

**“IF WE LOSE THE WAR AT SEA, WE LOSE THE WAR”:**

**THE ORDEAL, MAY - NOVEMBER 1942 (cont’d)**

*Continued from Chapter Five Part 1 ..... The loss of 11 merchantmen in return for two U-boats was regarded by some Allied commentators as an acceptable rate of exchange -although the enemy’s use of submerged attacks, in contrast to the previous favoured tactic of surface attacks, did not bode well. Dönitz, on the other hand, noting that many of the submarine commanders involved were relatively inexperienced, was satisfied with the results.*

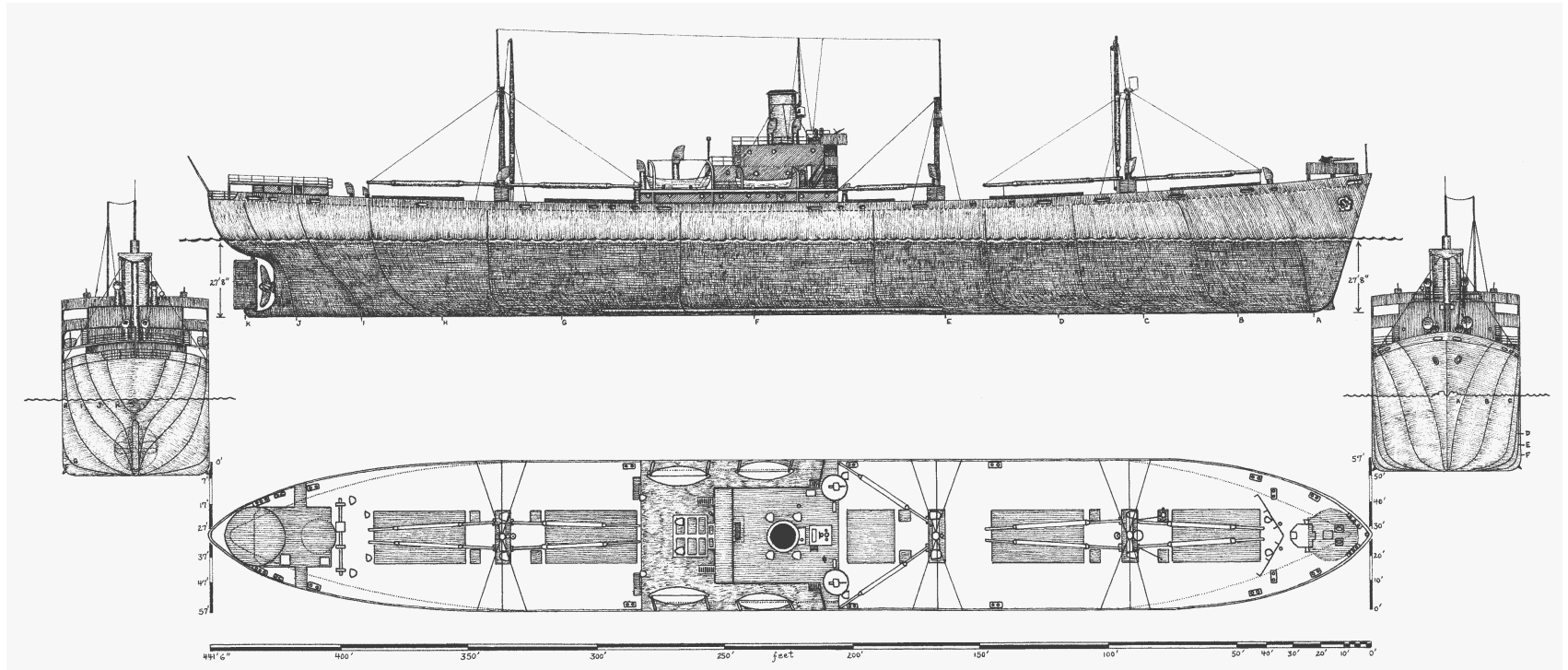
**Problems increase: The RCN in the autumn of 1942**

By the early autumn of 1942, the RCN had some reason to be happy with its recent successes. It had sunk three U-boats in the North Atlantic in August, more than the RN during the same -period, and HMCS *Oakville* got a fourth in the West Indies following a boarding operation that more closely resembled the age of sail than the age of steam.\* But knowledgeable observers pointed out problems with the Canadian escorts’ training, maintenance, efficiency and, above all, their lack of modern equipment. Unfortunately, due to the many and overlapping commands concerned with the Atlantic convoys, its own distance from the theatre of war, and the absence of good technical liaison with the USN and RN, NSHQ in Ottawa did not have a clear picture of the difficulties faced by the escort fleet. When a problem was brought to their attention, they acted upon it, usually slowly, but all too often they remained oblivious to the day-to-day problems at sea.

There was also the attitude of some of the senior naval staff in Ottawa, including Admiral Percy Nelles, who were proponents of a big-ship fleet with aircraft carriers, cruisers and fleet destroyers and regarded the war as a means by which the RCN could acquire the balanced service it had long desired. These officers viewed the escort fleet only as a stepping stone to the creation of a “real navy.” An additional problem was the seeming willingness on the part of Nelles to try to meet every request for assistance from the Admiralty, without considering the effect it had on his own service. The result was that in mid-1942, while there were grave shortages of trained personnel in the North Atlantic, thousands of Canadian officers and sailors were serving with the Royal Navy, and ironically there were more Canadian radar specialists in the RN, thanks to a British recruiting drive

*\*Although it was not known until after the war, the corvette HMCS Morden actually sank a fifth U-Boat in August 1942 when it engaged with U-756 while escorting Convoy SC-97.*

in Canada cheerfully assisted by NSHQ, than in the RCN. As a case in point, in September 1942, when escort strength on the North Atlantic was estimated to be 100 ships short of the necessary figure and German submarines were actively operating in the Gulf of St. Lawrence, Nelles obliged the Admiralty by detaching 16 Canadian corvettes to take part in Operation TORCH, the invasion of North Africa.



#### The Liberty Ship -- A War Winner

The Battle of the Atlantic was also a war of construction -- Allied shipyards had to replace lost merchant tonnage as quickly as possible. To do so, they began to build standardized types and the most common was the American Liberty ship (and the similar Canadian-built Park and Fort ships) designed for swift construction. The Liberty ship displaced 14,100 tons, could carry about 9,000 tons of cargo, was 441 feet in length and crewed by 50-60 sailors. American shipyards turned out these vessels in astounding numbers -- more than 2,751 were built -- and in astounding time, between 40 to 60 days being average. The record for construction was set by the **Robert G. Perry**, which was launched 111 hours and 15 minutes after her keel was laid, and ready to take on cargo three days later. (Drawing by L.B. Jenson, courtesy of the artist)

Senior officers in operational commands, particularly the newly-promoted Rear Admiral Len Murray, now stationed at Halifax as Commanding Officer, Atlantic Coast, were fully aware of the problems facing the -escorts, particularly the MOEF groups. For nearly a year, Murray had warned his superiors that the policy of building and manning as many ships as possible, and shoving them out to sea without proper training, equipment, maintenance and personnel, would ultimately backfire, and by the late summer of 1942 he and many others in the WLEF and MOEF were convinced

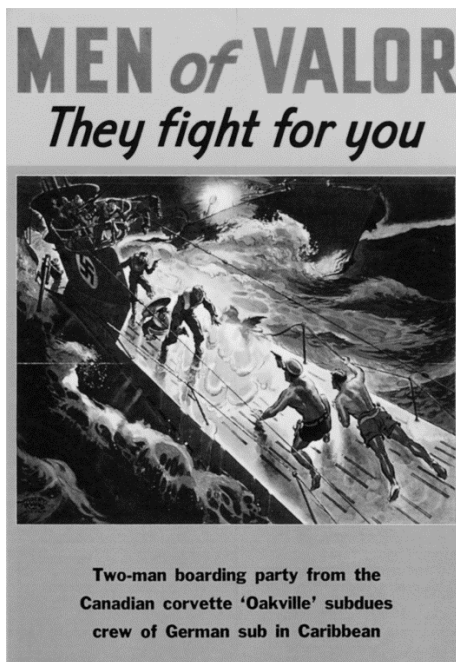
that, unless positive steps were taken to improve the efficiency of the Canadian escorts, a disaster would result. Having been forced to deal with the many problems caused by unchecked expansion, Murray could see that a crisis was at hand.

The performance of the poorly-equipped Canadian C-Groups stood in contrast to their British counterparts. An example of what a well-trained and equipped escort group could achieve was demonstrated during the passage of ONS 122 in late August. This convoy was escorted by B-6 Group, consisting of a British destroyer and four Norwegian corvettes. All the escorts were equipped with Type 271 centimetric radar while the -destroyer had HF/DF and Hedgehog, a type of mortar that threw its projectiles ahead of the vessel, usually permitting it to retain ASDIC contact during the attack. This group had served together for a long time and its Norwegian crews were composed of experienced seamen regarded as some of the best sailors on the North Atlantic. ONS 122 sailed from Britain in the third week of August and for four days, from 22 to 26 August, came under attack by nine U-boats. The Senior Officer in the destroyer used the corvettes to chase down accurate HF/DF contacts but did not permit them to stray far and their efficient Type 271 radar resulted in 13 submarine contacts which were followed up by depth charge attacks. Two U-boats were heavily damaged and forced to withdraw while, in return, the convoy lost four ships. Allied analysts praised the work of B-6 Group whose success contrasted with that of Canadian escorts carrying out a similar task.

#### **“Pitiable entreaties ... from the voice pipe:” Convoy ON 127, -September 1942**

By September 1942, Dönitz had enough submarines on station in the North Atlantic to form two patrol lines covering hundreds of miles of the main shipping lanes. Just what this meant was brought home during the battle for Convoy ON 127 which departed from Britain in the first week of September. Its mid-ocean escort was C-4 Group consisting of the Canadian destroyers *Ottawa* and *St. Croix*, the Canadian corvettes *Amherst*, *Arvida* and *Shebrooke* and the British corvette *Celandine*. Only the British vessel had Type 271 radar and none of the escorts were equipped with HF/DF. C-4 picked up the convoy on 5 September and the first five days were uneventful, but on 10 September, just as ON 127 moved beyond the range of air cover, it was attacked by the 12 submarines of *Gruppe Vorwärts*.

For three days, under constant attack, ON 127 battled its way through the air gap, losing 10 merchantmen (7 sunk and the others so badly damaged they had to drop out) in the process. The escorts obtained multiple visual, ASDIC and radar contacts as numerous submarines attempted to penetrate the defensive screen and get at the columns of merchantmen. The situation was not helped by the fact that, although ON 127 was nominally a fast convoy, the majority of the ships were empty and thus travelling light against prevailing headwinds with the result that their speed was so reduced that the U-boats could maintain contact. The Senior Officer, Lieutenant Commander A.H. Dobson, RCNR, of *St. Croix*, tried desperately to protect his charges and C-4 was happy when air cover from Newfoundland arrived in the morning of Sunday, 13 September, and drove the circling submarines under the surface, damaging three U-boats so severely that they were forced to break contact. At dusk that day reinforcements in the form of the British destroyer *Witch* and the Canadian destroyer *Annapolis* steamed up to help out.



#### **Duel on the deck.**

A wartime poster dramatizes an incident that occurred in the Caribbean in August 1942 when a two-man boarding party from the corvette HMCS *Oakville* landed on *U-94* after the corvette had rammed it. Such incidents were rare. (Author's collection)



**Convoy SC 97**

HMCS **Dauphin** of C-2 Escort Group launches a depth charge attack while escorting a Convoy SC 97 in September 1942. This convoy was attacked by 4 U-boats and one was sunk by HMCS **Morden**. (Canadian Naval Memorial Trust)

It was at this time that the crew of *Ottawa* buried the young gunner who had been picked up, badly wounded, after his ship was torpedoed the previous Friday. A few hours later, the destroyer was ordered to investigate radar contacts ahead of the convoy. Shortly before midnight, *Ottawa* was torpedoed by *U-91*, a Type VII boat commanded by *Kapitän-Leutnant* Heinz Walkerling. The torpedo blew off the destroyer's bows and at first there was some hope that she could be kept afloat, but Walkerling hit *Ottawa*'s boiler room with a second torpedo and she began to sink. On her bridge, Lieutenant Thomas Pullen, RCN, the first lieutenant, was horrified to hear "pitiable entreaties emanating from the voice pipe" from two young sailors trapped in the ASDIC centre below decks, entreaties which became unbearable to those ... who were totally helpless to do anything for them. What could, what should, one do other than offer words of encouragement that help was coming when such was manifestly out of the question? What happened at the end is hard to contemplate for the imprisoned pair, as that pitch black, watertight, sound-proofed box rolled first 90 degrees to starboard and then 90 degrees onto its back before sliding into the depths and oblivion.<sup>12</sup>

Nearly two hundred men were now in the water clustered around life rafts and carley floats as the convoy sailed past them – "the huge ships' sides (how could they be so big?) and small people at the top calling down to us," remembered Lieutenant Latham B. Jenson of *Ottawa*.<sup>13</sup> When HMS *Celandine* arrived next morning to pick up survivors, 69 officers and men were rescued, gamely singing to keep up their spirits and their body warmth, but *Ottawa*'s captain, Lieutenant Commander C.A. Rutherford, RCN, was not among them – while in the water he had given his lifejacket to one of his sailors and disappeared in the darkness.

### **"Fishing boats, coastal ships and luxury yachts:" Deficiencies and distractions**

Air cover from Newfoundland provided by RCAF Catalinas flying at extreme range ended the battle for ON 127. Although there was shock at the losses suffered, there was pride in the fact that C-4 Group had fought back effectively. Unfortunately, the loss of *Ottawa* reduced the RCN's modern destroyer strength to just three vessels (*Restigouche*, *Saguenay* and *Skeena*) as *Assiniboine* and *St. Laurent* were in refit or repair. The Town Class destroyers (the old four-stackers) had rendered yeoman service but only two had the range to operate effectively in the North Atlantic and all required constant repair. This reduction in destroyer strength was a major concern because these vessels were the RCN's most effective escorts. More compelling was the lack of modern radar, and although Murray had requested that all MOEF escorts be fitted with the useful Type 271 in place of the nearly useless SW1C, there were simply not enough sets to go around. It was ironic that the 16 Canadian Flower Class corvettes sent to support Operation TORCH included some of the most best examples of the type, with extended fore-castles, increased endurance and Type 271. It seemed that the Mid-Ocean Escort Force, tasked with the most important Canadian naval operation, would forever be the poor stepsister of its own service.

In the autumn of 1942, however, the attention of both the government and NSHQ was distracted from the North Atlantic to waters closer to home. The previous May and June, as part of Dönitz's offensive against North America, two U-boats had made a very successful cruise in the Gulf of St. Lawrence, sinking six merchant ships. They reported that the area was poorly defended, and although NSHQ tried to beef up -escort forces in the

Gulf, the RCN did not have the strength to contain a second onslaught that took place in September and October when five U-boats entered the Gulf area and sank several small coastal vessels, the passenger ferry *Caribou* and the corvette *Charlottetown* with great loss of life. There followed a media frenzy reminiscent of the “Hun Sea Wolf” scare of 1918 but the RCN was stretched far too thin to provide more escorts. Under public pressure to do something, the government took the momentous decision of closing the Gulf of St. Lawrence to shipping and moving freight destined for Atlantic ports by rail. It was a humiliating setback but it resulted from the RCN being asked to do too much with too little for too long.

Although Radio Berlin crowed that “the Canadian navy, which is nine-tenths composed of requisitioned fishing boats, coastal ships, and luxury yachts” was third-class, Dönitz was not enjoying the same success in the North Atlantic.<sup>14</sup> The rate of sinkings continued high, 35 ships in September and October, and his strength increased to 150 U-boats by the end of the latter month (although only one third were usually on patrol, the others in transit or refit). A combination of poor weather and inexperienced commanders frustrated his attempts to repeat his success against ON 127 until late in October when he managed to concentrate a large number of submarines against a single convoy. That convoy was SC 107 and, unfortunately, it was escorted by Canadian warships.

#### **“Little flickering lights in the water:” SC 107 – Convoy from Hell**

Signal intelligence provided by the *B-dienst* reached Dönitz in time for him to station a patrol line in a good location to intercept an eastbound convoy. On 29 October, *U-522* sighted just such a target off Cape Race in Newfoundland and began to track it. Dönitz immediately ordered *Gruppe Veilchen*, 17 U-boats, to concentrate for an attack.

His target was SC 107, 42 merchant ships escorted by C-4 Group consisting of the destroyer *Restigouche* under Lieutenant Commander Desmond W. Piers, RCN, who was the Senior Officer, and the corvettes *Algoma*, *Amherst*, *Arvida*, *Celandine* (RN) and *Moose Jaw*. In terms of equipment, C-4 Group was relatively well off, both *Restigouche* and the convoy rescue ship, *Stockport*, possessed HF/DF equipment and the destroyer and *Celandine* had Type 271 radar. On 1 November, as *Gruppe Veilchen* concentrated, C-4 Group became concerned when they picked up multiple signals as *U-522* guided various submarines into the attack. Piers



**Keeping Up Civilian Morale, c. 1942**

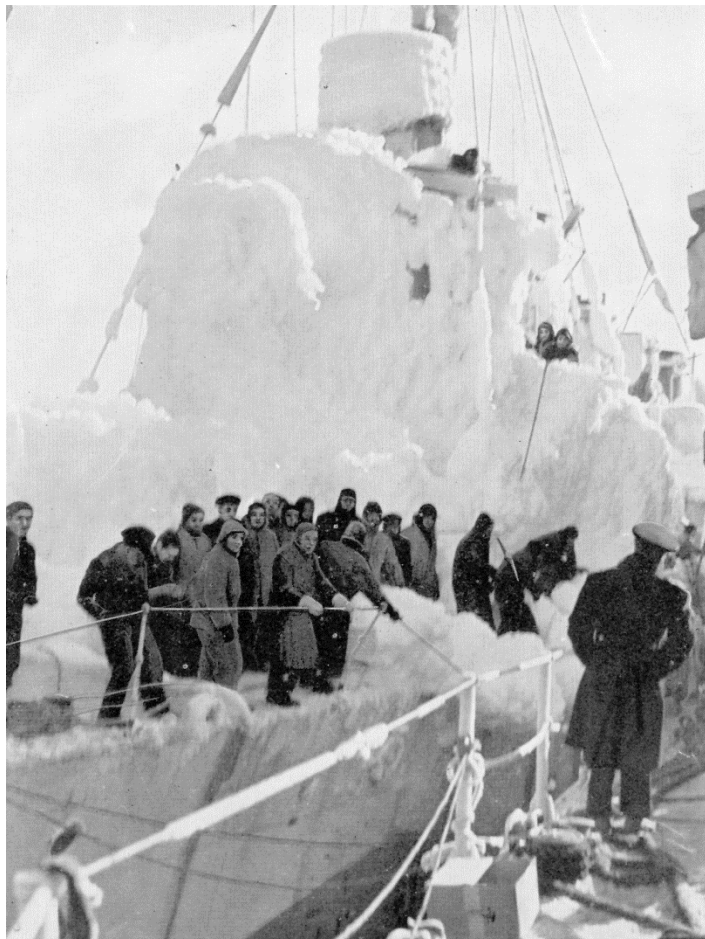
Wartime poster by Douglas Colville depicts a stylized depth charge attack off the stern of a corvette. Note the twin .50 calibre machine guns in the stern gun position. (Author's collection)

in *Restigouche* could identify the location of these signals by HF/DF but commanding the only destroyer in the escort, he could not leave the convoy to “run them down” to their source and attack. By midnight six boats from *Gruppe Veilchen* were in position and the battle commenced when three submarines penetrated the escort screen and sank eight merchantmen. One torpedo narrowly missed *Restigouche*, which was only saved when she made a routine course adjustment at the end of a “zig zag.” It was a terrible night for C-4 Group as, badly outnumbered, they were nearly swamped by

the attackers and the hours of darkness were a kaleidoscope of illuminating rockets, explosions and burning ships.

Lieutenant Commander Louis Audette, RCNVR, known as “Uncle Louis” because he had reached the rather advanced age of 30, commanded *Amherst*. That night, he got a good ASDIC contact about 1,500 yards ahead and was racing in at high speed to launch a depth charge attack when he realized his target was exactly beneath “a lot of little flickering lights in the water” – the small emergency lights on the lifejackets of survivors.<sup>15</sup> Faced with the terrible choice of attacking and killing these people or letting the enemy escape, Audette chose to attack. As *Amherst* bore down on the doomed men, Audette’s first lieutenant asked, “Are you going to go ahead?” in a hushed voice. Audette replied “Yes.” “I couldn’t leave the submarine,” he recalled years later, “I held him on asdic. I couldn’t leave him free to kill more men, sink more ships and their cargoes – and there were hundreds of other men in the convoy still.” Fortunately for Audette and his crew, at that moment *Amherst*’s ASDIC equipment failed and he cancelled the attack.

Bad weather on 2 November hampered the efforts of both escorts and their opponents although *U-522* was able to sink a ninth victim, raising its score to three ships in 24 hours. On 3 November the action was renewed although the British destroyer *Vanessa* arrived to assist *Restigouche*. There were still nine U-boats in contact and they were able to penetrate the escort screen in broad daylight and torpedo more ships. The escorts carried out continuous attacks on their assailants, damaging two submarines so badly that they had to break off contact. On went the battle. By 4 November, the rescue ship *Stockport* was so overloaded with survivors that she had to be detached for Iceland, as did two American tugs which had joined the convoy to assist her in her important task. Late that day more help -arrived in the form of two American destroyers and a Coast Guard cutter, but they were still unable to prevent the loss of another ship. That night, *Amherst* closed a burning freighter, *SS Daleby*, which had supposedly been abandoned only to find three men still on board the blazing wreck and

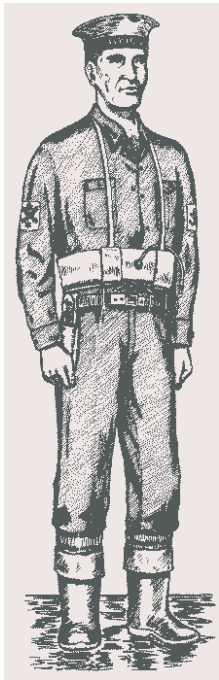


#### Not a Winter Wonderland

A Town Class destroyer, either *Niagara* or *St. Croix*, comes alongside so heavily covered in ice that she is almost unrecognizable. Winter conditions in the North Atlantic were brutal and ice accumulation was a serious hazard as the increased weight could cause a vessel to capsize. There was nothing for it but to chip it off by hand. (Canadian Naval Memorial Trust)

screaming for help. Against standing orders, Audette lowered a boat and called for volunteers to board the fiery hulk – the boat was quickly manned and the three survivors were rescued.

Matters came to an end on 5 November when aircraft from Iceland -arrived and Dönitz called off his dogs. The disaster long predicted by -Admiral Murray had finally come to pass – 15 merchant ships totalling 88,000 tons, more than a third of the convoy, had been lost – leaving SC 107 with the reputation for having suffered one of the worst convoy loss rates in the Battle of the Atlantic.



#### **Working rig.**

Working rig, or dress, as opposed to "Pusser Rig", or best dress, was practical and comfortable and consisted of a blue denim shirt, jacket and trousers worn with dark blue rank badges but no other insignia. The leading seaman illustrated here has added an inflatable "Mae West" type lifejacket and rubber sea-boots, the most popular form of footgear on board a ship. By regulation, every officer and sailor on board ship was to carry a knife although the regulation "pusser's dirk", a large clasp knife with a folding marlin spike, was not popular. Most Canadian sailors carried knives according to their own personal taste. The traditional naval cap, while smart in full dress, was liable to be carried away by the wind, and was often replaced on the North Atlantic by the more practical tuque or stocking cap. (Drawing by L.B. Jensen, courtesy of the artist)

#### **"The expansion of the RCN has created a ... problem:" The reckoning**

By November 1942 the situation on the Atlantic had become serious. Shipping losses, combined with the ever-increasing strength of the German submarine fleet, the absence of Ultra intelligence, the scarcity of VLR aircraft, and the need to siphon off Allied naval strength to provide escorts for Operation TORCH, had begun to sway the contest in Dönitz's favour.

It was obvious to the British government that the Battle of the Atlantic had to be won before any other major operation, including the bomber -offensive against Germany and an invasion of the European continent, could take place. They therefore took important steps to ensure that it would take precedence over all other theatres of war. A special Anti-U-Boat Warfare Committee, consisting of Churchill and senior representatives of all the services concerned, was instituted to supervise its higher direction and prevent a repetition of the bureaucratic "Battle of the Air" which had come close to losing the war. More important was the appointment of Admiral Sir Max Horton to the position of Commander-in-Chief, Western Approaches, the RN command directly concerned with the defence of shipping on the Atlantic. A ruthless ex-submariner, Horton was a good choice to oppose the artful and resolute Dönitz and he immediately began to shake up all aspects of his new command. It was Horton's belief that success in the Atlantic lay in providing proper leadership, training and equipment for the escort groups. Those groups that were not up to his exacting standards would have to be made so and it is not surprising therefore that his gaze fell on the C-Groups which had the worst record in ships lost in the MOEF.

Horton proposed to rectify this problem by removing them from the Atlantic and replacing them with British groups. The C-Groups would be shifted to the UK-Gibraltar convoys but, before that, they would receive "some really thorough training."<sup>16</sup> There is no evidence that Horton knew anything about the reasons for the Canadian escorts' poor record or the background of Canada's participation in the Battle of Atlantic – to him it was a simple matter: the Canadian escorts were the least efficient and had to be replaced. He convinced Churchill that the change was necessary and on 17 December the British leader sent a telegram to Prime Minister -Mackenzie King which adroitly but plainly stated that the RCN must be withdrawn from the MOEF:



A careful analysis of attacks on our transatlantic convoys has clearly shown that in those cases where heavy losses have occurred lack of training of the escorts both individually and as a team, has largely been responsible for these disasters.

I appreciate the grand contribution of the Royal Canadian Navy to the Battle of the Atlantic, but the expansion of the RCN has created a training problem which must take some time to solve.<sup>17</sup>



**Christmas Dinner, 1942**

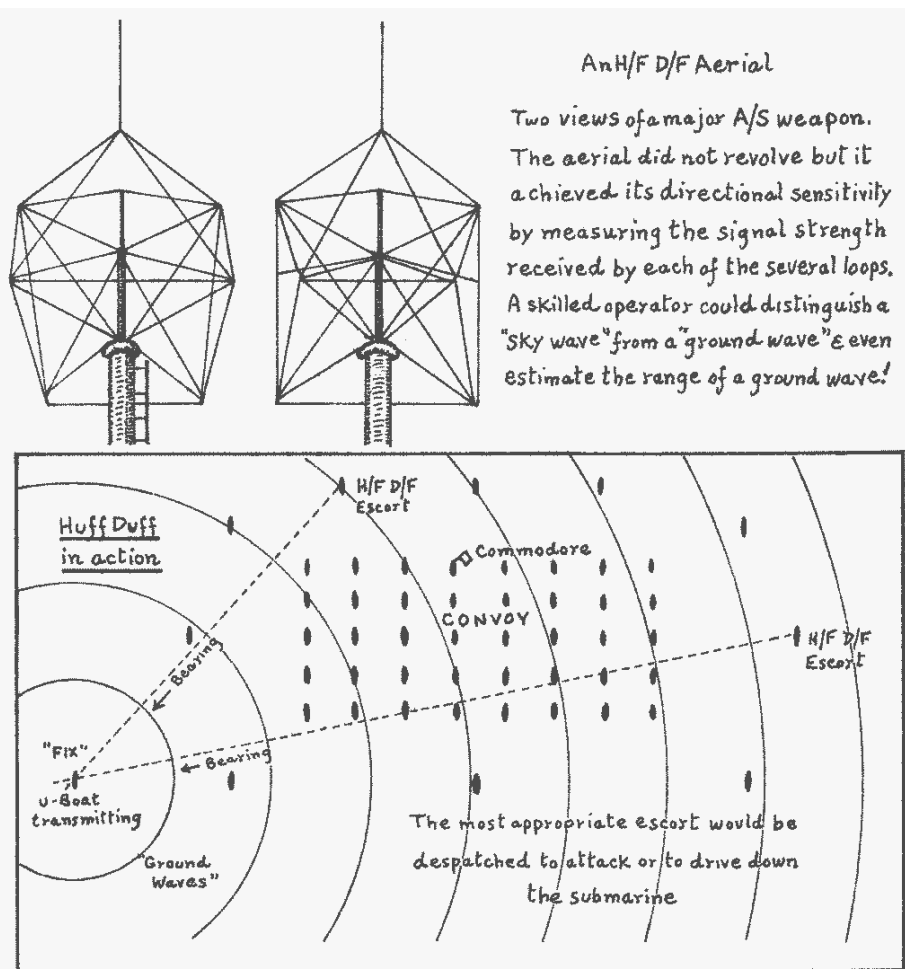
Happy to be in port for the festive season, the wardroom of HMCS **Sackville** celebrates with a formal dinner. From left to right: Lieutenant Tony Osborne, RCNR, first lieutenant; Mrs. Alan Easton; Sub lieutenant Colin Carruthers, RCNVR, (standing); Lieutenant Alan Easton, RCNR, commanding officer; Sub lieutenant Neil Chapman, RCNVR; and Sub lieutenant John Margison, RCNVR. On the bulkhead behind Easton can be seen the White Ensign

The problem of unchecked wartime growth, as Murray had long feared, was now steaming directly for NSHQ at high speed.



## FINDING U – BOATS: HF/DF, RADAR AND ASDIC

The Allied navies faced the problem of finding U-boats in the vast reaches of the Atlantic and, once their position was located, of closing in to attack them. The solution was provided by three different types of technology: High Frequency Direction Finding (HF/DF or “Huff Duff”), radar and ASDIC.



### “Huff Duff” (High Frequency Direction Finding)

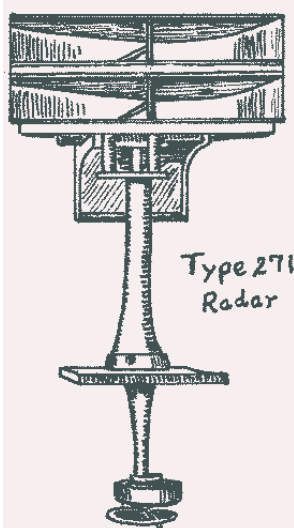
Dönitz’s command system was based on radio communication between his headquarters at Kerneval near Lorient (subsequently moved to Paris and later to Berlin) and his U-boat commanders at sea. Dönitz knew that radio transmissions could be detected by listening stations on land using High Frequency Direction Finding equipment that could obtain a bearing direction to the transmitter and that two such stations at widely separated locations could provide two different bearings which, if traced out in the direction of the source of the transmission, would provide a “fix” or “cross cut” at the point they intersected. The RN’s “Y” Service, or radio intelligence organization, established listening stations in the British Isles, Iceland, Gibraltar, Newfoundland and Bermuda to listen and establish bearings for German radio transmissions. This information was sent to the Operational Intelligence Centre at the Admiralty, which correlated the reports of the various stations and calculated the location of the transmission and, hence, the U-boats. Dönitz discounted the threat HF/DF posed because he did not believe that a “fix” obtained by this method would be accurate enough for Allied aircraft or surface vessels to find and attack the transmitting U-boat. His commanders were ordered to keep their transmissions short and many signals were in highly abbreviated, standardized formats for that reason. In fact, long-distance HF/DF “fixes” were subject to an error rate of up to 25 miles, but they still permitted the Submarine Tracking Room at the Operational Intelligence Centre in the Admiralty to build up a

picture of the deployment of U-boats and to route convoys away from them. The problem with HF/DF was that the locations it obtained were often too far from Allied warships and aircraft to be of tactical use – to permit U-boats to be attacked in time – and there was also a time lag between locating a U-boat's position and disseminating this information to the relevant naval force at sea. The answer was to fit HF/DF equipment on warships but this proved to be a most difficult task because of the size of the equipment. A technological breakthrough was made, however, in the spring of 1941 and the first British warship was equipped with mobile HF/DF a few months later. In 1942 an effort was made to fit at least two vessels in every escort group with HF/DF to permit them to obtain timely and accurate fixes on U-boats in their immediate vicinity. Two separate escorts, fitted with HF/DF, could obtain a "fix" and then run down the bearing to attack the source of the transmissions. The use of seaborne HF/DF became widespread in 1943 and by the end of the war, most major Allied warships were equipped with it.

### **Radar (Radio Direction Finding and Ranging)**

HF/DF was useful for locating U-boats at a distance, but at closer range radar came into play. Radar is an electronic device that generates a short radio energy pulse which, if it hits a solid object, will return an electronic echo. Invented in Britain in the mid-1930s, it saw widespread naval use for surface searching, fire control and ranging, and navigation. Its utility for ASW was not appreciated until 1940 when the need to counter night attacks by surfaced U-boats led to the introduction of the first British seaborne surface search radar, Type 286. This was an extremely primitive device that transmitted on a broad band of 1.4 metres that could not distinguish the conning tower of a trimmed-down submarine (a submarine with only its conning tower above the surface) from the background "clutter" of the sea. Under optimum conditions, Type 286 had a range between 1,000 and 2,000 yards (not much better than the human eye) and the original model could not be trained through 360 degrees, only about 120 degrees in a forward direction.

The inadequacies of Type 286 radar led to it being replaced by Type 271 in the spring of 1941. Type 271 was a surface search radar that generated its energy pulse on a much more narrow beam than Type 286 – 9.7 cm as opposed to 1.5 metres – which provided a more distinct and accurate echo that could differentiate the conning tower of a trimmed-down submarine from background "clutter." For this reason, it was termed "centimetric" or "10 cm." radar. Type 271 was provided with a full 360-degree sweep capability and under optimum conditions had a range of up to 5,000 yards. Although production was slow, by May 1942, 236 British escorts were equipped with Type 271 and it was followed by a constant procession of improved models (Types 272, 273, 276, 277 and 293).



In terms of radar, the RCN lagged behind the RN throughout the war. This was largely the result of a decision by the government in the spring of 1941 to manufacture a Canadian version of the Type 286 radar just as that equipment was superseded by Type 271. Dubbed "Surface Warning-First Canadian" (SW1C), this Canadian device only differed from Type 286 in having 360-degree sweep capability (albeit by manual power) but it proved unreliable and extremely delicate.\* An improved model, SW2C, followed but neither set was as capable as the Type 271, and in the spring of 1942 complaints from the escort fleet led to NSHQ trying to obtain 100 sets of Type 271 from Britain. This proved impossible because of the demand for these sets but the RN did agree to install 10 sets per month on RCN warships when they were in refit in British ports. By the end of 1942, however, just over half of the Canadian warships on the North Atlantic possessed Type 271 radar while most British escorts were fitted with it. Many RCN vessels were forced to use the SW1C and SW2C sets until well into 1943.

At this point, Ottawa compounded the problem by trying to introduce a Canadian version of Type 271 centimetric radar instead of copying the British original. Dubbed RX/C (if manufactured in Canada) or RX/U (if manufactured in the United States), it proved no more



reliable than its SWIC and SW2C predecessors and led to much cursing on the Canadian vessels forced to use it. The result was that the RCN was always behind in terms of radar and the problem was never solved.



#### Submarine detectors

The Battle of the Atlantic was waged not only at sea but also in the laboratory, and technology became increasingly important. The technological level of the Allied navies far surpassed that of the Kriegsmarine. Submarine detection equipment had by 1945 become extremely sophisticated and the sailors trained to use it (SDs – Submarine Detectors) were some of the most important members of the escort crews. (Photograph by W.H. Pugsley, National Archives of Canada, PA 139273)

information about the range, bearing and depth of an underwater target. Some British ships possessed the Type 147B, which was mated with the Squid mortar to create a fully-automated targeting and firing sequence. Although the RCN tried to procure this equipment, production delays meant that most Canadian escort vessels did not get the Type 144 or 145 ASDIC until late in the war, and many did not receive it at all.

#### German counter measures

Dönitz, who had been assured by his signals experts that it was impossible for HF/DF to be fitted to warships, never fully comprehended the asset it provided for Allied warships or the danger it represented to his submariners.

Germany was also behind the Allied navies in providing radar and radar detection equipment. From 1941 on, attempts were made to fit U-boats with these devices but generally they were not as effective as their Allied counterparts and were consistently a generation behind Allied models. When many U-boats reported surprise attacks by aircraft and surface vessels, Dönitz realized that the Allies were using radar, and in August 1942 U-boats were fitted with a radar detector. Commonly called *Metox* after the French company that manufactured it, this device was capable of picking up pulses

#### ASDIC or SONAR

If an escort vessel detected the presence of a submarine by HF/DF and radar, it would attempt to close with the target to attack it. Since U-boats usually submerged to escape, escort vessels used ASDIC to locate them under the water. ASDIC (now known by the American term SONAR from *Sound Navigating and Ranging*) was an apparatus housed in a dome on the underside of a ship's hull that emitted a sound pulse which, if it struck an underwater object, would return an echo giving that object's bearing and range. It could also be used in a passive mode as a hydrophone listening device. ASDIC was by no means perfect: its range was restricted, effective use limited a ship to a speed of less than 18 knots, and it was affected by the noise generated by the propellers of nearby ships, depth charge explosions or heavy weather; the depth and temperature of the water, ocean currents, and the presence of other objects under water such as whales, schools of fish or wrecks. It was also ineffective against surface targets and, finally, ASDIC contact with a target was usually broken when a depth charge attack was carried out.

As was the case with radar, Commonwealth ASDIC equipment experienced continual development and its range and capability were constantly being improved. but, as was also the case with radar, the RCN was generally behind the RN on the development curve. The Canadian corvettes built in 1940-1941 were equipped with Type 123A ASDIC, which was already obsolescent in the RN, and the Canadian navy never quite caught up: when the RCN introduced the improved Type 123D, the RN was using the improved Type 127, 128 and 129 sets. British wartime ASDIC equipment reached its peak of development in 1943 with the introduction of Type 144 and 145, which, with various attachments, could provide accurate

from metric search radars, such as the Type 286, at a safe distance but it entered service, however, just as metric radar was being replaced by the centimetric Type 271, which it could not detect. When the surprise attacks increased in 1942, Dönitz at first believed that the *Metox* device itself was emitting a signal that could be picked up by Allied radar and this delayed the introduction of equipment that could warn against centimetric radar until September 1943 when the *Naxos* equipment entered service. It proved effective but Allied scientists quickly came up with countermeasures that reduced its performance.

To counter ASDIC, German submarine commanders relied on tactics such as accelerating, forcing the escort vessel to undertake a stern chase through the wake of the U-boat and thus interfering with ASDIC contact. Other tactics were to make a sharp, power turn to disturb the water and confuse the ASDIC operator or to dive beneath an ocean thermal layer that would also interfere with ASDIC. Finally, in 1942 the U-boats were issued with *Bold*, the codename for a chemical projectile consisting of 370 grams of calcium and zinc which was ejected from the boat by a special discharge tube.

When *Bold* came in contact with the water, it produced hydrogen gas bubbles which simulated the sound of a U-boat and unwary ASDIC operators could be thus decoyed away from the real thing.