Naeyerlaan in Ostend for many years; now, after a recent restoration, they are displayed near the eastern pier of the port of Ostend.

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Concrete in the dunes: the German coastal defences during the First World War

Mathieu de Meyer

The best known battles from the First World War took place along the Western Front: the network of trenches stretching from the French-Swiss border to Nieuwpoort. In Belgium, the hostilities near Ypres and along the river Yser have left deep marks. However, the defensive lines did not end at the mouth of the Yser. The coastal strip was also fortified by the warring parties. The Entente Powers organised their defences in the dune and polder area behind the Yser (see contribution by Mahieu & Termote in this volume). The Germans constructed a chain of batteries extending from Raversijde to The Zwin. A defensive line was established along the Belgian-Dutch border as well. This was due to the fact that, even though the Dutch remained non-aligned during the war, the Germans were suspicious. They reasoned the Entente Powers could invade Belgium via Zeeland. The German defences along the Dutch border consisted of three parts: the *Hollandstelling* (between the Belgian coast and Vrasene), the *Antwerpen-Maas-Stellung* (around Antwerp) and the *Turnhout-Kanal-Stellung* (remaining area). It is one of the best preserved yet least known bunker networks from the First World War, while very few coastal batteries have survived, with the exception of the Aachen battery, located between Middelkerke and Raversijde.

German fortifications between Middelkerke and The Zwin (Knokke)

Ports were of great importance during the First World War, both to the Germans and to the Entente Powers, as they were strategically important for the supply of goods. Furthermore, Ostend, Zeebrugge and Bruges were also used as U-boat bases. It is no wonder then that these significant targets had to be defended. In addition, the Germans feared an Allied landing. Their fear turned out to be well-founded, as appeared from the attempts to blockade the ports of Zeebrugge and Ostend (see Strubbe, in this issue). The Germans therefore constructed 34 batteries between Middelkerke (see map p.6-7) and Knokke-Heist. Some of the batteries were mainly aimed at preventing landings and defending the ports. Others consisted of

long-range guns to shell targets at sea. In addition, we find numerous machine gun posts, trenches, anti-tank obstacles and barbed wire fences along the coast between Lombardsijde and Knokke-Heist.

The defence of the Belgian coast: nothing new under the sun

Numerous traces of wars and coastal fortifications can be found in the Flemish coastal area. The first important traces are of Roman military camps from the 3rd century AD, a period when this region was part of the vast Roman Empire. The best known camps in the area are located at Aardenburg, Oudenburg and Maldegem-Vake. There are also indications that there were some kind of coastal fortifications to prevent attacks by the Vikings in the Early Middle Ages. During the Eighty Years' War (1568-1648), Spanish and Dutch troops fought battles near various Flemish cities. Although no real coastal defence line was established during this very turbulent period, many defensive works, forts and redoubts appeared in the landscape (partly due to the siege of towns and cities such as Sluis, Nieuwpoort and Ostend). New fortifications were built at the end of the 18th century. From 1803 onwards Napoleon Bonaparte had several defensive works constructed along the coast within

the scope of the war against Britain. Fort Napoleon in Ostend still testifies to this conflict. Finally, the Flemish coast once again played a crucial part in both world wars and was fortified to repel invasions.

Construction of batteries

At the start of the occupation in 1914, the Germans quickly installed captured Belgian and British artillery near the strategically important ports. In addition, machine gun nests appeared at several locations. Barbed wire fences were erected on the beach. Observation posts were installed on top of high-rise buildings and dunes. From late 1914 onwards, the newly established *Marinekorps Flandern* began constructing the batteries. The corps was headquartered in the Provincial Palace in Bruges, and was under the command of Admiral Ludwig von Schröder. The construction of a battery took 3 to 15 months. Together, the finished batteries had the whole Belgian coast within range. In the vicinity of the ports and near the Dutch border we find a greater concentration of artillery. Batteries that were located closely together were interconnected by means of trenches and barbed wire fences. Strongholds were constructed in less fortified places: infantry positions equipped with several pieces of artillery.



■ Many bunkers from the *Hollandstelling* have been preserved, contrary to the bunkers located along the coastline. It is even one of the best-preserved bunker lines from the First World War in Europe. This bunker can be found at the 'swallowtail' (outwork) of the old fort of Sint-Donaas, which originated in the Eighty Years' War and continued to play a part in numerous other wars. It is located near the Damme Canal between Hoeke and Sluis. The 'swallowtail' was built by renowned Dutch military engineer Menno Van Coehoorn. The bunkers and the 'swallowtail' were still used during the Second World War. Aerial photographs from this period show traces of recently dug trenches. This is an example of a fortification that remained in use for centuries (Mathieu de Meyer, Province of West Flanders)



■ One of the best-known fortifications on the Belgian coast is Fort Napoleon. It is one of the few remaining fortifications along the coastline predating the First World War (Marc Ryckaert, Province of West Flanders)

Four such "Stützpunkten" were created between Bredene and Blankenberge. They were specifically intended to withstand an Allied landing.

Contrary to the *Atlantikwall* bunkers (WWII), there is no clear typological classification of WWI bunkers. There are some recurring standard principles, however. A battery usually consisted of four artillery emplacements in reinforced concrete with guns. These were flanked by observation and command bunkers. The order to fire was given by phone or by means of a bell. In

some cases this was done by means of a large sign stating the coordinates. In addition, iron rods were sometimes used to sound the alarm. Military quarters, a first aid post and ammunition stores completed the battery. Large batteries had an ammunition bunker next to every piece of artillery; in case of smaller batteries the ammunition was centralised in several depots. In the latter case, only a small amount of ammunition was stored near the artillery emplacements; for the most part, it was supplied via a narrow-gauge railway. Since the batteries

increasingly came under fire as the war progressed, they were all fitted with a bombproof shelter from 1916 onwards. Illumination flares and searchlights were used to light the field of fire at night. Initially, each battery had its own anti-aircraft gun. In the summer of 1917 air defence was organised in *Flakgruppen*. These had to ensure coordinated defence against Allied aircraft. The batteries were usually surrounded by two rings of barbed wire.

Hidden from view

Long-range guns were emplaced behind the dunes. The gunners received their instructions from advanced observation posts in the dunes. Aircraft also helped to locate enemy targets. So-called mobile batteries such as the Preussen Battery (Bredene) existed as well; in this case the guns were mounted on railway wagons. The heaviest batteries were the Deutschland Battery (Bredene) with 4 pieces of 38 cm artillery and the Kaiser Wilhelm II Battery (Knokke) with 4 pieces of 30.5 cm artillery. The emplacement of 'Langer Max', another 38 cm gun, can still be found in Koekelare (Leugenboom or Pommern Battery). There was a mortar battery as well: Groden Battery (Zeebrugge). This battery was not ideally located along the coast considering the mortars' limited range and the fact that these were indirect fire weapons. They were particularly useful in areas where trench warfare took place.



■ The Aachen Battery (Provincial Domain of Raversijde) includes all typical components of a battery: 1: left observation bunker, 2, 3, 4, 5: artillery emplacement, 6: bombproof shelter, 7: right observation post, 14: 'Barbara Brunnen', A: Royal Chalet, B: Norwegian Chalet, C: lighthouse keeper's house, D: low guidance light, E: high guidance light, F: officers' quarters, G: military quarters, H: central ammunition depots, J: guardroom, K: observation post between the Aachen and Antwerpen batteries (Province of West Flanders)



■ 'Langer Max' was emplaced in the Pommern Battery in Koekelare (Leugenboom) (Raversijde Collection)

Batteries were not just located in the dunes or in farmland in the hinterland. The esplanade proved to be a suitable location as well. One such example is the Gneisenau Battery in Ostend. In Zeebrugge the “Mole Battery” was situated on the mole while the Lübeck Battery was located at its entrance.

Batteries were often camouflaged to hide them from view as much as possible. For instance, large screens were installed in the direction of the Yser front near the Tirpitz Battery (Hamilton farm, Ostend). A smoke screen could be created by means of smudge pots to hide the batteries’ exact position. Exploding blank charges completed the deception of the enemy. Artillery pieces were often painted with camouflage patterns (e.g. Cecilie Battery in Mariakerke and Gneisenau Battery in Ostend). The observation posts were concealed with camouflage nets (e.g. Aachen Battery) or branches placed against the walls. Guns and rangefinders were covered with branches or marram grass to break up their outlines. The Oldenburg Battery (Ostend airport) went one step further: windows and doors were painted onto the bunkers, which were fitted with a roof that also covered the artillery pieces. ‘Dummy batteries’ were even created to deceive the Allies. A good example of this is the series of 19th-century guns emplaced between the Aachen and Antwerpen batteries.

Everyday life

The daily routine followed a strict timetable. The marines often spent the night in wooden military quarters; they slept in hammocks just like they did on board ships and submarines. The batteries were provided with electric power, since the use of candles near ammunition stockpiles was too dangerous. Photographs of several batteries exist that show soldiers working in vegetable patches. The planting of flowerbeds has been documented as well. Numerous postcards from this period show a *Marine Corps* band performing a concert for officers and men as well as the sick. This took place in the larger towns but also in villages or in the batteries themselves. The repertoire mainly consisted of patriotic songs. The officers and men could take a dip at demarcated beaches. Separate bathing areas were set aside for civilians, officers and men (see Mahieu, in this issue). There were other forms of entertainment as well: there was a casino for officers in Ostend, for instance. It is therefore assumed that the troops responsible for manning the coastal batteries and the *Hollandstelling* suffered less hardships than those in the trenches of the Western front. This was true to a certain extent, although bombings and shellings also occurred on the coast.



■ A series of 19th-century guns in the dunes between the Aachen and Antwerpen batteries served to mislead the enemy (Kristof Jacobs, Nieuwpoort Sector 1917)



■ The Oldenburg Battery can confidently be considered an example of good camouflage. This is one of its bunkers, camouflaged as a farmhouse. Windows and doors were painted onto the concrete and a pitched roof was constructed on top. Note one of the artillery pieces on the right-hand side of the picture (CDH Evere, Foto Massot)



■ The soldiers tried to make life as pleasant as possible. Here we see the ‘front garden’ of a few wooden military quarters of the Augusta Battery. Note the different naval mines used for decoration (Province of West Flanders, Raversijde Collection)

The fortifications after WWI

During their withdrawal in October 1918 the German troops destroyed most of the batteries' guns as well as the harbours, floodgates and bridges. The Marine Corps was in the vicinity of Lokeren on the day of the armistice. Afterwards they returned to Germany, where the corps was disbanded in December. Belgian soldiers took over the batteries, or what was left of them. In the interwar period they were thoroughly studied by engineers and visited by Belgian and foreign dignitaries. The battery network also served as an example for the design of various defensive lines in Europe and beyond. For the Germans it would turn out to be an important source of inspiration for the development of the well-known *Atlantikwall* during the Second World War.

The Aachen Battery: a solitary witness to the coastal front

Location

The only preserved fortification from the First World War on the Belgian coast is the Aachen Battery. Located between Middelkerke and Raversijde, it is now part of the Open-Air Museum Atlantikwall in the provincial domain of Raversijde, as parts of the battery were reused during the Second World War. It is no coincidence that this battery has been so well preserved. It was built in the then royal domain, created by King Leopold II in the dunes west of Ostend in 1903. After Leopold's death the domain was passed on to his successor, King Albert I. One year before the outbreak of the war, the site was visited by Archduke Franz Ferdinand, heir to the Austro-Hungarian throne, who would be assassinated in Sarajevo on 28 June 1914 (see picture on cover), the event that up to this day is considered to have triggered the First World War. King Leopold II had a few 'Norwegian' chalets and stables, designed by Norwegian architect Knudsen, constructed on the domain. The brick base of the main building is still visible from the esplanade. Located in the dunes, the chalets were too easy a target for the Allies. This is why the Germans burnt them down at the beginning of the war. One of the positions of the Aachen Battery was built behind the chalet's brick base. The two guidance lights were removed for the same reason in the spring of 1915. These lights, situated near the battery to be constructed, were pulled down and remained there until after the war.

Upon King Albert I's death, his son Prince Charles, Count of Flanders, (1903-1983) became interested in the royal domain. However, it was not until after his regency (1944-1950) that he permanently settled here. Thanks to him, the Aachen Battery and the constructions from the Second World War have been preserved so exceptionally well. He ensured that nothing was demolished so that everything could be restored after his death. The 'Prince Charles Domain' became



■ *The observation and command bunker of the Aachen Battery with the range-finder beside it, which was certainly located on the roof of this bunker during part of the war. It is now part of the Open-Air Museum Atlantikwall (Raversijde). The brick constructions were built by the Germans in the Second World War when a few of the battery's bunkers were incorporated into the Atlantikwall (Yves Adams, Province of West Flanders)*

a provincial domain in 1988. Nowadays, the Aachen Battery is a listed monument.

What remains

Construction work on the battery started on 8 January 1915. It was operational by the end of April 1915. You can still see the four gun emplacements flanked by an observation bunker on either side. The western observation bunker also served as command post and in time it would also play this role for the Deutschland Battery in Bredene. The expensive equipment needed for this forced the Germans to reinforce the construction to a greater extent. Four pieces of 15 cm naval artillery were mounted on the emplacements, each with a range of 18.7 km. The guns were protected by steel shelters. A narrow-gauge railway connected the emplacements to the different ammunition stores hidden in the dunes. Near the observation post you can still see the original range-finder that was used to determine the distance to potential targets at sea. Part of the trench and the bombproof shelter, made from sheets of corrugated iron and covered with sand and concrete, have been preserved. The wooden structures have all disappeared: various military quarters, officers' quarters, a guard post and a first aid post. One of the three water wells, *Barbara Brunnen*, was located near the battery's entrance on Duinenstraat. The monument constructed on this site was named after the patron saint of artillerymen and can still be seen today. A gate is still located at another entrance at the esplanade. Two naval mines flanked this entrance during WWI.

Shell and be shelled

The Aachen Battery posed a real threat to the Allies, as it was the battery nearest to the Western Front. The first time it came into action was on 5 and 9 May 1915, when it bombarded the lines near Nieuwpoort. Two months later the battery's anti-aircraft guns opened fire on Allied aircraft. The Allied bridgehead in Lombardsijde was conquered by the Germans with the help of the Aachen Battery on 10 July 1917. One year later they sunk an American ship with the battery.



■ *Barbara Brunnen, named after the patron saint of artillerymen, was one of Aachen Battery's three water wells during the First World War. Its name was written in big letters on the monument at the time. It is now part of the Open-Air Museum Atlantikwall (Raversijde) (Jeroen Cornilly, Province of West Flanders)*

The battery was also regularly the target of shelling itself. On 9 September it came under fire from British monitors, which resulted in the destruction of military quarters. Allied ships were repeatedly given the order to shell the German batteries, but this usually had little impact. The Aachen Battery was threatened from land as well. A shelling on 6 October 1916 for instance caused a great deal of damage. After this, the Germans decided to better reinforce the military quarters in the area west of Ostend. The embrasures of the observation bunker were fitted with iron plates and the ammunition stores were closed off with armoured doors.

A few other vestiges

The other coastal batteries have been less well preserved. At first, attempts were made to conserve some of them and use them as a tourist attraction. These attempts all ended in failure. Most fortifications disappeared completely in the course of the 20th century. Numerous artillery pieces were sold for scrap at public auction in 1923. A bunker of the Antwerpen Battery located near the Aachen Battery has been preserved. Some vestiges of two batteries can still be seen in Uitkerke (Blankenberge). The first one is a command bunker and a railway gun emplacement of the Hessen Battery. The locations of the three other emplacements are visible as well. A concrete emplacement of the Sachsen Battery has also been conserved. A guardroom of the Eylau Battery remains on the East Bank of Ostend ('De Halve Maan'); an air defence battery was built on this site during the Second World War. The Eylau Battery was specifically intended to protect the entrance of Ostend harbour. The emplacement of 'Langer Max' (Pommern Battery) can still be found in Koekelare.

The Hindenburg Battery was located near Fort Napoleon (Ostend). Its primary purpose was to be a training ground for marines. The battery itself disappeared in 1923, yet traces of the occupation are still visible inside the fort. A wall painting by German soldier Heinrich Otto 'Pieper' is reminiscent of the presence of German troops. The knight in armour, who has beheaded his enemies with his sword, represents heroic Germany. Central Powers Austria-Hungary and Turkey as well as the Allied Powers are represented as animals. Belgium is depicted as a small tricoloured beetle. A snake depicts Italy, treacherous in the eyes of the Germans ...



■ The observation and command bunker of the Aachen Battery was camouflaged with branches on top of the embrasure, since the bunker was one of the most conspicuous constructions of the complex when seen from the sea. The concrete reinforcement was added on top of the embrasure after the structure had been brought into use for the Deutschland Battery at Bredene in order to better protect the expensive equipment. This picture was taken after the war during a visit by American soldiers (Imperial War Museums, MH 30839)



■ One of the few remaining traces of the coastal batteries is this vestige of an emplacement of the Sachsen Battery in Uitkerke. (Tom Vermeersch, Province of West Flanders)



■ A wall painting by German soldier Henrich Otto 'Pieper' in Fort Napoleon (Decler)

Well-preserved remains of the Hollandstelling in the Zwin area

Numerous bunkers have been preserved in the Zwin area. It is remarkable that these are found on old dikes as well as on vestiges of older fortifications dating from the Eighty Years' War, the War of the Spanish Succession and the period of the Austrian Netherlands. The first bunkers of the *Hollandstelling* are located in the Zwin area itself: this was the site of *Stützpunkt Bayern-Schanze*. *Stützpunkt St. Paul* was created on the old fort of Sint-Paulus in Het Zoute and *Stützpunkt Wilhelm* on the dike of Nieuwe Hazegraspolder (see map p. 6-7). Traces of the trenches are still visible in several places on top of the dike. This dike is connected to the former fortress of Nieuwe Hazegrasfort built by Austrian troops in the late 18th century to protect a sluice. A stronghold was constructed on the site of the old fort: *Stützpunkt Heinrich*. The line then follows the Cantelmo line, a defensive line built by Spanish troops during the Eighty Years' War (1568-1648). It is remarkable for a centuries-old construction to get a military function again after nearly 300 years. *Stützpunkt Hauptstrasse* is situated in the middle of this line. Near the Damme Canal the line connects to the fort of Sint-Donaas, another relic from the Eighty Years' War. Renowned Dutch military engineer Menno Van Coehoorn made significant alterations to this fort during the War of the Spanish Succession. In the First World War, a stronghold of the *Hollandstelling* was constructed here: *Stützpunkt Dora*. These bunkers were also used during the Second World War. Aerial photographs from this period show recently dug trenches. From here the line continued to Lapscheure and Strobrugge. The *Hollandstelling* was also developed in depth.

Throughout the years the line has remained virtually intact. Within the scope of several European projects centred around the fortifications from the Eighty Years' War, several parts have now been made accessible to the general public: information panels have been placed at *Stützpunkt Heinrich*, and the bunkers on the 'swallowtail' of the fort of Sint-Donaas can now be visited. Both bunkers also serve as a roost for bats.



View of the electric fence erected along the Belgian-Dutch border. This image may have been staged (Zeeuwse Bibliotheek/Beeldbank Zeeland)

The Hollandstelling

The electric fence

The coastal battery furthest removed from the frontline along the Yser river is to be found in the Zwin area on the Belgian-Dutch border. Both the Allies and the Germans had doubts about the neutrality of the Netherlands. The Germans were especially worried about a British landing in Zeeland, from where they could invade Belgium relatively easily. Building materials for the construction of bunkers on Belgian soil were shipped in from Germany for a while.

A fence was erected along the whole border to prevent illegal traffic between the two countries as much as possible. This fence had to stop refugees, spies, volunteers for the Allied forces, smugglers and deserters. It was energised with high voltage and propaganda pictures showing dead bodies under the electric fence were distributed as a deterrent. Nevertheless, 500 to 800 persons were killed in attempts to cross the border.

A line of bunkers

However, this did not suffice to prevent troops from landing. This is why the plan for a real border defence system encompassing three lines along the Belgian-Dutch border was soon developed. One of these, the *Hollandstelling*, stretched from the Zwin area in the west to Vrasene in the east. The land forces built the part between Strobrugge and Vrasene, while *Marinekorps Flandern* – which was also responsible for the construction of the coastal batteries – took care of the part between the coast and Strobrugge. These two forces did not work in the same manner: the land forces constructed bunkers using concrete blocks, while the Marine Corps poured concrete bunkers. The line mostly consisted of personnel bunkers, command bunkers and machine gun emplacements. Many



Overview map of the German lines along the Belgian-Dutch border during the First World War (*De Hollandstelling*, Hans Sakkers)

casemates were camouflaged to look like farms or houses. Thanks to their thatched roofs they were hardly recognisable from the air.

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Coastal defence by the Allied forces behind the Yser front: about arms, water, sand and patients

Guido Mahieu & Johan Termote

The dunes of the Belgian west coast occupied an important place in the First World War. This had not been foreseen nor prepared by the Belgian high command, however. This part of the Belgian coast had only recently been discovered by tourists. De Panne and Nieuwpoort had quickly become important seaside resorts in the last quarter of the 19th century. The seaside resorts of Sint-Idesbald, Koksijde and Oostduinkerke had hardly been developed at all. The municipality of De Panne had been split off from Adinkerke as recently as 1911 and was experiencing an explosive growth as more and more villas and hotels were being built. It had originally been a fishing settlement, and fishermen still occupied an important position. On the eve of the First World War,

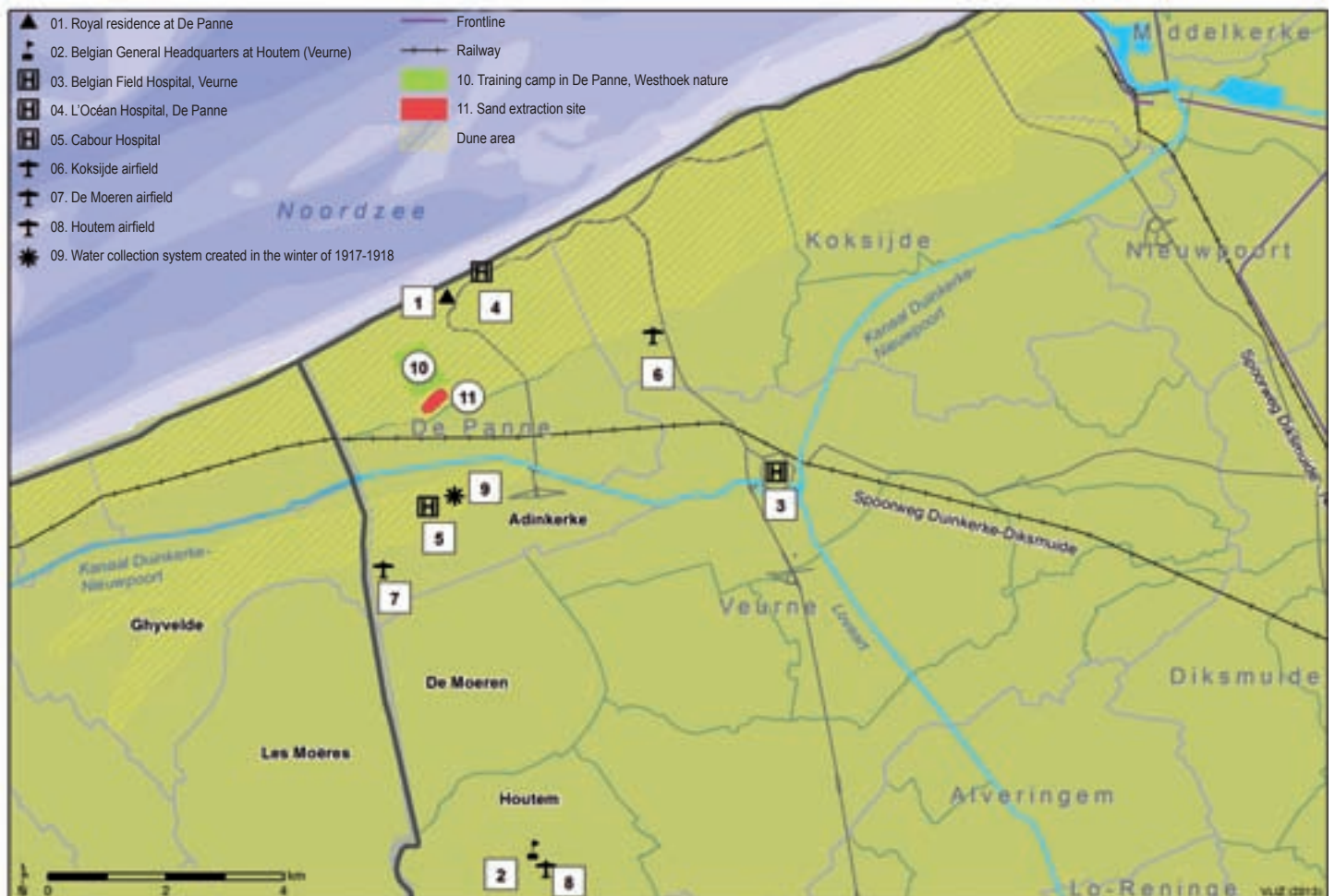
plans were ready to construct a fishing port. So there was no reason to suspect that the Belgian army would end up in this region in October 1914 when it succeeded in halting the German advance at the river Yser with the assistance of Allied troops. The Belgian rearguard was situated in a small, quiet coastal area with high dunes.

Intensive use of the dune area

When you look at the map, you immediately realise the strategic importance of this area. The area between Nieuwpoort and De Panne had a belt of high sand dunes overlooking the sea with a hinterland that



■ The Belgian west coast was undergoing an explosive growth prior to WWI. Numerous villas and hotels – such as Hotel Terlinck – were being constructed (Kristof Jacobs, Nieuwpoort sector 1917)



■ Map of the dune area between De Panne and Nieuwpoort representing various (military) infrastructures (VLIZ)

could be inundated for the most part. The old dunes of Adinkerke-Ghyvelde (hereinafter the “old dunes”) extended as far as one kilometre inland near the French-Belgian border. The area was only used to a limited extent as farmland and hunting grounds in this period. Both the near-shore dunes and the old dunes located more inland were very easily accessible, including from France, as they were situated between the important transport links of the Nieuwpoort–Dunkirk canal and the single-track railway between Diksmuide and Dunkirk. The principal traffic junction of unoccupied Belgium, which turned out to be vital for transport to and from the frontline to the east, was therefore situated between both dune systems. Furthermore, the western part of this area was initially out of range of the heavy German guns. This advantage was short-lived, however, because in April 1915 the Germans started to deploy long-range artillery that covered the entire coastline up to Dunkirk. Nevertheless, said circumstances helped to determine the location of the royal residence in De Panne. The new General Headquarters were moved from Veurne to the presbytery of Houtem village on 23 January (as Veurne came under fire) and they were easily accessible via Les Moères/De Moeren. Yet the war was also felt here, seemingly safely far away from the frontline. In particular the take-over of the coastal area by the British Fourth Army in early 1917 in preparation for the Allied offensive at Ypres

resulted in heavy and relentless German bombings. This did not prevent this western dune area from being used for all sorts of purposes during the Great War. It has never been used more intensively than in this eventful period.

Prepared for a German landing on the Belgian west coast

Dunkirk protected

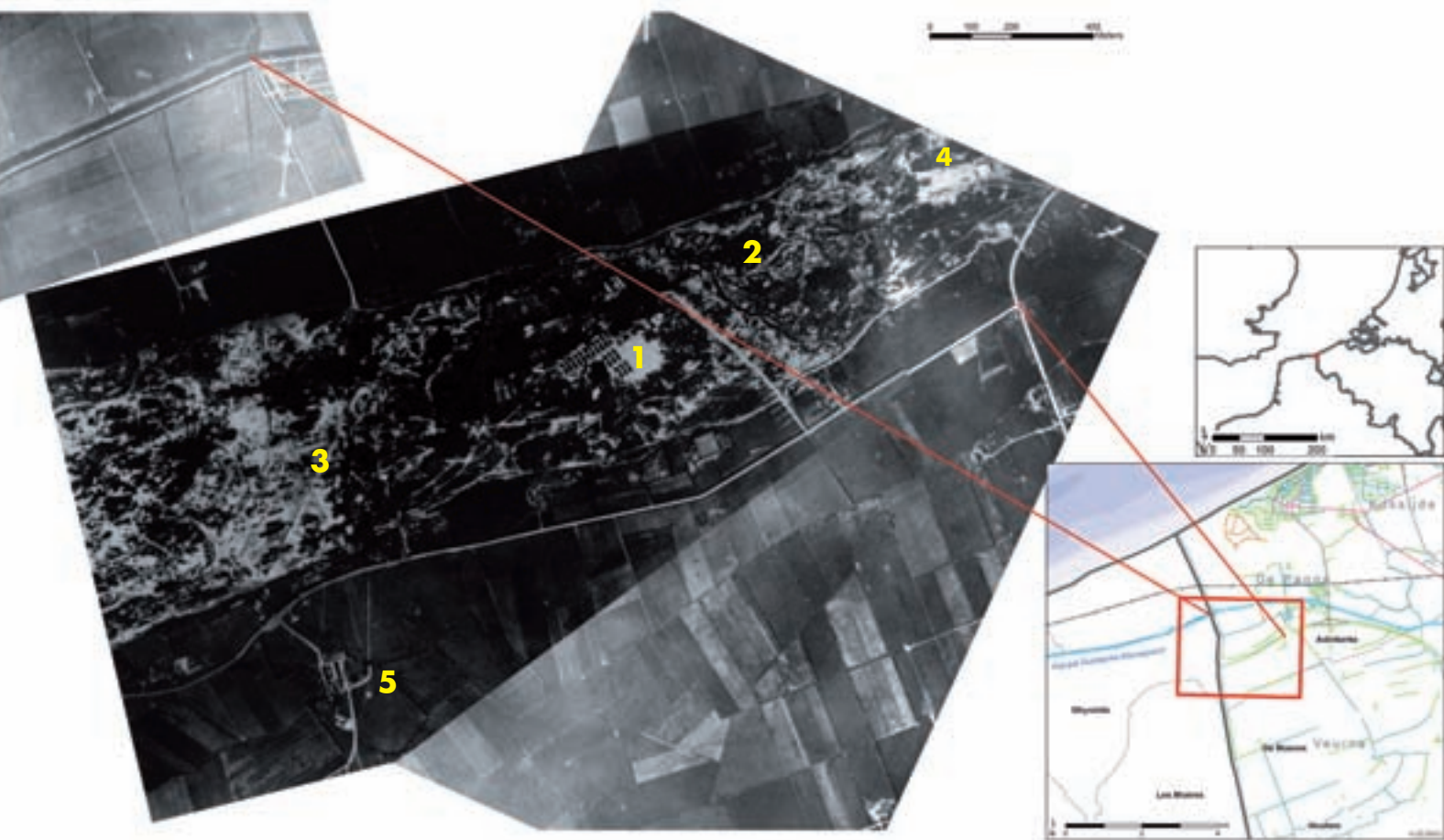
An extensive defence infrastructure was established on the dunes. This may seem surprising since this location was at some distance from the front. If we take a look at the bigger picture, it soon becomes clear what the reason was: everything revolved around the defence of the Channel ports and Dunkirk in particular. In this context, various scenarios had to be taken into account. The Germans could mount an attack by land as well as by sea. The French were especially interested in the protection of Dunkirk. The port of Dunkirk therefore had its own defence system, the so-called *camp retranché*, which had been gradually developed from 1878 onwards. It consisted of an inundation belt south of the city and a series of batteries on the coastline. The weakest link was the French-Belgian border area, in particular the two above-mentioned dune belts, which formed the ideal corridors towards the port in case of a German breakthrough. The Belgian coastal strip was therefore under

shared Belgian and French control, with a strong presence of French troops in the Nieuwpoort sector.

The line of defence behind the Yser front

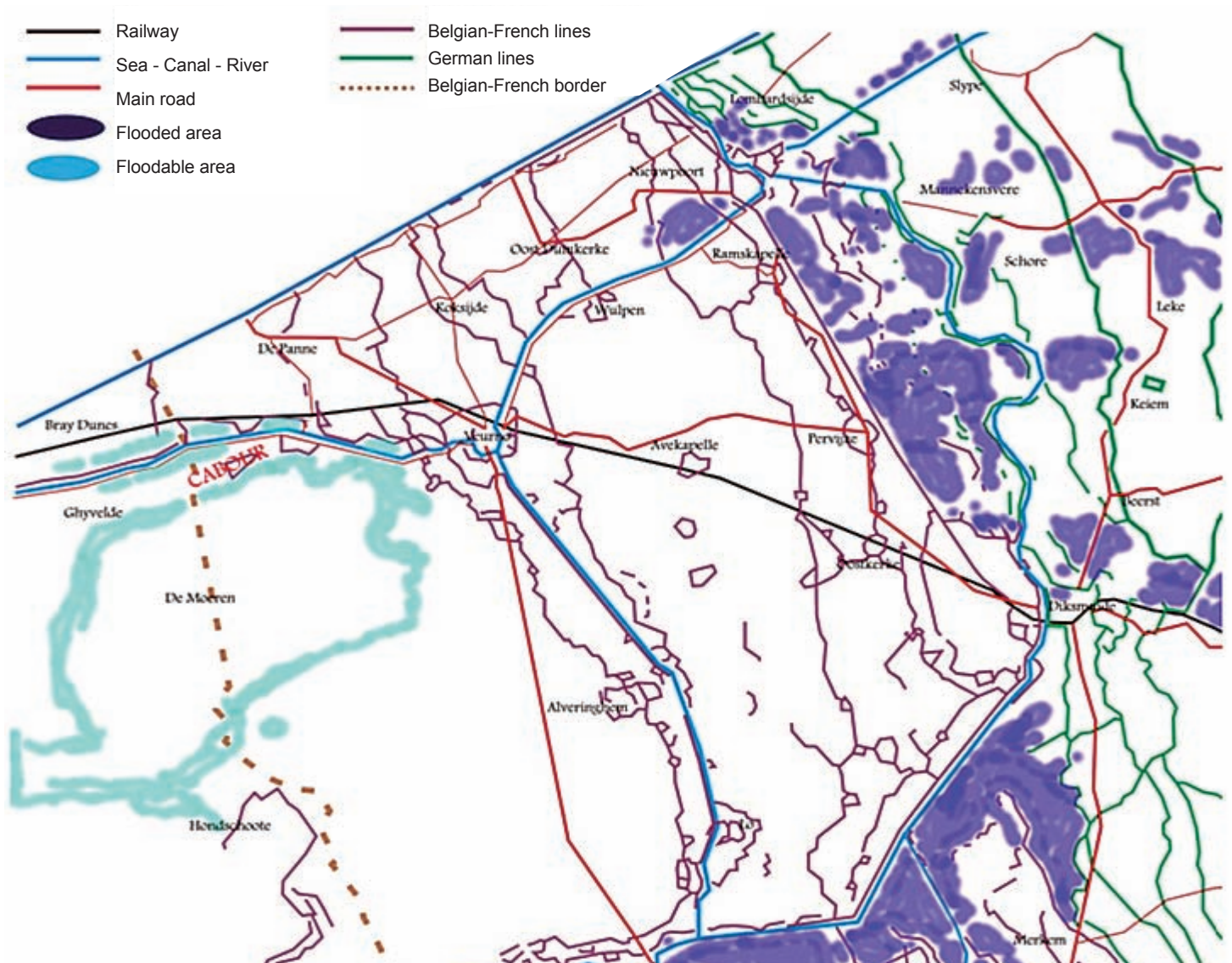
The Belgian army was responsible for the defence of the Yser plain. Immediately after the consolidation of the frontline in the Yser plain, Belgian troops established a new line of defence behind it. This line consisted of a series of parallel defensive lines combined with areas that had been or could be flooded. On Belgian territory four north-south running lines were established, the westernmost of which extended beyond the coastal polder area. The lines continued to the dune belt, where they split up. The crucial point was the Yser estuary, where the Allies were able to maintain the bridgehead of Lombardsijde until it was taken by the German army during operation *Strandfest* on 10 July 1917.

In early 1916 the Allies also became aware of the risk of a German invasion on the Belgian west coast. This was the result of the increasing activity in the occupied Belgian ports and the presence of *Marinekorps Flandern*, which prompted the Allies to set up a coastal defence system under the command of Lieutenant General Drubbel, at this time commander of the Belgian 2nd army division. Five defensive structures, each manned by a company, were built on the near-shore dunes between the towns of Bray-Dunes and De Panne, the most obvious landing place. These structures consisted



■ The Belgian part of the dune area of Adinkerke – Ghyvelde (aerial photographs 118, Royal Army and Military History Museum)

1 Cabour military hospital. 2 First line of defence. 3 Second line of defence. 4 Water collection system created in the winter of 1917-1918. 5 Groot Moerhof farm



■ Location of the Cabour lines as part of the Belgian-French defences behind the Yser river (map based on the overview map of the Yser front by A. De Boeck, 1918)

of three firing lines equipped with machine guns and an artillery piece to hit targets at sea. Such small-scale coastal defences were also constructed in the remaining part of the Belgian west coast, east of De Panne.

The “forgotten” trenches

The Belgian defence was apparently limited to the above-mentioned linear elements. The French defences were slightly more solid and were mainly directed against a possible German attack by land. Both in the near-shore dunes and in the old dunes the French army constructed an in-depth defence system which partially extended into Belgian territory. Vestiges of these defences have been conserved. They belong to the best-preserved trench lines from the First World War on Flemish soil and are a classic example of the structure of a trench system. The trench system is situated east of the Cabour hospital complex (see below) and was part of a bigger system of trenches dug in the old dunes. It consists of various lines forming a large triangle pointing east. The system is intersected by a *boyau*, a trench connecting and providing communication between the



■ Westhoek nature reserve, aerial view of the Belgian-French border area with traces of the first French line of defence (Google Earth, 2-4-2007)

The Cabour trenches at present

The main trenches are built in a zigzag pattern. The northern line follows the first inland dunes, parallel to Veldstraat, which is the northern edge of the dune complex. In the easternmost part, the line is constructed as a zigzag trench in a raised dune. The area towards Veldstraat was levelled for this purpose. The trench runs in a north-south direction across the site. The existing dune terrain was taken into account, and the trenches split up on the high parts of the dune ridges. The use that was made of the existing terrain explains the erratic course of the trench. Bomb shelters were constructed over the trench in three places. They are made of yellow brick and have a concrete roof. This was reinforced with a 60 cm thick concrete plate at the time of the German spring offensive of 1918. The three bomb shelters are located at either end and in the middle of the line at a distance of about 150 metres. In front of these lines there were several barbed wire fences, which are still visible as evenly levelled strips about ten metres wide, partly running in a straight line, partly in a zigzag. The chronology in which this was built remains unclear. The descriptions and the rare aerial photographs that have been preserved only date from late 1917 and early 1918.



■ This aerial photograph of the old dunes at Adinkerke-Ghyvelde clearly shows the linear traces of trenches from WWI (Decler)

lines, which continued to the middle of the north-south running western line. The design took the terrain into account and made use of the higher dunes. Where these were absent, a dam was created with sand coming from the levelling of the surrounding terrain. This way the trench was above ground level, which gave the defenders a considerable advantage.

The near-shore dunes were also put in a state of defence by the French. This system consisted of a series of trench lines at right angles to the coastline and intersecting the dune belt. The westernmost line was constructed on the Belgian-French border (see picture p.41). These lines have been partially preserved as well.

Dune hospitals

Good communications and the relatively safe location were valid reasons to establish the principal Belgian military hospitals in the westernmost dune area. The medical service of the Belgian army was in a state of collapse after the German invasion of 1914, and the Red Cross (appointed by law as the mobilisation reserve of the medical service and consisting of civilian volunteers) was also unable to perform its task properly. During the invasion, the evacuation of the wounded was therefore quite chaotic, partly because the medical services did not have any experience with treating the victims of modern industrial warfare. Three hospitals would eventually be established in this part of unoccupied Belgium: the Belgian Field Hospital (in Veurne, later on in Hoogstade), the l'Océan field hospital (in De Panne) and the Belgian military hospital (on the Cabour domain in Adinkerke). These three hospitals each took care of the wounded from a particular sector of the Belgian front. They also ensured the organisation of a number of surgical outposts: Sint-Jansmolen post for l'Océan and Groigny post for Cabour.

Belgian Field Hospital (Veurne-Hoogstade)

As a result of the general reorganisation after the Battle of the Yser, two additional hospitals were established at a distance of approx ten kilometres, one run by the Red Cross (De Panne) and the other by the Belgian army (Adinkerke). Both institutions had their own management and funding, which frequently led to tensions. This rivalry eventually resulted in effective assistance which was unique in the context of the war and would finally serve as a model for the treatment of the wounded in later conflicts. This Red Cross hospital was managed by the strong-willed doctor Antoine Depage (1862-1925), and in part thanks to British and American material and financial support it developed into one of the best performing hospitals of the First World War. The development of De Panne as a logistic and administrative centre as well as the

presence and support of the royal family all contributed to this success. Summer resort hotel L'Océan, located on the esplanade of De Panne, was the hospital's main building. A real complex grew up around it in the following years (see picture p. 43). The hospital remained operational until 15 October 1919, albeit with a reduced medical staff.

L'Océan field hospital (De Panne)

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Belgian military hospital (Cabour - Adinkerke)

The Belgian military hospital was established a short while afterwards on the so-called Cabour domain in the old dunes. The domain is named after insurance broker Charles Cabour from Dunkirk, who, at the turn of the 20th century, inherited the estate from his uncle Eugene Carpentier, who had bought it from the Belgian State. Charles Cabour had a country house built on this site which was to become the core of the surgical hospital. The hospital was established between 2 and 26 April 1915 by order of doctor Leopold Mélis (1853-1932), inspector general of the Belgian Army's medical service. The Antwerp British Hospital Fund and Count Félix de Mérode supported the hospital financially. The Belgian military hospital had the advantage of being much closer to the railway and the canal so that it provided better possibilities for evacuation to France. Dr. Paul Derache (1873-1935), who had been put in charge of the Belgian military hospital in Fort Louis near Dunkirk in October 1914, was appointed superintendent of the hospital.

The Cabour hospital complex consisted of the country house and 22 wooden pavilions,



■ L'Océan field hospital (Brussels, Royal Army and Military History Museum)

1 Hotel l'Océan, 2 British pavilion, 3 Everyman's pavilion, 4 Albert-Elisabeth pavilion, 5 Power station, 6 Laundry, 7 Reception pavilion, 8 Rehabilitation rooms, 9 Dispensary and workshops



■ The blocks and the number of storeys of the current l'Océan residence still refer to the former pre-WWI construction (Johan Termote)

19 of which were destined for patients and 3 for staff. The total capacity was some 500 beds. Each pavilion included 24 beds and in each corner there was a separate room for quarantine patients, a linen room and a bathroom. The pavilions were well lit and were constructed on a concrete or brick base. The operating room was located in the country house. The hospital complex was brought into use on 26 April 1915. Cabour surgical hospital (*Cabour chirurgicaal*) was operational up to 12 March 1917. An average of 5 operations were carried out each day and a total of 2811 soldiers were operated upon. The mortality rate of 6.8% was relatively low. A scientific journal was published on a monthly basis for the benefit of the entire medical service: the first issue of 'Archives Médicales Belges' appeared on 1 January 1917. Both Cabour and l'Océan made use of the casualty clearing station near Adinkerke railway station.



■ The Cabour surgical hospital in mid-1915

1 Cabour country house, 2 pavilions, 3 chapel and 4 pond (Archives of Walter Lelièvre, Ramskapelle)



■ Doctor Derache and his team in action in the operating room, formerly the drawing room of the Cabour country house (Tonneau photo collection)

The end of the (relative) calm

From early 1917 onwards, the German bombings steadily increased with the preparation of Operation Hush (a British amphibious landing plan) and the Battle of Passchendaele (or Third Battle of Ypres). The British took over the coastal sector from the French on 20 June 1917. The Cabour and L'Océan hospitals had to be moved to the hinterland. On 12 March 1917 Derache moved with his surgical division from Adinkerke to the new military hospital of Beveren-aan-de-IJzer. A general hospital for the ill (*Cabour Médical*) remained on the Cabour domain and was managed by doctor Pierre Nolf. This medical station was operational until 17 February 1920 and concentrated on 'special cases': it treated mustard gas or Yperite victims as from August 1917 and Spanish flu patients as from early 1918.

L'Océan field hospital was moved to the hinterland, in particular to the village of Vinkem, on 24 October 1917. These two field hospitals were not the only ones: one was brought into use in Bourbourg on 18 May 1915, and the Elisabeth Private Hospital on the Couthove estate in Proven was operational from 21 May 1915 to 25 November 1918.

Water collection in the dunes

The supply of clean drinking water in the area behind the front was of vital importance, e.g. to prevent the spread of contagious diseases. The army gradually put in place a new distribution system for water supplied from France (for the area north of the Dunkirk-Nieuwpoort canal). New water collection systems were created along the Yser river in Haringe and Roesbrugge, and surface water was collected as well. The ground under the dunes contained considerable freshwater resources that were used for the first time during the First World War. During the preparation for the Passchendaele offensive in mid-1917 the British army developed a first limited water collection system in the old dunes on French soil, just west from the border. This sector returned to the control of the Belgian army after the offensive had failed. A fully-fledged water collection system was created by the engineers of the TAG (*Troupes Auxiliaires du Génie*) under the command of Major Van Meenen. This fitted in with the development of a general water distribution system for the area behind the front. The Cabour domain enabled the distribution south of the Veurne-Dunkirk canal, west of the Lo canal and north of Alveringem. The dune area north of the Veurne-Dunkirk canal up to Koksijde was supplied from Dunkirk.

This laid the foundation of a more systematic approach to water collection in

the dunes. The Belgian Ministry of the Interior became responsible for the installations and the distribution after the war. In 1920 the installations were transferred to the Royal High Commission for Reconstruction, which further expanded the water distribution system to the towns and villages to be reconstructed. This authority increased the capacity and added a dozen drilled wells to the drainage ditches. The municipalities of Adinkerke, De Panne, Veurne, Oostduinkerke and Nieuwpoort founded the Veurne-Ambacht Intermunicipal Company for Water Distribution on 24 December 1924. In 1928 they purchased a first part of the Cabour domain and further expanded the water collection system. The company's name changed to Intermunicipal Waterworks of Veurne-Ambacht or IWVA in 1930. Due to the area's high nature conservation value, water collection has been stopped and the Cabour domain has become a Flemish nature reserve.

The core buildings from this first water collection installation, built during the First World War, have been preserved on the domain. They constitute a remarkable industrial-archaeological whole. The installation was located east of the defences. The Belgian army probably took over the water collection system in late 1917 and began to expand the infrastructure in the winter of 1917-18. The system included a pump unit as well as two round water catchment holes. The two drinking water

tanks west of the pumping station probably date from this period as well.

The original pumping station is a simple single-storey building with 6 bays and a pitched roof. A steam-powered pump was installed in the northernmost bay. West of the pumping station are the covered reservoirs, built from cement-coated brick. These reservoirs were covered by a pitched roof during the war. A preserved bomb shelter is located near the pumping station. Two of the original water catchment holes have been conserved as well. They are 10m and 4m in diameter respectively. The installation was expanded and altered several times.

Sand extraction

The dune area provided another resource besides water. Dune sand was extracted in huge quantities to produce cement. It was also used as a track bed for the various narrow-gauge railways through which the frontline was supplied. But above all, a lot of sand was needed for the sandbags used to construct and repair the trenches. Sand was extracted systematically. On the southern edge of the Westhoek nature reserve in De Panne, in particular in an area west of the Duinhoek neighbourhood, the so-called Fransooshille dune was completely levelled. The sand was transported to the railway line via narrow-gauge railways. This parabolic dune was an obvious choice as it was still shifting and threatened to swallow the road (current Duinhoekstraat). This large-scale levelling across an area of nearly 0.5 km was carried out by the engineers (TAG) of the Belgian army. This makes it one of the highest dunes on the Belgian coast to have been levelled. The southern edge of this sand extraction site, which stands out as low-lying and scrubby, is still visible as a southward bend in Duinhoekstraat. A vast drill ground, where the Belgian troops prepared for the final offensive from September 1917 to early 1918, was established north of this sand extraction site and south of the Centrale Wandelduin dune, situated in the centre of the Westhoek nature reserve. A network of practice trenches that could be surveyed from the higher dunes was dug in the low dunes. This area was connected to the coastal tram line and surrounded by barracks and storage depots. The American army also drilled here in 1918.

Airfields on the Belgian west coast

The air force became fully fledged during the First World War. The Belgian army started constructing airfields in early 1915. The dune area indirectly played a part in this as well, since dunes are characterised by strong thermals. Planes benefit from this during takeoff, which was sufficient reason to



■ The pumping station for water collection in the Cabour dunes in the winter of 1917-1918 (Archives of Walter Lelièvre, Ramskapelle)



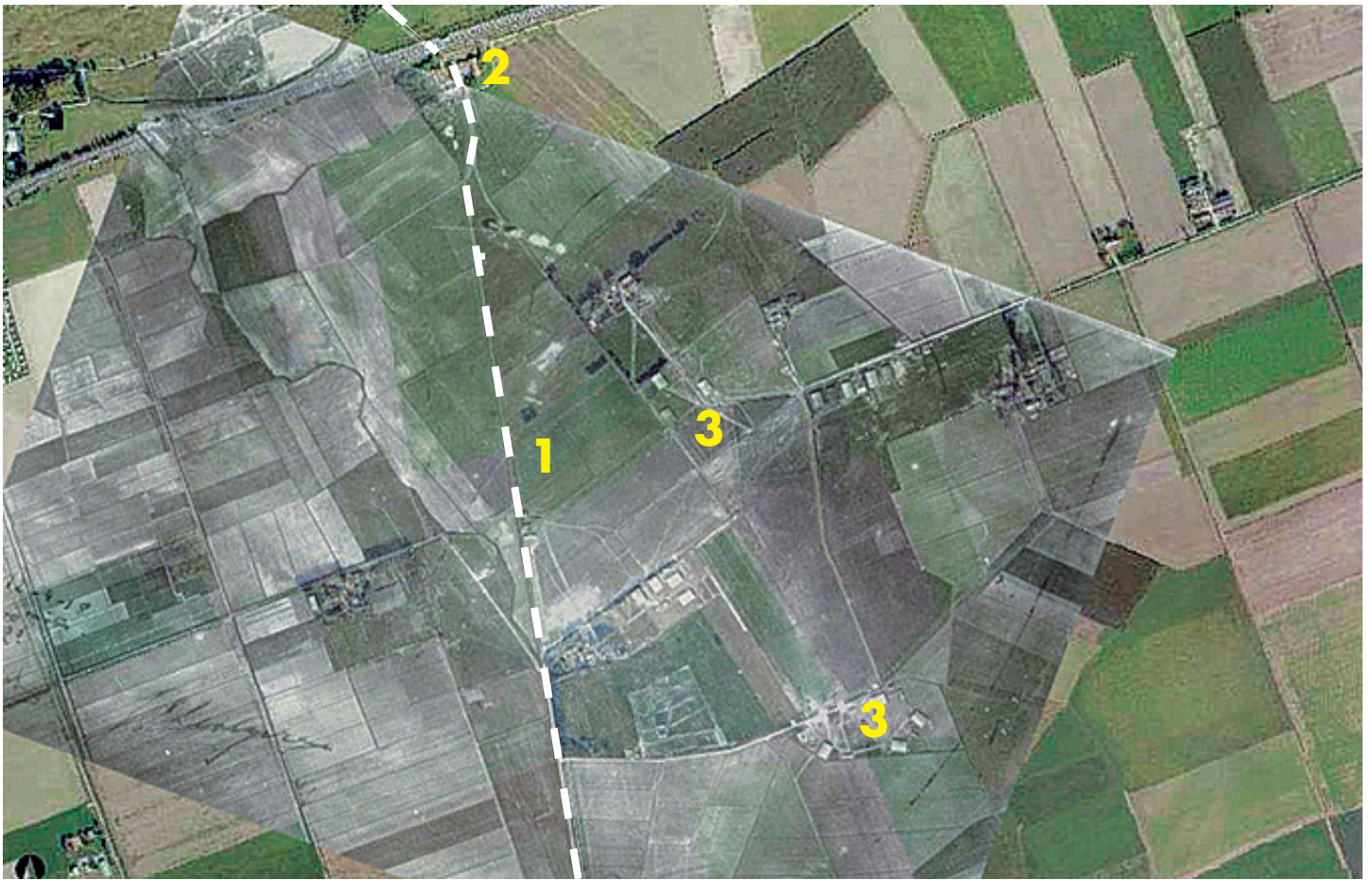
■ The construction of a water catchment hole in the winter of 1917-1918 (Archives of Walter Lelièvre, Ramskapelle)



■ The levelling of the Fransooshille dune, located on the southern edge of the Westhoek nature reserve (Brussels, Royal Army and Military History Museum)

construct airfields preferably near the dune belts. It was no coincidence then that the first military airfield was located on the grounds of the Ten Bogaerde farm in Koksijde. It was extended with a second strip along the dunes' edge in 1916 and was the home base of the 1st, 2nd and 3rd squadron. Koksijde airfield, invariably called "Furnes airfield" by the British high command, was close to the frontline, which made fast interventions

possible. But this was also one of its weaknesses. In the night of 8 to 9 September 1916, German aircraft bombed this airbase, which compelled the Allies to move the airfield westward. They selected a sandy spit of land in De Moeren south of the Ghyvelde-Adinkerke dune belt. This airfield was on the grounds of the Groot Moerhof farm near the French-Belgian border. The relocation took place in stages. The 1st squadron was



■ Aerial view of De Moeren airfield (12 April 1918) (Brussels, Royal Army and Military History Museum) projected on a present-day aerial photograph. The hangars are scattered so as to minimise the impact of bombardments.

1 Belgian-French border, 2 Groot Moerhof farm, 3 Hangars

transferred after the construction in late 1916. The 2nd and 3rd squadron followed on 9-10 February and at the end of May 1917 respectively. Both airfields were also used by the Royal Air Force, as were the recently constructed airfields near the port of Dunkirk (Bray-Dunes, Coudekerque, Saint-Pol and Petit-Synthe).

Conclusion

After the war, the dune area was metamorphosed further by the resurgence of tourism. The traces of the Great War were largely erased and nature gradually took back its place. A few large-scale infrastructures that had proved their usefulness, such as the water collection system, have been conserved.



■ Georges Guynemer made an emergency landing on De Moeren airfield on 9 September 1917. An attentive soldier took this picture. Guynemer was shot down above Poelkapelle a few days later on 11 September (Brussels Air Museum)

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The flooding of the Yser plain

Guido Demerre & Johan Termote

The northwesternmost part of Belgium played an important part in the First World War, as it was there, on the plains of the river Yser, that the advance of the German Fourth Army came to a halt. This was thanks to a tried and tested method: flooding or inundation. The flat Flemish polders, situated below sea level at high tide, were ideally suited for such a scheme. It was sufficient to manipulate the Ganzepoot sluice complex at Nieuwpoort, which controlled the inflow of seawater and the drainage of the polders in the hinterland. In those dramatic days of October 1914 the flooding of the Yser valley did not go smoothly at all, however. But after the war, these early setbacks were soon forgotten and the actual events were embellished. This inspired many romanticised patriotic stories, reinforced by all sorts of vanity documents written by those involved. What follows is an as objective as possible representation of the facts.

Water as a means of defence

Inundation is a means of defence that has been used frequently in the Low Countries at least since the end of the 16th century. It has primarily been used to defend ports, as was the case during the Siege of Ostend (1600-1604). The city of Nieuwpoort has also regularly adopted these tactics throughout history. The floodgates around the city were opened several times to flood the area during the French-Spanish wars in the second half of the 17th century. The last flooding took place in 1813-1814 when French troops defended the city. So the military commanders were sufficiently familiar with flooding as a means to halt the German advance at the onset of the First World War. The British and French high command were also aware of the possibilities. British engineers had helped to fortify the city of Nieuwpoort within the scope of the completion of the Wellington Barrier between 1815 and 1830. This fortification was equipped with a system of floodgates. In addition, French military engineer Vauban had drawn up detailed inundation plans for the port of Dunkirk in 1694. The floodgates of this fortification were still operational at the outbreak of the First



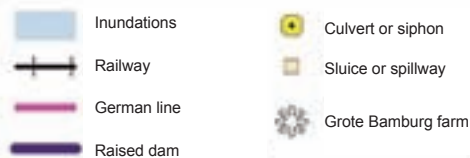
■ *Nieuwpoort viewed from the east. Aerial photograph made by a German scout on 19 August 1917. (Bundesarchiv, Koblenz)*

- 1 *Sluice at Nieuwendamme creek through which the inundation of Nieuwendamme polder took place in the night of 21 to 22 October 1914*
- 2 *Oude Veurnesas sluice, through which the first inundation attempt was made in the night of 26 to 27 October 1914*
- 3 *Spillway of the Noordvaart canal, through which the flooding was carried out on 29 October 1914*

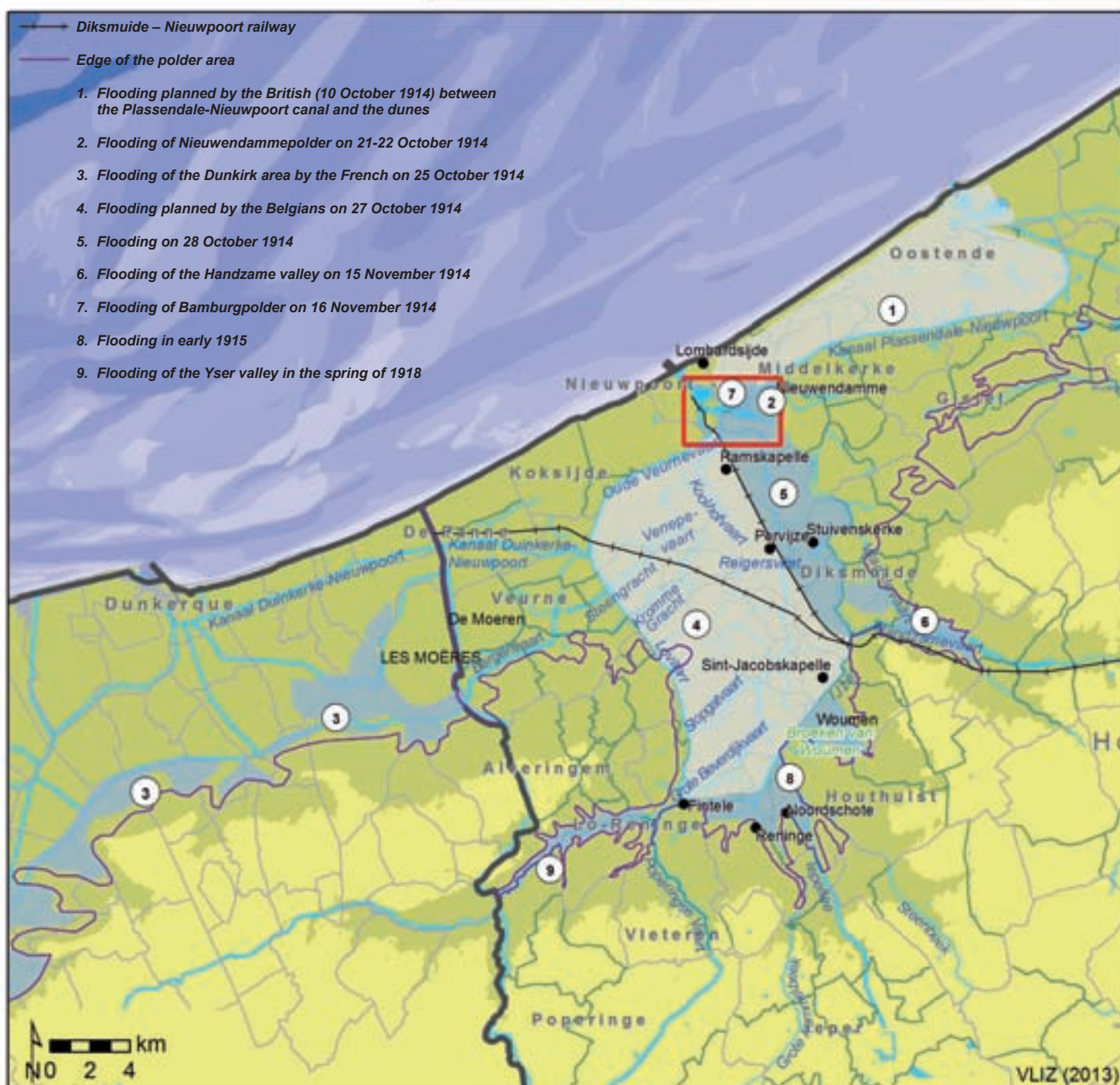
World War, which was no longer the case for Nieuwpoort. With the exception of the sluice at Nieuwendamme creek, the fortifications around the city had been systematically demolished from 1853 onwards.

Of great importance was the fact that the drainage system of the Yser basin had been completely altered between 1861 and 1880, so shortly before the First World War. This large-scale project was aimed at improving drainage as well as navigation. The Lovaart canal was widened, deepened and embanked, a sluice gate and spillway were constructed at the confluence of this canal with the Yser river near the hamlet of Fintele, and siphons were constructed under the Lovaart canal for drainage (see map). The project was completed with the construction of several sluices and spillways at Nieuwpoort. The Veurnesas sluice on the new Veurnevaart canal as well as the sluices and spillways on the Noordvaart canal (1875) and the Iepervaart canal (or the canalised Yser river) were

given a makeover. However, this system was not perfect: priority had been given to navigation instead of drainage. Nevertheless, the system was flexible enough to allow the navigable waterways to be used for drainage in case of abundant rainfall. All these hydraulic works were to play a crucial part in the war and helped facilitate the continued flooding of the Yser valley.



1.	Oude Veurnesas sluice
2.	Spillway of Nieuw Bedelf
3.	Sluice on the Plassendale-Nieuwpoort canal
4.	Sluice on the Nieuwendamme creek
5.	Spillway and Iepersas sluice on the Yser
6.	Spillway on the Noordvaart canal
7.	Veurnesas sluice and spillway on the Veurnevaart canal
8.	Siphon under the Yser
9.	Siphon under the Veurnevaart canal
10.	Koolhofvaart embankment, 1914
11.	Dam on the Veurnevaart canal, 1916
12.	Dam on the Oostvaart canal
13.	Sas van Dierendonck or sluice of the Oostvaart canal



Why was flooding resorted to in extremis?

The question of who came up with the idea of flooding is not very relevant. Yet it still is the subject of numerous discussions. A much more intriguing question is why this means of defence was only used in the final stage of the Battle of the Yser and not earlier. The Battle of the Yser started on 15 October when the port of Ostend fell into German hands and the Belgian high command decided to defend the natural boundary formed by the river Yser at any cost. The French high command sent reinforcements: French *fusiliers marins* defended the bridgehead of Diksmuide. The German army mounted a massive attack on 18 October. With the help of French troops, the battered Belgian army held out at the expense of heavy losses. Because they had waited for so long, the opportunities for flooding had declined considerably by now.

The fact that the decision was taken so late raises questions. British officers – probably including Colonel Tom Bridges – had already contacted sluice keeper Gerard Dingens at the Nieuwpoort sluice complex on 10 October. They asked him to flood the area between the Nieuwpoort-Plassendale canal and the coastal dunes with a view to the defence of Ostend. The sluice keeper, however, was clearly more concerned about the human and economic impact of the flooding and pointed out the inefficiency of such an operation. When on 13 October Commandant Prudent Nuyten asked him to draw up an inundation plan, Mr Dingens was conspicuously reluctant. In theory it was still fairly easy to flood both banks of the Yser at that moment, which would have prevented or at least shortened the bloody Battle of the Yser. There was still another reason why this did not happen.

On 11 October the Belgian and French forces had opted for a coordinated command. This implied that the commanders, King Albert of Belgium and French General Paul François Gossetti (commander of the 42nd division), communicated directly with General Ferdinand Foch, who had been in command of the northern army group since September 1914. So it was Foch who was responsible for the joint war effort in consultation with the British Expeditionary Force and the Belgian army. Up to 1911, the 63-year-old Foch had been a commander and teacher at the *École Supérieure de Guerre* (a military academy), where he had developed doctrines about the all-out offensive (*offensive à l'outrance*) in several authoritative publications. These doctrines characterised his approach in the first months of the war. According to this vision, the possibilities for a counteroffensive had to be left open at all times. This is what stood in the way of a complete inundation of the Yser valley. Only after the failed counterattacks by the French 42nd Division at the Yser front on 21 and 23 October did General Foch realise

that a more defensive strategy was the only way to stop the German advance. Only then were the Belgian inundation plans taken into consideration. Furthermore, an inundation on Belgian soil was of vital importance to France for the defence of the Channel ports of Dunkirk, Gravelines and Calais. Even if they were protected by a flooding on French soil, the French ports would still be within the range of the German artillery, which would result in their gradual destruction. An inundation on Belgian soil would create an additional buffer and could safeguard the French ports against such a catastrophe. Nieuwpoort would not be so lucky.

Heroes just for one day

Bargee Hendrik Geeraert

On 17 October the Belgian troops had taken control of the sluices, but there was a breakdown in communication with the sluice operators, and in particular sluice keeper Gerard Dingens, who was disregarded and sent away. As a result, the sluice operators joined the stream of refugees without keeping in touch with the military commanders. The failure to requisition the sluice operators turned out to be a huge mistake later on. Fortunately, an attentive bargee called Hendrik Geeraert (1863-1925) stayed on the scene and advised and assisted the Belgian troops. His practical mentality and attentiveness made him the perfect substitute for the discharged sluice operators. He would be part of the special engineer company that managed the hydraulic structures throughout the war.

The first limited inundation

In the brief window of opportunity allowed by the French offensive strategy, the



General Ferdinand Foch (1851-1929) did not give his consent to an inundation on Belgian soil until 24 October (Wikipedia)

Belgian engineers carried out a first limited flooding at Nieuwendampolder (just east of Nieuwpoort) in the night of 21 to 22 October. This flooding was not very difficult to achieve from a technical perspective, as the sluice on the Nieuwendamme creek, which also served as a floodgate, could be used. This is where Hendrik Geeraert made his first appearance. Thanks to his knowledge of the terrain, a limited area could be flooded with seawater. This prevented the Germans from encircling Nieuwpoort and protected the sluice complex in particular. Mr Geeraert proved his worth by pointing out that the siphon under the canalised Yser had to be closed off if the inundation was to be successful. So the siphon was closed off.



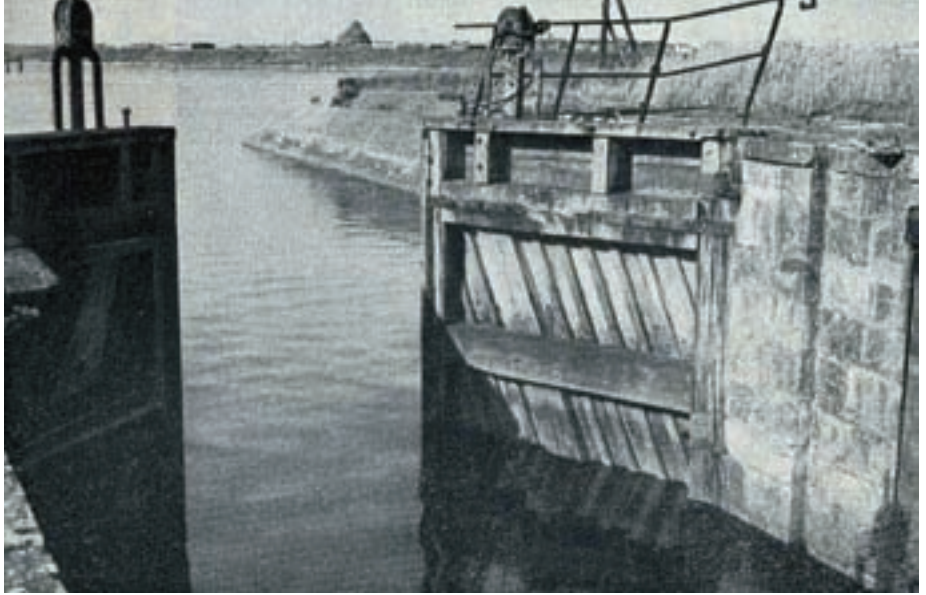
■ *Hendrik Geeraert posing in front the spillway of the Noordvaart canal (Callanaere-Dehouc Collection)*

A complete inundation with the help of Karel Cogge

The necessity of a complete inundation became clear a few days later. The German advance proved to be unstoppable. Two German battalions were already on the left bank of the Yser on 24 October. Sunday 25 October was a crucial day. What was left of the Belgian army retreated behind the embankment of the railway between Nieuwpoort and Diksmuide in the morning. In an attempt to gain an insight into the hydrology, the potential consequences of the flooding initiated by the French and the practical execution of a complete inundation of part of the Yser plain, the Belgian Headquarters (established in Veurne) tried to contact specialists. But the engineers of Noordwatering Polder turned out to have fled the town. Eventually, Captain-commandant Prudent Nuyten enlisted the help of Karel Cogge (1855-1922) at the advice of mayor Raphael De Spot and justice of the peace Feys. Mr Cogge was a supervisor at a public body in charge of protection against flooding, was very familiar with the area's hydrology and was able to answer Captain-commandant Nuyten's specific questions. Contrary to many other members of the staff, Captain-commandant Nuyten was also able to communicate with Mr Cogge as he spoke the West Flemish dialect. On the basis of this information, a concrete plan was eventually drawn up which started from the new Belgian line of defence at that moment: the embankment of the railway between Nieuwpoort and Diksmuide. Time was running out: the French high command had already initiated its own inundation plan of flooding the area of the Colme river



■ Karel Cogge (Kristof Jacobs, Nieuwpoort Sector 1917)



■ At the first attempt, the Oude Veurnesas sluice was opened so that the water could flow under the Nieuwpoort-Veurne canal via the Oude Veurnevaart canal (Veurne-spreek.be)



■ The sluice gates of the Noordvaart canal, which were opened at the second attempt (Kristof Jacobs, Nieuwpoort Sector 1917)

and Les Moères by means of the sluices of Dunkirk. In practice, this meant that what was left of the Belgian forces could only retreat via a few corridors and would be trapped in case of a German breakthrough. By force of circumstances, the decision was made to flood the Yser plain as quickly and as completely as possible.

Easier said than done: a two-stage operation

The practical implementation of this operation turned out to be problematic, however. As stated above, Nieuwpoort no longer had the required floodgates, the sluice operators were scattered and the city had come under German fire. At the request of Captain-Commander Nuyten, Mr Cogge had suggested the possibility of inundating the area between the railway embankment and the left bank of the Yser in a controlled manner. This required using the spillway of the Noordvaart canal as well as closing the openings in the railway embankment at the locations where three fairly wide watercourses and about twenty small ditches passed under it. Initially, Captain-Commander Nuyten rejected this

plan because the sluices were no longer under Belgian control. Subsequently, Mr Cogge proposed an alternative which made use of the Oude Veurnesas sluice, located on the slightly safer west side of the city, for the inundation. Mr Cogge indicated the openings in the embankment that had to be closed. At high tide, seawater would be let in through the Oude Veurnesluis sluice and the Oude Veurnevaart canal and then forced under the Nieuwpoort-Veurne canal via the Arkevaart siphon. Beyond the siphon to the Koolhofvaart canal, a 150 m long bank across the Koofhofstuw weir was needed to prevent the floodwaters from entering the Belgian lines. The go-ahead was finally given after the military engineers had completed these preparations within 24 hours and the officers had taken Mr Cogge on an inspection twice. The first attempt made by Mr Cogge and Captain Thys in the night of 26 to 27 October and on the next day failed due to technical reasons. Since they lacked the required tools, they could not secure the floodgates, which slammed shut again when the tide rose. They did succeed the following night and during the subsequent high tides. However, the capacity turned out to be

limited and the considerable detour and the siphon under the Veurne-Nieuwpoort canal furthermore proved to be an obstacle. In addition, it was neap tide so that the water supply remained limited. On the other hand, the rainy weather was a lucky break as the unmanned sluices remained closed, so that the inland water rose steadily as well.

In view of the precarious situation on the front and the panic at the Belgian headquarters in Veurne, the army eventually gave the order to open the spillways of the Noordvaart canal. In the night of 29 to 30 October, Captain Fernand Umé and a detachment of soldiers raised the sluice gates of the Noordvaart canal following the directions of Hendrik Geeraert. This attempt was made within sight of the enemy, who remained remarkably passive and apparently was unaware of any harm. The gates were closed at low tide, mostly at night. Time was running out: German troops had in the meantime reached Ramskapelle and Pervijze, i.e. beyond the principal line of resistance formed by the railway embankment. *‘La France sauvée par une rampe d’un mètre cinquante’* (France saved by a 1.5 metre embankment), General Foch would write in his memoirs later on.

A 1.5 metre embankment

For two days, additional Belgian troops supported by the French waged a fierce battle for Ramskapelle and Pervijze. After the second flooding by Captain Umé and his men, the water in the fields already stretched southward to the village of Stuivekenskerke. This flooding combined with a counterattack

eventually forced the Germans to retreat from Ramskapelle and Pervijze in the afternoon of 31 October. When the Germans captured the bridgehead of Diksmuide after the Battle of the Yser on 10 November, Captain Umé succeeded in bringing about a new inundation to the northeast of this city, in Handzame valley. To do so, he opened the gates of the Iepersas sluice on the Yser in Nieuwpoort on 15 November and the five following days, as a result of which Handzame valley was flooded with seawater. The Allies took advantage of the fact that the right embankment of the Yser was low and the adjacent land served as tide storage in winter. The French had abandoned the bridgehead of the Redan (also known as Palingbrug) on 26 October, which had made the sluice complex vulnerable. Fortunately, they were able to retake their positions on 2 November. A company under the command of Captain Thys then flooded the Boterdijk area up to Bamburghoeve farm on 16 November. They were assisted by the French *fusiliers marins* as their Captain Pelle des Forges had discovered a possibility to inundate the polder area of Lombardsijde in front of the bridgehead that same week. This stabilised the frontline. Nieuwpoort was even surrounded by water on two sides. However, this had come at a heavy cost of 3,500 Belgian dead and 12,000 wounded. If flooding had been used at an earlier stage, this would have prevented a great deal of casualties.

Holding the line...

The inundation posed two important problems for the next four years: on the one

hand, the flooding had to be maintained and controlled further. On the other, the drainage of the area behind the railway embankment had to be completely revised.

Maintaining the flooding

It was far from easy to control the various inundations. The sluice complex was under German fire and the Allies feared the Germans would try to neutralise the inundation of the right bank by means of the drainage sluices in Ostend. The military engineers were primarily responsible for controlling the floodings. Already at the start of the Battle of the Yser, the Service des Inondations (Inundation Service) was established by order of Major Maglinse and Captain-commandant Nuyten. It was under the command of Captain-commandant Jamotte, who first recruited Captain Thys and later on Captain Umé for the execution. The *Service des Inondations* would be succeeded by a real unit, the *Compagnie des Sapeurs-Pontonniers* under the command of Captain Robert Thys, on 2 September 1915.

The engineers had to find an outlet for the excess surface water from the Veurne-Ambacht area in December 1914. The first obvious solution was using the siphon to the Arkevaart canal and the Oude Veurnesluis sluice, but now “in the opposite direction”.

For four years they managed to respond to the devastation caused by the German artillery. In the summer of 1915 the Germans started to target the infrastructure. The Veurnesluis sluice at De Ganzepoot was progressively damaged so that the Veurnevaart canal was completely drained in January 1916. A huge emergency dam had to be raised near Nieuwpoort, and the sluice of the Oostvaart canal proved to be very useful



■ An emergency dam on the Nieuwpoort-Dunkirk canal at the moment of a bomb explosion (Kristof Jacobs, Nieuwpoort Sector 1917)



■ The long-range gun Langer Max in Moere could shell Dunkirk (Johan Termote)

for the drainage of rainwater from the unoccupied polder area. The flooding of the area between the railway embankment and the Yser was maintained through the Oude Veurnesas sluice. This was not the case for the marshes of Woumen, however. This is why the Yser was dammed up near Sint-Jacobskapelle in early 1915. The water used to inundate the Handzame valley was supplied by the upper reaches of the Yser from then on. In the process, the marshes of Noordschote, Reninge and Elzendamme were flooded as well. The aim was to raise the water level upstream from the Knokkebrug bridge as much as possible (up to + 4.3 m TAW [Second General Levelling]) so as to feed the flooding of the right bank of the Yser. Supplying water from the upper reaches of the Yser posed less of a problem in winter. In summer, however, water had to be pumped up from the Grote Beverdijkvaart canal. If fresh water was lacking, seawater could be supplied via the Nieuwpoort-Veurne canal and the Lovaart canal. Two pumps with a total capacity of over 100 m³ a minute had been installed at De Fintele for this purpose.

Revision of the drainage system

On the other hand, the drainage system of the Yser plain had to be entirely reorganised. Excess rainwater was pumped up from the Slogatvaart canal and discharged through the Lovaart canal. This was also the case for the Steengracht ditch. Excess water from the upper reaches of the Yser near De Fintele had to be discharged through the Lovaart canal as well. The work on the Lovaart canal carried out between 1861 and 1880 now fully proved its usefulness.

French ports largely protected

When the German spring offensive threatened the southern Belgian positions in 1918, the area between Elzendamme (Oost-Vleteren) and the Belgian-French border was temporarily flooded as well. This flooding took place with fresh water and by means of weirs constructed across the Yser valley. This final flooding of the Westhoek area during WWI would help define the outcome of the Great War. Just like four years earlier, beating off the German attack on the Yser-leperlee line through inundation from Nieuwpoort played a decisive role in the further course of the First World War. This had considerably shortened the frontline on the North Sea coast and had largely stabilised it for four years. As a result, the pressure was concentrated on the Ypres Salient. The failure to take the Channel ports, the real objective of the western advance of the German Fourth Army in October 1914, was in part due to the inundations. The French harbours, vital for bringing in supplies from Britain, remained in Allied hands.

This did not prevent the Germans from continuing to set their sights on the port of Dunkirk all this time. They had several long-range guns that were capable of shelling this port. The Predikboom gun, mounted at the foot of Klerken hill, was put into operation on 28 April 1915 and was finally silenced on 15 May 1915. It was replaced by the notorious Leugenboom gun or Langer Max on 27 June 1917. Despite intense shellings by the Allies, this 38 cm gun remained operational until 16 October 1918. The 411 shells it fired on the port of Dunkirk and the 114 people killed as a result were not sufficient to take out the harbour. However, the psychological impact should not be underestimated.

Deployment of so few troops?

Finally, we wish to come back to those who implemented the inundation system for four years and the difficulties they encountered. This company consisted of 300 men at most. However, it took the Belgian high command nearly 9 months to provide sufficient troops. People like Captain Thys were often frustrated because the authorisations or orders came too late or were conflicting. They constantly had to improvise. Nevertheless, the 5 platoons and 3 sections of men from all ranks of the Belgian Army managed to make a valuable contribution to the war effort with the help of a few specialists, workhouses, rolling stock and supplied materials. A total of 27 soldiers were killed in action. There were 296 casualties of different chemical weapons employed by the Germans (especially from 1917 onwards). This brings to mind a quote by Winston Churchill: "Never in the field of human conflict was so much owed by so many to so few."

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Paardenmarkt Bank, a WWI ammunition dump site off the Belgian coast

Tine Missiaen

Although this topic pops up in the press from time to time, surprisingly few people are aware that there is a WWI ammunition dump site off the Belgian coastal town of Heist. The figures are perplexing: at least 35,000 tonnes of German ammunition, at least a third of which are chemical shells, located at only a couple of kilometres from the esplanade! Yet there still are many gaps in our knowledge and it turns out that these are not easy to fill.

What has happened, has happened...

Very large quantities of explosives were left behind all over Belgium after the First World War. Their collection and preliminary storage in ammunition depots created extremely dangerous situations, resulting in many fatal accidents. As the situation gradually became intolerable and the disposal of ammunition on land still involved too many risks, the Belgian government decided to dump the ammunition in sea in late 1919. This received hardly any attention and was soon forgotten.

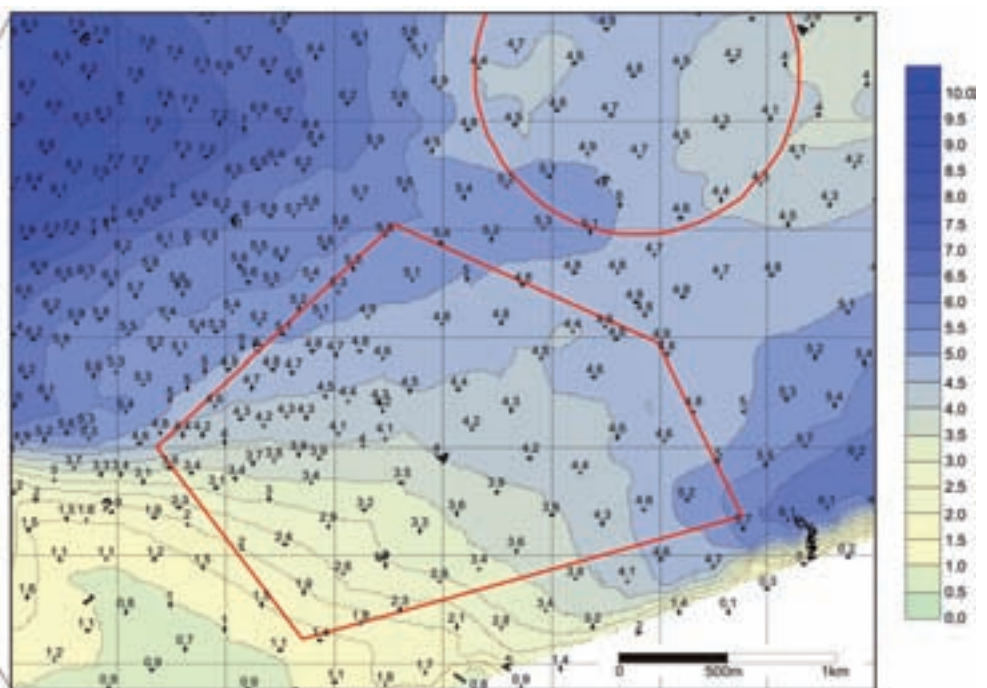
During dredging operations east of the port of Zeebrugge in 1971, various obstacles were found on the seabed. Extensive investigations by Navy divers in 1972 revealed ammunition including a number of chemical shells on 17 different sites. The first exploratory seismic and magnetic investigation of the ammunition dump site was conducted in 1988. On the bases of the results, the area was represented on hydrographic charts as a pentagon (with a total surface area of approx 3 km²) with an anchor and fishing ban (see chart). Other measures were not imposed at that time.

Thousands of bombs and grenades...

Nobody knows exactly how much ammunition has been dumped at Paardenmarkt Bank. Most estimates are in the 35,000 tonne range. This is probably for the most part unused German ammunition,

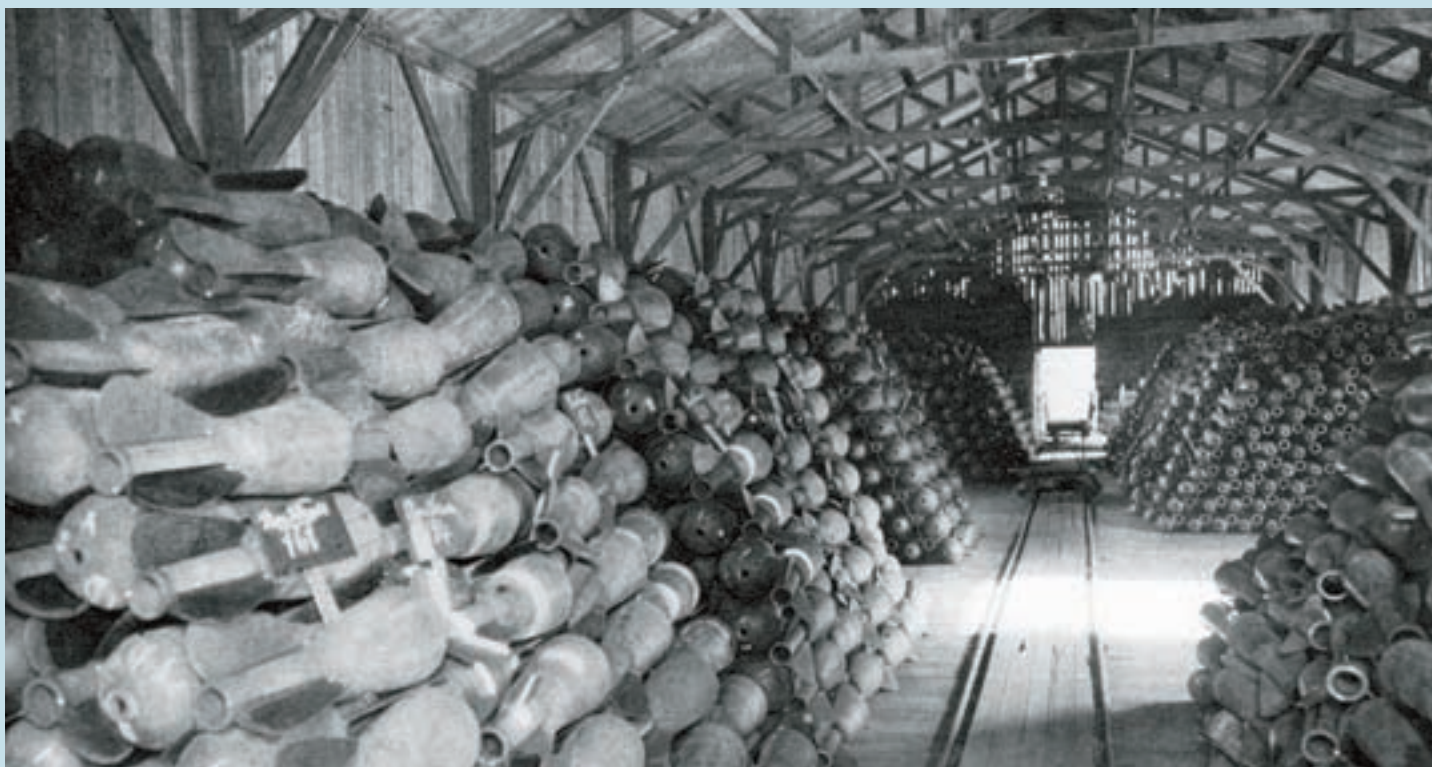
usually packed in (wooden) crates. So far it has been generally assumed that about one third of the dumped ammunition consists of chemical shells. However, there are indications suggesting that this share may be much bigger (see box).

A common misconception is that the majority of chemical shells contain mustard gas. Mustard gas (also called Yperite after the Third Battle of Ypres in 1917, where it was used for the first time) is only one of many chemical warfare agents from WWI. Other commonly used chemical warfare agents included chloropicrin, phosgene, diphosgene and (extremely toxic) arsenic compounds (so-called 'Clark') (see illustration on p.56). The ratio between these substances is unknown, but in all probability mustard gas shells do not exceed one third of the chemical munition on Paardenmarkt Bank.



■ The pentagonal area of prohibition (in red) of the ammunition dump site on Paardenmarkt Bank. Right: bathymetric chart of the area on the basis of soundings taken by the Flemish administration in 1996. Depth in metres MLLW (Mean Lowest Low Water level at Spring tide). The circle at the top-right corner shows the location of the Zeebrugge Oost dredgings dump site)

How many shells are there really?



■ An ammunition depot for storage of finned bombs for Van Deuren mortars. These weapons proved to be effective against German U-boats ("N'Oubliions Jamais" series of photos published by the army's photographic service after the war)



■ The dumping of ammunition at sea after WWI (ORO Nieuws Knokke-Heist)

There is still a great deal of uncertainty about the dumping operation at Paardenmarkt Bank. No reports or hard evidence has been available so far. The Belgian military archives (from the interwar period), which were located in Moscow until recently, may shed some light on the matter. However, the files of the *Commission Centrale de Récupération* included therein are not just very voluminous, the Soviets also created a lot of chaos in them. The perusal of these reports will take a lot of time. However, several documents that may provide new information have recently been found in the archives of the Marine Affairs Administration.

Large quantities of ammunition were left behind, often in railway stations, at the end of WWI. In 1919 the army's 'recuperation service' collected these war materials (German as well as British and Belgian ammunition) and stored them in ammunition depots across Belgium. Conventional (i.e. non-chemical) shells did not pose a problem; they could be set off in fields far away from inhabited areas in a controlled manner. At the same time, attempts were made to dismantle the ammunition; German prisoners of war were often used to perform this task. This was a very slow and hazardous process, in part due to an acute shortage of trained personnel. Meanwhile, there continued to be many casualties among the civilian population, mainly due to theft of iron and copper, and sabotage.

The chemical shells were a special case. The shells, estimated at hundreds of thousands and often made in Germany, could not be set off just like that, as the probability of release of highly toxic substances was too high. Burying them was not an option either because this was too risky in the long run. Dumping them at sea was initially considered too dangerous on account of the required transport, often through densely populated areas, and the risks of transshipment. However, the situation gradually became intolerable and the then Defence Minister Fulgence Masson opted for dumping at sea after all. Yet the Belgian navy did not have any suitable vessels at its disposal. The Marine Affairs Administration therefore looked for

usable transport vessels.

But where should they take the ammunition to? It seemed ideal to dump it in the deep waters of the Atlantic Ocean, but this was a long way off and therefore expensive. Furthermore, this would result in a temporary accumulation of chemical shells on the quay. It seemed a better idea to dump the shells on a sandbank at a short distance from the coast, preferably a "*banc absorbant*" (an absorbing sandbank), and the Marine Affairs Administration shared this view. At such a site, they reasoned, the shells would quickly sink and be buried in the silt. A batch of non-chemical shells of the Belgian army (stored in the central depot or *Grand Parc de Campagne*) had already been dumped on sandbanks off Gravelines. Eventually, Mr Urbain, head of the Hydrography department of the Marine Affairs Administration, designated Paardenmarkt Bank as the ideal site. The dumping operation could be carried out with relatively small vessels. This meant that no large quantities of toxic ammunition had to be stacked on the quay in the port of Zeebrugge.

Problems soon followed, however. By August 1919, the workers had realised the danger of transporting such a cargo and therefore demanded exorbitant wages. This threatened to delay the operation and the ministers wanted to prevent this, as the country had been struck by various large explosions the previous months. Entire trainloads of ammunition had exploded and people were frightened.



■ An image of the seabed off the Belgian coast (EOS N° 6, 2013, 'Duizend bommen en granaten')

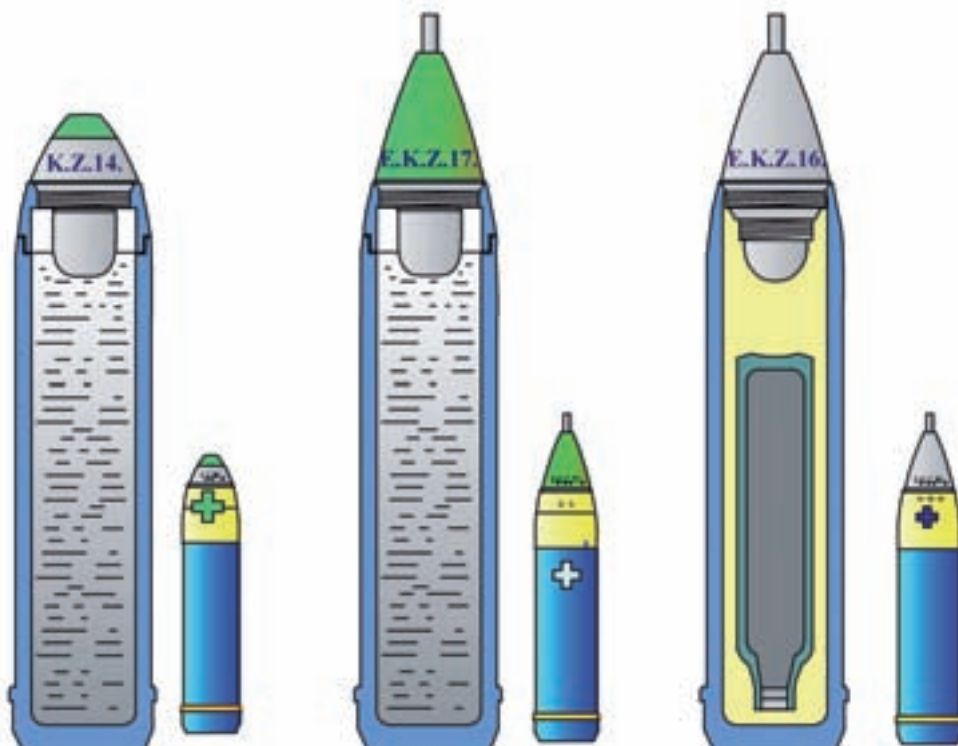
The dumping operation on Paardenmarkt Bank began on 22 October 1919. It was carried out by the Marine Affairs Administration in close cooperation with the Ministry of Defence. The operation progressed steadily without many incidents, except for a small boat whose cargo exploded at just five metres from the quay wall on 18 December. The vessel sank and one of the persons on board was killed. On 17 January 1920 it was announced that the operation was finished, much to the relief of the Marine Affairs Administration. Because many unexploded shells turned up afterwards, new boat trips were made to Paardenmarkt Bank from the end of March 1920 onwards.

To this day the exact quantity of dumped ammunition remains a matter for conjecture. The generally accepted estimate of 35,000 tonnes is based on a (non-contemporary) testimony. It was written down by the Navy in 1971 and states that a shipload of ammunition (approx 300 tonnes) was dumped every (working) day for 6 months. However, recently found documents of the Marine Affairs Administration do not mention a word about

this. The exact quantities mentioned in correspondence are very vague as well. Parliamentary reports and newspapers from 1919 and 1920 speak of 50,000 to 100,000 tonnes of abandoned war materials (in some cases up to 200,000 tonnes). How much of this ended up in the sea is unclear. It is therefore possible that (much) more ammunition was dumped.

It is also uncertain what share of this ammunition consists of chemical shells. The common estimate of one third chemical shells (and two thirds non-chemical ammunition) is based on production figures from WWI. But although chemical shells made up between a quarter and a third of the total amount of artillery ammunition produced in the last months of the war, it is likely that the ammunition was dumped selectively on Paardenmarkt Bank. This is confirmed by documents from the Marine Affairs Administration archives which expressly state that only chemical shells were dumped. If this is correct, the amount of chemical munition would be considerably larger.

However, a final remark as to the dumping operation is worthwhile. Newspaper reports from 1919 refer to previous dumping operation(s) carried out by the British admiralty in mid-1919. The ammunition in question is reported to have come from the British zone of the Yser front. The minutes of the parliamentary debates of 5 March 1919 refer to a report by the British authorities according to which over 16,000 tonnes of ammunition coming from some 20 stations was collected on 6 February 1919 and subsequently transferred to 1,600 goods wagons. Research in the British Public Office Records at Kew in 2002 indicates that these war materials were probably dumped in British waters. The quantity and the exact types of ammunition that were dumped are unknown.



GREEN CROSS
(chloropicrin, phosgene)

YELLOW CROSS
(mustard gas)

BLUE CROSS
(Clark)

■ Sectional view of German chemical shells from WWI. The shells were marked with a blue, green or yellow cross according to the chemical filling...



■ Belgian soldiers of the third army division at an observation post in 1918. They are carrying a newly designed gas mask which protects both the lungs and the eyes. ("N'Oubliions Jamais" series of photos published by the army's photographic service after the war)

The word poison gas is misleading in this case: most chemical agents are liquid or solid, and only exceptionally volatile. This is also true of mustard gas, which is a viscous liquid in pure form at normal temperatures. However, most chemical warfare agents will slowly evaporate when used and form the well-known 'gas cloud' that lingered in the trenches.

On average, the chemical filling is about one tenth of the total weight of a chemical shell, the remainder being for the most part the ammunition body. If we accept the conservative estimate of 35,000 tonnes of ammunition dumped on Paardenmarkt Bank, this would mean that at least 1,200 tonnes or possibly even 3,500 tonnes are chemical warfare agents. The dispersing explosives (e.g. TNT) are often highly toxic as well. They form a very small part of the chemical shell (typically a few hundred grams), but they can make up as much as one tenth of the total weight of the shell in case of conventional ammunition.

On or in the seabed

The ammunition found during the 1972 diving operations was located on or just below the seabed. These shells have been largely covered by a layer of sediment by now, as the current pattern has radically changed since the extension of the port of Zeebrugge in the late 1970s and early 1980s. This has resulted in significant sedimentation in the ammunition dump area. The proximity of the Zeebrugge Oost dredgings dump site may also have played a role. The amount of sediment deposited is largest in the southwest (up to 4 m) and decreases northwards. In addition, the new current pattern has created an erosion area northwest of the dump site. This erosion area seems to move slowly towards the east.

Recent topographical studies seem to indicate a stagnation in the sedimentation process. Between 1996 and 2003 the ammunition dump site was still largely subject to a sediment accumulation of 10 to 60 cm, about 850,000 m³ in total. Virtually no erosion occurred in this period, except in two small areas in the far southeast and northeast. Between 2003 and 2011, however, almost the entire dump site was subject to erosion, approx 612,000 m³ in total. Erosion was greatest in the central and the northeastern part (up to 60 cm); only the part of the ammunition dump site closest to land was subject to a small sediment accumulation (up to 20 cm) in this period. The net result over the 1996-2011 period is therefore a slight sediment increase in the southern part and slight erosion in the northern part (see map).

So far it is unclear what the evolution of the site will be over the coming years. It is possible that the ammunition dump site has achieved a new balance after the construction of the moles. In this case, the

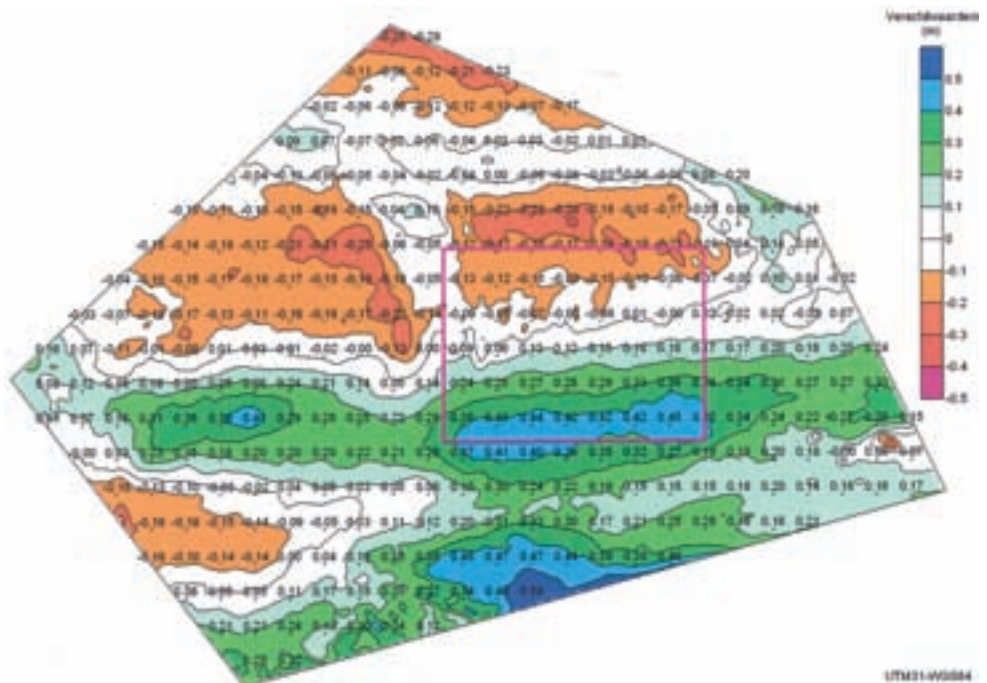
minor volumetric fluctuations of the last few years can be interpreted as periodical fluctuations around an equilibrium point. Seasonal factors may play a part in this process as well. On the other hand, it is possible that the erosion in the northern part and the sedimentation in the southern part will continue.

The current water depth of the ammunition dump site varies between 1 m and 5 m MLLWS (Mean Lowest Low Water level at Spring tide i.e. the zero line on nautical charts). Recent magnetic measurements indicate that most shells are covered by at least a couple of metres of sediment. The exact depth at which the shells are buried is difficult to determine with certainty, but according to provisional rough estimates they are buried at a depth of 2 to 6 metres below the seabed. The highest concentration of shells appears to be in the central part of the ammunition dump site. In 2012 sophisticated magnetic equipment was dragged just above the seabed to conduct a large-scale measurement campaign at the ammunition dump site. This should allow to sketch a highly detailed picture of the buried ammunition. This way, researchers hope to distinguish individual shells from clusters of ammunition.

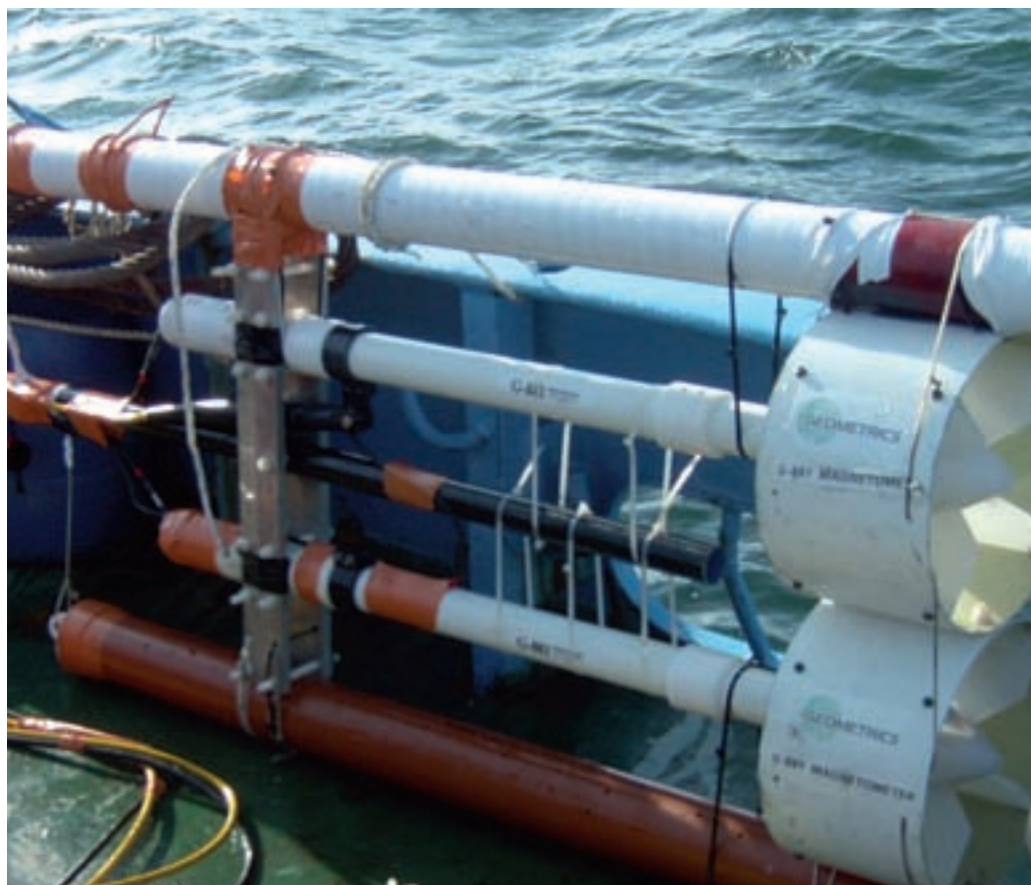
Slow corrosion

A number of shells were brought to the surface in 1972. The condition of the shells was “remarkably good” according to the reports written at the time. This may be explained by the occurrence of natural gas (methane) in the seabed, caused by the bacterial decomposition of organic matter. This creates a low-oxygen environment, which can slow down corrosion to a considerable extent. No ammunition has been brought to the surface since 1972, however, so the current state of the shells is unknown. Nevertheless, it seems plausible that the ammunition has not corroded very much at this moment.

Since the 1990s, sediment and water samples taken at numerous locations in the dump area have been examined on a regular basis (every 2 years on average). The samples are analysed for the presence of mustard gas, Clark, phosgene and their (equally toxic) degradation products as well as explosives (in particular TNT) and heavy metals. So far, only one sediment sample showed traces of contamination (a low concentration of mustard gas). Subsequent samples taken at the same location did not reveal any traces of mustard gas. However, prudence is called for when conclusions are drawn from these sampling campaigns. On the one hand, it is possible that there is no contamination of the seabed (yet) (the samples were taken at a depth of up to 50 cm). On the other, it is equally possible that the used detection limits were too high to detect extremely low toxic concentrations.



■ Topographical evolution of the ammunition dump site between 1996 and 2011. As can be clearly seen in the image, the southern part is characterised by slight sedimentation (blue and green areas) while slight erosion occurs in the northern part (orange and red areas). The red rectangle indicates the zone with the highest concentration of ammunition (Magelas)



■ Magnetometers that are used to image the ammunition below the seabed (Tine Missiaen)

Moreover, we should keep in mind that even slow corrosion cannot prevent the shells from leaking in the long run. When this will happen is unclear.

According to calculations, it could take hundreds or even thousands of years for all ammunition to corrode.



■ Shells from the First World War await identification in the West Flemish village of Poelkapelle (EOS N° 6, 2013, 'Duizend bommen en granaten')

(e.g. caused by anchors or fishing nets). Mustard gas seems to pose the biggest threat when it comes into direct contact with organisms.

The presence of large quantities of *TNT* and *heavy metals* (which do not break down) may constitute an additional environmental hazard. Because of the slow corrosion and the large degree of dilution, their concentration will in all probability be relatively low, although peak concentrations near the shell cannot be excluded.

Shipping disasters: a real threat to the dump site?

Thanks to the present sediment cover it is unlikely that shells will be washed ashore. Currently, the biggest threat seems to come from accidents, e.g. shipping disasters, as the ammunition dump site is located near one of the busiest ports of northwestern Europe, within a stone's throw of the principal shipping routes and numerous pipelines, and close to one of the largest LNG terminals.

On the face of it, it seems very unlikely that a large ship will run aground on Paardenmarkt Bank. Ships with a relatively deep draught (such as tankers and container ships) are likely to get stranded before they reach the ammunition dump site. Yet several ships have run ashore on the Belgian coast in stormy weather over the past decades. The most recent accident took place in November 2001, when a German container ship was stranded on the beach of Blankenberge (see image).

The possibility of ammunition exploding in case of a mechanical impact is small ($\leq 10\%$). However, there is a real risk that the ammunition will (continue to) burst open and that the contents will be released. As

What if the shells start to leak?

Corrosion of the shells will cause the chemical agents to be released only very slowly, so that the chemicals are very likely to get diluted. High concentrations are therefore only suspected in the immediate vicinity of the shell. Due to the large degree of dilution and the relatively quick hydrolysis (i.e. the decomposition of a chemical compound by reaction with water), most chemical agents will probably not pose much of a threat to the marine environment. There are two exceptions: Clark and mustard gas, which are both extremely toxic and break down only very slowly. Furthermore, their degradation products are often equally toxic as well.

Arsenic compounds (such as Clark) easily adsorb onto sediment particles, so that they may pose a threat to the animals and plants living on and in the seabed. Recent studies state that the release of Clark from a buried shell will probably lead to contamination of the sediment within a radius ranging from ± 0.5 m (after 10 years) to ± 1.5 m (after 100 years). The possibility of acute contamination of the water column is slim, but sediment pollution can occur over much greater distances due to soil erosion.

Mustard gas is characterised by extremely slow hydrolysis and can therefore remain active for a long period of time, up to several

decades or more. Studies indicate that the mustard gas will, to a large extent, remain inside the remnants of ammunition after the shell has corroded. This means the volume of contaminated sediment around a leaking shell will remain relatively small. Nevertheless, lumps of mustard gas can be released as a result of mechanical disruption



■ The German container ship *Heinrich Behrmann* was stranded on the beach of Blankenberge in November 2001. There is a real danger that such an accident could occur near Paardenmarkt Bank (VLIZ)

the ammunition comes from stocks, there is sufficient reason to assume that the detonator was deactivated. However, there is a possibility that relatively intact shells filled with (active) explosives will react under the pressure, which could result in an explosion. The current sediment cover in the ammunition dump site forms a natural protection, however, and will certainly limit a possible impact. Nevertheless, the North Sea Disaster Contingency Plan takes into account the special character of Paardenmarkt Bank.

Contaminated fish?

Arsenic compounds could well be the main source of contamination of fish directly linked to the ammunition dump site. Especially fish that feed on organisms living in or on the seabed (so-called *benthos*) are at risk from increased arsenic concentrations. The principal commercial fish species occurring in the Belgian littoral zone include flatfish (plaice, flounder, sole), brown shrimp and, to a lesser extent, whiting and cod. Marine benthic life in the eastern Belgian littoral zone has deteriorated partly as a result of chemical pollution of the Scheldt estuary.

Commercial fishing in the immediate vicinity of the ammunition dump site (fishing is still banned on the site itself) is for the most part limited to shrimping, usually by means of small boats, while larger vessels operate further offshore. In view of the recent sedimentation, the (supposedly) good condition of the shells and the relatively small contamination radius, the risk of contamination of fish or shrimp for human consumption seems to be minimal at present.

However, contamination is still possible in the future. Vigilance and regular inspections are therefore required.

Salvage does not seem a good idea

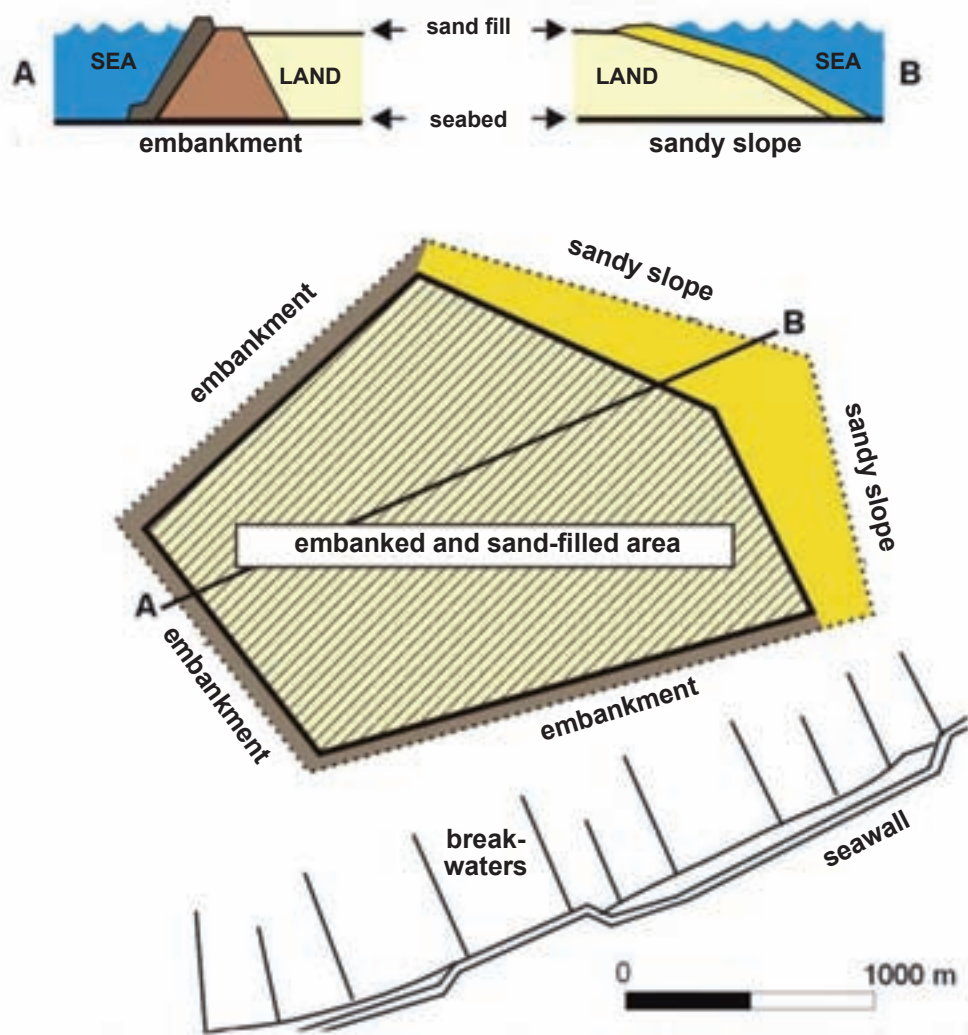
Salvaging the ammunition seems technically feasible, but it is a very costly and hazardous undertaking involving considerable risks both to personnel and the environment. The risk of uncontrolled quantities of harmful substances being released into the environment during the salvage operation is very high. Moreover, such an operation also requires specially adapted transport and storage facilities.

One of the principal concerns remains the dismantlement of the salvaged shells. The destruction of such a large quantity of ammunition requires a very extensive dismantling capacity. The current capacity of the dismantlement facility for chemical shells in Poelkapelle is very limited. Over 2600 chemical shells are currently awaiting dismantlement. Shells are still found in fields on a daily basis. Unless there is an acute risk, salvage of the ammunition therefore does not seem to be the best option. Theoretically speaking, it nonetheless remains the only option to resolve the matter once and for all.

Local containment

If there were indications that the ammunition would surface, e.g. due to erosion of (part of) the dump site, partial or complete containment of the site could be considered. In 2009 Ghent University conducted a feasibility study which revealed the three best options: (1) Locally depositing soil on the eroding area. This option has the major advantage of being relatively cheap, but it is not very sustainable since it requires regular maintenance. (2) Constructing a freestanding breakwater on the seaward side. This minimises the risk of a shipping disaster and is conducive to sedimentation of the dump site. A major disadvantage is that the exact behaviour of this sedimentation process is hard to predict; it is possible that the area between the dump site and the coast inadvertently silts up completely. (3) Creating an artificial island. This is a sustainable solution, but it is also very expensive.

The construction of an island does provide important opportunities such as nesting sites for terns, gulls and plovers as well as haul-out sites for seals. The current tern and gull populations in Zeebrugge are doomed to disappear as a result of the further development of the port, so a tern island on the dump site would ensure the survival of these birds in Belgium.



■ Possible civil engineering solution for covering the ammunition dump site with an artificial island. Three sides of the island are formed by an embankment, the other two sides are sandy slopes (Tine Missiaen)



■ The activity of a dredged up shell is checked.
(EOS N° 6, 2013, 'Duizend bommen en granaten')

However, we must bear in mind that locally depositing soil on the dump site or its conversion into an island will not solve the problem of leaking ammunition as such. Additional inspections will therefore still be needed.

Frequent monitoring is necessary

At the moment there seem to be no indications of immediate danger. Consequently, the best option is to let the ammunition dump site be. In view of the short distance to the coast and the shallow water depth, frequent monitoring of the area remains highly important. Measurement campaigns by means of multibeam echosounder (and if need be side-scan sonar) regularly take place to monitor the evolution of the seabed. This makes it possible to keep track of the erosion and accumulation process and detect objects on the sea floor.

However, chemical monitoring on the basis of regular sampling campaigns remains the most important method of detecting toxic contamination. This has taken place twice a year on average since the mid-1990s. Advanced analysis techniques are required to measure the expected low toxic concentrations during these operations. A new protocol has recently been developed abroad with regard to sample preparation, quantitative analysis and validation for detecting chemical warfare agents in and around ammunition dump sites at sea. Studies are under way to determine how this protocol can be optimally applied to Paardenmarkt Bank.

Despite the conducted (and ongoing) research, a lot of factors are still unknown. For instance, virtually nothing is known about the state of the ammunition. It is therefore

advisable to bring several shells to the surface. A thorough analysis of these shells combined with a numerical modelling of the corrosion should eventually provide a better insight into the state of the corrosion process and the consequences thereof in terms of the release of chemical warfare agents.

At present, very little is known about the spread of toxic substances in the water column as well. Detailed hydrodynamic research by means of numerical experiments is therefore required to model the movement of the released toxic substances under different circumstances (wind and wave characteristics, current, tide ...).

A thorough long-term strategy for the dump site is of vital importance, not just in order to manage the monitoring operations and achieve a fundamental understanding, but also to guarantee good communication. International studies such as the European MERCW (Modelling of Environmental Risks related to sea-dumped Chemical Weapons) project have shown that a manageable database and user-friendly visualisation play an important part. These make it possible to gain a clear insight into factors such as the depth at which the ammunition is located, changes in the terrain, the exact position of the ammunition, toxic concentration in sediment and water, and even possible risk scenarios. Such a database has not been developed yet for the Paardenmarkt site. This is problematic since such a database is essential for optimum monitoring and efficient future research. It allows us to tackle the problem in the best possible way, now and in the future.

Paardenmarkt Bank is one of the world's most studied chemical munition dump sites at sea. Scientists abroad are envious of this, and rightly so. But experience has taught that a transparent policy and openness to the public are also of crucial importance. This is the only way to remove the many uncertainties and doubts as to this matter and avoid exaggerated public panic.

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Belgian marine scientists during WWI

Ruth Pirlet

When the German forces occupied the Flemish coastal strip in October 1914, they went about it vigorously. In view of the exceptional strategic importance of this region as a base of operations for the battle on and over the North Sea, they installed a vast network of naval ports, artillery batteries, bunkers and airfields between the Yser front and the Dutch border. In addition, the area between the Yser and the border with France was the theatre of the Great War for four years. This situation not only disrupted the everyday lives of the local population greatly, but also resulted in the unemployment of the Belgian coastal and marine scientists. Prior to the war these scientists regularly set up camp on the Belgian coast, for example to examine the marine fauna and flora. The arrival of the German forces put a temporary stop to this activity and forced the scientists to reach out to new horizons. However, this forced exile did not halt all Belgian marine research. In spite of the difficult conditions, some researchers tried to continue their research in one way or another. This chapter does not only discuss marine research in times of war, but also life and work in occupied Belgium. These individuals were not only scientists, but also civilians in an occupied country who did not close their eyes to the events happening around them.

Belgian marine research on the eve of the Great War

Marine sciences were a largely unexplored scientific area in Belgium until halfway the 19th century. Without intending to discredit the work of some important predecessors, we dare say that Pierre-Joseph Van Beneden (1809-1894) heralded the real start of this type of research. Van Beneden was a zoology professor at the Catholic University of Leuven and showed interest in the sea and its residents already at an early stage in his career. For example, he was the first scientist to study marine fauna in the North Sea in a systematic manner. Within this scope he even established his own modest research lab in Ostend in 1843: the “Laboratoire des Dunes” (Dune Laboratory). This first marine research station in the world (!) was an ideal base of



■ *Pierre-Joseph Van Beneden's 'Laboratoire des Dunes' was set up in the buildings of the Valcke - De Knuyt oyster farm, the company of his parents-in-law, situated to the east of Ostend's harbour channel. The proximity of the sea and the constant supply of living research material ensured that the oyster farm was a perfect location for marine biological research (Bibliothèque National de France)*

operations for Van Beneden's expeditions at sea. Edouard Van Beneden (1846-1910), son of Pierre-Joseph and zoology professor at the University of Liège, also frequented his father's private research station. From this location he initiated numerous students into the research of underwater life.

The marine research field gained momentum in the 1870s. Marine research stations emerged at countless locations along the European coastline, while pioneering scientific ocean expeditions produced a wealth of new data. The era of modern marine research had begun. However, the Belgian authorities refused to invest in this new discipline. The foundation of a marine laboratory financed by the State appeared to be a major obstacle. Only years after the First World War would such a public body come into existence with the establishment of the *Zeewetenschappelijk Instituut / Institut d'Etudes Maritimes* (Institute for Marine Sciences - ZWI). The unwillingness of the Belgian authorities to invest in adequate research infrastructure and to provide appropriate funding

contrasted sharply with the enthusiasm of the Belgian scientific world towards these marine studies. Researchers soon went to foreign marine laboratories to gain experience and assisted with several international oceanographic expeditions. When the '*International Council for the Exploration of the Sea*', a cross-border cooperation aimed at gaining better insights into the decreasing fish stocks and the marine environment, was launched in 1902, the Belgian scientists were among the first who expressed their willingness to participate.

This means that at the turn of the century, Belgium boasted a meritorious and respected team of marine and coastal researchers who explored both the Belgian waters and the seas and ocean further away. A large part of them furthermore owed a great deal to father and son Van Beneden, who had managed to turn marine studies into an essential component of scientific life in Belgium. Zoologists Paul Pelseneer (1863-1945), Auguste Lameere (1864-1942) and



■ The entire Van Beneden family around 1868, with Pierre-Joseph on the far left and Edouard on the right. Both played a crucial role in the development of marine studies into a fully fledged research discipline in Belgium (De Bont, *Evolutionary morphology in Belgium: The fortunes of the "Van Beneden School"*, 2008)

Gustave Gilson (1859-1944), biologists Julius Mac Leod (1857-1919) and Alphonse Meunier (1857-1918), oceanographer Desire Damas (1877-1959), geologist Alphonse Renard (1842-1903), doctors Charles Van Bambeke (1829-1918) and Louis Stappers (1883-1916) and botanist Jean Massart (1865-1925) fell in with this research tradition. The Belgian part of the North Sea was therefore the setting of numerous and diverse scientific activities on the eve of the First World War. All these activities came to a halt when the Germans invaded.

Belgian marine scientists during WWI

The unfortunates

The research possibilities for Belgian scientists in general were severely restricted from 1914 onwards. The universities closed their doors and numerous research labs, facilities and libraries were occupied, destroyed or plundered. Marine biologists were furthermore cut off from their main research environment, as working at sea had become overly dangerous. The German occupation even heralded the final departure of a number of scientists from the Belgian coast: Charles Van Bambeke and Alphonse Meunier, both passionate marine researchers, died without experiencing the liberation of their homeland. The war also ended disastrously for Louis Stappers, a marine scientist employed by the Royal Museum of Natural History in Brussels. This zoologist also had a degree in medicine and decided to use his medical knowledge at the front. However, the unhealthy conditions

behind the trenches soon affected his health. Stappers died on 30 December 1916 in the military hospital of Calais.

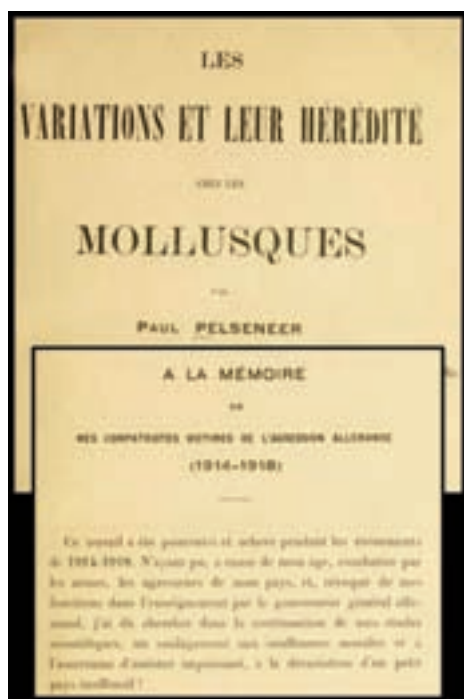
Refuge in work

Other marine scientists were more fortunate in this regard: they survived the war and even managed to continue their marine research in some cases. In spite of the many restrictions, Belgian marine research did not come to a full stop. Several scientists looked for something to hold on to in their research during the war. Paul Pelseneer, who focused on the study of molluscs, lost a lot of certainties in his life

at the start of the conflict: he was fired as a botany and chemistry teacher at the Teachers' College of Ghent and had a hard time getting used to the occupation, partly because he was unable to continue his usual trips to the North Sea. He therefore looked for solace in his scientific work, which Pelseneer said served to '*relieve the mental pain, bitterness and helplessness*' caused by the war. Using stacks of earlier notes, rough drafts and materials from his own collections, Pelseneer continued his studies on the anatomy and living environment of molluscs from his residence in Ghent. He wrote down the results in '*Les variations et leur hérédité chez les Mollusques*' (1920), a 826-page tome which discusses over 400 species of molluscs in great detail. The war nevertheless left marks in the publication, as Pelseneer dedicated his book to all "*compatriots, victims of German aggression [...] and to those who fell while defending the things I care most about: my country, my ideas, my hope.*"



■ Left: Charles Van Bambeke (1829-1918), top: Alphonse Meunier (1857-1918) and right: Louis Stappers (1883-1916) were part of the group of unfortunates who did not live to see the end of the hostilities. Gustave Gilson described the premature death of Stappers at barely 33 years of age as a heavy blow to Belgian marine research (left: Ugent Memoires, top: Hegh, E. (1920). *Nécrologie: M. l'abbé Alphonse Meunier* Revue Générale Agronomique, right: Hasselt Municipal Archives).



■ Pelseeneer dedicated his work 'Les variations et leur hérédité chez les Mollusques' to all compatriots who had not survived the battle against the German aggressor. (Pelseeneer, P. (1920). *Les variations et leur hérédité chez les mollusques* Mém. de l'Acad. Roy. de Belg.)

Gilson and his silent resistance

It may not come as a surprise that people like Pelseeneer took refuge in their research. After all, scientists already had a reputation for being unworldly and living in an ivory tower. Yet this is not entirely true in the case of the Belgian marine scientists. Although several of them were trying to continue their studies, they did not turn a blind eye to the problems tormenting the country. Gustave Gilson is perhaps the best example of this. Before the war broke out, he was one of the most active researchers of the Belgian marine area. In 1894 Gilson took the chair in zoology at the Catholic University of Leuven, and four years later he also went to work as a researcher at the Royal Museum of Natural History. In this period he began extensive studies of the relationship between marine animals and plants, and the environment of the *Mer Flamande* (the Southern Bight of the North Sea). When Gilson became head of the Royal Museum of Natural History in 1909, he immediately shifted this research in a higher gear. He bought a small boat for marine research and established a small marine laboratory in Ostend without any support from the government.

When the war put an end to all this, he needed to direct his focus somewhere else as of 1914. He spent most of the next four years in the research rooms of the Royal Museum of Natural History. Together with his colleagues, he engaged in preparing, cleaning, sorting and studying collections that had been brought back during previous explorations and were kept in the warehouses.



■ Top: Gustave Gilson (second from left) at work at sea. Bottom: Shortly before the outbreak of World War I, Gilson set up a laboratory in a building near the oyster farm 'Stichert-Stracke & Cie' to further examine the samples taken on his sea expeditions. (Gilson, G. (1914). *Le Musée Royal d'Histoire Naturelle, sa mission, son organisation, ses droits*. Mémoires du Musée Royal d'Histoire Naturelle de Belgique)

As curator of the Royal Museum of Natural History, Gilson not only performed scientific work but also had to address the administrative challenges brought by the war. Like almost all museums in Belgium, the institution was under German control as from the end of 1914. Although curators usually adopted a very reluctant attitude towards the German demands, they were forced to tolerate the German interference for fear of reprisals. Moreover, many of them remained at their post on moral considerations: someone had to take care of the national heritage. This consideration led Gilson to fight a silent battle with the occupying forces

as from 1915. A particular expression of this fight was the so-called 'dinosaur issue' (see box).



■ Massart's anti-German writings confronted the enemy in two ways. In the first place he wanted to demonstrate the brutality of the occupying forces on the basis of their own posters and propaganda products. For example, the above picture of Aarschot was part of a series of triumphant German postcards displaying several Belgian cities that had been burnt to the ground. Contrasting with this barbarity, Massart highlighted the brave and unrelenting attitude of the Belgian people. He did so by displaying the work of various clandestine newspapers. Above: the front page of 'Patrie', 'journal non censuré paraissant comme, où et quand il peut.' (left: Massart, J. (1916). Comment les belges résistent à la domination allemande: contribution au livre des douleurs de la Belgique, right: Massart, J. (1917). La presse clandestine dans la Belgique occupée)

Exile to France

While Gilson fought the German interference within the limits of his professional activities, botanist Jean Massart opted for a more frontal approach. Shortly before the war, Massart had engaged in mapping the different plant communities in Belgium. Within this scope, he had also explored the landscape of the coastal plain. During this activity, he was not only interested in systematically listing all species. He also made a careful analysis of the environmental conditions to which the coastal and alluvial flora had to adapt. A few months after the start of hostilities, Massart suspended all his botanical studies because he believed *"there was no time to lose yourself in speculations of pure science when the entire world's political geography was at risk."* In the subsequent time, Massart especially devoted himself to writing and distributing all kinds of anti-German propaganda. He started from a scientific attitude: he wanted to demonstrate the brutality of the occupying forces on the one hand and the moral superiority of the Belgian people on the other as objectively as possible. In practice this meant that Massart secretly assembled a collection of photographs of German posters and announcements lining the walls of the Belgian capital. He also collected books and newspapers from Germany as well as Belgian newspapers that were censored by the German occupying forces. Massart furthermore obtained information about

the Belgian resistance through active correspondence with the front and with the clandestine press. In this way, he amassed more than enough proof to give a precise impression of the *"state of mind of a Belgian who lived under German domination"*.

However, his illegal activities did not pass unnoticed by the German forces, who kept an increasingly close eye on Massart's family. In early 1915 the situation became too risky, so Massart was forced to flee the country. His children had been able to leave the country for the Netherlands under the pretext of health problems, but things were not so easy for Massart and his wife. After several failed attempts they eventually succeeded in crossing the border with the Netherlands near Bree in the province of Limburg on 15 August under disguise and with the cooperation of an obliging customs officer. They then moved on to Amsterdam, where they were reunited with their children. The valuable collection of information was also smuggled into the Netherlands by means of a suitcase with clothes for Belgian refugees. The whole family soon moved on to England and eventually ended up in the coastal municipality of Antibes in the south of France in autumn 1915.

Once he had settled down in this new location, Massart immediately started editing various pamphlets to boost the morale of the Belgian people and the troops. He also formulated an answer to the notorious 'Manifesto of the Ninety-Three', a proclamation issued in 1914 in which 93

renowned German scientists and artists legitimised the German invasion in Belgium in the name of spreading the superior German culture. The document met with a storm of indignation in foreign scientific and cultural circles. Massart was also furious, but he assumed that the German intellectuals were simply carried away by the wave of chauvinism that accompanied the beginning of the war. He therefore invited them, together with Swiss botanist Robert Chodat, to meet in Geneva to discuss the whole issue in a neutral atmosphere. Unfortunately, the initiative met with little success: only 2 of the 93 German scholars responded to the invitation, and both of them negatively. In *'Les intellectuels allemands et la recherche de la vérité'* (1918), Massart mercilessly condemned the lack of critical sense of these figures. The proceeds from the sale of all anti-German printed matter were used to finance several initiatives on behalf of the Belgian people, such as the *'Asiles des soldats invalides belges'*. This organisation collected funds for the establishment of homes for disabled Belgian soldiers. Interesting detail: Massart donated the manuscript of his war diary to the War Archives Committee after the war. It can be found in the General State Archives nowadays.

Jean Massart also spent his days giving English lessons at a French grammar school and teaching a number of courses at the Paris-based Muséum national d'Histoire naturelle. And even though he had argued at the beginning of the war that the time was not right to engage in science, he soon appeared in a laboratory again. He had found accommodation in Antibes in the vicinity of 'Villa Thuret', a research institution with a famous botanical garden. It is here that Massart was able to devote himself to a thorough study of Mediterranean coastal flora and other topics. He was especially interested in how the specific climatic conditions in this sunny region influenced the growth of plants which also occurred at the Belgian coast.

Massart was not the only Belgian coastal and marine scientist who spent the war in France. August Lameere and Marc de Selys Longchamps also awaited the end of the conflict in this country. In the summer of 1914 both biologists embarked on a short working trip to the *Station Biologique de Roscoff* in Brittany together with their families. The outbreak of military operations in Europe prevented them from returning to Belgium, as a result of which this holiday resulted in a 'four-year exile', to put it in their own words.



■ The notorious 'Manifesto of the Ninety-Three', originally entitled 'Aufruf an die Kulturwelt', was published on 4 October 1914 in Germany. The document was signed by 93 famous German Nobel prize laureates, artists, doctors, physicists, chemists, theologians, philosophers, poets and architects. The manifesto extenuates, among other things, the war crimes committed by Germany in Belgium, which provoked a storm of indignation abroad (Archiv der Berlin-Brandenburgischen Akademie der Wissenschaften)

The dinosaur issue

In 1878 a coal mine in Bernissart (Hainaut) was the setting of one of the most spectacular finds of dinosaur skeletons in the whole of Europe. At a depth of 322 metres, mine workers found the petrified bones of an Iguanodon, a plant-eating dinosaur species that walked the earth over 125 million years ago. A team of mine workers, technicians and specialists of the Royal Museum of Natural History managed to bring some 30 Iguanodons to the surface, including a large number of complete skeletons. When the excavations were temporarily suspended in 1883 due to practical and financial reasons, it was clear that many more treasures remained buried under the ground. For a long time there were no specific plans for new excavation works. This changed when the Germans invaded Belgium in 1914. A group of German palaeontologists, led by Otto Jaekel from the University of Greifswald, saw the occupation as a great opportunity to get hold of these treasures. The German scientists also managed to convince Berlin of the importance of the fossils, and in July 1915 the German government decided to resume the excavations. The researchers of the Royal Museum of Natural History were appointed as experienced experts to support the entire operation. Gilson, who was little inclined to enter into any form of cooperation with the Germans, tried to prevent this 'detestable theft' of valuable Belgian archaeological heritage from the very beginning. He did nevertheless realise it was unwise to refuse categorically. Gilson explained his strategy in a post-war report: instead of refusing all cooperation, he decided to hinder the excavations "through inertia and slowness of action. [...] We started to behave in a completely passive way by avoiding any contact with the Germans and refraining from doing any work." This approach initially seemed to work, as the project remained in a purely hypothetical stage for quite a long time. In May 1916 Jaekel was fed up with it and ordered the construction of a first access tunnel which was supposed to lead to the dinosaur skeletons. The works on this tunnel started two months later. Gilson and his employees had to abandon their strategy of general passivity, but this did not mean they gave up just like that. The new plan was a subtle combination of pump system sabotage, controlled collapses and small-scale staff strikes. This enabled them to put the excavations on a back burner. So little progress had been made by 1918 that the German government felt compelled to strike out hard: the place where the Iguanodons had been found had to be accessible within six months. The end of the war eventually came right in time. The proposed six-month period had not yet expired when the Germans were eventually forced to sound the retreat. Prior to their retreat they flooded the tunnels that had already been dug so as to strongly hamper possible future excavations. After the war Gilson argued in favour of continuing the excavations to ensure that "the fight against the looting of the treasures of Bernissart had not been in vain." However, resuming the project appeared to be too expensive and not much of a priority, as a result of which Gilson had to give up on the plan with a heavy heart.



■ The impressive skeleton of an Iguanodon found in Bernissart, as currently on display in the museum of the Royal Belgian Institute of Natural Sciences (Paul Hermans)



■ A picture of 'Villa Thuret' around 1924. The famous botanical garden was laid out in 1857 by French botanist Gustave Thuret and provided Massart with ample research materials during his exile in France (*'Histoire des jardins des Alpes-Maritimes: du jardin exotique au jardin méditerranéen'*).



■ Lameere had settled in this 'Station Biologique de Roscoff' in the summer of 1914 to observe *Dicyemida* when the outbreak of World War I prevented a possible return to Belgium. In the following years Lameere was able to continue his research in Roscoff, at the 'Laboratoire d'Evolution des Etres', which is affiliated with the Sorbonne, and in 'Villa Thuret' in Antibes. His work on these parasites earned him the 'Decennial Award for Zoological Sciences' in 1922 (Guesnier, V.).

Both Lameere and de Selys Longchamps continued their research at various French institutions during this period. In the winter months they regularly visited Antibes, where they joined their colleague and friend Massart in 'Villa Thuret'. The Armistice of 11 November 1918 ensured that these Belgian families could at last return home.

After WWI

The war had not been a complete waste of time for the Belgian marine researchers. Pelseneer wrote an impressive work on molluscs, Massart performed a comparative study on coastal flora in various climatic regions and de Selys Longchamps continued his research on tunicates and plankton. Lameere in turn used his time in France to thoroughly study *Dicyemida*, tiny worm-like parasites that live in the organs of cephalopods. His publication on the subject even won the 'Decennial Award for Zoological Sciences', the highest Belgian award within his area of expertise, in 1922. The predominant feeling among the marine scientists was nevertheless that they had been limited in their research possibilities

for four years. Furthermore, not all marine scientists had had the opportunity to continue their studies during the war, so they were very eager to get back to work in and around the Belgian part of the North Sea in total freedom after 1918.

However, the coastal region they found after 1918 was no longer the same as the one they had known before the outbreak of the worldwide conflict. Jean Massart was for example confronted with significant environmental damage caused by the strategic flooding of the Yser plain around Nieuwpoort. The brackish seawater had brought about a significant increase in the salt content of the soil, which obviously had repercussions on the vegetation in this landscape. Massart had extensively mapped the Belgian coastal flora before the war, and now he could return to observe and describe the transformations. To conduct this investigation in a thorough matter, he temporarily installed an improvised laboratory in Nieuwpoort, from which he studied soil reclamation in the former front zone.

The material damage inflicted on the Belgian coast by the Great War also slowed down the resumption of marine research activities. The only Belgian marine station, installed by Gilson in Ostend shortly before WWI, was severely damaged during the war. The vessel which Gilson had used for his explorations at sea had been destroyed. As there were no funds available to repair the research station, Gilson and his colleagues were strongly limited in their research capabilities. In addition, the 'International Council for the Exploration of the Sea' (ICES) decided to resume work in March 1920. Partly because of a lack of appropriate research infrastructure, Belgium was unable to participate in this intergovernmental science organisation.

This was reason enough for Gilson to resume his pre-war campaign to have a publicly financed modern research station set up in Belgium. "Only the establishment of a permanent organisation by the sea can meet the needs that result from the continuous study of the marine environment," said Gilson. However, it appeared quite difficult to establish such an institute in a country recently ravaged by war. The Belgian state was not immediately able to donate large amounts of money to science. After years of diplomatic manoeuvring, Gilson eventually succeeded in convincing the government: 1927 saw the establishment of the Institute of Marine Sciences (ZWI) in Ostend.



■ The inundation of the Yser plain near Nieuwpoort did not only affect the flooded farmland, but also the natural vegetation in the area. The above picture of the flooding between Nieuwpoort and Ramskapelle shows trees that have fallen victim to the salty sea water. Upon termination of the hostilities, only a few green branches remained in the area according to Massart. The results of his post-war study into the effect of the increased salt content of the soil on the local flora were published in 'La Biologie des Inondations de l'Yser' (1922) (Massart, J. (1919). *Ce qu'il faut voir sur les champs de bataille et dans les villes détruites de Belgique: II. Le front de Flandre*)

The institute only had limited means and Gilson was its first director. The organisation focused on offshore fishing research, inventory of fauna and flora in the Belgian coastal waters and statistical offshore fishing inspections. ZWI's modest facilities represented the only marine research site at the Belgian coast for many years. The building was razed to the ground during the Second World War, after which a new reconstruction process began. Only in the 1970s did a new generation of marine and coastal scientists succeed in launching marine research in Belgium.

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■ An article from the 'Journal de la Côte' of 19 November 1927 discusses the new Institute for Marine Sciences in Ostend (*Journal de la Côte*)

Belgian 'power' at sea?

Luc Vandeweyer

During the First World War, Germany reduced Belgium to beggary and inflicted serious damage to the latter at sea as well. Belgium lost 44 ships or – expressed in tonnage – 35.5 % of its merchant fleet. Nearly 300 sailors or 19% of Belgian seamen perished, a percentage which even exceeds that of soldiers killed at the front. These staggeringly high losses also had a great strategic impact, as they threatened the reinforcement of the forces at the Yser front and the capacity to transport sufficient food to the people in need in occupied Belgium. Did Belgium take action to counter the progressive destruction of its merchant fleet? Yes it did! Despite the need to reinforce the army at the river Yser as much as possible, the military commanders also sent troops into battle at sea, even though this was not easy, as the Belgian army did not have a maritime tradition nor any warships. For generations, Belgium had believed in a land strategy based on the defence of a 'national stronghold', in particular the fortified city of Antwerp. The core of the Belgian state had to survive an enemy invasion within this heavily defended belt of fortifications until the superpowers would oust the enemy. This did not mean the Belgian army would 'stay out of the water'. After all, the Scheldt river split the Antwerp fortifications in two and the engineers had to construct pontoon bridges to allow the supply and movement of troops in case of a siege. It was therefore imperative for the Belgian army to control this broad river at any cost. The North Sea was quite different from the Scheldt river, however...

The Belgian government goes to sea

Traditionally, the Belgian shipping industry did not play a significant part in this strategy. Belgium was nevertheless obliged to pay some attention to its small surface area of territorial waters, as armed neutrality had been imposed on the country in 1839. This meant it had to defend its borders militarily in case of aggression. But for several decades it turned out to be unfeasible to deploy vessels that were capable of fending off attacks by intruding warships. The main armament was the naval



■ In the build-up to the First World War, Belgium did not have a Navy nor any vessels that could be effectively deployed against intruding warships. It did have fishery protection vessels such as this ship, *Ville d'Anvers*, that could help settle conflicts at sea in addition to performing fishery-related duties (VLIZ Collection)

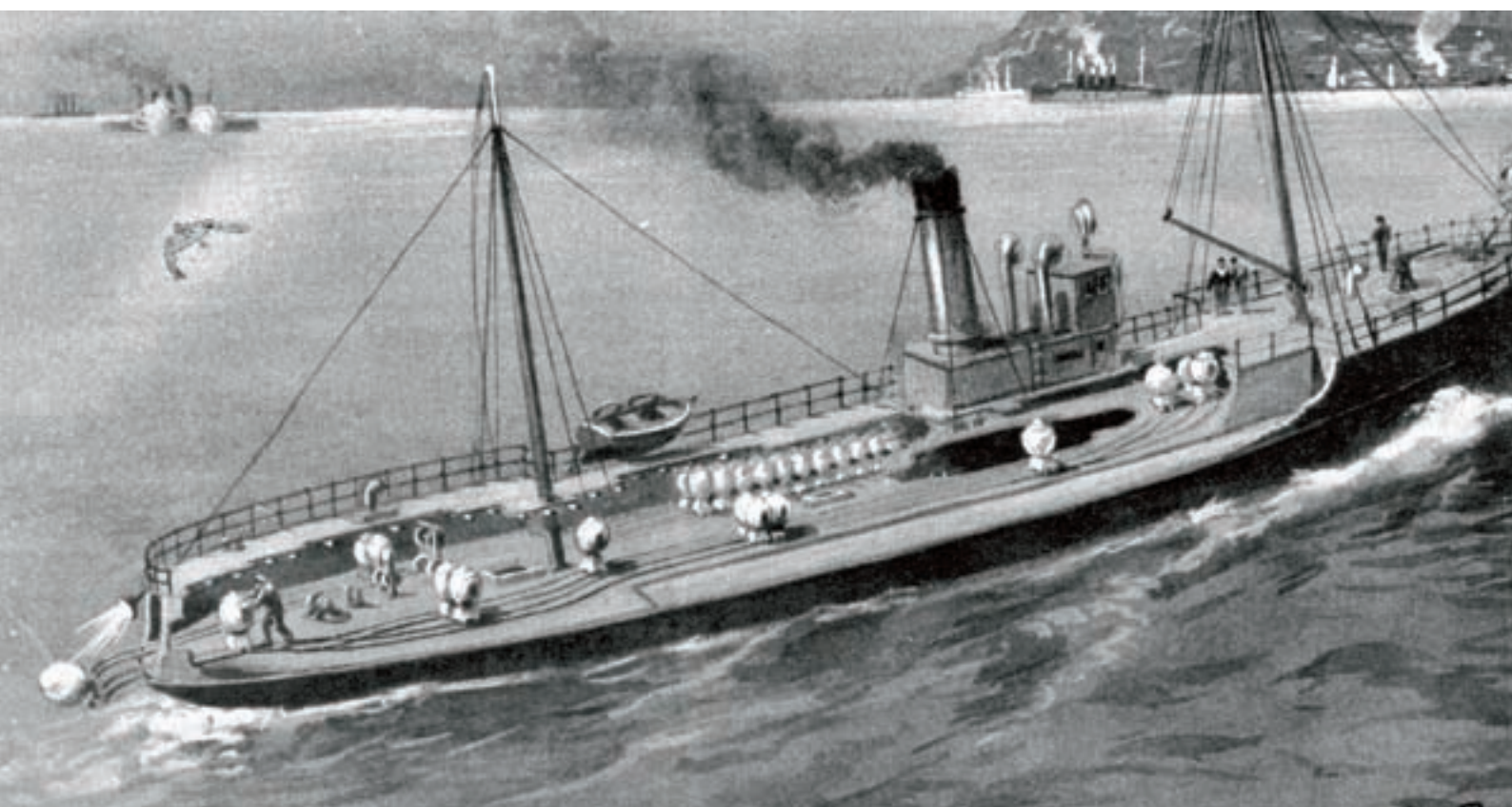
gun, and a small country like Belgium could not afford to keep up with the developments in artillery on ironclads.

Belgium did have fishery protection vessels to maintain authority at sea as well as to exercise certain police powers in accordance with the law of 6 January 1884 and the agreements made with the neighbouring countries. These ships were charged with the duty of monitoring the fisheries activities as well as settling conflicts and giving assistance to fishermen in distress. One of these fishery protection vessels was *Ville d'Anvers* (launched in 1886), a so-called "aviso". These small but fast boats, equipped with sails as well as an engine, were also used to train both merchant marine and naval officers. One of them, Count de Borchgrave d'Altena, opted to continue his training as a naval officer. The Belgian government asked the French navy to enable him to gain practical experience on one of its warships. Although he was able to acquire experience in France for eleven and a half years, this did not result in an independent Belgian navy.

Yet change was in the air. The technical development of the "torpille" (basically a floating bomb) into the (self-propelled) "torpedo" posed a serious threat to vessels, including the most heavily armoured warships. Floating naval mines also constituted a considerable hazard to ships. Furthermore, these weapons could be deployed by relatively small ships. This meant the end of the period of maritime powerlessness.

On the eve of WWI, Belgium had no navy but it did have a civil administration with maritime competences. The Marine Affairs Administration was not just responsible for the fishery protection vessels but also for the pilot boats and state packet boats of the Ostend-Dover line. By now, the Marine Affairs Administration had recognised the growing threat of war in Europe.

Still they did not consider the expansion of naval capacity, since the Second International Peace Conference held at The Hague in 1907 had extended the laws of war in an attempt to restrict the use of force as much as possible and ensure the safety



■ This German drawing shows how naval mines were laid to block ports (*Die Wochenschau*, 1915)

of civilian vessels (including the merchant fleet). However, the 1907 Hague Convention would not defuse the growing international crisis nor solve the problem of how to protect the Belgian coast.

Armed forces at sea?

Taking a stand against foreign warships

The 1907 Hague Convention made it legally possible to arm merchant ships and convert them into so-called “auxiliary cruisers”, on condition that the crew was uniformed and subject to military discipline. This meant that Belgium would be able to maintain its armed neutrality at sea at low cost and in the relatively short term. This was quite a relief for the government, which absolutely wanted to keep out of a war, and to do so it needed to uphold Belgian neutrality at all costs.

The Marine Affairs Administration did not stand by idly either. Engineer A. Pierrard, senior official at the Marine Affairs Administration, stated in a report dated 25 October 1910 that the state packet boats could be armed with guns. He also proposed to replace the existing fishery protection vessels with ships that had military capabilities. The acquisition of ships and their conversion into minelayers could also be considered. Only through such means would Belgium be able to take a stand against the intrusion of foreign warships in its territorial waters and, if need be, take



■ Charles de Broqueville (*Wikipedia*)

action. This intrusion of foreign warships was a real problem. In the summer of 1913, for instance, French submarines and torpedo boats entered the Belgian national waters several times. The departments concerned in Brussels communicated extensively on that matter. But Belgium did not have any armed ships yet, so all the authorities could do was protest. This created the risk that foreign powers could seize the opportunity to accuse Belgium of not being neutral in reality. In

other words, it could provoke an invasion. That something had to be done was beyond dispute.

Plans of De Borchgrave and De Broqueville nipped in the bud

Since 1909 Belgium had systematically expanded its military force. Catholic politician Charles de Broqueville played a crucial part in this. To get his arms programme accepted, which was highly controversial including in his own party, he combined the role of Prime Minister and Minister of War. He succeeded in considerably extending conscription and thus expanded the land forces significantly. But what about the naval forces? These did not come to the attention of the government until 1913, when the Prime Minister first saw the Pierrard report, three years after it had been drawn up. The threat of war had now increased even further. Could newly-built fishery protection vessels be converted into torpedo boats as a last resort? This was certainly technically feasible, as the French navy had already proved. In addition, two state packet boats could be equipped to serve as minelayers. This would allow Belgium to block the entrance to the coastal ports of Ostend and Zeebrugge. Such an act would send out a powerful message.

The Prime Minister definitely wanted to do something. On 22 May 1914 he dispatched a remarkable report to head of state King Albert I. Its contents were not very reassuring. Belgium had to face the possibility of an enemy landing at the coastal



■ Ostend packet boat *La Flandre* was moored in the harbour of Ostend when the Germans arrived on 15 October (14/18 *op Zee, Belgische schepen en zeelui tijdens de Grote Oorlog*, Freddy Philips)

ports. Moreover, Zeebrugge was important for ensuring the country's supply in the long run, as the neutral Netherlands could close off the river Scheldt. Belgium therefore had to expand its defensive capabilities. In the meantime, De Borchgrave d'Altena had used his maritime knowledge to reinforce the fortifications around Antwerp, but he had more to offer. De Broqueville suggested to the King that a real navy should be

established which would be able to defend not just the Scheldt but also and particularly the North Sea coast. De Borchgrave could be put in command. Yet reality soon caught up with this proposal, launched at the end of May 1914. War was imminent. In early July, the senior officials of the Marine Affairs Administration were informed of the plan to take the best state-owned ships in Antwerp and the coastal ports to safety to

protect them from being commandeered by warring navies. Additional fuel reserves were also built up. The Belgian army started to mobilise openly at the end of July. It was to no avail. The Germans presented an ultimatum on 2 August, which was resolutely rejected by the Belgian government.

An enemy invasion from the east

Stronghold Antwerp

Now it was all hands on deck. Engineers started to build pontoon bridges across the Scheldt, which required vessels. The fortification's garrison included *pontoniers* (pontoon bridge builders) but since April 1903 a *compagnie de torpilleurs et d'artificiers* (torpedo and explosives expert company) had also been available to defend the Scheldt with their artillery and mines. These torpedo and explosives experts had a few small boats with light guns at their disposal. When the German invasion began on 4 August 1914, the Belgian government ensured that part of the Marine Affairs Administration moved to the fortified city of Antwerp. They were still concerned about the coast as the maritime plans had not yet been implemented. De Borggrave had been appointed *commandant de la surveillance côtière* (coastal surveillance commander), but he did not have any means at his disposal, so Belgium continued to depend on foreign support. This became clear when the government enlisted the help of the British



■ The pontoon bridge across the Scheldt in Antwerp in 1914 (Antwerp City Archives)

to defend the Ostend-Dover line after one of the packet boats noticed a “torpille” and was forced to turn around on 6 August. Such explosives could also enter the Scheldt river, carried by the incoming tide. The British government replied that their admiralty could not promise to send a warship to deactivate “torpilles”.

The German invasion force did not attack the fortified city of Antwerp until several weeks after the invasion. When the German artillery systematically eliminated the belt of fortifications in late September, Antwerp soon turned out to be indefensible. On 6 October the King decided to send the bulk of the army to the coast. The pontoon bridges across the Scheldt had more than proved their usefulness by now. Now they had to be destroyed.

The Belgian retreat

The objective was to create a base around the ports of Ostend and Zeebrugge so that the army could regroup. This suddenly highlighted the strategic value of the Belgian coastal ports. But the German pressure was too great. The Belgian army therefore marched on towards the French border, but they failed to destroy the harbour facilities. Eventually, the greater part of the Belgian coast fell into the hands of the enemy. The German advance was only halted in the Yser plain in the second half of October, partly thanks to the rising water.

The Belgian government retreated to the French coastal city of Le Havre. They were joined by a few senior officials from the Marine Affairs Administration, including A. Pierrard. They had a lot of work to do as the Belgian merchant fleet had for the most part escaped from the Germans and numerous fishing vessels were moored in French, Dutch or British ports. As a result, Belgium still had the means to contribute to the war effort against the invading force at sea. However, Belgium waited a long time before it really began to deploy merchant and fishing ships in the war. The decree-law of 2 February 1916 finally regulated the commandeering of ships.

In the meantime, the German navy had bared its teeth. On 12 December 1916, Mr Pierrard informed the minister that 16 Belgian ships had been sunk. It goes without saying that the protection of the remaining freighters was of great importance. He asked whether the Belgian army could place guns and gunners on the ships so that they could defend the vessels against German attackers.

Armed ships

A total of 66 steamboats with a collective tonnage of 180,640 tonnes were still sailing under Belgian flag at that time. Of these ships, 25 were commandeered by the state and 25 other vessels exclusively carried out transports to supply food to the occupied part of Belgium. These ships had to be



■ A torpedo barely misses an enemy ship (Die Wochenschau, 1915)

particularly well protected. The remaining 16 ships were more or less free but they risked being commandeered, as all warring nations were short of transport capacity. Mr Pierrard pointed out that many of these remaining vessels were too small and too weak to cross the Atlantic. Moreover, he was very concerned about the supply of food to the population in occupied Belgium. New steps in the militarisation of the fleet were not to jeopardise this.

In early 1917 he thought there were too few Belgian ships to carry much-needed food supplies to the German-occupied zone. He feared this lack of transport capacity would even be felt after the war. This is why Mr Pierrard sounded the alarm in a memorandum to Minister of Transport Paul Segers on 4 February 1917. He found the scarcity of available tonnage alarming and was convinced that more losses would follow due to the aggression of German U-boats. He hoped that arming merchant ships would help solve this problem, as American merchantmen were also being armed with guns, both on the bow and on the afterdeck. His disturbing statements are hardly surprising. On 1 February 1917 Germany had announced it would engage in unrestricted submarine warfare against

enemy merchantmen and fishing vessels. From then on, the battle against U-boats was an absolute priority for the Allies. Belgium could not stay behind, and the Marine Affairs Administration formally established the *Dépôt des Equipages* (Crew Depot) in early May 1917.



■ The production of torpedoes in Germany (*Marinekorps Flandern, De Vlaamse kust en het hinterland tijdens de eerste Wereldoorlog, Johan Ryheul*)

The Dépôt des Equipages: a thorn in the side of the Marine Affairs Administration

The decision had in fact already been taken in January, when the competent ministers aimed at the formation of a war fleet in addition to the civilian Marine Affairs Administration. This Dépôt was actually a training centre and hub for sailors and had to make it possible to replace crew members of neutral nationality with Belgians, since neutral seamen pulled out en masse now that they risked their lives too. On 3 May 1917, the cabinet of the Minister of War informed the General Headquarters that the Dépôt would also be used for the military training of sailors and gunners who operated the artillery pieces mounted on the ships. The Dépôt was established at Grand Fort Philippe near the small French port of Gravelines. In addition to a staff and training facilities there were two companies of sailors and one platoon of naval gunners.

Cooperation between the military and the Marine Affairs Administration did not go smoothly, however. Their objectives were too far apart. The Marine Affairs Administration wanted to deploy as much cargo ships as possible while the Ministry of War wanted to create naval capacity to protect those cargo ships. This required vessels to be berthed at the quayside for a while so that they could be equipped with artillery pieces. The Marine Affairs Administration found this hard to accept. Mr Cornellie and another officer paid a visit to Mr Pierrard on 26 October 1917. Mr Cornellie had been captain of a packet boat but he was also a reserve officer and now in military service. Both officers informed Mr Pierrard that the command of the Dépôt would be fully transferred to the military.

Mr Pierrard explained the Marine Affairs Administration's point of view: the Dépôt had to be a reservoir of able seamen and only in the second place a training centre for military who would fight in the war. In his view, the military's only task was to provide solid training to gunners and nothing more. He added that recent experience had taught that the gunners aboard Belgian ships were

often insufficiently trained. The military therefore had to set their own house in order first, he thought. Mr Pierrard added that the old fishery protection vessel *Ville d'Anvers* would soon be transferred to Mr Cornellie and was available for training purposes in Calais. The ship had to make it possible to train ship mechanics and gunners in realistic circumstances at sea. Mr Cornellie knew *Ville d'Anvers* very well since he had served as an officer on the ship. However, the Marine Affairs Administration continued to demand that the captain and the chief mechanic would be answerable to the civilian administration.

The Marine Affairs Administration wished to reduce the influence of the military as they feared that the ships would otherwise also be deployed for the Allied war effort. This could provoke a German reaction that would threaten the supply of food to occupied Belgium. Mr Pierrard therefore wanted the Marine Affairs Administration to keep in charge of the deployment of Belgian vessels. In his opinion, the Ministry of War was in the wrong position to act in this delicate matter. This conflict no doubt delayed the development of naval power. Mr Bultinck, a colleague of Mr Pierrard at the Marine Affairs Administration in London, felt differently, however. He was in favour of close cooperation, even with the navies of the Allies.



■ A typical 75 mm gun mounted on a pedestal from 1916. Many merchant ships were equipped with this type of gun (*14/18 op Zee, Belgische schepen en zeelui tijdens de grote oorlog, Freddy Philips*)



■ *Torpedoes carried a very heavy explosive charge but could be launched by relatively small vessels. This is how German propaganda illustrated the operations of the Flanders Flotilla in the Channel (Die Wochenschau, 1915)*

Gunners on board

Mr Bultinck had seen a report (dated 19 November) by M.C. Simon, former captain of the port of Bruges. In this report, Mr Simon asked whether the virtually inexistent training of captains was the cause of the heavy losses inflicted on the Belgian merchant fleet. British experience had shown that well-trained captains had a 95% chance of escaping from an approaching German U-boat. He did not beat around the bush and recommended the British training course to the Union of Belgian Shipowners, established in London. He also found an audience on the Continent. In December the Ministry of War decided to have eight officers of the *Dépôt des Equipages* take the British course. Only two Belgian captains had been given this opportunity in the past, and those two had convinced Mr Bultinck. Now the Ministry of War agreed.

Mr Pierrard came round, as the gunners came under the command of the captain. The training course would improve the command and thus increase the captain's authority. He also approved of Bultinck's efforts to have the captains of the state packet boats take

the course. After all, the training course only took four days. The Cornellie report on training dated 23 February 1918 especially highlighted the usefulness of practical demonstrations at sea. This involved a U-boat attack and target practice with a naval gun. There were only three gunners on board so the civilian crew also had to help operate the gun and keep watch. Every participant in the course could fire six rounds at a moving target at sea in practice. Civilian naval officers were taught how to operate the gun as well. They even went aboard a submarine. The training course was short yet intensive and had a very practical focus.

It also made clear that many people aboard the Belgian ships were insufficiently familiar with naval guns. So this training course came not a moment too soon. Yet the deployment of naval guns also had disadvantages. Direct-fire artillery pieces could only be used against surface-running German submarines that intended to use their gun. This was indeed the usual strategy if no warships were nearby. But what if the attack came from a submerged submarine that intended to use torpedoes? Did the latest developments in the field of artillery

make it possible to solve this problem? This is where Belgian engineer and officer Van Deuren came in.

A mortar against U-boats?

Pierre Van Deuren had worked on the development of a simple mortar for a long time. It had to provide the front-line infantry with the necessary power to destroy opposing German positions. He also saw possibilities in the war at sea. Experience had taught that a German U-boat could do serious damage with her gun if she was able to approach within one kilometre. This was exactly the distance at which the Van Deuren mortar could be fired efficiently.

But how was this done? The high-arching ballistic trajectory of the finned mortar round made a direct hit on the submarine virtually impossible. But this was largely compensated by the fact that the mortar bomb contained a much bigger explosive charge than the shell of a direct-fire gun. Van Deuren devised an explosive charge of 30 to 50 kg. An impact within 50 to 100 metres from the submarine was sufficient to give the



■ Thanks to the large stabiliser fins, these mortar rounds held a steady course over their trajectory (Luc Vandeweyer)

enemy a good shaking. The U-boat would certainly be hindered in her attack operation, especially if the finned bombs came down on the sea surface in quick succession. If a submarine was bombarded in this manner, there was a good chance that the attack would be aborted.

In addition, firing a mortar from a boat was much easier than firing a gun. As the launch tube was always set at 45 degrees, less expertise and training were required to operate it. Van Deuren claimed he would be able to arm a thousand ships in three months. But his mortar had to be tested first. This took place in close collaboration with the French navy in the summer of 1917. A mortar was fired from a ship at a demarcated area of 75 metres by 25 metres, 700 metres away on a beach east of Calais to see where the bombs would fall. Rounds were fired both in calm and turbulent conditions to determine the precision of the shots. Everything worked properly during the tests. The precision of the mortar at sea was comparable to that on land, so they were on the right track. During a test in turbulent conditions the operators achieved very reasonable results in terms of accuracy, even though the boat was rolling a lot. The assessment committee also had a 47 mm naval gun tested. On comparison, the mortar turned out to perform much better. Moreover, the finned bombs made it possible to hit submerged U-boats from the moment their periscope was detected. This was not feasible with a regular naval gun.

Too late, the war was over

It took too long for the mortar to become operational on board the Belgian merchant fleet. In the meantime, the tide had turned on the western front. The summer of 1918 heralded the decline of Germany's military might. An armistice was signed on 11 November. The war was over, but it was not until 11 April 1919 that a memorandum followed which allowed the gunners to leave the merchant fleet, mainly because the freighters were no longer commandeered. In addition, the peace negotiations in Versailles progressed well and it was clear that the German navy no longer posed a threat. Now that all hostilities had ceased, what was to be done with the built up military capacity at sea?

Belgium had lost a large part of its merchant fleet, but at least the development of a Belgian navy had started. Was Belgium able and willing to expand its naval power in the coming peacetime as well? It certainly was within the bounds of possibility, if only because German warships were made available after 11 November 1918. But the Belgian authorities did not wish to invest in this after an international détente set in 1925. The option of a navy was discarded again, yet this would be only temporary, as history has shown.

Sources

- Lists of ships sunk and crew members killed can be found in *Onze helden, gestorven voor het vaderland, België's epische strijd van 1914 tot 1918*, Brussels 1922, p. 226 and 229-230.
- The first attempted historiography of the development of military power at sea is: Louis Leconte, *Les ancêtres de notre Force navale*, 1952.

In the meantime, a lot of records have become accessible, partly to be found in the files transferred by the army's historical service to the documentation centre of the Royal Army and Military History Museum. Another part is located in the Belgian military archives, which were first confiscated by the German army and then by the Red Army, and can now also be studied in the Royal Army and Military History Museum.

The archives of the Marine Affairs Administration located in the Belgian General State Archives are also very important, especially files 8001, 8002, 8010, 8008, 8033-8044.

The accessibility and the role of the beach during WWI

Erwin Mahieu

Access to the sea was crucially important throughout the First World War. Beaches were therefore of the utmost strategic importance, even though they had many other functions as well. Furthermore, the Belgian coastline was divided in a German-occupied zone east of the Yser estuary and an area west of the river Yser that was controlled by the Allies in October 1914. This article discusses the “beach life” between 1914 and 1918, and how this sandy strip of Belgium got through those four difficult years.

The coast occupied

After the capture of Antwerp on 10 October 1914, the German army could march on the Belgian coast without hindrance. On 12 October they occupied Ghent and two days later, on 14 October, troops commanded by Hans von Beseler entered Bruges. The coastal towns of Zeebrugge, Blankenberge and Ostend followed the next day, so that an important objective of the modified German attack plan was achieved. Although the occupation of the Flemish coast had not been considered nor prepared before the war (see De Meyer, in this issue), the German navy now virtually controlled the southern North Sea. The deployment of submarines and torpedo boats from Ostend, Zeebrugge and Bruges greatly increased the Flemish coast's strategic importance.

In the first few days of the occupation, the Germans consolidated their positions by entrenching their artillery, e.g. on the Ostend esplanade. They also emplaced guns on strategic locations such as high dune tops in the conquered coastal towns. The German military authorities took over command of the city of Ostend and announced the new rules to the population by means of *Bekanntmachungen* (proclamations) and *Befehlen* (orders).

The first article of the Proclamation of 21 October by commandant Tägert in Ostend read as follows: “*Entering the esplanade and the beach is prohibited within the city limits of Ostend. Persons living on the esplanade have to carry a pass.*” The next day, 22 October, a supplement to this measure was announced: “*The inhabitants of Ostend are*



■ As one of the first measures taken after the occupation of Ostend, commandant Tägert banned going for a walk on the esplanade. The slopes leading to the esplanade were blocked by means of beach cabins attached with barbed wire. This is Vlaanderenstraat in the direction of the esplanade (Collection of Erwin Mahieu)

forbidden to leave lights on in places overlooking the sea. Windows overlooking the sea have to be covered with roll-down shutters or curtains at night.” This set the trend: the beach and the promenade became an exclusively German military zone where civilians were only exceptionally allowed or tolerated ...

The first clash between Allied and German forces in Ostend took place on 23 October 1914. Around noon, two British torpedo boats fired a few volleys at the city, whereupon the Germans responded with artillery fire. Officers and soldiers took cover in a panic while civilians, who were less familiar with the danger, looked on. Despite the German response, the British hit a target after a couple of minutes. A shell landed on the dining room of the Majestic Hotel and wreaked havoc. The shelling of 23 October resulted in the measures of 21 and 22 October being tightened and extended. On 28 October, Admiral von Schröder issued the

following order ‘as to the movement of the inhabitants of the Belgian coastal area’:

1° Full freedom of movement is abolished.
2° Local traffic in the streets is subject to the following stipulations:

- Entering the beach and the streets behind the beach is prohibited.
- The houses on the streets behind the beach as well as the adjacent houses on the sidestreets have to be evacuated.

To enforce this order, the Germans blocked the streets leading to the beach and the esplanade with confiscated beach cabins, if this was not already the case. On the seaward side, a row of benches was placed in front of the cabins and all this was firmly attached with barbed wire (see picture)!



■ The beach of Ostend, deserted and without bathing machines, was provided with a bathing service for the military in the spring of 1915 (Collection of Erwin Mahieu)

Verspätete Kurgäste (delayed seaside visitors)

However, Ostend had much more to offer than just strategic interests. Ostend's fame as a seaside resort had not escaped the notice of the Germans. Fashionable Ostend, an important meeting place for the upper middle class in the Belle Époque period, received a horde of uninvited guests during the occupation. Nevertheless, the German officers and soldiers considered themselves seaside visitors and soon postcards were printed that illustrated this attitude.

In addition, a bathing service for the military appeared on the Ostend beach between the Casino Kursaal and the Palace Hotel in the spring of 1915 (see picture p.77). There were changes for the civilian population as well. On 7 May 1915, Mayor Liebaert informed the population that the Imperial German *Kommandantur* permitted entrance to the esplanade along and in the gallery from 8 a.m. to 7.30 p.m. This authorisation took effect on 8 May and applied to the part of the promenade located between Koninginnelaan and the entrance of the racecourse. The notice was slightly modified on 13 May: traffic on the esplanade along the gallery was allowed up to 8.30 p.m. The modification took effect the very same day.

The beach was now divided in zones fenced off with barbed wire. The zone for officers stretched from the slope near the



■ Prior to the First World War, Ostend had been an important meeting place for the upper middle class. German soldiers, unaccustomed to the sophisticated pre-war life in Ostend, considered themselves seaside visitors now. Here we see three soldiers on a bench on the promenade. They are represented as *Verspätete Kurgäste* (delayed seaside visitors) in Ostend (Collection of Erwin Mahieu)

Kursaal to Wenenstraat (currently Kemmelbergstraat). Civilians were allowed to enter the beach between Wenenstraat and the continuation of Koninginnelaan. Non-commissioned officers had the area from Koninginnelaan to the steps in front of the gallery to themselves. Soldiers had to make do with the remaining zone in front of the gallery up to the large slope in front of the entrance of the Palace Hotel. A different zone

was allocated to each rank and the equipment made available also differed a great deal. To change clothes, the officers could make use of the luxurious cabins lined up on the beach in front of the promenade (see pictures p.77).

Next to the empty beach put at the disposal of the civilians (see picture), the non-commissioned officers had to change clothes in ordinary beach cabins. Finally,

soldiers had to use the gallery to change, but the men preferred to take off their clothes on the beach or on the nearby breakwater. They had never heard of swimming trunks... The Ostend civilian population, who was allowed to go for a walk in and along the gallery, often complained to the Mayor and the Chief of Police about all this indecency. Without success...

Ostend as *Läusebad* (delousing bath)

Soldiers who had served at the front for a few months would be given leave to rest and recover for a while. Regiments that had showed 'exemplary' conduct were rewarded with a short stay at the coast. The units were transported by train to the 'health resort' of Ostend. For many German soldiers the visit to this city was the first time they saw the sea. Among those who came from the interior of Germany, only the well-to-do could afford the long journey to the North Sea or Baltic Sea and the sojourn there in peacetime.

Soldiers on furlough in Ostend had to pay a 'mandatory' visit to the Palace Hotel. The German navy had equipped this luxury hotel on the promenade as a *Desinfektionsbad* (disinfection bath) to enable soldiers to get rid of the bugs that thrived the trenches. Lice (and other pests) were a real nuisance to soldiers and were impossible to exterminate in the unhygienic conditions of the frontline. The Germans, however, were convinced that the lice infestation was the result of contact with lice-infested nations! After their clothes had been thoroughly scrubbed and disinfected, the men were rid of their unwelcome guests for a while. Many soldiers expressed their joy by writing verses on the walls of the sanitary facilities of the Palace Hotel. The following rhyme about Ostend was popular at the time: "*Ist es auch kein Weltbad heute – Macht's als Läusebad uns Freude*" (Although it's not a topnotch resort, it makes a fine delousing bath).

Bathing according to rank and the rules

Bathing regulations

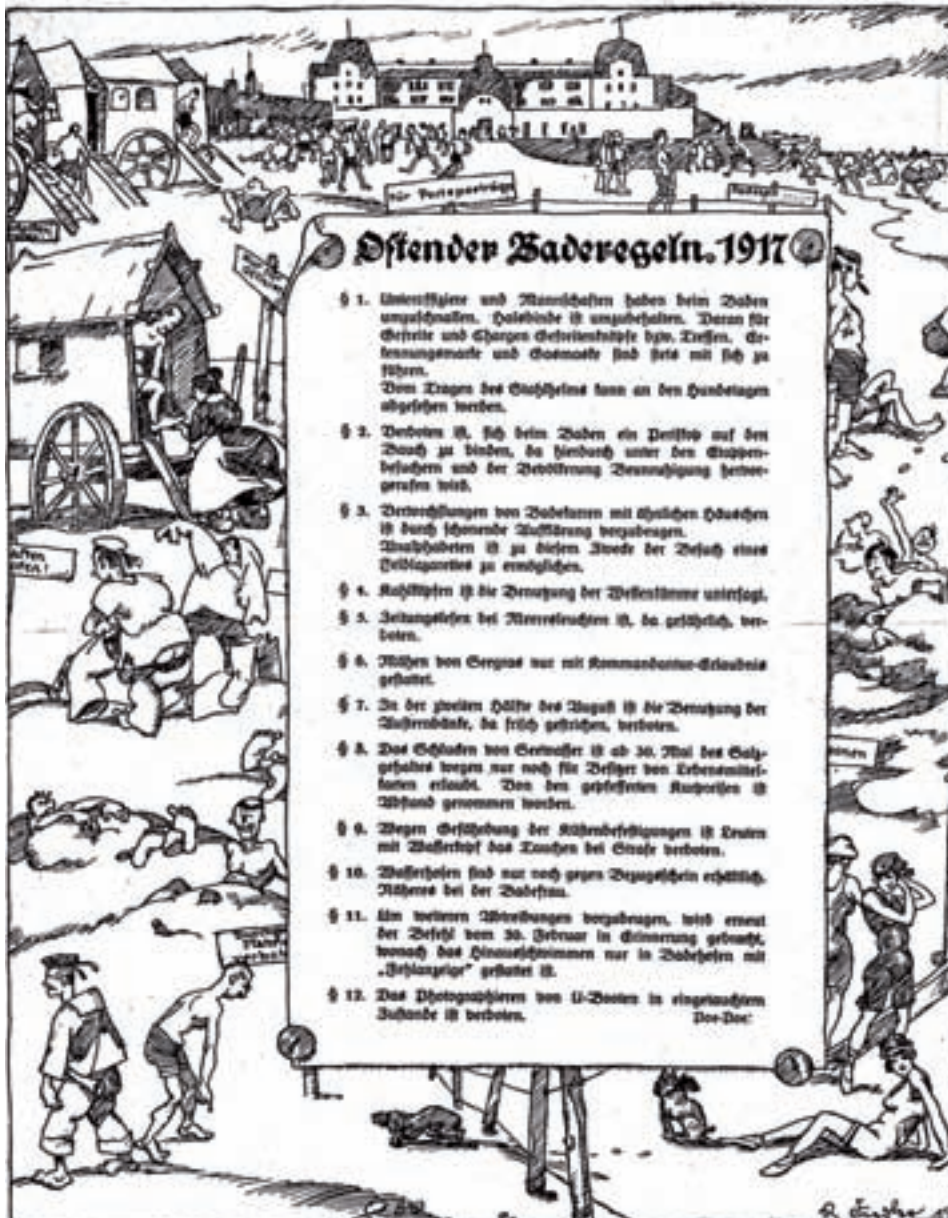
Germans who wanted to go for a swim had to observe the regulations. Initially (in the summer of 1915) these consisted of 9 stipulations, and they were extended to 11 articles in 1916. For instance, military staff were urged not to go into the water further than chest deep on account of the strong currents (art. 1) and to swim only at neap tide and rising tide (art. 2). Bathing was only and exclusively allowed in the designated area (art. 3). At each zone, signs warned swimmers for possible strong currents. The recreational beach was divided in four zones (see *Verspätete Kurgäste*) and stretched from the Kursaal to the entrance of the Palace Hotel. Soldiers were provided with fresh



■ The contrast between the officer's area and the beach for civilians. A sign at the entrance of the bathing zone fenced off with barbed wire read: "Nur für Offiziere" (For officers only). Against the slope of the seawall there was a row of bathing machines where the officers could change clothes before they went for a swim. Civilians had to be content with being tolerated on the beach, since they did not have any bathing machines (Collection of Erwin Mahieu)



■ This picture was taken by F. Gerlach from Berlin and was entitled: "Am Strande von Ostende" (On the beach at Ostend). Once the men were on the beach, they got undressed on the spot and took a dip in the brine. For many soldiers who came from the interior of Germany this was the first time they saw the sea (Collection of Erwin Mahieu)



■ "Ostender Baderegeln 1917"(1917 Ostend bathing regulations) appeared in "An Flanderns Küste" on 15 August 1917. These regulations are a parody of the many rules as well as the officer's arrogant and haughty attitude. They claim the best stretch of the beach and do not allow private soldiers to come close. The drawing is clear: four half-hidden signs indicate that the area in the front left is for officers only. In the foreground, an officer calls his dog, who has just visited a bitch (the dog with the bow tie). The look of the recumbent lady is directed to us and speaks volumes (Collection of Erwin Mahieu)

linen and swimming trunks for a small fee (art. 4). The beach reserved for civilians was off limits for all military staff who were off duty (art. 5). Buoys marked the swimming area and the men were supervised by an officer (art. 6). Bathing without swimming trunks and changing clothes on the beach were forbidden (art. 7). Troops who went to the beach with their rifles had to leave them at the racecourse during bathing (art. 8). In case of an air raid, the beach had to be abandoned immediately (art. 9). Alarms and the threat of bombings were made known by means of a siren (art. 10); in such cases, the supervising non-commissioned officer was given additional instructions (art. 11).

The men usually observed these regulations faithfully – except for changing clothes on the beach and swimming naked. The men felt no qualms about nudity; once a platoon had arrived on the beach, changing clothes (i.e. undressing) was done quickly. Trousers, tunic and the rest of the uniform were taken off on the spot and together they went into the sea in the nude (see picture p.77).

Comical situations

A parody of the bathing regulations appeared in "An Flanderns Küste", the magazine of Marinekorps Flandern, in 1917. In "Ostender Baderegeln 1917" (1917 Ostend bathing regulations), the magazine mocked both the rules and the bathers (see below). The text was laid out like a poster on top of a scene from the Ostend beach life of the time. The drawing was made by Richard Fiedler and the text is signed with the pseudonym Poe-Poe.

In his parody, Poe-Poe first pokes fun at the officers. "During bathing (when only swimming trunks are worn) they have to gird on their belts and sabres and carry their facings and other badges with them. Periscopes may not be used during bathing so as not to cause panic. Bathing machines must not be confused with outhouses. Baldheads may not use the crest of the waves, and reading the paper by means of the phosphorescence of the sea is prohibited on account of being too dangerous. Seagrass may only be mown with prior permission by the Kommandantur, and the oyster beds must not be used in the second half of August because they have just been made. As from 30 May, swallowing seawater is only permitted to holders of a ration card on account of its salt content. However, spicy stories are exempted. People with water on the brain may not dive so as not to damage the coastal defences. Swimming trunks are only available in exchange for a receipt. To prevent drifting off, the order of 30 February is called to mind: swimming outside the zone is only allowed in swimming trunks without an identifying mark. Taking pictures of submerged U-boats is forbidden."

Some of the jokes in the parody by Poe-Poe may not be very edifying, but the drawing by Richard Fiedler is much more subtle (see illustration).

It is obvious for whom the rules on the poster were intended: a sign above the text reads "Für Portepeeträger" (for sword bearers), a derisory nickname for officers. To the right of the poster, in view of the officers, there are a few ladies... At the bottom of the drawing we see an officer who calls his dog to order after a visit to a bitch (the dog with the bow tie). A lady lying on the beach gives us a seductive look. And the men? Far away, near the Palace Hotel, they undress on the beach near the high-water mark and take a dip in the brine...

A visit to the beach as propaganda

A group photograph

In the *“Kriegs-Album des Marinekorps Flandern 1914-1917”*, the Marine Corps is represented as the protector of the threatened Flemish coast. The French and especially the British, who bombard the area and cause a great deal of damage, are depicted as the aggressors. A masterly example of pure propaganda. The *“Kriegs-Album”* includes a few pictures that show the ‘military’ beach life in Ostend. One picture shows the beach with hundreds of military bathing in the water. Two other images show soldiers in swimsuit in the sea. The caption to these photographs reads as follows: *“Ostend. Military beach life. Many thousands of German soldiers, including from units stationed far inland, who had probably never seen the sea before, were invigorated and refreshed by the cool waves in summertime.”* In other words, the soldiers had no reason to complain. In any case, propaganda wanted people to believe they had a grand time by the sea. Large-sized pictures of soldiers provided with an ‘appropriate caption’ (see below), as published by Paul Hoffmann & Co in Berlin-Schöneberg, had to spread the same message.

Officers and persons in authority preferably presented themselves as important and respected seaside visitors. They did not just claim the most exclusive part of the Ostend bathing area, they also wished to change clothes in luxurious cabins. And as was fitting for men of distinction, they had their picture taken in full dress uniform as a souvenir to take home. For the men, the Navy made a lifeboat with (inexperienced) German lifeguards available.



■ The caption to this picture of hundreds of elated soldiers on the Ostend beach reads: *“Beginn der Bade-Saison in Ostende”* (Beginning of the bathing season in Ostend). The German soldiers appear to have the time to start the new bathing season and paddle a bit! (Collection of Erwin Mahieu)



■ A postcard which troops often sent home is this one of a group of soldiers who had climbed on a bathing machine on the beach of Ostend. They are dressed in swimming trunks but still have their cap on. Such postcards reassured and soothed the home front so that the war efforts could continue (Collection of Erwin Mahieu)



■ An unused lifeboat used as decoration with the Royal Chalet in the background. German soldiers in swimsuit with their caps on (Collection of Erwin Mahieu)



■ Three officers, photographed in their bathing zone, try not to look stiff. Sitting casually in a wicker chair with a bucket inscribed “Oostende” between the legs and accompanied by a young local boy, they want to create the impression of being honoured and welcome guests (Collection of Erwin Mahieu)

The city of Ostend was responsible for the parts of the beach reserved for the officers and non-commissioned officers. The (experienced) Ostend lifeguards now had to look after a new type of tourists: German officers in swimming trunks... The difference in experience between the German and Belgian lifeguards resulted in the drowning of 11 soldiers on 6 September 1915. We do not know how often the lifeboat was used to rescue people from drowning, but it was one of the most popular pieces of decoration (with the Royal Chalet in the background) in pictures taken on the beach (see photo).

The “*Kriegs-Album des Marinekorps Flandern 1914-1917*” demonstrated that the Marine Corps presented itself as the protector of the threatened Flemish coast. But the officers also liked to behave as honoured and well-liked guests. The civilian population – and in particular the children – were sometimes involved to add lustre to the picture.



■ Flemish beach fishermen pose for an (obligatory) photograph. A soldier from the *Marineabteilung* looks at the catch. The awkwardly posing fishermen with one dragnet and three push nets meet the photographer's requirements, but they do not seem to have set one foot in the water (Collection of Erwin Mahieu)



■ The “electric fence” on the Belgian-Dutch border. This photo of the beach in Knokke shows that it ran all the way to the water line. The fence was raised and extended over the course of the war. Initially it was about 1.50 m tall, and later on it was raised to about 2.50 m. Approx 500 people were killed by touching the fence (Collection of Erwin Mahieu)

German soldiers and beach fishing

The military occupation of the coast and the ban issued by Admiral von Schröder (28 October 1914) on entering the beach for the civilian population meant the end of beach fishing. The bombings and especially the concern of the Germans that civilians would give “signals” to enemy warships were the reason for this ban. Although beach fishing was not practised anymore, a photographer from the Marine Corps had a few beach fishermen pose with their gear for an “action picture”. This photo was published in the *“Kriegs-Album des Marinekorps Flandern 1914-1917”*. It had to show that the German military was interested in the regional way of fishing. Five awkwardly posing fishermen with one dragnet and three push nets meet the photographer’s requirements, but they do not seem to have set one foot in the water (see picture)

What about the other beaches along the coast?

Blankenberge, with its many hotels, was ideal for the German occupiers to billet troops. Also in this case, the esplanade became an exclusive German military area, the civilian population was not allowed to enter the beach, and bathing machines and a bathing service were put at the disposal of German soldiers so they could swim in the sea in summer. To ensure the troops’ safety, the *Kommandantur* requisitioned the local lifeguards. The rules were apparently relaxed later on and civilians were allowed on the beach from 1 p.m. to sunset. The area between Hotel Bürgerhof and Hotel

Excelsior (approx between the Kursaal and the Pier) remained exclusively reserved for the military, however. On 23 April 1917 *Leutnant und Platzmajor Letz* noticed that these rules were sometimes broken and from then on parents were held responsible for children ignoring the orders. Lt Letz made the following known:

“Blankenberge, 23 April 1917. To the town council of Uytkerke.

Certain people, in particular elderly fishermen, have recently been found on the beach before 1 p.m. on repeated occasions. Furthermore, children and adults are often found in the prohibited area between Hotel Burgerhof and Hotel Excelsior. As a result, the following has to be officially announced once more:

All civilians are strictly prohibited from entering the beach prior to 1 p.m. and after dusk. Entering the prohibited area of the promenade and of the beach between Hotel Burgerhof and Hotel Excelsior is also forbidden. Parents shall be held responsible for children who violate this order. Violations shall in any case be punished as severe disobedience as from today.

By order of (signed) Letz, Leutnant und Platzmajor”.

The neutral Netherlands were spared German occupation. To prevent Belgians from fleeing to the north and to halt the increasing smuggling during the first months of the war, the Germans constructed an electric fence on the Belgian-Dutch border. This “electric fence” stretched from the beach in Knokke (see image) over the area north of Antwerp all the way to Aachen. Construction

commenced on 31 March 1915. The fence in Knokke was energised with electricity on 31 August 1915. From then on it was impossible to smuggle or flee to the Netherlands over the beach.

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Battlefield tourism on the coast after WWI

Alex Deseyne

In West Flanders, the First World War and battlefield tourism are mostly associated with the Yser and Ypres area. By contrast, the coast reminds us more of holidays, sun, sea and the Belle Époque period. Yet a considerable part of the coast was occupied by German troops and defended against a possible Allied invasion from 1914 to 1918, as was the greater part of Belgium. The German *Marinekorps Flandern* constructed an impressive line of defence consisting of 34 heavy and medium batteries along the Belgian coast. When the Allies approached in October 1918, all artillery pieces were put out of action in great haste. After the termination of hostilities, the batteries and defences were left virtually untouched. At that moment, no-one foresaw that these remnants had tourism potential and would come to the attention again a hundred years later on the occasion of the centenary of the Great War.

Royal visit

On 28 October 1918, prior to the armistice, King Albert I of Belgium already paid a visit to the Aachen battery, built on his property in Raversijde. All pre-war buildings on this site had either disappeared or had been irreparably damaged due to the construction of said battery in 1915. In the company of French President Poincaré, Prince Leopold (future King Leopold III of Belgium) and several senior French officers, the King revisited Raversijde on 9 November 1918. An armistice was already a prospect then. Shortly afterwards, the royal family also visited the Tirpitz and Pommern batteries (in Mariakerke and Leugenboom respectively). On 10 December 1918 British King George V visited the Belgian coast together with the Prince of Wales. Particular attention was paid to the Mole of Zeebrugge, where the remains of the Zeebrugge Raid of 22-23 April 1918 could be viewed. But they visited the Leugenboom gun in Koekelare as well. On 11 May 1922 King George V paid a second visit to the Mole and to the British war graves

in Zeebrugge as part of his tour of several military cemeteries in West Flanders and northern France. The King was accompanied by Field Marshal Douglas Haig and Major General Sir Fabian Ware; Frank Fox described this trip in “The King’s Pilgrimage” in 1922.

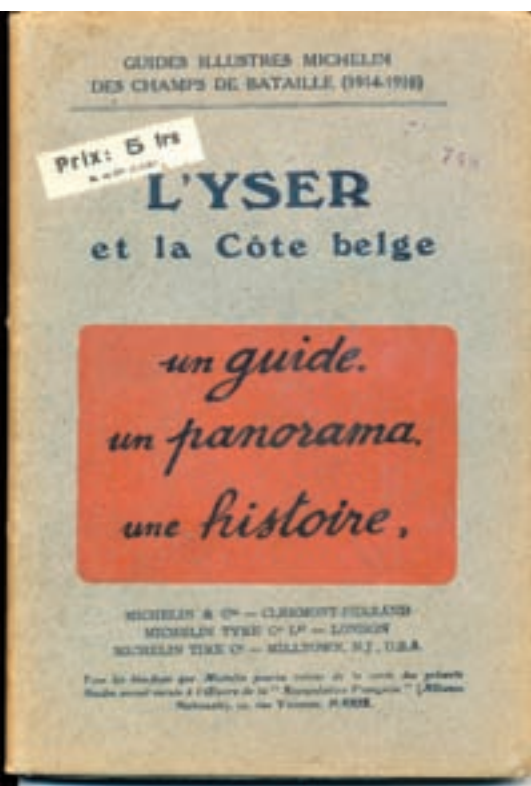
The Michelin battlefield guide and the like

The French initially wished to preserve a number of sectors along the western front as “sacred ground”, e.g. the region of Verdun. The British also played with the idea of leaving the ruins of devastated Ypres untouched and building a new city beside it. *“I should like to acquire the whole of the ruins of Ypres... a more sacred place for the British race does not exist in the world”*, Winston Churchill stated. This plan was eventually abandoned under pressure from the Belgian government and the former residents of Ypres, and the city was rebuilt stone by stone.

More pressing problems presented



A brief lunch during the visit of British King George V and King Albert I of Belgium to the Mole at Zeebrugge on 10 December 1918 (Imperial War Museums)



■ Cover of the Michelin guide “L’Yser et la côte belge” (Private collection)

themselves on the coast. Many people were eager to see the beach and promenade opened up again for tourism so as to revive the region’s economy. Some seaside resorts had been largely destroyed, and many hotels had sustained very heavy damage. The original owners re-claimed their former properties and started to reconstruct them (sometimes hurriedly). As a result, there turned out to be little enthusiasm to preserve the relics of the German occupation.

The coastal batteries were first brought to the public’s attention when they were included in the Michelin battlefield guide *L’Yser et la Côte belge*, published in 1920, as “tourist sights”. This guide was part of a whole series of publications encompassing the entire Western Front. The Michelin guides were characterised by their reliability and their interesting illustrations. At that time, most batteries were still in a relatively good condition. The heavy batteries such as Deutschland and Pommern and particularly the British raid on Zeebrugge in 1918 were highlighted.

The Belgian army also published a brochure entitled *De Oorlogsoorden – Les Sites de Guerre* (The War Sites), but only in 1924, so rather late. It included a kind of official list of war relics that had to be protected. For the coastal area these were the Lübeck, Pommern, Wilhelm II and Deutschland batteries, *Abri de l’Amirauté* in Middelkerke, the large Redan in Nieuwpoort and the Karnak battery in Oostduinkerke. Of course, the Pommern (Leugenboom) battery was also included in the list. But when this list was published, certain “sights” had already disappeared...



■ The brochure “Les sites de Guerre” appeared in 1924 (Private collection)

Improvised conservation

The Ministry of War realised as early as 1919 that measures had to be taken to conserve part of the coastal defences and prevent further disrepair. At that time, the military’s main objective was to preserve the extensive coastal defences and to rearm them if need be. After all, the peace treaty had not been signed yet and a resumption of hostilities could therefore not be ruled out completely. The simplest course of action was to offer one or several batteries to each coastal municipality.

The commander of the coast suggested to the Minister on 7 April 1919: “I intend to request the coastal municipalities to conserve and maintain certain defences that have to be preserved either from a military perspective or for the sake of commemoration and documentation.” The commander of the coast did not object to certain elements being used by the local authorities for decorative purposes. Of course, each municipality would have to foot the bill: “the municipalities shall be responsible for the maintenance and monitoring of the equipment and installations entrusted to them. All alterations (fences, access roads etc.) to be carried out beforehand so that the aforesaid structures can be visited by tourists have to be performed by the municipal administrations.”

Preservation of the batteries

When it turned out that this improvised conservation policy was unsuccessful – most municipalities showed little or no interest in these remains – the deterioration continued. Some constructions obstructed redevelopment, others had to make way to reinforce the seawall. The Hamburg battery was demolished out of necessity “because of encroachment by the sea on the seawall”.



■ For the traditional photograph this boy climbed into the barrel of the Leugenboom gun in Koekelare (Royal Institute for Cultural Heritage – Brussels)



■ War museum of the Wilhelm II battery in Knokke (Royal Institute for Cultural Heritage – Brussels)



■ Remains of the Lübeck battery at the beginning of the mole in Zeebrugge (Private collection)



■ Shortly before the Gneisenau battery near the Ostend Palace Hotel (located on the promenade between Kapucijnenstraat and Louisastraat) disappeared, this tourist from Ghent posed on one of the guns (Private collection)

Most of the still present metal from the coastal defences was scrapped after a public auction in Bruges, organised by the administration of the Domains on 3 May 1923 (so before the publication of the “War Sites”). The catalogue of the auction shows that, within just five years, several guns had already disappeared or been sold and that many others were buried in sand or had been knocked over. Only the most impressive batteries such as Deutschland (Bredene), Wilhelm II (Knokke) and Pommern (Leugenboom in Koekelare) were eventually conserved. The necessary steps to exploit the remains as tourist sites were chiefly taken by a few semi-official organisations such as *Dienst der Oorlogsoorden* (War Sites Service). The proceeds were donated to a charity for war invalids and orphans.

The Deutschland battery with its four imposing 38cm guns had the least visitors. The battery was not converted into a real museum; at first the army used it to store ammunition that had to be destroyed. Only two guns could be visited by guided tour with war invalid Leopold Degreeef as a guide. The two other guns were scrapped in November 1928. The rest followed in 1938.

The admission for a visit to the well-preserved Wilhelm II battery in Knokke was half a Belgian franc (0.0125 EUR in today’s money). Initially, only the imposing 30.5cm guns in their emplacements were on display. Later on, the greater part of the local arms museum was transferred to the battery. So a lot of additional war materials that had nothing to do with the battery but came from the Yser front were displayed there. Dioramas were even constructed in the former ammunition bunkers.

The Lübeck battery with its two guns on both sides of the access road to the old Zeebrugge mole was left untouched. Zeebrugge therefore exerted a great attraction on British visitors. The guns formed the ideal background for amateur photographers and visitors to the mole.

The Pommern battery with its 38cm gun, popularly called *Langer Max*, was probably the most successful attraction. Who knows how many battlefield tourists had their picture taken after they had climbed into the gun’s barrel... The heavy iron trolley for the 38cm shells and the large ammunition bunkers attracted a great deal of interest as well. One German publication even appealed to national pride: “*The gun greatly advertises German industry!*”

Museums as poles of attraction

Museums were often established next to the batteries so as to promote tourism. Honorary colonel Gustave Stinglhamber played a crucial part in this development. He served in the Belgian Congo from 1914 to 1916, returned to Belgium ill but was made commander of an artillery regiment on the front at his own request in 1917. Having been promoted to honorary colonel after the war, he saw opportunities in the emerging battlefield tourism industry, not just along the Yser front and in the Ypres Salient, but also in the coastal area.

Zeebrugge

Mr Stinglhamber was the key figure in the creation of the Zeebrugge war museum. This museum, established in 1923, was clearly aimed at the tourist impact of the Zeebrugge raid of 1918. At first, Mr Stinglhamber had ambitious plans for “his” museum. It was to be a huge building which would not only house a museum but also numerous commercial facilities. The ground floor would include several cafés and restaurants, shops, garages and houses, as well as the lower part of the museum. This museum, situated in the centre of the building, was designed as a circular Memorial Hall with a line-up of tanks, large guns and other war materials as its focal point. Behind this there would be a spacious cinema. The first floor would contain a hotel, a dancing hall and flats. Above the circular Memorial Hall there would be a panoramic painting representing the Zeebrugge raid of 1918, and behind this the balcony of the cinema. The second floor would consist entirely of flats.

This ambitious plan would never be implemented, however. Mr Stinglhamber had to content himself with a simpler setting in the basement of the State Building (demolished in the 1980s). The interior consisted of two sections: on the one hand, the German presence along the coast was illustrated, and on the other there was an evocation of the Zeebrugge raid (and to a lesser degree of the Ostend raids). The first part mainly consisted of the reconstruction of a “German navy casino”, built with original furniture and reproductions of German murals from various buildings that had been occupied by the Imperial Navy: the Flak (*Flugzeugabwehrkanone* or anti-aircraft guns) command centre in St.-Andries (Bruges), the casino of the U-boat officers located in the Catulle mansion at Fort Lapin (Bruges), the “De 3 Koningen” café in Lissewege and *Hindenburg-Keller* in Fort Napoleon at Ostend. The reproductions on canvas were made by painter Maurice Sieron. Several souvenirs of the German occupation were also on display: the album “*Unsere Gäste*” of commander of *Marinekorps Flandern* Admiral von Schröder (with 800 signatures from all kinds of invitees) as well as the imperial flag that flew on the Bruges belfry during the war. In addition, all sorts



■ Entrance of the Zeebrugge War Museum (Private collection)



■ Reconstruction of a German officers' casino in the Zeebrugge War Museum (Private collection)

of patriotic souvenirs were displayed: the German medal struck to commemorate the sinking of RMS *Lusitania* and many pieces of glassware and chinaware from the collection of Raoul Van Trappen from Ghent. The large collection of German Vivat ribbons was also worth mentioning. These were silk ribbons with a printed symbolic representation of German victories. They were very popular in Germany and were sold to raise money for a good cause. In addition, the museum displayed a large collection of German photographs that had been copied in secret by Bruges photographer Arthur Brusselle while processing the negatives handed in by German soldiers. Captain Charles Fryatt, who had been executed by a German firing squad near Kruisvest in Bruges in 1916 (see preface in this issue), was also commemorated, and an evocation was shown of the electric fence along the Belgian-Dutch border.

The other part of the museum was dedicated to the Zeebrugge raid of 1918 and comprised several relics recuperated during the salvage of the blockships. In addition to pictures of the protagonists, there were many personal maps, photographs and souvenirs donated by the British war veterans who had participated in the raid. Attention was also paid to the Belgian army in the First World War, the military cemeteries in West Flanders, those who had been executed and the spy networks. On the third floor of the tower, a panorama was displayed representing the raid with attacking ships painted on the windows. Outside the museum there was a small giftshop surrounded by war materials that sold postcards, picture stamps, books, war newspapers and all sorts of knickknacks.



■ The Yser panorama, painted by Alfred Bastien (Sophie Muylaert)



■ The Knokke War Museum displayed a wide range of weapons and other war materials (Private collection)

The museum entrance featured the text “*Qui a vu cette guerre cherchera toujours la paix – Die den oorlog heeft gezien zal altijd naar vrede trachten – To know war is to value peace*”.

Knokke

Knokke also had its Arms Museum. This was no coincidence, as the director of the War Site Service had his seat in the Knokke lighthouse building. Initially, the museum was established in the lighthouse building itself, but later on it was transferred to a larger space on Zoutelaan. It featured an impressive collection of weapons, equipment and even aircraft, displayed according to the then prevailing principles: a showcase containing sabres, a collection of bayonets and of helmets etc. Many pieces did not even have a link to the Knokke area but came from the Yser front or France. Apparently, the Knokke arms museum was not very successful, since the collected pieces were moved to the Wilhelm II battery later on, which provided



■ The Hindenburg-Keller mural in Fort Napoleon. Its name refers to Field Marshal Hindenburg (Private collection)

very little information about the battery’s history. It appears that the museum counted on paid guides to convey the message. The former ammunition bunkers housed several dioramas that represented the environment of the Belgian soldiers stationed along the river Yser: a piece of trench with a Belgian sentry post, an underground shelter, a dressing station...

Oostende

In 1932, Fort Napoleon in Ostend was turned into a local history museum on the initiative of municipal archivist and librarian Carlo Loontjens. During the war it boasted the *Hindenburg-Keller*, a mess for the officers of the Hindenburg battery, named after the German field marshal. The new museum, which strongly focused on the figure of Napoleon – who had the Fort built – and on local history, integrated the original fireplace mantel with a wall painting entitled “*der Barbar*” (the Barbarian). Visitors could also see a mural depicting the German eagle, the



Turkish crescent and the Austrian double-headed eagle that looked down on the Gallic rooster, the Russian bear, the British bulldog, the Italian serpent, the Japanese dog and... the Belgian louse (page 86). When the museum was created, the frescoes in the fort, which had suffered greatly from vandalism after the end of the war, were completely repainted.

Ostend also boasted the Yser panorama by Alfred Bastien from 1926 onwards. This huge painting had no connection with Ostend, as it showed the front area between Nieuwpoort-Bad and Ypres. It was put up on the occasion of the sale of the panorama building in Brussels, where it had been on display since 1921. The reason for selecting Ostend as its new location was purely commercial. It was reasoned that the boom of battlefield tourism at that time would benefit Ostend as well, as most British tourists travelled to the Flanders Battlefields via Ostend. There, tour operators awaited them with special busses that covered large parts of the former front. The Yser panorama could be considered the ideal start for this tour. Besides the traditional visits to the Ypres Salient, an afternoon trip to Zeebrugge, Knokke and Bruges was organised as well, with visits to several German batteries.

Middelkerke

In Middelkerke an imposing bunker was turned into a war museum in the 1930s. The bunker, constructed on land of Baron de Crombrugghe and locally known as *Château des Dunes*, was called *Abri de l'Amirauté*. The story goes that Admiral von Schröder once stayed here, but this is highly unlikely as he had his headquarters in centrally located Bruges. After the war, the large family of Camiel Boydens first moved into this bunker. Then a charity for war invalids turned it into a museum in 1933. The museum did not provide a great deal of information. It mainly featured photo collections regarding the First World War (including images taken by photographers Maurice and Robert Antony), supplemented with the usual incoherent collection of weapons, helmets, sabres and shells.

Nieuwpoort and Koksijde

The Allied sector of the Belgian coast could be visited as well, although it boasted far fewer imposing relics. In Nieuwpoort



■ *Abri de l'Amirauté in Middelkerke (Private collection)*

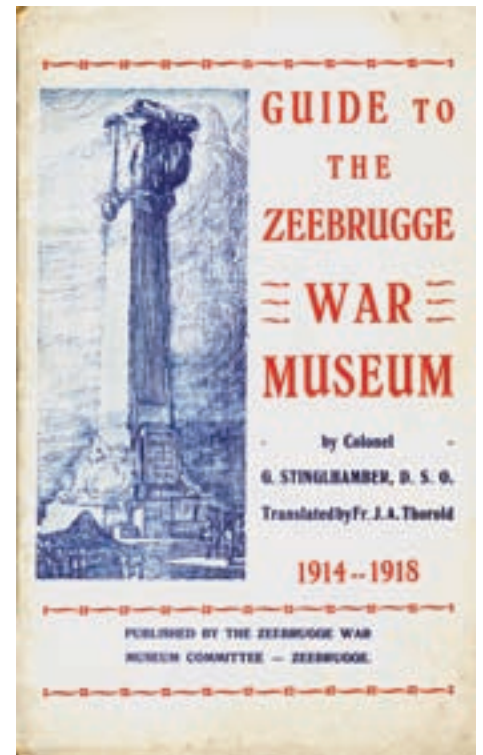


■ *The Belgian positions of the Redan in Nieuwpoort in their original state (1919) (Private collection)*

the Grand Redan was opened to the public. Dating from Vauban's time, this fortification was "restored" by Belgian engineers in the same style as the *Boiau de la Mort* (Trench of Death) in Diksmuide after the war: new timbers, steel plates and cement bags replaced the authentic remains. The tunnels dug under the city by the Australian Tunnelling Companies in 1917 were initially an attraction for many tourists. After a while they were considered too unsafe, however, and they were filled in when new streets were constructed. The impressive bunkers of the Karnak battery in Koksijde were located too far from the front to rouse any interest. Moreover, the sectors of the Yser front and the Ypres Salient were much more important to tourists.



■ The Redan in Nieuwpoort in the “restored” version. Nothing is left of the original relics (Private collection)



■ The cover of the museum guide depicts the original design of the St George's memorial in Zeebrugge (Private collection)

Other memorials

The First World War sights along the coast, managed for the benefit of a charity for war invalids, was fairly successful at first. Booklets with postcards sold like hotcakes, and whole busloads visited the batteries accompanied by a guide (usually a war invalid themselves). The monuments also played an important part as crowd pullers. *Beluik der Gefusilleerden* (the Courtyard of the Executed) was inaugurated near the Kruispoort gate in Bruges on 7 May 1922. This memorial commemorates 13 people who were brought before a firing squad by the court-martial of the German Marine Corps at this location. One of the victims was British master mariner Charles Fryatt, captain of SS Brussels, who was sentenced to death in 1916 after trying to ram a German submarine.

The Zeebrugge memorial in commemoration of the British raid of 1918 was inaugurated on 23 April 1925. This monument, designed by architect Jos Smolderen, stood eleven metres tall and was topped with a figure of St George and the dragon, sculpted by Josué Dupon. King Albert I dedicated the monument in the presence of Queen Elisabeth, the British ambassador, Lord Roger Keyes and many survivors of the operation.

The mole itself also served as a monument. The German air defence battery remained in place for some time. On 27 June 1926 a memorial plaque designed by Armand Bonnetain was unveiled on the site where HMS *Vindictive* landed. The ceremony was organised by Colonel Gustave Stinglhamber and was attended by Belgian Prince Charles, who wore his British Royal Navy uniform for the occasion, as he had trained as a cadet in

the British Royal Navy during the war.

The following year, on 28 August 1927, Colonel Stinglhamber had the honour of unveiling a memorial plaque in memory of Lieutenant Sandford and the crew of HMS C3. During the raid, they had destroyed the viaduct connecting the mole to the shore by blowing up their submarine. Lt. Sandford was awarded the Victoria Cross, the highest British military decoration. The unveiling of the memorial plaque was again attended by a large group of survivors of the raid.

In 1920 the Royal Navy Salvage Section commanded by Commodore Young began to clear the remains of the blockships in order to improve the safety of the harbour entrances at Zeebrugge and Ostend. Some elements ended up in the Zeebrugge museum. The bow section of HMS *Vindictive* was moved to Ostend, where it has served as a memorial since 1925.

Waning interest

All sorts of travel guides and brochures aimed at foreign tourists paid special attention to the Great War. They advertised museums as well as photographers who sold war pictures. Besides Arthur Brusselle from Bruges, who capitalised on pictures taken by German U-boat crews, we also encountered Stephen Cribb from Southsea, who offered “*Snapshots of salvage operations at Zeebrugge and Ostend 1919-1922*”. Of course, the travel guides included several hotels and guesthouses whose name referred directly to the Great War.



■ The bow section of HMS Vindictive is set up as a monument in Ostend (Private collection)

Zeebrugge even featured “Chalet Fryatt”, a “café-restaurant, speciality raisin bread and waffles” where objects such as “late Capt. Fryatt’s chair from S.S. Brussels and other famous souvenirs” were on display.

However, the interest in the war sites was waning in the 1930s. The batteries and museums closed their doors one by one; only the Zeebrugge museum continued to exist. And then a new war broke out in May 1940...

Coastal tourism linked to WWI in decline

After the Campaign of WWII, when the violence in Flanders had subsided, the German occupying forces went on excursions to the battlefields of the First World War. The oldest among them had fought there before; the younger soldiers wanted to see the sites where their fathers had fought or lay buried. Outings were organised to Ypres, the Somme or Verdun. It goes without saying that the museums and war sites along the Belgian coast could be visited too. In the ammunition stores of the battery Aachen at Raversijde you can still see graffiti left by visitors from the interwar period as well as by German soldiers in 1940. This did not last long, however, since museums closed their doors and the remaining batteries were dismantled or brought into service again. The German army appropriated the museums in Zeebrugge and Fort Napoleon in Ostend, as a result of which a lot of their contents were lost. The Germans also removed the Leugenboom gun in the spring of 1941, as they collected all steel they could find so that it could be turned into arms. The imposing memorial in Zeebrugge was demolished by

the German *Trophäenbrigade* on 21 April 1942. This unit was also responsible for blowing up the memorial to the first gas attack in Steenstrate and for effacing the texts on the World War I demarcation stones in West Flanders. Old bunkers from WWI were integrated into the new coastal defences which developed into the *Atlantikwall* later on. And the construction of this *Atlantikwall* finally put an end to the battlefield tourism along the Belgian coast. The coastal area became *Sperrgebiet* (prohibited area) and was therefore off limits to anyone who did not have an *Ausweis* (pass).

After the liberation in September 1944, there appeared to be little interest in preserving the remains of the *Atlantikwall*. The memory of all suffering and personal grief was much stronger than after the First World War. The demolition of the *Atlantikwall* wiped out all traces of the coastal defences from the First World War as well. The museums and even some monuments had disappeared in the meantime. Only the Zeebrugge museum reopened its doors in 1947. It was even expanded with a sizable section about the Second World War. Unfortunately, this museum also had to close its doors in 1980 due to the harbour extension. Nowadays, only the well-preserved positions of the Aachen battery at the Provincial Domain of Raversijde, a few bunkers at the Halvemaan site on the east side of the Ostend harbour and the bow section of HMS *Vindictive* on the eastern mole in Ostend remind us of the First World War on the Belgian coast. The bunkers and positions of the Aachen battery owe their preservation to “royal protection”. They are located on a royal domain and were left untouched after WWI. After WWII, Prince

Charles expressly opposed any form of demolition on his domain. The opening of the Domain of Raversijde to the public in 1993 ushered in a new, modest wave of battlefield tourism. Hopefully, the centenary of the First World War will give local tourism a boost as more people visit the remains of one of the deadliest military conflict in history.

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Fisheries and the First World War

'Herring saved our lives'

Brecht Demasure

For a long time, the supply of food to occupied Belgium and the developments in agriculture were a neglected aspect of historiography of the First World War. Although this has recently changed, it is striking that little or no attention is paid to the fishing industry. Yet fisheries can be complementary to agriculture, particularly in times of imminent food shortage. Nearly the entire Belgian fishing fleet left the country in October 1914. The fishermen who stayed behind succeeded in meeting the local needs under difficult circumstances. For refugee fishermen the war period was anything but wasted. They continued their activities operating from British, French and Dutch ports. In this article we investigate to what degree the First World War was a turning point for sea fisheries. Was herring fishing crucial to the survival of the civilian population, as was the case in the Second World War (in other words: Did herring save our lives)? Were fishermen able to get back to work in Belgium after WWI? And what role did the seaside resort of Ostend play?

Sea fisheries on the eve of the war

The decade prior to the start of the First World War was a favourable period for the fishing industry. The average purchasing power was increasing in Western Europe and transport to consumption centres was improving noticeably. The growth of the fishing industry was based on a spectacular technical evolution. In the last quarter of the nineteenth century, the fishing industry underwent rapid development thanks to the use of ice to preserve fish (1874) and the introduction of steam fishing boats (1884). The use of ice extended food life and made longer fishing trips possible. Steam fishing boats were soon adopted in Belgium thanks to the intensive fish trade between Belgium and Britain.

Ostend was the principal fishing port on the Belgian coast. In 1885 the *Société Anonyme des Pêcheries Ostendaises* was established specifically for operating steam trawlers. Wealthy investors from Brussels enabled substantial investments, while the introduction of steam ships opened up new



■ Traditional sailing ships in the Ostend harbour at the end of the 19th century (Private collection)



■ De Panne had a fishing fleet but no harbour. Boats were stranded at low tide during the First World War as well. Picture taken by Belgian Queen Elisabeth on 7 July 1916 (Albert en Elisabeth 1914-1918: albums van de koningin, 1984, cat. N°: S.M. 389, p. 66)

Port	Sailing boats	Sloops	Steam trawlers
Ostend	140	149	29
Blankenberge	60	3	-
Nieuwpoort	28	5	-
Oostduinkerke	16	2	-
Heist	68	-	-
Koksijde	8	1	-
De Panne	88	-	-
Zeebrugge	20	-	-
Total	428	160	29

perspectives with regard to fleet structure and fishing grounds. The shipbuilding industry adapted to this new situation: steel ships replaced wooden vessels. And the traditional sailing ships that had dominated fishing until 1875 gradually disappeared. This is clearly illustrated by the evolution of trade in the Ostend fish market. In 1890 steamboats accounted for 15% of the total value of landings (worth 3,749,000 Belgian franc or approx 95,000 EUR in today's money). By 1910 this figure had increased to 58% of a total value of 4,396,000 Belgian franc. Thanks to steam boats, Ostend was able to compete with northern French fishing ports such as Dunkirk and Calais. Fishing communities from the Belgian west coast provided crews for French vessels on account of the low wages and their extensive expertise. Besides Ostend, every coastal town had its own small fishing fleet (see table). The boats were sometimes moored on the beach and were operated by a fisherman and his close relatives. Especially those fishermen who did not modernise had a hard time of it. They often supplemented their income from running an inn or a shop.

When the war broke out in August 1914, the Belgian fishing fleet responded in various ways. Most fishermen chose to flee abroad, taking only their relatives and some personal belongings with them. Fishermen who had larger vessels helped with the evacuation of Belgian refugees. Others, especially those in De Panne, chose or were forced to stay at least until 1916-1917.

The German declaration of war affected the food supply straightaway. The Belgian authorities immediately banned the export of foodstuffs. Food prices rose considerably as a result of hoarding by the population. Non-perishable foodstuffs were particularly sought after. By contrast, fish prices declined sharply. Ostend, a major market for the export of fishery products, saw its export

vanish completely so that prices in the fish market dropped systematically. Due to the closure of the borders, entire trainloads even had to return to the Belgian coast in the summer heat. Furthermore, the domestic market was already saturated. The demand for more expensive fish dropped in the first week after the German invasion: the price of turbot declined from 3.5 Belgian franc to 0.2 Belgian franc per kilogramme and the price of sole fell from 200 Belgian franc to 36 Belgian franc per kilogramme.

Refugee fishermen

All fishermen who had a seaworthy boat fled abroad from the autumn of 1914 onwards. France, England and the Netherlands were the most popular destinations. A few fishermen even went all the way to the Belgian Congo. The refugee fishermen were soon given a fishing licence in their new home port. To protect them during the war, the Marine Affairs Administration created a war-risk insurance fund for fishermen in September 1917. The fund was intended to provide insurance for the Belgian fishing fleet and the families of fishermen in case of accidents or other incidents resulting from the war.

The Netherlands

Immediately after the start of the war, Zeelandic Flanders was overrun by Belgian refugees. Two boats of the Belgian Telegraaf company, accompanied by numerous mussel boats carrying refugees from Antwerp and Mechelen, arrived in Bruinisse during the first week of September 1914. Fishermen from the Scheldt area, e.g. from Temse and Baasrode, also fled to the Netherlands. Due to the reception problems in Zeelandic Flanders, many Belgians continued to Rotterdam or Amsterdam. Nearly 720,000 Belgian refugees had arrived in the Netherlands by October 1914. This situation did not last long, however. Already in November 1914 large numbers of Belgians returned home. The warring parties had gotten bogged down in a bloody trench war and the Germans threatened to confiscate property.



■ The fishermen from Heist and Zeebrugge fled to Zierikzee in Zeelandic Flanders in the spring of 1915, as did Eugène Vlietinck on H36 (Schot, *Vlaamse vissers als vluchtelingen*, p.75.)

Ostend and sea fisheries during the First World War

From the end of September 1914 onwards, nearly all Ostend fishermen fled abroad, not just for fear of the German army but also for fear their fishing activities would be severely disrupted. They were right: the Germans banned any form of fishing on 22 October 1914. They were suspicious of fishing vessels that wanted to enter port and opened fire at the slightest pretence. Although many ships and boats had been taken abroad, 33 vessels stayed behind in Ostend. The majority were small shrimpers and sloops that could only be used for inshore fishing. In March 1915 the German authorities ordered all boats to be collected and transferred to a shed. In other words, it did not seem like a lot of fishing would take place during the war.

Yet a few brave Ostend fishermen secretly began to fish in an abandoned dock, since the food shortage caused the demand for fish among consumers to rise. Fishmongers were eager to buy up the fish. Remarkably enough, the Germans tolerated these spontaneous fish sales. Subsequently, Mayor Liebaert successfully entered into negotiations with the *Ortskommandant* to resume inshore fishing. Eventually, fifteen small boats were permitted to fish just outside the harbour channel in May 1915. They had to stay hidden from the French coastal batteries on the front in Nieuwpoort. When the Germans had a fishery protection vessel – an abandoned and converted motorboat – at their disposal, several sloops were allowed to leave port under German surveillance. However, fishermen needed to have a *Schein* (licence) issued by the *Oberkommandantur* (Supreme Command) in Bruges.

The fish caught by Ostend fishermen were a welcome supplement to the inadequate food supply. Potatoes, beans, bacon, rice and bread were the staple foods. The caught fish could only be sold in the fish market. The first official sale during the occupation took place on 21 May 1915. Fish was rationed so that every household got the opportunity to buy some. A family with two children, for instance, was entitled to two large and two small soles. The gross sales were modest: 108 Belgian franc on the first day. Sales in the fish market quickly increased afterwards, so that values of 600 Belgian franc were no exception anymore. To regulate trade in the fish market, the local authorities drew up several decrees. For example, only holders of a municipal bread ration card were allowed to purchase fish. To prevent sale at exorbitant prices, passing on or reselling family bread ration cards to fishmongers was strictly forbidden.



■ Fishermen fled with their families from Bassin d'Echouage, the current Montgomery Dock in Ostend (Freddy Philips, 14/18 op Zee, 2013)



■ Recreational fishing was strictly controlled by the German occupiers. Heavy fines were imposed on fishing without a permit (De Vooruit, 04-07-1915)

Although the fish caught was intended for supplying food to the local population, German officers sometimes tried to get a piece of the pie. In addition to difficulties with the Germans, fishermen also faced common problems such as storms and accidents. Remarkably enough, the German fishery protection vessel often rescued unfortunate fishermen from drowning. After a few incidents, 25 fishing boats were allowed to leave port every day. These small boats were seaworthy in calm weather and as long as they stayed close to the coast. But in foul weather the thirst for money sometimes prevailed over common sense. No less than seven boats sunk and nine fishermen lost their lives off Ostend during the storm of 23 December 1916.

The amount of caught fish steadily grew, as did the daily trade in the fish market. Values of over 1000 Belgian franc were no exception. A peak of 3700 Belgian franc was even reached in December 1916 thanks to the supply of fresh sprat. Of course, inflation also played a role in this. Fishing threatened to become the victim of its own success. A regulation by the *Kommandantur* (commander's office) curbed the exorbitant prices. For instance, the maximum price for sprat was fixed at 0.25 Belgian franc per kilogramme and for shrimp this was 0.90 Belgian franc. Fish market staff saw to it that fish was only sold in the fish market. Such provisions indicate that the fish trade was increasingly regulated. Towards the end of the war, the German occupiers took ever stricter measures such as confiscating all fish caught, since Germany increasingly faced problems with the food supply of their troops. The harbour channel was completely blocked on 6 October 1918. Fishing only became possible again after the armistice of 11 November.



■ *De Roos* – a wooden shrimper built in 1912 – is moored at the pier in Nieuwpoort. This way the ship could leave the harbour quickly. The nets are drying after fishing (Collection of Daniel Moeyaert)

Belgian fishing boats in British ports in 1917 (ARA, Marine Affairs Administration, N° 7921: Annex to 'Situation de la flotille de pêche belge', 1917).

Port	Sailing boats	Sloops	Total
Lowestoft	43	8	51
Ramsgate	38	-	38
Rochester	4	-	4
Gravesend	3	-	3
Folkestone	-	14	14
Rye	10	1	11
Brixham	5	-	5
Swansea	4	-	4
Milford Haven	31	-	31
Total	138	23	161

In late November 1914, the British-French fleet shelled the ports of Zeebrugge and Heist. A great deal of harbour facilities were hit and destroyed. The inhabitants of these coastal towns were advised to leave their homes and relocate. Fishermen from Heist and Zeebrugge first went to the Dutch towns of Philippine and Cadzand, hoping to be able to fish in the Western Scheldt estuary. In late April 1915, the Germans told them they had to leave the Western Scheldt, whereupon the Heist and Zeebrugge fishermen moved northward to Zierikzee.

No less than 72 Belgian fishing boats arrived in this Zeeland coastal town in April 1915, carrying 325 adults and 173 children. The fishermen lived with their families on their boats for a while. There was a pressing need for housing in Zierikzee. It was not until April 1916 that the first wooden houses were ready for the Belgians. By that time, many fishermen's families were housed in private houses and warehouses. The presence of a large number of fishermen's children made the establishment of a separate school in Zierikzee necessary. Nearly all Belgian fishermen brought their catch on the market in Zierikzee. A few of them also supplied the markets of Breskens and Vlissingen. The most targeted species in 1916 and 1917 were sprat, herring and shrimp. Shrimp peeling plants were founded where fishermen's wives could be employed. Belgian fishermen continued to sail under the Belgian flag and markings for a long time. This was



■ English-language media urged the population not to waste food. Fishermen were depicted as heroes (Canadian War Museum).

dangerous, as they also ventured out of the Dutch territorial waters. For instance, a German submarine sank a Heist fishing boat in August 1915. From then on the Belgian fishing fleet sailed under the Dutch flag and markings.

Britain and France

After the start of the war, France and England received a lot of Belgian fishermen as well. Due to various circumstances they were not all able to keep on fishing. Ships were commandeered, lost at sea or used for spare parts. Fishing boat crews were sometimes forced to work in shipyards in Scotland. Fishing sloops that moored in Britain were allocated certain fishing grounds by the local maritime authorities. Belgian sailing boats and sloops that were not of military importance were spread over the British ports (see Table p.93). By contrast, steam trawlers operated from the minor ports of Lowestoft, Milford Haven and Fleetwood.

The Belgian boats that were temporarily based at Milford Haven sailed under the Belgian flag and were equipped with guns. Just like the British fishing vessels, the Belgian fishermen needed a licence issued by the British Board of Agriculture and Fisheries. In case of attack, Belgian fishing vessels had to raise the British flag and the crew had to put on the uniform of the British Royal Navy so that they would not be considered francs-tireurs. The smooth deployment of Belgian steamboats in British



■ Some Ostend fishermen fled to France during the war (1915) (De Plate 2004, p.169)

offshore fishing is demonstrated by the sales figures for Milford Haven, Swansea and Fleetwood. From September to December 1914, Belgian steam trawlers achieved a turnover of 20,907 pound sterling. In 1915 and 1916 this figure had risen to 148,610 and 258,054 pound sterling respectively. The figures for 1917 are not available, but the turnover for 1918 is estimated at 870,442 pound sterling.

Overall, living conditions for fishermen were better in Britain than in Belgium. Wage growth outpaced the increase in food prices. The proximity of the fishing grounds enabled fishermen to make longer fishing trips as well as to spend more time on shore with their wives and children. Although the Belgian fishermen formed a separate social group in each port, the British government did not leave them to fend for themselves. The local authorities set up a general and vocational education system together with

the Belgians. And it was possible to take exams for captain, lieutenant and mechanic. However, not everything went smoothly. Occasionally there was friction between the English and the Belgians in Milford Haven, since former competitors were now forced to live side by side for a while. The authorities threatened with severe punishment. Fishermen who went too far were sent back to Belgium or, in the worst case, to the front.

The Belgian fishermen who had fled to France were divided into three groups, each supervised by a Belgian maritime commissioner. The first group operated from Calais, Boulogne, Gravelines and Dunkirk, and had about sixty sailing boats. The second zone was located near Dieppe, where approx 90 fishing vessels were spread over the ports of Le Tréport, Dieppe and Fécamp. The third and final group of Belgian fishermen had fled to the Normandy coast. A total of 20 vessels operated from Le Havre,

Trouville, Honfleur and Port-en-Bessin. The aim was to maintain these numbers throughout the war. The movements of the Belgian fishing fleet based in French ports were more strictly regulated than in the case of British ports. The French administration was less inclined to issue licences, partly for fear of Belgian competition.

Belgian fishermen continued to practise their trade in France and Britain. Sometimes they actively took part in the war. Some of them were involved in provisioning the Belgian troops. Occasionally, the fishing boats also performed support tasks such as clearing mines or escorting submarines. Several steam trawlers were even armed. These ships served as coast guard vessels and engaged with German U-boats. Belgian crews rescued shipwrecked British sailors on various occasions, often in difficult and dangerous circumstances. As a token of gratitude, the Belgian rescuers and crews were given an engraved silver cup as well as a monetary remuneration. The Distinguished Service Cross was awarded for exceptional gallantry.

Fishermen who suffered damage, irrespective of their active participation in military operations, could apply for compensation. To this end, the captain of a sunk ship submitted a form with a detailed description of the circumstances. The shipmaster and his (surviving) crew then appeared before a committee that assessed the matter and decided whether the shipmaster was eligible for compensation.

The fishing industry after the war

The fishermen who had fled abroad were greatly affected by the war. No less than 74 of them lost their lives. The fleet registered before the war lost 7 steamboats and 125 sailing boats. Over 60% of losses was caused by the enemy: 77 sailing boats were sunk by gunfire or torpedoes, or struck a naval mine. A total of 21 sailing boats sank because of the weather conditions. Thirteen vessels were lost during the occupation of Belgian ports or were towed away by the Germans. Finally, fourteen sailing boats were sunk by the Allies. All stricken steam trawlers sank during combat at sea.

The first steam trawler returned to Ostend in December 1918. The ship was loaded with fish, a gift from the refugee fishermen in Milford Haven to the residents of Ostend. The British Royal Navy had granted special passage to the steamship, given the numerous minefields in the English Channel. All sailing sloops that had fled returned in the course of 1919. The steam trawlers were more hesitant about going back to the Belgian coast, as fish prices were a lot higher in England than in the devastated homeland. Moreover, the operating costs were high in Belgium due to a lack of materials and the destruction of the harbour facilities. The domestic demand for fish was low, on the other hand, as the population had become

Vrijdag 20 December			
van 8	tot 9.30 uur	1 tot 1000	
9.30	11	1000	10000
11	12.30	1000	10000
1.30	3	1000	10000

Zaterdag 21 December			
van 8	tot 9.30 uur	1 tot 1000	
9.30	11	1000	10000
11	12.30	1000	10000
1.30	3	1000	10000

Ostende, den 20 December 1918.

Met. wett. Ont. Onten.

Het Gemeentebestuur.

Immediately after the war, free fish was distributed among the hungry population in Ostend (Archives of the Marine Affairs Administration, N° 7921)

impoverished. Belgian steam trawlers continued to operate from British ports up to the end of 1919. It was not until 1920 that the Belgian fishing fleet was up to strength again, although its composition was different than in 1914.

The problems resulting from the war damage to fishing boats continued until the early 1920s. The Belgian legislator established a special arbitration committee for war damage done to fishing vessels at sea. Its express assignment was to investigate the damage to fishing boats caused by the war in Belgian or international waters. The Committee was founded because many problems could not be dealt with within the normal scope of the war damage courts.



Fishing boats lay neglected at the Maritime Station in Ostend at the end of WWI; picture taken in 1919 (VLIZ, www.vliz.be/wetenschappen)

The First World War had diverse effects on sea fisheries. Capital was not lacking after the war, since considerable reserves had been built up from 1914 to 1918 and sales in the fish market were high from 1922-1923 onwards (taking into account post-war inflation). In addition, Brussels financiers invested a great deal in the expansion of the fishing fleet and in steamers. For example, Ostend saw the foundation of six new steamship companies between 1919 and 1923, including *SA Pêcheries à Vapeur du Congo*. A total of 31 steam trawlers, 104 sailing sloops and a large number of shrimpers operated off Ostend in 1920. Individual fishermen had also accumulated a nest egg during the war and became the proud owners of their own sloops. Some switched over to the internal combustion engine or even to high-sea fishing (in Icelandic fishing grounds) after the war.

The migration of Belgian fishermen to the French Channel ports and the British west coast also had several technical consequences for the fishing industry. Mooring shrimpers on the beach, as had been the custom in De Panne, was finally abandoned. Smacks with a manoeuvrable steel hull replaced the old sailing sloops. Tonnage and length increased, and comfort on board improved. Wireless telegraphy and the first refrigeration systems were introduced. Furthermore, the emigrant fishermen had explored new fishing grounds in St George's Channel, the Bristol Channel and the Irish Sea from their new home ports. They continued to visit these fishing grounds after 1918 as well, which resulted in large catches.



■ NV Oostendsche Reederij was established on 1 October 1921 thanks to investments from socialist circles. 0.149 – Emiel Vandervelde was part of the ‘Red Fleet’ (Daman en Jansoone, *Oostende na 1918*, 63.)

Many fishermen who returned home had changed mentally. During the war, they had not just been promoted to brave warriors, they had also come into contact with the militant British trade unions for fishermen and sailors. They brought these ‘revolutionary’ ideas with them to Belgium, much to the anger of the large traditional shipowners, who wished to keep on imposing the same working conditions after the war, while fishermen wanted to improve their situation. On 15 June 1920 a general strike broke out that would last until October. The social struggle was especially intense in the socialist bulwark of Ostend: the socialist movement even created the so-called ‘red fleet’, *NV Oostendsche Reederij*, in 1921. The shipowners eventually made concessions with regard to wages.

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CIS THE BEACHCOMBER



Wikipedia

He knows the beach like no other. Beachcombing is his passion, and passions should be shared with other people. Are you ready to become initiated in the mysteries of the strangest flotsam and jetsam?

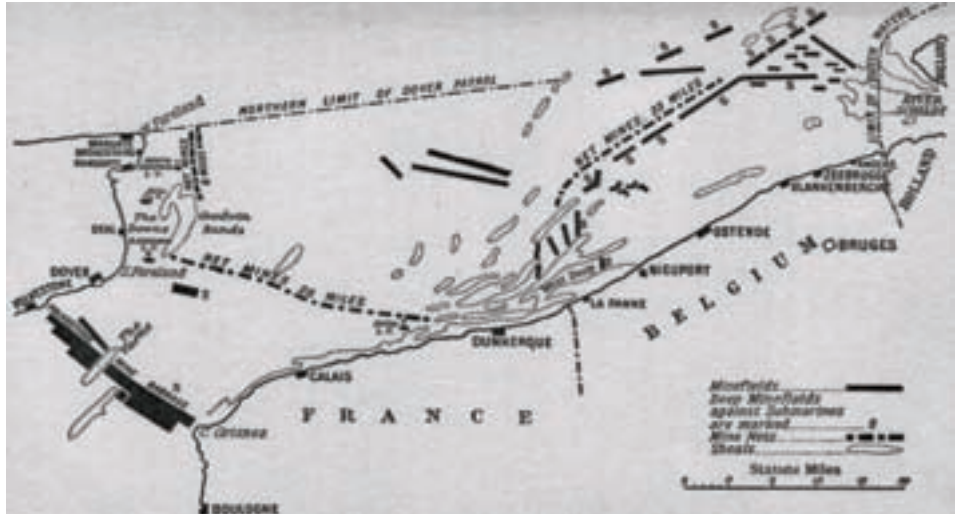
NAVAL MINES, DECORATIVE AND DEADLY

The beach was largely off limits during World War I (see Mahieu E. in this issue). It was a dangerous place, partly because all sorts of war materials, in particular naval mines gone adrift, were washed ashore. Mines found on the beach were deactivated and often used as decoration.

THE NORTH SEA CLOSED OFF BY MINEFIELDS

The warring parties extensively deployed naval mines in the North Sea and beyond during WWI. The mines were cheap and effective. The Germans targeted the routes of merchant and navy ships heading for and departing from the United Kingdom. The Allies tried to cut U-boats off with naval mines in the Strait of Dover and the northern part of the North Sea and keep the German fleet confined. As part of this strategy, the Americans and British developed the North Sea Mine Barrage in the final years of the war by laying 70,000 naval mines between the Orkneys and Norway. Earlier on (in 1915), the Allies had blocked the entrance to the English Channel with a chain of minefields (the Dover Barrage, see map) to confine German submarines to the North Sea. In all, some 235,000 naval mines were laid in minefields in WWI.

The best-known are the spherical metal devices with characteristic protuberances (Hertz horns), but various types existed. Quite a few of these mines broke from their moorings and went adrift after a while. For instance, the British Mark 3 naval mine, which was ignited by a protruding float that rotated upon contact with a ship, was not very successful: hundreds of these mines washed up on the surrounding beaches.



Just like the North Sea Mine Barrage constructed between the Orkneys and Norway in 1918, the Dover Barrage consisted of a chain of minefields laid by the Allies to keep the German fleet, including submarines, contained to the North Sea as much as possible (Wikipedia)

DECORATION

Once washed ashore and deactivated, mines often got a second life. People enjoyed posing next to them, as is still customary with other remarkable objects such as wrecked ships or beached marine mammals.

Afterwards, they could be used as decoration in the officers' mess or as a flower tub in the garden. Naval mines from WWI can still be found in many places as eye-catchers

or decoration. However sinister these old spherical mines with their protuberances may be, they do look the part. And being cast-iron, they are solid in an old-fashioned way. I pass by two such mines almost every day, displayed at the entrance of the Naval Mine Warfare School (EGUERMINE or *Ecole de Guerre des Mines*) in Ostend. I hadn't noticed them until now...

Francis Kerckhof



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Posing next to a washed up naval mine was very popular. On the left: three German soldiers behind a British Mark 3 naval mine (Forum Eerste Wereldoorlog). On the right: a washed up naval mine in De Panne with young Belgian Prince Charles in Royal Navy uniform. This picture was taken by Belgian Queen Elisabeth in November 1918 (Royal Palace Archives)

FRUITS OF THE SEA



Collection of NAVIGO – National Fisheries Museum, municipality of Koksijde

In this section we provide you with objective information on sustainable fishing and fish consumption.

FISH CONSUMPTION DURING WWI

Before the war, bread and potatoes were the staple foods of the average Fleming, while meat was increasingly consumed as well. Due to the circumstances of war, fish would quickly gain importance, however.

HEALTHY FISH AS A SUBSTITUTE FOR MEAT

The consumption of fish increased during the First World War. Although specific figures are lacking, there are various indications for this increase, e.g. the growing scarcity of meat on the market. The average meat consumption per capita had risen from 15 kg in the period 1890-94 to 31 kg in the period 1909-13. This trend came to an end when the Great War broke out. On the one hand, the Germans confiscated a large part of the country's livestock, not just to provision the army but to feed the German civilian population as well. The number of pigs, cattle and horses in Belgium dropped by 45%, 30% and 41% respectively between 1913 and 1919. On the other hand, the import of foreign meat declined sharply due to the British blockade. The National Relief and Food Committee, which ensured the supply of food to occupied Belgium during the war,

mainly devoted itself to the import of grain. The limited amount of meat available on the market, often illegally, was sold at exorbitant prices.

Academics therefore advocated replacing meat as much as possible by fish. Albert Clerfayt and Martin Herman, two physicians, each published a brochure on nutrition in time of war (1916). They found herring to be an ideal substitute for meat. Thanks to its high protein and fat content, herring could supplement a plant-based diet (rice and potatoes) and provide the required calories. A smoked herring weighing 70 grams – gutted and without head – provides 163 more kilocalories than 100 grams of beef. Doctor Clerfayt also pointed out the qualities of stockfish and dried flatfish. Stockfish has a high nutritional value: 100 grams represent 316 kilocalories. Both stockfish and plaice contain more protein but less fat than herring. To serve as staple food, starchy foods had to be added according to Dr Clerfayt. Mussels were also included in the category of 'recommended foodstuffs'.

FROM A WELCOME DIETARY SUPPLEMENT TO A WIDESPREAD FOODSTUFF

In other words, fishing provided a welcome dietary supplement. Moreover, fish and shellfish are not just an important source of protein but also contain other nutrients such as iodine. Consumption of oily fish such as herring, sprat, mackerel, tuna, sardines and salmon was particularly important in times of food shortage. These fish species

are mostly pelagic (i.e. living in the open ocean) and provide a rich source of essential fatty acids (especially omega-3). They also contain low levels of saturated fats and a great deal of protein, iron, calcium as well as vitamin B and D. By a lucky coincidence, a lot of sprat and herring was caught off the Belgian coast during the war. This fish was not just important for public health, it also improved the unbalanced diet of bread and potatoes.

However, not everyone was fortunate enough to live near the sea. Luckily, the numerous Belgian rivers, canals and brooks provided an alternative. The pollution of waterways decreased as industry had come to a standstill because of the war. For example, no flax was retted in the Lys river for four years. The population of freshwater fish systematically increased during the war thanks to this improved water quality. Many people fished on riverbanks. Crabs and shrimp were fished in the creeks of the Meetjesland region (northern East Flanders). It was easy to make a primitive hook and line. Despite close monitoring and regulation of river fishing by the German occupiers, a lot of households ate fish every once and a while.

Fish consumption further increased after the war. The Belgian fishing industry thrived and more fish was imported as well: imports rose from 68,323 tonnes a few years before WWI to 75,530 tonnes after the war, an increase of 10%. Fish became available to a growing number of people thanks to technical innovations in sea fisheries and the expansion of distribution.

Brecht Demasure



■ Employees of a sprat cannery pose during work (Carbonez family & NAVIGO – National Fisheries Museum, municipality of Koksijde)

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ASK YOUR SEA-RELATED QUESTION



A mine salvaged from SM UC-61 (Chatelle & Tison, 1927)

Over 1500 Flemish researchers and managers are involved in professional activities relating to the sea and coast. Do you have a pressing question about the ocean, the dunes, the beach or the estuaries? Ask it and they will provide you with an answer!

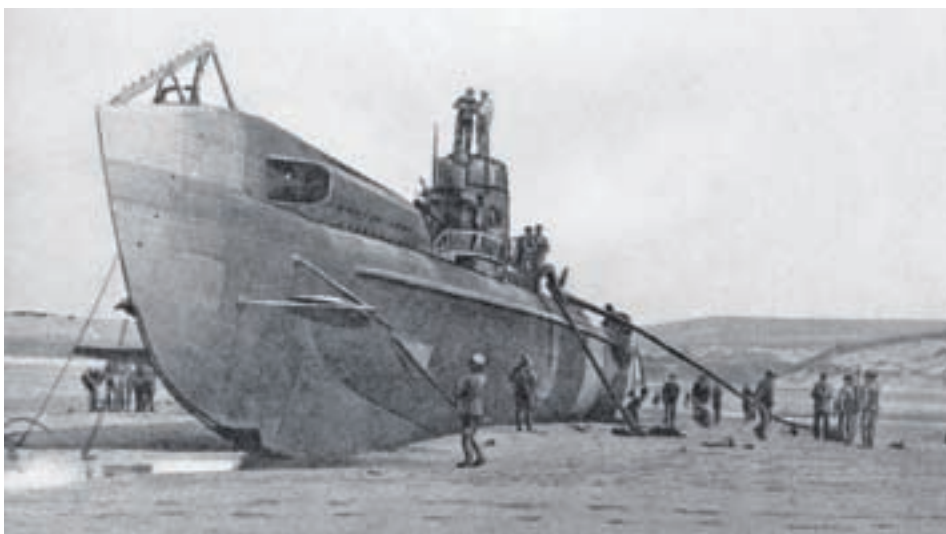
WHAT DO THE BELGIAN CAVALRY, A GERMAN U-BOAT AND THE VAN DEUREN MORTAR HAVE IN COMMON?

Sometimes events can take an unexpected turn. Take the following example: the story of the Belgian cavalry, a German U-boat and the inventor of the Van Deuren mortar.

THE TRAGIC FATE OF A GERMAN SUBMARINE IN WISSANT

The captains of the small German U-boats were all too aware of the unpredictability of the sea between the northern French and British coasts with its powerful tides. They operated from Zeebrugge and Ostend with submarines specially designed for this region. Captain Georg Gerth, commander of SM UC-61, experienced this personally when he carried out his fifth combat mission on 25 July 1917. SM UC-61 was a mine-laying submarine with a length of about 50 metres, had a crew of 25 men and had been commissioned on 13 December 1916. She had a deck gun and three torpedo tubes and carried 18 naval mines.

The mission's objective was to break through the French-British Dover Barrage and then lay mines on the shipping routes to the ports of Boulogne and Le Havre. Captain Gerth tried to navigate close to the coast between Cap Blanc Nez and Cap Gris Nez. However, he had overestimated the depth of the water along the route. Suddenly, the crew heard the keel grating on the sand. The U-boat was stranded on a sandbank and irretrievably lost.



German U-boat UC-61 captured by Belgian cavalymen at Wissant (Chatelle & Tison 1927)

THE BELGIAN CAVALRY PLAYS A LEADING PART

Captain Gerth knew that it would not take long for the conning tower to come to the surface due to the falling tide. His only option was to abandon ship, destroy her and surrender to the enemy. But a few French customs officers stationed at Wissant heard strange noises in the pitch-darkness of night. They alerted the nearest military force, namely the 5th regiment of lancers, a Belgian cavalry unit. Several dozens of cavalymen rushed to the scene and saw the German crew making frantic efforts to destroy SM UC-61 in the bay of Wissant. They managed to break the U-boat in half with a heavy explosion. Fire broke out but it was fairly quickly put out with seawater. The Belgian cavalymen stood by and looked on in amazement. The German crew was ordered to walk to Calais escorted by the mounted lancers. The wreck stayed behind with several unexploded naval mines on board.

VAN DEUREN AND HIS MORTAR

In Calais, Belgian engineer Pierre Van Deuren heard the story about the German U-boat crew taken prisoner. He was testing the recently designed trench mortar named after him, and investigating the possibility of deploying this weapon – mounted on the forward deck or afterdeck of a ship – against submarines. Now that Paris had given permission to install this Belgian weapon on

French transport ships, operators needed accurate directions and firing tables. The Belgian Ministry of War allowed Van Deuren's workshop to complete the order as soon as possible. In the meantime, the weapon had been considerably improved thanks to tests at sea carried out from the base in Calais. But it remained uncertain how an enemy submarine would behave when mortar rounds came down and exploded. This could now be tested in September 1917 thanks to the German U-boat that was stranded near Wissant. As SM UC-61 was 4-5 metres under water at high tide, it was possible to examine the effects of explosions on a submerged U-boat. First fire was opened on the target from the beach. The projectiles landed perfectly in the immediate vicinity.

The fifteenth mortar round even fell so close to the target that the shock of the explosion set off a dozen naval mines in the bow in a chain reaction. The entire bow was destroyed. The French evaluation commission was impressed.

Luc Vandeweyer

THE COASTAL BAROMETER



Westtoer

By looking at indicators, we try to find out whether the coastal policy pays enough attention to people, nature and economic development.

THE QUESTION:

WHAT IMPACT DOES WWI STILL HAVE ON THE COAST?

WHAT IS THE IMPORTANCE OF THESE FIGURES FOR COASTAL MANAGEMENT?

You may not realise it, but the First World War still influences the appearance of many places nearly 100 years on. Along the Belgian coast there are still many traces to be found of the Great War: bunkers, memorials and other sites. The war past still has an attraction for visitors. WWI tourism has increased considerably over the past few years. And the impact of the diverse commemoration activities and initiatives is noticeable on the Belgian coast as well, specifically in the hospitality industry and the development of certain activities.

WHAT ARE THE RESULTS? WHY THIS RESULT?

Battlefield tourism is crucial to the Belgian Westhoek area

With over 340,000 WWI tourists a year, WWI tourism accounts for no less than 30% of the total turnover for the Westhoek

Places outside the Westhoek area where WWI tourists who go on daytrips to the Westhoek area stay (in %). Source: Study by Westtoer: Oorlog en Vrede in de Westhoek (2006)

	Individual visitors	Groups
West coast (De Panne, Koksijde, Nieuwpoort and Middelkerke)	37,3%	13,4%
East coast (Bredene, De Haan, Blankenberge, Zeebrugge and Knokke-Heist)	1,7%	6,3%
Ostend	5,0%	5,9%
Greater Bruges (excluding Zeebrugge)	17,6%	37,8%
France	11,3%	14,3%

tourism industry (2011). WWI tourism does not just generate flows of visitors to the Westhoek area, it is also an important economic driver. The number of day trippers and the number of long-term tourists are both rising and create a turnover of 136 million EUR in this region. In 2012 the number of WWI tourists was estimated at 359,000. This figure is expected to increase over the coming years up to approx 400,000. A small part of these tourists combine visits to several WWI memorials with a stay on the Belgian coast. The majority of individual WWI tourists who go on a daytrip to the Westhoek area and who stay in another location than their own residence stay on the Belgian west coast (37.3%), in Greater Bruges (17.6%) or in nearby France (11.3%). Groups, on the other hand, spend the night most often in Greater Bruges (37.8%) and to a lesser extent in France (14.3%) and on the Belgian west coast (13.4%).

Commemoration projects on the Belgian coast supported by Flanders

Flanders organises several commemoration projects on the coast. Currently, three 'coastal' projects receive support from Flanders:

- In **Ostend**, visitors can become acquainted with the city's WWI past through a digital experiential walk and cycling route along the war heritage.

- **Nieuwpoort**, which played a key role during WWI, focuses on the De Ganzepoot site. The visitor centre located here allows visitors to relive the story of the flooding and understand the role of the sluice complex. Visitors are invited to explore

other WWI heritage in the region and the centre can serve as a base for visiting other tourist attractions in Nieuwpoort and the surrounding area. The new visitor centre and the King Albert I Memorial will be presented as one attraction in the future.

- **Blankenberge** invests in signposted walking and cycling routes.

WHAT WILL THE FUTURE BRING?

Ypres and the rest of the Westhoek area will be besieged in a figurative sense by tourists and visitors during the commemoration period. Hotels in the Westhoek area will often be fully booked, and visitors will frequently be forced to spend the night on the Belgian coast. Research has shown that many individual visitors in particular will stay on the Belgian west coast and make trips to the WWI heritage in the Westhoek area from there. This is also often the case with (school) groups. Good interaction in the field of accommodation management with the west coast municipalities is therefore essential. In addition, it would be advantageous to develop package deals and certainly also special offers collectively.

Hannelore Maelfait

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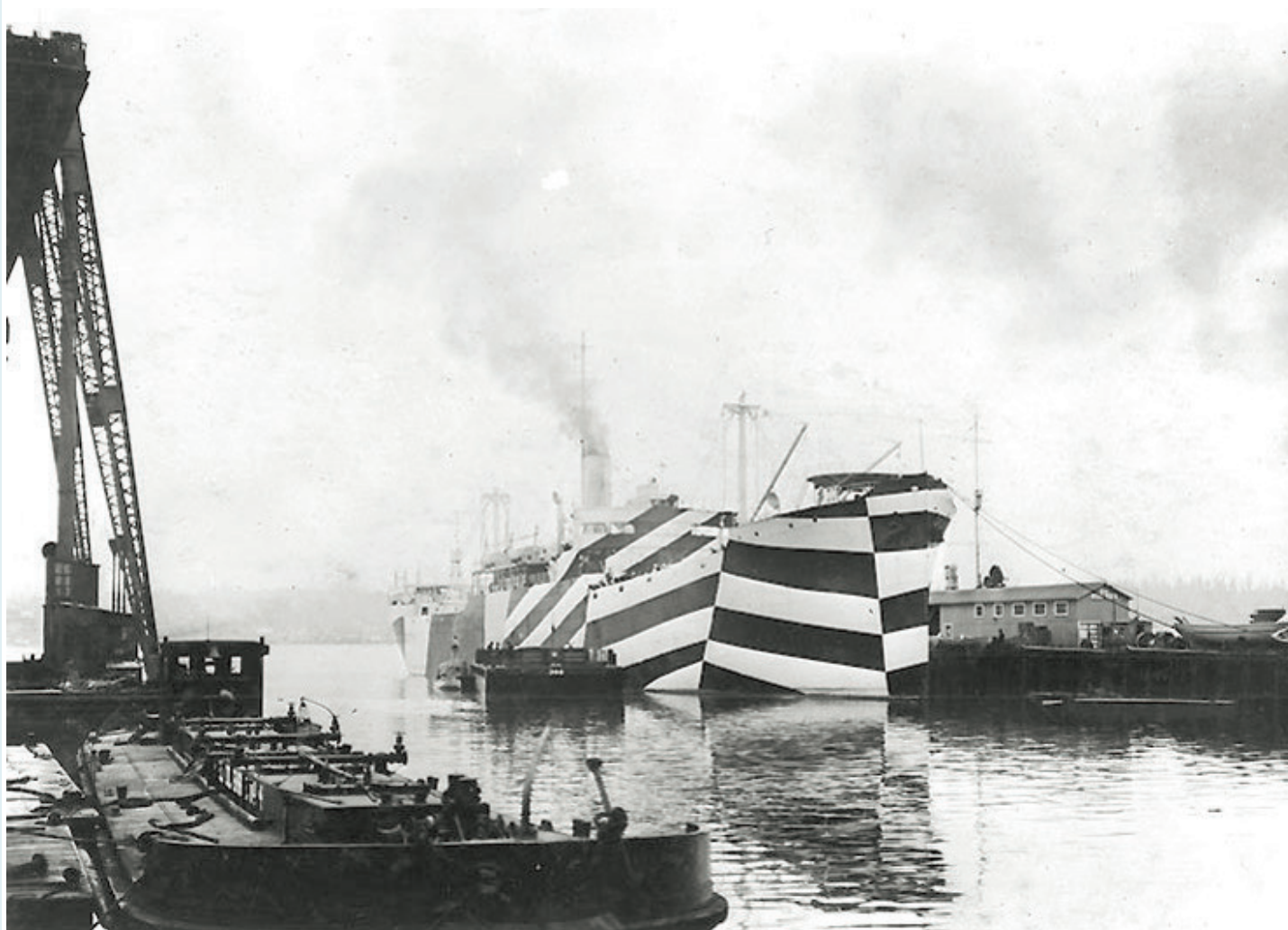
■ A working drawing of the planned "De Ganzepoot" visitor centre below the Albert I Memorial in Nieuwpoort, which will host an exhibition on the inundation. Construction will start shortly (Patrick Vanleene)

Snapshots of the coast



It is sometimes said that we live with our backs to the sea too often and pay too little attention to what the coast has to offer, especially in the hidden spots.

This is why we always challenge readers of De Grote Rede to recognise and name the following image. As this special issue will be available throughout the centenary of WWI (2014-2018), we opted to provide the answer to this questions already in this issue (see 'In the surf' section). Consequently, no prize is awarded for this quiz question.



Wikipedia

What is shown in this picture?

The answer can be found on page 111



ANSWER TO THE QUESTION IN DE GROTE REDE 35

The beautiful flowering plant we were looking for in the previous issue of De Grote Rede is the Burnet Rose (*Rosa pimpinellifolia*). This small shrub displays white or sometimes pale pink flower in May-June and has prickly stems. Dark purple to black hips appear after the flowering season. The Burnet Rose typically grows on dry, mostly calcareous soil, and in Northwestern Europe it is found chiefly in coastal dunes.

EDUCATION & THE SEA

If you think the sea and coast only need to be discussed as a footnote in class, think again! We therefore gladly help interested teachers with all sorts of assignments, experiments and useful information.

THE FIRST WORLD WAR IN THE CLASSROOM

The Flemish coastal municipalities are organising a lot of activities concerning the First World War between 2014 and 2018. Various organisations and authorities provide customised educational packages in this period. One of these is briefly explained below. Other useful websites with regard to education and WWI include:

www.wegwijzerWOI.be
www.nooitmeeroorlog.be
www.1418herdacht.be

'REMEMBRANCE CLASSES' ABOUT WWI ON THE BELGIAN COAST

One of the initiators is youth hostel De Ploate from Ostend. Remembrance classes are organised in collaboration with the Provincial Domain of Raversyde and the Ostend Marine Ecological Centre. This is a varied two-day programme which focuses on the First World War on the Belgian coast. If required, the programme can be extended to three days so that the children have a bit more free time.

On the first day the pupils are introduced

to the topic. This is followed by the 'HMS Vindictive walk'. Then the ferry takes the group to the east bank of Ostend harbour. Starting at the HMS Vindictive memorial, they go for a historical walk with a guide. During this walk, the story is told of how the First World War became a reality for Ostend on 25 August 1914, when the first German soldiers were seen in the surrounding area. When the first wounded soldiers arrived in Ostend from the front, this resulted in a stream of refugees. Many inhabitants of Ostend as well as other Belgians made use of the fishing fleet to flee to the United Kingdom. The Germans captured Ostend and Zeebrugge and used these two coastal towns as a base of operations for their U-boats. Subsequently, the British did all they could to blockade these Belgian ports. And this is where the story of HMS Vindictive comes in (see also Strubbe in this issue). After a walk in the evening, the youth hostel becomes the setting for a special 'WWI meal' offered to the pupils and served in mess tins.

On the second day, the pupils visit the Domain of Raversyde, where attention is paid to the Aachen battery from WWI, the Saltzwedel Neu battery from WWII, the Prince Charles Memorial and 'ANNO 1465' (the story of the excavated and partly reconstructed medieval village of Walraversijde). For more information on these remembrance classes please go to www.schoolklassen.be, www.jeugdherbergen.be or www.raversyde.be.



■ A class visiting Raversijde (Province of West Flanders – Raversijde)



Netwerk Oorlog en Vrede – Province of West Flanders



From the summer of 2014 onwards, Raversyde will provide school groups with additional options that can be integrated in overnight school trips.

'WWI TOUCHSTONE' DEVELOPED BY THE PROVINCE OF WEST FLANDERS

To ensure the quality of similar packages regarding peace and remembrance education, the Province of West Flanders has developed a 'WWI Touchstone'. This educational inspiration guide concerning WWI has been developed to support enthusiasts in the creation of a project. It is a tool and/or guideline for completing the project successfully. After all, the story of the war should be a story with a clear message of peace. This is only possible if we start from responsible remembrance. The touchstone can be used to prepare a new project or as an instrument for reflection and self-evaluation. Anyone who elaborates a project relating to the First World War can use this (school teams, individual teachers, university teachers involved in teacher training, museums, local authorities, holiday accommodations...). The touchstone's structure is based on three important aspects of remembrance education: knowledge and insight; empathy and solidarity; and reflection and action. Attention is also paid to possible pitfalls, ideas and opportunities. In addition, the reader will also find specific educational projects for primary and secondary education. This is just a selection, but the aim is to update the touchstone on a regular basis. The complete 1914-18 touchstone can be found under the section 'Oorlog en Vrede' on the webpage 'Vredeseducatie' of the Culture Department of the Province of West Flanders (www.west-vlaanderen.be).

Mathieu de Meyer, with thanks to Carl Craey

SEA FEELING



Alfons Staelens (Blankenberge City Archives)

The sea touches people. No-one is unmoved by the violence of a storm, the tranquillity exuded by the distant horizon, the immeasurable depths that remain unseen by human eyes... In this section we look for the relationship between man and sea.

WAR CHILD IN OCCUPIED BLANKENBERGE

Alfons Staelens (°Blankenberge, 28-10-1910) was nearly four years old when the Germans marched into Blankenberge triumphantly on 15 October 1914. They left the seaside resort in great haste in October 1918, just before his eighth birthday. We were able to interview him on this topic on 13 September 2012, two weeks before his sudden death. The following is an impression of how a war child lived through this turbulent period.

THE OCCUPIERS, NOT AS EXPECTED...

The war became really apparent to Alfons when hundreds of inhabitants of Blankenberge fled the city at the end of the summer of 1914 for fear of the advancing German troops. The Staelens family also fled to the Netherlands on a horse-drawn cart a few days before the Germans arrived in Blankenberge but returned about two weeks later. Then he came face to face with the enemy for the first time, and it was not as he had expected. He saw a band of undisciplined and drunken German soldiers who celebrated their "victory" by drinking litres of wine they had seized from the cellars of hotels.

But the Germans would not be trifled with. One day he unintentionally made a tram packed with German soldiers depart after he had blown a toy whistle at a tram stop. As a result, he was given a beating by the Feldwebel (a rank of non-commissioned officers in the German army), and it also made him realise that the Germans were planning to rule the city with a rod of iron for a long time. Bewildered, he saw a procession of starved Russian prisoners of war being marched through the streets of Blankenberge, and when bystanders wanted to slip them some food, their guards delivered hefty blows with the butt of their gun.

ANYTHING BUT A NORMAL CHILDHOOD

Alfons Staelens had very little to eat, especially in the second half of the occupation period. He often went catching eels illegally with his father in the Blankenbergse Vaart canal or collect mussels on the breakwaters. At night, starving inhabitants of the city went to the fields in the countryside to steal potatoes and grain. The German occupiers regularly commandeered children of school age to clear sand and snow from the esplanade or pull up nettles from the end of 1916 onwards. The Germans even sent Alfons' playmates, aged 12 or 13, to the Yser front to help construct shelters, barracks and trenches.

Going to school in time of war was far from easy. Classes took place very irregularly. School holidays and free days were often announced only one day in advance. Many teachers had fled and school buildings were requisitioned for long periods of time to billet German troops on leave or stopping over on their way to the front. Out of necessity, lessons were given in improvised classrooms in hotels and private houses or even in a wooden shack on the firing range of the local shooting club.

Alfons Staelens spent most of his free time in the street. Some of his friends passed the time by hitching a ride on the back of carts and cars for as long as possible. Others disrupted military telephone communications by casting ropes weighted with stones at the ends over the telephone lines. The greatest daredevils played in the trenches on the esplanade, which was expressly prohibited and severely punished. The beach was also off limits to civilians, but not everyone observed this prohibition. For example, two children lost their lives when they tried to rip the metal off a washed up naval mine on the closely guarded beach and the mine exploded.



German troops march past St Anthony church in Blankenberge (Blankenberge City Archives)



Children playing in a German ammunition depot in the dunes of Blankenberge (post-war picture, probably taken in 1919) (Blankenberge City Archives)

THE LIBERATION

There was a lot of euphoria when the Germans left the city in great haste in early October 1918. Desperate German deserters who had hidden in the sewers and on the ridge of early-20th-century windbreak in the harbour turned up. They surrendered to the Belgian troops who marched into Blankenberge on 19 October 1918. The liberators were cheered by a frenzied crowd that lined the streets. Alfons Staelens was among them. Waving his home-made paper flag, he greeted the liberation forces enthusiastically from the first row. Unfortunately, he did not have much time to give ample thanks to his liberators. They were ordered to march on to Zeebrugge as quickly as possible...

Pieter Deschoolmeester,
with thanks to Sophie Muyllaert

SEA-RELATED WORDS

The origin of the names of sandbanks, channels and other ‘sea-related words’

Magda Devos, Roland Desnerck, Nancy Fockedeey, Jan Haspeslagh, Willem Lanszweert, Jan Parmentier, Johan Termote, Tomas Termote, Dries Tys, Carlos Van Cauwenberghe, Arnout Zwaenepoel, Jan Seys

Have you ever wondered what the origin of the toponym Trapegeer is, or how cod got its name? Or are you interested in the person behind Thornton Bank or the genesis of the maritime term ‘crow’s nest’? Then you’re in luck, since a team of experts explains the meaning of some of the most intriguing sea-related words in every issue of De Grote Rede.

*In this special issue of De Grote Rede, we focus on the etymology of the toponym Flanders and other place names from the front area of the First World War. Due to limited space, we had to make a selection from the extensive list of cities, towns and villages in the Belgian Westhoek area that were part of the war zone. In case of places that are no (longer) independent municipalities, we always mention the amalgamated municipality of which they are part. Then we state a few attested forms of the place name, including the oldest one. This information was mainly extracted from the work by F. Debrabandere, M. Devos et al. (2010), *De Vlaamse gemeentenamen, verklarend woordenboek*. The etymological explanation is also based on this publication, to which we refer the reader for extensive bibliographical references. Some name forms are preceded by an asterisk (*) in the text. This is to indicate that the form in question is not attested as such in a historical source, but has been reconstructed by linguists from derived forms found in more recent language development stages.*

FLANDERS

Latin sources: 1st quarter of the 8th C. *Flandrensis, Flanderenses, in Flandris*, 745 *in pago Flandrinse*, 854 (copy from circa 1175) *in Flandrense pago, in pago Flandrensi*, 1014 (copy from circa 1050) *Flandria*

Anglo-Saxon sources: 1075 (copy from 1121) *to Flantran*, 1079 (copy from circa 1100) *on Flantran*, 1085 (copy from 1121) *of Flantran*

Dutch sources: 1237 *Vlandern*, 1277 *Vlaendre*, 1295 *Vlaendren*, 1281 *Vlaemdren*

Currently, Flanders is the official name of the Dutch-speaking northern part of Belgium. Within the Belgian federal structure, Flanders is one of the three “regions”, besides the Walloon Region and Brussels-Capital Region. The name comes from the historical County of Flanders, which encompassed the current Belgian provinces of West and East Flanders, Zeelandic Flanders (in the Dutch province of Zeeland) and French Flanders, located in the Nord department of France (map p.105).

FLANDERS, A FLOODED AREA

The most commonly accepted etymology of the name *Flanders* was developed by Ghent toponymist Maurits Gysseling in an article he published together with historian Jan Dhondt in 1948. According to Gysseling, the root of *Flanders* is the Germanic noun **flauma*, which means ‘flood’ and hence ‘flooded area’. This word does not appear to have any direct descendants in Dutch, but it does have derivatives in other Germanic languages. For instance, current English dialects still have the word *flam* for a waterlogged area near a stream, as well as *fleam* for a drainage ditch or leat. *Flaumr*

meant ‘torrent, eddy’ in Old Norse, from which Norwegian *flaum* and Danish *flom* are derived, meaning ‘flood, high tide’.

As a rule, the Germanic diphthong *au* became the close-mid vowel /oo/ in Dutch, e.g. Dutch *rood* (red) from Germanic **rauda*. But in North Sea Germanic or Ingvaenonic languages – which include Frisian and English as well as the oldest stratum of Flemish and Hollandic – this phoneme has sometimes developed into *aa*, e.g. in case of the toponym *Adinkerke* (see below). Other examples of an Ingvaenonic *aa* derived from *au* or *oo* are Middle Dutch *sade* (sod) (from Germanic **sautha*) and toponymic forms such as Zeelandic Flemish *Aardenburg* (metathesis of *Radenburg*, which goes back to *Rodenburg*, the first part of which probably stems from Celtic water name **Rodana*), the historical name *Radenburg* of the Leiden neighbourhood of Roomburg (from Germanic *rauda* ‘red’ and *burg* ‘fort’), *Asdonk*, a hamlet of the village of Mendonk in northern East Flanders, *Asthusa* (Oosthuizen) in North Holland, and *Astbroek* (Oostbroek) in Velsen, also in North Holland. In the three last names, *ast-* goes back to Germanic *austa* (east).

The two final syllables of *Vlaanderen* (the Dutch name of *Flanders*) are remnants of two suffixes. Gysseling reconstructed the complex form as **flaam-dra-um*. The last part is a case ending, namely dative plural, which became the standard form of numerous place names, even if the root did not evoke the idea of a plural. The element *-dra* is an old Germanic suffix, thought to be derived from a prehistoric language. This suffix was originally used to form nouns from verbs. However, the root *flauma* of **flaam-dra* already is a noun, which in an older, pre-Germanic stage had been derived from a

verb meaning ‘to flow, to stream’ by means of another suffix, namely Indo-European **-mo* (>Germanic **-ma*). It is likely that this Indo-European verb is also at the basis of the Dutch verb *vloeien* (to flow). Strictly speaking, the element *-dra* is therefore redundant, as it does not add anything to the etymological meaning of *flauma* (flood, flooded area). Yet combinations of two suffixes with the same morphological function and meaning sometimes occur in Dutch. For instance, this process can be seen in the formation of diminutives, where the Germanic diminutive suffix *-l* is often combined with the more recent suffix *-kijn* (reduced to *-ken* later on). Examples of this are Middle Dutch and dialectal diminutives such as *bosselke* ‘bundle’, *wegelke* ‘path’ and *visselke* ‘little fish’. The evolution of the reconstructed root form **flaam-dra-um* to *Vlaanderen* is plausible phonetically speaking. The vowels in the unstressed suffixes became weaker, which resulted in the intermediate form *vlaam-dr-em*. Already in the West Germanic stage that preceded Old Dutch, the Germanic dative case ending *-m* was replaced by *-en* due to assimilation with the accusative case. The change of the *m* in *vlaam* to *-n* under the influence of the *-d* that follows probably dates back to the West Germanic period as well. The old form ending in *-m* has been found four times in 13th-century texts, e.g. *graue van vlaemdren*, Bruges 1281. This *-m* has also been preserved in the demonym *Vlaming* (Fleming), where it has been able to maintain itself before a vowel. Finally, the Germanic *f-* at the beginning of the word shifted to *v-* in Old Dutch, e.g. compare Dutch *vlam* to Frisian *flam*, English *flame*, and German and Danish *flamme*.



■ Nowadays, Flanders (pale green) is one of the three “regions” of the kingdom of Belgium, besides the Walloon Region (dark green) and Brussels-Capital Region (olive green). The name comes from the historical County of Flanders, which roughly encompassed the current Belgian provinces of West and East Flanders, Zeelandic Flanders in the Netherlands and French Flanders (situation circa 1400) (VLIZ on the basis of Wikipedia maps).

ORIGINS IN PAGUS FLANDRENSIS

As far as the meaning is concerned, the explanation ‘flooded area’ is consistent with the historical geography of Flanders. The oldest sources in which the name *Flanders* – in its Latinised form – appears (8th-10th century) prove that the toponym already existed prior to the foundation of the County of Flanders by Baldwin II (in 884 or shortly afterwards). The area originally called *Flanders* was much smaller than the future county. It constituted a territorially limited administrative unit in the Frankish Empire, a so-called *pagus* (shire). According to Jan Dhondt, *Pagus flandrensis* covered a broad strip along the North Sea coast, which included the flood plain as well as the northern fringe of the adjacent sandy region. The area would have stretched from the Zwin estuary in the east at least to the river Aa (currently located in France) in the west. Yet according to recent historical research, Flanders originally had a smaller surface area, bounded in the west by the river Yser (Declercq 1995). In any case, its landscape mostly consisted of unembanked salt marshes criss-crossed with tidal channels and creeks. It is therefore not surprising that this marshy land was called “the flooded area” (map p.107).

ADINKERKE (DE PANNE)

1123 *Adenkerka*, 1132 *Odecherca*, 1139 *Adenkerke*, 1159 *Odenkercha*, *Odenkerke*, 1513 *Adinkerke*, 1537 *Aeyenkercke*.

This place name is composed of *-kerk* and the Germanic personal name *Audo*, here in the genitive case, and means ‘**Audo’s church**’. The Germanic diphthong *au* became the close-mid vowel *oo* in Dutch (e.g. *brood* from Germanic *brauda*). In accordance with this phonetic law, *Audo* should become *Odo* as is the case in the southern West Flemish place names *Otegem* (submunicipality of Zwevegem) and *Ooigem* (submunicipality of Wielsbeke), both derived from *Odengem* which in turn stems from **Audo-inga-heem*. However, in coastal dialects *au* sometimes became *aa*, hence *Adenkerke* besides *Odenkerke* (for this phonological change, see the etymology of ‘Flanders’ above). Apparently, the two variants coexisted for a very long time, and *Adinkerke* eventually became the standard written form as well as the common colloquial form. Due to replacement of the intervocalic consonant *d* by the palatal consonant *j* (e.g. Dutch *odevaar* > *ooievaar* [stork]) the – antiquated – local pronunciation is *Ooienkerke*: 1566 *Oyenkercke*, 1650 *Oye Kercke*, 18th C. *Oienkerke*.

BOEZINGE (YPRES)

1107 *Bosinga*, 1120 *Boesinga*, 1138 *Boesinghe*, 1276 *Bousinghes* (Romanic form), 1744 *Boesinge*.

Derived from the Germanic personal name *Boso* and the patronymic suffix *-inga*, which converts personal names into clan names. These names were in turn often given to the settlement of the clan in question. *Boezinge* was originally the **home of the people of Boso**.

DE PANNE

± 1785 *de la Kerkpanne nommée Josephe Dorp*, 1786 *de plaets Kerkepan*, 1800, 1820 *Joseph Dorp*, 1818 *Kerkepanne*, 1826 *Kerkepanne (La Panne)*, 1840 *hameau la Panne*, 1900 *Sint-Jozef's Dorp*, 1900 *de Kerkepanne*, 1901 *de Panne*.

The original name of this fairly recent settlement is *Kerkpanne*. Its root is *panne*, the western form of Dutch *pan*, which literally means 'a vessel used in cooking' and metaphorically also 'a depression in the earth, a basin, a dune valley'. This is one of many names of containers used to indicate valleys and depressions, cf. *basin*, *bowl*, *crater* and *trough* in English. The premodifier *kerk* does not refer to a local church, as no chapel was built on this site until 1860, the precursor of the current St. Peter's Church. Was this hamlet the property of a church, e.g. Adinkerke church? Holy Roman Emperor Joseph II wanted to expand the settlement and turn it into a real fishing village named after himself: *Jozefdorpe*. Yet this name did not take hold. The current name *De Panne* is the literal translation of *La Panne*, the French form of vernacular *Kerk(e)panne*. In 1789 *Kerkepanne* was a hamlet of Adinkerke, in 1911 it became the independent municipality of De Panne. Adinkerke became a submunicipality of De Panne in 1977.

DIKSUIDE

1089 *Dicasmutha*, 1119 *Dischemue*, *Dixmue*, 1128 *Dixmude*, 1608 *Dixmuyde*, 1906 *Diksmuide*.

The forms ending in *-mue* are Romanic. The current French form *Dixmude* actually corresponds to Middle Dutch orthography. *Diksmuide* is a compound of *muide*, which stems from Germanic *muntha* 'mouth', also in the sense of 'the point where a river empties into a sea or lake'. In Dutch coastal dialects and in English, the *-n* disappeared before the dental fricative *-th*, as a result of which the preceding vowel became longer, hence Middle Dutch and West Flemish *muide* (>Dutch *muide*) and English *mouth*. The first part is the genitive of Germanic **dika*, from which Dutch *dijk* and English *dike* are derived. In the name *Diksmuide*, *dik-* has the original meaning, which still exists in the West Flemish dialects, of 'ditch, narrow channel'. Old English *dic*, which is etymologically identical to *dik* or *dijk*, has the same meaning (in addition to 'embankment') and is akin to the verb *to dig*. The settlement of Diksmuide was founded **where a small stream issued** into the Yser. Perhaps this stream was the forerunner of the current Handzamevaart canal, dug in the bed of a natural watercourse.

HANDZAME (KORTEMARK)

1085 *Hansam*, 1155 *Hanzam*, 1268 *Hansame*, 1289 *Handsame*, 1826 *Handzame*.

Handzame stems from *Hands-hamme*, a compound of the Germanic personal name *Hanno*, in the genitive case, and *ham*, a Germanic word that is frequently found in toponyms meaning 'meander, bend in a watercourse' as well as '(alluvial) land in such a bend'. The *-d* in *hand* was added later on, perhaps by analogy with the word *hand*; the *-e* in *hamme* is a dative ending. *Handzame* was originally the **land of Hanno, located in the bend of a local watercourse**. In French, *ham* evolved into *han*, as in *Bohan*, *Frahan*, *Poupehan* and *Mortehan*, which are all names of places near the Semois river.

HOUTHULST

1096 *in Walnensi nemore*, 1151 copy from ± 1225 *Woltehurst*, 1187 *Wouthulst*, 1201 *Outhulst*, 1306 *Houthulst*.

This site was originally called *Woudhu(l)st*, traditionally considered as a compound of *woud* (wood) and *hulst* (holly). According to this explanation, it would have signified 'holly wood'. If this were the case, we would expect the reverse order of the name's components, i.e. *Hulstwoud*, with the modifier preceding the modified element, as in *Hulshout*, a municipality in the province of Antwerp. It is therefore possible that the premodifier has another origin, but it remains unclear what this actually was. On the basis of the oldest vernacular attestation, *Woltehurst*, it is possible to consider *hurst* as a variant of *horst* with the West Flemish elision of *-r*. Because the *-w* at the beginning of *woud* was dropped before the back vowel in West Flemish, as is still the case in West Flemish *oensdag* 'Wednesday' and *oekeren* (Dutch 'woekeren'), the form *Oudhulst* came about. The first part was interpreted as the word *hout*, which formerly meant (timber) forest in Flemish and sounded like *oud* in *Oudhulst* in the h-dropping dialects of West Flanders. After this reinterpretation by folk etymology, *Houthulst* found its way to the written language and later on it became the official name. In 1926 *Houthulst* was split off from Klerken and became an independent municipality, which nowadays also includes Klerken, Merkem and Jonkershove.

YPRES

1071-93 *Ipera*, 1096 *Ipre*, 1162 *Ypre*, 1798 *Yperen*, 1903 *Ieperen*.

The city's name is derived from the river *Ieper*, which was canalised and renamed *Ieperleet* later on. *Ypres* (*Ieper* in Dutch) is a prehistoric water name borrowed from the Indo-European language that preceded Germanic and Dutch in this region,

presumably Celtic. *Ieper* stems from *ip-ara*, a compound of an Indo-European root **ip*, derived from **ejap*, which means 'flame-coloured' or 'red', and the suffix *-ara*, which occurs in numerous names of rivers (e.g. *Dender*, *Demer* and *Vesdre*) and probably means 'water'. *Ypres* therefore means 'flame-coloured water'. The formerly often used form *Ieperen* is a more recent calque of the French form *Ypres*. The current Dutch spelling *Ieper* is etymologically incorrect, since the *i* is short in local pronunciation and according to the phonetic laws, and is not a long vowel or diphthong. The correct Dutch spelling should therefore be *Iper*, cf. *Izenberge* and *Izegem*, or it should be pronounced with a Dutch diphthong (*Ijper*), cf. *Ijzer* (Yser), *Slijpe* and *Wijtschate*.

YSER

846 *Ysera*.

Yser (*Ijzer* in Dutch) is also a prehistoric water name, formed with the same suffix as *Ieper*. The first part is the Indo-European (Celtic) word **is*, which is thought to mean 'lively'. The river was therefore called 'lively water'. The Dutch name *Ijzer* is etymologically identical to e.g. *Isère* (France), *Isar* (Germany) and *Jizera* (the Czech Republic).

KEMMEL (HEUVELLAND)

1066 *Kemble*, 1089 *Kemlis*, 1189 *Kemle*, 1243 *Kemmel*, 1269 *ad opus rivi qui vocatur Kemle*.

Various explanations have been suggested as to the origin of *Kemmel*. Gysseling initially traced the name back to *Camulion*, a prehistoric settlement named after the Celtic god *Camulios*, and he assumed that this god had once been worshipped on Kemmel Hill (*Kemmelberg* in Dutch). Later on he recognised a prehistoric water name derived from the Indo-European root **-akom*, meaning 'charming' or 'excellent'. Debrabandere also thinks that it originally was a pre-Germanic water name, *Kemmel* or *Kemmelbeek*, but he says its meaning is unclear. In 1977 *Kemmel* was consolidated with seven other villages into the new amalgamated municipality of Heuveland.

KOKSIJDE

1270 *Coxhyde*, 1295 *Koxide*, 1915 *Koksijde*.

Koksijde is one of many toponyms ending in *(h)ide* on the coast. The second part stems from the Middle Dutch verb *hiden*, etymologically identical to English *to hide* and Dutch *hoeden* (to tend, to keep watch over). Its original meaning 'to hide' developed into 'to take to safety' and in particular 'to land a vessel'. An Ostend city account from 1403-04 states "*als men de bakine stac omme de harijnc scepe te hydene*" (when the beacons were lit to guide the herring ships to land). The derivative noun *hide*, which lost the *h* and became *ide* in the local dialect, indicates a place on shore where small fishing boats were brought to protect them from storms, in particular a **creek or channel behind the dunes**, perhaps sometimes a flat area between the dunes, cf. Low German *hude* 'entrepôt, staple town' (e.g. *Buxtehude*, *Steinhude*). The first part of the name *Koksijde* is thought to refer to a person, an important inhabitant of the settlement that grew around the landing place. The same name is possibly found in other coastal toponyms such as *Coxland* (Westkerke), *Coxmoer* (Varsenare) and *Coxweg* (St.-Kruis, Zeeland). It is more likely, however, that *kok* stems from *koog*, a coastal West Germanic word meaning **unembanked alluvial land**. In this case, the place name is comparable to German *Cuxhaven* (Lower Saxony): 1570 *Kuckeshaven*. It is likely that *Koksijde* was originally located on the

coastline just outside the domain of Ter Duinen abbey. This settlement disappeared in the 14th century, after which the name was passed on to the older settlement of Simoenskapelle, which in turn was buried under the Galloper dune in the 17th-18th century. The current town of Koksijde was established about 600 metres to the south.

LANGEMARK (LANGEMARK-POELKAPELLE)

1102 *Marc*, 1219 *Langhemarc*, 1824 *Langemark*.

Initially this village was called *Mark*, the name of the watercourse on which Langemark and Merkem (from *Mark-heem* 'settlement on the Mark') are located and which is still in part called *Martje*. *Mark*, from Germanic **mark* -, originally meant 'boundary', hence also 'boundary marker' and in particular '**watercourse as a boundary**'. Numerous watercourses in the Low Countries have names derived from *mark*, and several of these names have been passed on to the settlements on these rivers, e.g. Marke (near Kortrijk), Maarke (near Oudenaarde), Merksem and Merksplas (both in the province of Antwerp). A village of the same name, currently known as Kortemark, was situated about twenty kilometres northeast of Mark. To distinguish between these two places, the premodifiers *Lange-* and *Korte-* were added in the 12th century. Why

these premodifiers were chosen exactly remains unclear. *Lang* (long) and *kort* (short) do not refer to the shape of the territory of the two villages, as neither of them is particularly long or short.

LOMBARDSIJDE (MIDDELKERKE)

1285 *Lombardie*, 1375 *van Lombardien*, 1408 *Lombaerside*, 1409 *van Lombaerds yden*, 1818 *Lombartzijde*.

In view of the oldest form, *Lombardie*, which survives in popular speech up to this day, it is unlikely that this is a name ending in *-hide* like *Koksijde* and *Raversijde*, from which the *-d-* disappeared in the local dialect. This assumption does not explain the first part of the name: *Lombard* is probably not a personal name, as the genitive ending *-s* is lacking and since no given name or surname resembling *Lombard* has been found in our historical personal name lexicon. The name may refer to the region of Lombardy in Italy, not literally but in a figurative sense: a **place far away** from the eponymous centre. Remote hamlets and estates have often been named after distant places, e.g. *Turkijen* (Turkey), *Pollanen* (Poland), *Egypten* (Egypt), *Bohemen* (Bohemia), *Canada*, *Argentinië* (Argentina) or *Siberië* (Siberia). We know from 13th-century sources that the polder of Lombardsijde was owned by St. Peter's Abbey in Oudenburg. According to medieval standards, this *polre van Lombardien* was quite a long way from the abbey, which is probably where the thought of distant Lombardy came from. Rotterdam and Roermond also have neighbourhoods called *Lombardije* and these are located at a fair distance from the city centre. The form *Lombaerside* did not appear before 1408, and likely arose by analogy with *Koksijde* and *Raversijde*. The ending *-ide* can be explained as a hypercorrection of *-ie* (cf. Dutch *kastijden* (to chastise) from Middle Dutch *castien*).

MANNEKENSVERE (MIDDELKERKE)

1171 kopie 13^{de} eeuw *Manekini overvara*, 1235 *Mannekinsvere*, 1435 *Mannekensvere*.

This place was named after a *veer* or **ferry across the Yser owned by someone called Mannekin**, a diminutive of the old Germanic male name *Manno* or of a shortened dithematic name such as *Herman*. Mannekin was probably the official who operated the ferry on behalf of the count. The ferry was replaced by the Gravenbrug bridge in 1287. The current Uniebrug bridge was constructed during the French occupation of Belgium. Mannekensvere was an independent municipality until it was consolidated with Schore, Slijpe and Sint-Pieterskapelle into the new municipality of Spermalie in 1971, which became part of Middelkerke in 1977.



■ Pagus Flandrensis covered the coastal area between the Yser and the Zwin estuary, including the flood plain as well as the northern fringe of the adjacent sandy region. This administrative unit was created in the Carolingian period, so before the County of Flanders existed (Raakvlak, from Hillewaert et al 2011)

NIEUWPOORT

1163 *Novus portus, Novum oppidum*, 1190 *Nieweport*, 1302 *van der Niewer port*, 1723 *Nieuwpoort*.

Compound of *nieuw* (new) and Middle Dutch *port*, *poort* from Latin *portus*, which means ‘port’ or ‘harbour’. In the case of *Nieuwpoort*, this word already had the Middle Dutch derived meaning of ‘city’. The name is etymologically identical to *Nieuwpoort* near Gravelines in northern France and *Newport* in England (*Novus Burgus* in Latin). The city was called ‘new’ by contrast with the older city of Veurne. *Nieuwpoort* was built in the area of *Zandhoofd*: 1083-93 *Sandasovad*, 1107 *Sandeshoved*. This name, which refers to a chain of dunes on the Yser estuary, appeared frequently until 1373, so two centuries after the appearance of the new name.

OOSTDUINKERKE (KOKSIJDE)

1120 *Duncapella*, *apud Dunckerkam*, 1135 *Duunkerka*, 1149 *Duncaple*, 1231 *Dunkerke*, 1235 *Ostduenkerke*, 1827 *Oostduinkerke*.

Up to the 2nd half of the 12th century, this place next to *Dunkirk* (*Duinkerke* in Dutch) was also known as *Duinkapel(le)*, the former meaning ‘church in the dunes’ and the latter ‘chapel in the dunes’. In the 13th century, *oost-* (east) was added to the name to distinguish the site from *Dunkirk*, located to the west and currently in France. However, the old form *Duinkerke* still appeared frequently in archival sources until after 1450.

OOSTENDE

± 1115 *in orientali fine in Testrep*, 1256 *Ostende*, 1285 *Oostende*.

The name literally means ‘east end’. *Ostend* (*Oostende* in Dutch) and *Westende* were located on the eastern and western tip of the island of *Testrep*. *Middelkerke* was situated in the middle of this island. The name *Testrep* (992 in *Testerep*, 1107 *Testrep*, 1173 *Testreep*) is a compound of West Germanic **tehstera* ‘on the right side’ and **raipa*, from which Dutch *reep* is derived, meaning ‘a long, narrow strip of land’. *Testreep*, or ‘the strip on the right side’, was an elongated tidal island separated from the mainland by a tidal channel. As the Germanic tribes orientated themselves along the north-south axis, the west is on your right-hand side if you are facing south. *Testreep* is in other words a ‘western strip’. When the meaning of this name was no longer clear, it was reinterpreted by folk etymology as *Ter Streep*, currently the name of a hotel in *Ostend*. Cf. 1380 *ten Streep*, 1455 *te Streep*, 1483 *ter Streep*. The island was swallowed up by the North Sea later on, as was the original site of *Ostend*.

PASSEDALE (ZONNEBEKE)

844-864 kopie 961 *Pascandala*, 1187 *Paskendale*, 1190 *Paschendale*.

Compound of *dal* ‘valley, hollow’ and the name of a former inhabitant. Perhaps this is the Hebrew name *Pascha*, or a name from the language spoken in this region prior to the arrival of the Germanic tribes and linked to the Indo-European word **pasik*, which means ‘child’. *Passchendale* was an independent municipality until 1977, when it was consolidated with *Zonnebeke*.

PERVIJZE (DIKSMUIDE)

1063, 1115 *Paradisus*, 1172 *Parvisia*, 1225 *Pervisa* (TW), 1189 *Parvise*, 1190 *Pervise*, 1915 *Pervijze*.

The name comes from Old French *parevis*, French *parvis*, which stems from Latin *paradisus* and meant ‘forecourt or square in front of a church’ in the Middle Ages. This is derived from the original meaning: ‘enclosure, courtyard, park’. *Pervijze* is therefore named after its village square. The local pronunciation ending in *-ie* or *-ze* can be explained by the frequently occurring Latinised variant *Parvisia*.

POELKAPELLE (LANGEMARK-POELKAPELLE)

1377-78 *ter capelle ten Poele in de prochie van Langhemaerc*, 1648 *Poele cappelle*, 1681 *Poelcapelle*, 1915 *Poelkapelle*.

The name refers to a chapel within the domain of *Ten Poele* in *Langemark*. *Ten Poele* means ‘at the pool, at the marsh’. *Poelkapelle* became an independent municipality in 1904, but was consolidated with *Langemark* into the municipality of *Langemark-Poelkapelle* in 1977.

POPERINGE

844-864 *Pupurninga villa*, 877 *Pupurningahem*, 1040 *Poparingehem*, 1190 *Poperinghem*, 1218 *Poperinghe* (TW), 1903 *Poperinge* (DF).

The toponym *Poperinge* originally ended in *-ingaheem*. This common name type consists of three elements. The first part is a personal name, in particular the name of the chief of the Germanic clan that founded the settlement. The patronymic suffix *-ing* was used to derive a clan name from this personal name, with the plural genitive ending *-a*. The final part is *heem*, which means ‘home’. The personal name in *Poperinge* is sometimes believed to be the Germanic name *Poppo*, a pet form of *Robrecht*, which survives in the surname *Poppe*. However, this is unlikely according to the phonetic laws, as we would expect *Poppingaheem* in that case,

without *r* and with *-pp-*. *Gysseling* therefore suggests a personal name derived from **pupurn-* which goes back to the root **peup-* ‘child’. Already in the early 13th century, the suffix *-heem* seems to have disappeared, perhaps by analogy with other names ending in *-inge* from the area such as *Vlamertinge*, *Boezinge* and *Elverdinge*.

RAMSKAPELLE (NIEUWPOORT)

1120 *Ramescapella*, 1227 *Ramscappel*, 1915 *Ramskapelle*.

Named after a chapel founded by a person with the Germanic name *Hraban* or *Hramno*. Another village called *Ramskapelle*, currently a submunicipality of *Knokke-Heist*, is located in the northeast of *West Flanders*. Yet vernacular pronunciation distinguishes between both place names: *Ramskapelle* on the *Yser* is called *Ramskapel*, while its namesake is called *Ramskapelle*.

RENINGE (LO-RENINGE)

877 kopie 12de *Rinenga*, 1085 kopie 12de *Rininge*, 1162 *Reninghe*, 1903 *Reninge*.

Just like *Boezinge*, *Reninge* was originally the name of a Germanic clan, named after its chief, *Rinno*. This name is a pet form of a Germanic name beginning with *ragin* such as *Reinbert*, *Reinhard* and *Reinboud*.

RENINGELST (POPERINGE EN HEUVELLAND)

1107 *Rinigelles*, 1133 *Rinegels*, 1200 *Rininghelst*, 1391 *Reninghelst*, 1686 *Reningelst*

The modern form, a compound of the place name *Reninge* and *elst* ‘alder wood’, is misleading. As the oldest attestation indicates, *Reningelst* is in fact a compound of *Reninge* and the Old French diminutive suffix *-elle*. So the name means ‘little *Reninge*’. As early as the 12th century, this foreign suffix was assimilated with the well-known Dutch word *elst*.

SCHOORBAKKE (DIKSMUIDE)

1643 *Schoorebacke*, ca. 1680 *tot Schoorbacke*.

Schoorbakke is a hamlet of *Pervijze* on the *Yser* near *Schore*. The name is a compound of the place name *Schore* and the word *bak* (with dative ending), a Flemish derivation from Old French *bac*, which means ‘ferry’. In *Schoorbakke* you could take the ferry to *Schore*. Nowadays, it is the location of the *Schoorbakkebrug* bridge.

STADEN

1115? *Stathen*, 1183 *Staden*, 1552 *van Staen*, 1641 *Staden alias Staen*, 1818 *Staden*.

The name comes from Germanic **statha*, which became *stade* in Middle Dutch, and meant a bank or **landing place on a watercourse**. The name is etymologically identical to Old High German *stade* 'bank, shore', *Gestade* in modern German. In West Flemish it is pronounced *Staan*, with omission of the -d between the two vowels, cf. West Flemish *braan* and *laan* for Dutch *braden* (to roast) and *laden* (to load).

STUIVEKENSERKE (DIKSMUIDE)

1218 *Stuvinskerke*, 1350 *Stuveskerke*, 1459 *Stuvekens kerke*, 1494 *Stuvekinskerke*, 1903 *Stuivekenskerke*.

The oldest form, *Stuvinskerke*, clearly refers to a **church of a person called Stuvín**, a name that lives on in the surname *Stuyven*. In the 15th century, the pet suffix *-in* was replaced by the diminutive suffix *-kin*, which became *-ke* in Dutch. The shortened form *Stuvekins* evolved into *Stuuetjes* or *Stuigies* in the local dialect.

TERVATE (DIKSMUIDE)

1180 *uate*, 1219 *Vatha*.

Tervate is a hamlet of Stuivekenskerke, currently part of the municipality of Diksmuide. The name is a compound of the preposition *ter* (contraction of *tot deer*) and the dative form of the word *vaat*, a dialect variant of *vat*. *Vat/vaat*'s original meaning 'container for holding or storing liquids' changed to a public well or a watering place in Flemish and Zeelandic dialects. Tervate therefore originally meant: **near the watering place**.

VEURNE

877 kopie 961 *Furnis*, 1080-85 *Furnes*, 1110 *Furna*, 1237 *Veurne*, 1306 *Voerne*, 1324 *te Vorne*, 1686 *binnen Veuren*.

Veurne stems from a water name, but its age and original form are uncertain. In all likelihood, the name is etymologically identical or at least akin to the river names *Voer* (the name of two rivers, one in Limburg and one in Flemish Brabant) and *Vurre* (in Afsnee near Ghent), as well as *Voorne*, the name of a Dutch island. Gysseling initially thought this was the Germanic water name **Furno*, derived from the same root as *to fare* (Old English *faran*). In this case it would mean 'navigable water'. As a place name, this would have led to Old Germanic **Furnum* (in the plural dative) and the Romanic plural dative forms of *Furnis* and *Furnes*. In a later study about water names in the wide

European-Asian area of the Indo-European languages, Gysseling stated that *Veurne* and *Voer* go back to an older stratum than Germanic. He thought it was a prehistoric water name which he reconstructed as **Pur-ina*, a derivative from the Indo-European root **peur*, from which *puros* stems ('flame-coloured' in Greek and 'pure' in Latin). The equally prehistoric suffix *-ina* means 'water', as does *-ara* in *Ieper* (Ypres) and *IJzer* (Yser). According to this explanation, *Veurne* means **settlement on the red or pure water**. French river names *Rhône* and *Seine* were also formed with (a variant of) this suffix.

VLADSLO (DIKSMUIDE)

992 kopie 11^{de} eeuw *Frordeslo*, 1119 *Flardeslo*, 1150 *Fladreslo*, 1223 *Flartslo*, 1279 *Vlardselo*, 1529-38 *Vlaedzeele*, 1609 *Vladslo*.

Compound of the Germanic personal name *Frawarad* with genitive ending *-s*, and the word *lo*, which means 'woodland on higher sandy soil' in Flemish place names. So the village inherited its name from a **woodland that once belonged to Frawarad**. However, the locals of Vladslo and the surrounding area do not call the village *Vladslo* but *Vlazele* in their dialect. The latter form, which dates back to at least the end of the 15th century, developed spontaneously from *Vladslo* in popular speech. Due to the strong stress on the first syllable, the second syllable was reduced to *-le*, which occurred with various names ending in *-lo*, e.g. *Stavele* (West Flanders), *Ronsele* (East Flanders) and *Zoerle* (Antwerp). After this vocal reduction, the pronunciation became *vladzle* in line with the West Flemish assimilation rule whereby an *-s* preceding an *-l* changes into a voiced *z* (cf. West Flemish *vizleurder* instead of Standard Dutch *visleurder*). Yet the new form did not just have an obscure meaning, it was also difficult to pronounce because of the heavy consonant combination *-dzl-*. This was rectified by expelling the *-d-* (cf. dialectal variant *Dizele* for the West Flemish village of Dudzele) and inserting the long close-mid vowel /ee/ between *z* and *l*, which resulted in a new ending: *-zele*. This may have occurred by analogy with other place names in the area ending in *-zele* such as *Voormezele* and *Dadizele*. In written language, the original etymological form *Vladslo* remained predominant throughout the centuries and acquired official status.

WESTROZEBEKE (STADEN)

1072 vals 12^{de} eeuw *Rosebeke*, 1200 *Roosebeke*, 1299 *Droghe Rosebeke*, 1567 *Droochroosbeke*, 1652 *West roosebeque*, 1802 *West-Roosebeke*, 1915 *Westrozebeke*.

This village was originally called *Rozebeke* after a local brook. The first part stems from Germanic **rausa* 'reed', so *Rozebeek* was a **brook in which reed grew**.

The premodifier *West-* was added later on to distinguish it from another 'Rozebeke' located about 20km to the east, currently called *Oostrozebeke*.

WIJTSCHATE (HEUVELLAND)

1069 *Widesgada*, 1080-85 *Wideschat*, 1224 *Widescate*, 1237 *Witscate*, 1313 *Wijtscate*, 1641 *Wijtschate*.

The root in this name is *gat*, which meant 'passageway, entrance' in Old and Middle Dutch (and still has this meaning in some Dutch dialects), cf. English *gate*. The first part is probably the Germanic personal name *Wido* in the genitive case. Another possibility is Middle Dutch *wide* 'osier', from which the synonymous West Flemish word *wiedouw* was derived. Wijtschate is therefore named after a **passage or entranceway** that either belonged to **Wido** or that was bordered with **osiers** or ran through such a woodland.

ZARREN (KORTEMARK)

1089 *Sarra*, 1112 kopie 12^{de} eeuw *Sarran*, ± 1185 *Zarren*.

Named after a local **brook** called *Zarre*. This prehistoric water name is derived from the Indo-European root **ser-/sor-* which means 'to flow, to stream' and is akin to the name of the Saar river (French: *Sarre*), a tributary of the Moselle in France and Germany.

ZEEBRUGGE (BRUGGE)

This recent name dates from the late 19th century, when the development of a seaport connected to the inland harbour of Bruges by means of a canal was begun. The port was founded within the limits of the municipality of Lissewege, currently incorporated into the city of Bruges. The name *Zeebrugge* was devised by officials and was written down for the first time in 1894, when the Belgian state, the city of Bruges and a few private investors entered into an agreement as to the construction and operation of the planned seaport.

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GULLS USED TO DETECT SUBMARINES

German submarines posed a serious threat to the Allies. U-boat attacks claimed nearly 13,000 victims among the British alone during WWI. On 7 May 1915 a German submarine torpedoed RMS Lusitania, a British 240-metre-long ocean liner, killing almost 1200 passengers and crew. The attack spread panic, all the more since the supply of food was threatened. In April 1917, the situation had escalated to such a degree that one out of four ships leaving the British Isles was never seen again. Any proposal or creative idea to locate and/or neutralise U-boats was therefore welcome. The Board of Invention and Research (BIR) was established in the United Kingdom in 1915, superseded in 1916 by the Anti-Submarine Division (ASD), which stimulated the military, scientists as well as the general public to come up with solutions. Numerous suggestions were taken into consideration, e.g. using strong magnets, pouring out green paint to obstruct the view through periscopes and even tracking submarines by means of a divining rod. One idea put forward by Thomas Mills, the use of seagulls to detect submarines, got the benefit of the doubt and was further examined. The plan was to train gulls to descend on periscopes so that they would defecate on them each time this 'submarine eye' surfaced. This result needed to be achieved by first teaching the birds that they would find food in the immediate vicinity of a periscope. Once they had been conditioned, they would spontaneously flock around every periscope they saw and give away their positions. The gulls were trained by means of an apparatus equipped with a dummy periscope that was towed by a ship and discharged pieces of sausage or cat food into the water at regular intervals. Needless to say that this original idea never caused any problems to the German submarine fleet ...

Jan Seys



Wikipedia

ANSWER TO THE QUESTION REGARDING THE 'SNAPSHOT' IN THIS ISSUE

On page 101 there is a picture of a ship painted in a strange pattern. This is USS West Mahomet, an American freighter painted in dazzle camouflage (also known as "razzle dazzle"). Painting a ship in geometric patterns – usually in black, white, blue and green – is not intended to conceal the vessel, but to make it difficult for the enemy to estimate the targeted ship's range, speed and heading, as is the case with a bolting zebra. This razzle dazzle was used for the first time during the First World War. Having lost many ships due to actions by German submarines, the British started to paint their merchant and military ships in 1917. Over 4000 merchant ships and 400 warships would eventually wear dazzle camouflage. Each ship's dazzle pattern was unique to prevent the enemy from making classes of ships instantly recognisable. Later on, the art world showed interest in this technique; Pablo Picasso would even have claimed the concept had been invented by the cubists!

Jan Seys

KONINKLIJK WERK IBIS IN MILFORD HAVEN (WALES) DURING WWI

Located in Bredene (near Ostend), Koninklijk Werk IBIS is a unique school, and not just because of its typical navy uniform. Founded by Belgian Prince Albert in 1906 to provide training and education to orphans from a fishing background, this boarding school has evolved into an oasis where children aged 6 to 16 from mostly underprivileged social backgrounds find a safe learning and living environment. Under the gracious patronage of His Majesty the King, this school currently offers primary or maritime technical secondary education to a maximum of 110 students (www.ibisschool.be). When WWI broke out, the school decided it was no longer safe in Belgium. On 13 October 1914, the day before the taking of Ostend by the Germans, the staff and 20 pupils who had stayed behind went on board the steam trawlers IBIS V (O.75) and IBIS VI (O.76) and headed for Milford Haven in Wales (United Kingdom). Milford Haven would remain the haven of refuge for the IBIS students and staff throughout the war. IBIS VI was the first fishing vessel which returned to the port of Ostend under military escort in December 1918. It was loaded with fish, a gift from the Belgian shipowners from Milford Haven to the residents of Ostend.

Jan Seys



IBIS



ON DYNAMITE FISHING AND OPPOSITION TO DEEP-FROZEN MEAT

The creeks in the village of Assenede in the Meetjesland area were full of fish during the First World War. Eel was particularly abundant in the muddy waters. Other fish migrated to the shallow waters along the banks to spawn during the mating season. For local amateur fishermen this provided a valuable supplement to their everyday diet. It turned out they could also learn a thing or two from the German occupiers.

When several inhabitants joined a group of German soldiers who had recently returned from the front in May 1916, they witnessed a very peculiar fishing method. The Germans had discovered by accident that when an artillery round was thrown into the water and exploded, a large number of fish was killed or stunned. They demonstrated that the blast of an exploding hand grenade caused the fish in the water to float to the surface, after which they could be simply scooped up. The German soldiers gave some of the fish to the residents of Assenede, but they had not reckoned with their superiors. When the German officers found out that hand grenades had been used for non-military purposes, the fun was over and they had to hand in their hand grenades at once. This was not just a waste of valuable weaponry, it was also highly dangerous for users and bystanders alike.

Fishing in watercourses fitted in perfectly with the habits of the rural population at that time. The Flemish viewed new techniques such as deep-freezing food far less positively. Experiments with deep-freezing had begun in the United States at the turn of the twentieth century. In Belgium the first deep-frozen products were consumed at that time as well. Deep-freeze technology was used during the war, although

this was not yet quite perfect. When a deepfreeze broke down in the middle of the ocean, the only option was sometimes to throw the contents overboard. Meat was one of the products supplied in this way. When the cargo ship arrived at an Allied port, the meat was transferred to a refrigerated truck. The ship would often remain moored in the harbour for a while and the cold stores continued to be used.

Deep-frozen meat was primarily destined to supply the army and was only secondarily provided to the Belgian civilian population. Despite the food shortage and exhaustion, a lot of soldiers were strongly opposed to eating deep-frozen meat. They had an aversion to its taste and colour. It was not until the 1930s that deep-freeze technology became more widespread.

Brecht Demasure

ANTI-SUBMARINE NET

An iron net placed in a harbour or across a strait to stop submarines.

ATLANTIKWALL

A line of defence built by Nazi Germany during the Second World War along the coastline from the French-Spanish border to the most northerly tip of Finland to prevent an Allied invasion and defend the strategically important ports.

AVISO

A fast vessel tasked to carry military dispatches to and from the war fleet.

BATTERY

This military term means a unit of artillery pieces (e.g. guns or mortars), often positioned in a row. Batteries can be deployed for offensive (e.g. field artillery) or for defensive purposes (e.g. a coastal battery or anti-aircraft battery).

MILITARY ENGINEERS

Military units whose task is to construct and destroy structures so as to enable operations by other units and ensure their mobility.

EUROKOTTER

Ship model designed in Holland in the 1980s, 24 m long and equipped with beam trawls.

FLAKGRUPPE

Flak is an acronym of *Flugzeugabwehrkanone*, German for anti-aircraft artillery. Various air defence posts were grouped in a *Flakgruppe*.

FLOTILLA

A squadron of several ships under one commander.

EMPLACEMENT

A (fortified) position for the siting of an artillery piece such as a gun or mortar.

HOCHSEEFLOTTE (HIGH SEAS FLEET)

The battle fleet of the *Kaiserliche Marine* (Imperial German Navy) during the First World War. This included all heavy ships with their support and reconnaissance units.

AUXILIARY CRUISER

A fast merchant ship armed as a war ship and with a military crew.

INFANTRY

The branch of an army made up of soldiers who literally 'fight on foot'. Nowadays, 'mechanised infantry' is the commonly used term since modern infantry is usually transported with vehicles.

KRIEGSFISCHKUTTER

Armed trawler in the service of the German navy.

CRUISER

A multifunctional war ship, smaller and less heavily armoured than a battleship, but faster and more manoeuvrable.

MARINEKORPS FLANDERN

The component of the *Kaiserliche Marine* (Imperial German Navy) stationed on the Flemish coast.

MINE NET

A type of minefield. Mines were placed at various depths so that it was hard to avoid them.

MORTAR

A piece of artillery with a very short barrel set at an angle of at least 45 degrees to the ground. The projectile is consequently fired at an angle and follows an arcing trajectory before hitting the target.

MOTOR LAUNCH

A fast motorboat in the service of the British Royal Navy.

PONTOON BRIDGE

A temporary bridge consisting of interconnected pontoons (floating platforms) or barges that support the bridge deck.

PONTONNIER

Pontoniers or pontoon bridge builders are engineers who construct (temporary) bridges. These bridges are laid on interconnected pontoons on wide rivers and straits.

BATTLESHIP

A large and heavily armed type of war ship.

SMACK

A traditional fishing boat sailing under various rigs and with a manoeuvrable hull, used along the British coast, in continental Europe and off the Atlantic coast of America in the 19th century and first half of the 20th century.

SPERRBRECHER

A German ship of any size used to clear a path through an enemy blockade.

STEAM TRAWLER

A fishing boat powered by a steam engine. These vessels fished with an otter trawl. The first steam trawler entered the port of Ostend in 1884.

TORPEDO

In the 19th century, torpedo meant any explosive used on or in the water. A modern torpedo is a self-propelled and (usually) guided military weapon deployed under water and intended to explode against or near an enemy target (a submarine or a surface ship).

TORPEDO BOAT

A relatively small and fast war ship designed to fire torpedoes at larger surface ships.

TORPILLE

French term for a floating bomb.

TRENCH DEADLOCK

British term for stationary positional warfare / trench warfare.

U-BOAT

The anglicised version of the German word *U-Boot*, a shortening of *Unterseeboot* or submarine.

FISHERY PROTECTION VESSEL

A vessel that exercises supervision over fisheries to prevent illegal fishing activities.

FINNED BOMB

A mortar bomb fitted with large stabiliser fins so that it would hold a steady course during its trajectory through the air.

VORPOSTENBOOT

A small German patrol boat, often a pre-war fishing vessel or yacht, deployed for reconnaissance in coastal areas.

YPRES SALIENT

A piece of Allied territory around the city of Ypres that projected into the German lines.

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The name ‘De Grote Rede’ requires some explanation. We hope to make as much information as possible available in a well-reasoned manner (‘rede’ is Dutch for ‘reason’). In nautical charts, *De Grote Rede* is a channel north of Ostend, an important shipping route to and from the Flemish coast; likewise, this magazine is intended as a bridge between the Flemish and Belgian federal coastal and maritime authorities, between various industries, between users in the strict sense and interested persons, and between researchers, policy makers and the general public. Finally, this magazine can also serve as a quiet anchorage or roadstead (another meaning of ‘rede’ in Dutch) in our often turbulent waters.

Colophon

‘De Grote Rede’ is an information magazine in Dutch on the Flemish coast and the adjacent sea published by the Flanders Marine Institute (VLIZ). This publication is aimed at providing information and voicing different opinions with regard to current themes in keeping with the concept of ‘integrated coastal zone management’. ‘De Grote Rede’ is written by a dynamic editorial team experienced in research or coastal zone management, and recruited from various disciplines and fields of study. The members participate in the editing in a personal capacity and not as representatives of the organisation in which they are employed. Neither the editors nor VLIZ are responsible for opinions expressed by third parties. ‘De Grote Rede’ appears three times a year and can be obtained free of charge by applying to the address below. Responses to the contents may be sent to the editorial staff. Reproduction of articles is authorised provided that the source is acknowledged.

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