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THE BATTLE OF THE ATLANTIC

-- by --

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INTRODUCTION
Sources and Scope

Apart from Special Intelligence, the main source used in writing this account was the B.d.U.’s War Logs.¹ This series of documents² was captured with the German naval historical archives at the capitulation of Germany; it covers the whole of the war period up to the end of 1944. Use has been made of it throughout the work, not only to keep the Special Intelligence picture in focus, but to fill in the gaps where Special Intelligence was not available. As head of the U-boat arm, B.d.U. was, of course, concerned chiefly with the operations of U-boats, but he referred to the operations of surface vessels and the German Air Force wherever they affected those of his own forces. In the case of the air forces anti-shipping effort, the main source of information available to the historian was Special Intelligence, confirmed and, on occasion amplified by these logs. The war logs of the Operations Division of the Naval War Staff³ provided a certain amount of information on high-level policy in connection with both surface forces and U-boats.

Nothing was known currently from Special Intelligence about the operations of main units in the Atlantic until the battleship "Bismarck" was fighting her last action at the end of May 1961. As "Bismarck" and the heavy cruiser "Prinz Eugen" were the last main units to make cruises in this area, the account of their activities, which is the subject of Chapter I, has had to be written from other sources. The same is true of auxiliary cruisers (Chapter II), for, although these were operating well into the period covered by Special Intelligence, they used a type of naval Enigma cipher which was never broken.⁴ In this case, however, their working up in the Baltic and passage through the English Channel to the Atlantic was known in some detail after the spring of 1941 from indirect information contained in the Home Waters Enigma traffic.

Much of the contemporary information on the activities of surface raiders (whether main units or auxiliary cruisers) came from survivors of merchant ships sunk by them, and on occasion vague indications as to the whereabouts of in individual raider came from distress signals transmitted by her victims. But this happened only seldom, as it was the object of every raider to prevent her victim from using wireless. In the early days, it was very often the case that even the raider’s presence at sea, though it might be suspected, could not be established definitely until a merchant ship had been sunk. Occasionally, photographic reconnaissance proved useful by showing the absence of a raider from her usual berth in harbour, but it was not always possible to know where she had gone, or even whether her absence indicated a raiding cruise rather than a move due to other causes. Such information as was currently available was published by the Admiralty in “Raider Supplements” to the “Weekly Intelligence Reports” (W.I.R.). These have been consulted; but most of the matter for Chapter I has been extracted from a series of

¹ B.d.U. = Befehlshaber der Unterseebote. Head of the U-boat Arm.
² PG/30
³ For surface vessels, Part A - PG/32021-32084; for U-boats, Part C - PG/31750-32011, 32173-32176
⁴ “Ausserheinisch” (“Outside Home Waters Settings”).
German document, captured after the war, which contained reports of the individual cruises.\(^5\)

Italian submarines in the Atlantic used a cypher which was also never broken, and as no relevant Italian documents were captured either before or after the armistice with Italy, the account of their activities given in Chapter Y has had to be written from German sources, chiefly from B.d.U.’s logs.\(^6\) German Special Intelligence provided a certain amount of contemporary information, but it was not regularly available until the period of joint German-Italian operations in this theatre was nearly over. During the war, the plotting of Italian submarines by the Allies was based mainly on “external” evidence, namely, D/F, examination of call-signs, R.F.P. and Tina.\(^7\) This evidence was collated by Naval Section, and provided the Admiralty with a broadly correct picture of the activities of the Italians.\(^8\) However, as it never got beyond the stage of estimate and appreciation, no attempt has been made to use it here as the basis of a day-to-day account of operations. The account in Chapter V is therefore very brief and deals with the subject only in outline.

In accordance with the terms of reference within which this history of naval operations has been written, periods when Special Intelligence was not available are sketched in briefly in order to set the periods covered by Special Intelligence in the proper background. This applies to most of Part I and the whole of Part II. It should not be assumed, therefore, that the briefer treatment in these parts in any way reflects the importance of the periods which they cover. As far as Atlantic U-boats were concerned, the period from the beginning of February 1942 to the middle of November of that year was also one when Special Intelligence was not available, and the treatment of it in Part IV is consequently briefer than it otherwise would have been.

One other question of treatment needs to be explained, that of chronology. From the late spring of 1941, the Battle of the Atlantic was to all intents and purposes synonymous with the U-boat war in the Atlantic. Since it deals with only one arm of the German Navy, the account from this point onwards is in the main chronological. In the account which precedes it, however, it has been found convenient to deal with the various protagonists—German main units, auxiliary cruisers, U-boats, and Italian submarines—in separate chapters, which therefore overlap one another in point of time (Chapters I-V). Since auxiliary cruisers were operating in 1942, Chapter II also overlaps most of the chapters in parts III and IV. But as their activities were relatively unimportant after the spring of 1941, it is felt that this drawback is outweighed by the advantages of dealing with them in a single chapter. The activities of the Air Force have, however, been integrated throughout with U-boat operations.

The Atlantic was the main theatre of U-boat operations during the war. For this reason, matters which concerned the U-boat are as a whole are discussed here rather than in other parts of the

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\(^5\) “Operationen und Tektik” - PG/14256, 14257, 18549-18555.

\(^6\) See also PG/33088.

\(^7\) For a fuller description of these methods, see G.C. & C.S. Naval Sigint, Vol. XV: “W/T Intelligence” Part 3, “Traffic Analysis European”.

\(^8\) See ZIP/ZZI Series.
G.C. & C.S. Naval History covering the German and Italian navies in motion. Thus, the policy which led to the ?? of U-boats from the Atlantic to the Mediterranean\textsuperscript{9} and Northern Waters\textsuperscript{10} is discussed in this section, and not in those treating of the naval war in the Mediterranean and in Northern Waters, which deal only with the actual operations in those theatres.

The operations of U-boats in the Indian Ocean, although they were in a very real sense an extension of the Battle of the Atlantic, are not dealt with here, since they have been treated at length in “The German Navy and Japan”\textsuperscript{11}.

The development of U-boat weapons and anti-radar devices, which had a vital influence on the course of operations in the Atlantic, are discussed fully in G.C. & C.S. Naval History, Vol. VII, “The U-boat Arm” Part 2 “Evolution”. The reader is advised to consult that section before turning to the account which follows.

To complete the study of factors which affected the U-boat war in the Atlantic, the reader is referred to G.C. & C.S. Naval History, Vol. VII, “The German Navy’s Use of Special Intelligence and Reactions to Allied Use”.

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Had a significantly larger number been available on the outbreak of war, the impact of German operations on British sea communications would have been very different. As it was, the Germans attempted to make up for lost time, and decided in September 1939\textsuperscript{12} to increase the construction rate of U-boats at the expense of surface ships, the larger of which were only to be completed if they were nearly finished.

Such a policy, however, could not be expected to take effect for nearly two years; and in 1939 and 1940, the strength of the German U-boat arm did not allow more than a small number of boats to operate. It soon became clear to the U-Boat Command, and subsequently to the High Command, that the very small number of U-boats available could only inflict “pin-pricks” on Britain’s trade at sea. In the winter of 1939-1940, for instance, never more than ten, and often as few as two, U-boats were at sea together in the Atlantic and North Sea.

As the few U-boats available during the early years of the war could not be sufficient to harass Britain’s sea-communications to any great extent, it had been planned to use major units as well. The weakness of the German Fleet had to be compensated by boldness of plan, but, with the revision of building priorities which came into effect on the outbreak of war, any losses in major units were irreplaceable. Further, in order to create the maximum confusion, the commerce raiders were to be ubiquitous in their operations, whether against convoys or against

\textsuperscript{9} G.C. & C.S. Naval History, Vols. XX and XXI, “The Mediterranean”.
\textsuperscript{10} G. C. & C. S. Naval History, Vol. XXIII, “Northern Waters”.
\textsuperscript{11} G. C. & C. S. Naval History, Vol. XXIV, “The German Navy and Japan”.
\textsuperscript{12} NID 1/GP/10.
CHAPTER I

COMMERCE RAIDING BY MAIN UNITS

When Great Britain and France entered the war on 3rd September 1939, the German Navy was completely unprepared for war with one, let alone two, big maritime powers. Grossadmiral Doonitz, at that time Captain (U/B), in an essay on the causes of Germany’s defeat, written at the instigation of the Allied authorities after the capitulation, recounts that even on 1st September 1939 Hitler had stated that England would not come into the war. Vizeadmiral Heye, who was, towards the end of the war, Admiral Commanding Small Battle Units Command, makes the corresponding points in a similar essay: namely, that the German Supreme Command was continentally minded, that it had no proper appreciation of the importance of sea power in a land war, and that the German Navy was inadequate to undertake successfully a war against a great naval power such as England.

This “continentally-mindedness” of the German High Command, coupled with the restrictions imposed by the Treaty of Versailles, led the Supreme Command of the Navy to think in terms of operations involving, at the most, war with the Baltic or Scandinavian states, or with Russia.

Consequently, until September 1939, the German Fleet had been developed as a small homogeneous unit, and had not been designed for operations against any big maritime nation; that is to say, the fleet consisted of capital ships, cruisers, destroyers, minesweepers, U-boats and ancillary craft in a balanced relationship, constructed with a view to close tactical cooperation with one another but not on a scale capable of fighting a decisive sea battle with fleets such as those possessed by Great Britain or France. The Treaty of Versailles had limited German naval strength to a level at which it was quite unequal to the combined naval strengths of these two powers; consequently, the German High Command had relied primarily on air and land power, with the secondary support of the fleet, to carry out its strategy in theatres in which little naval strength would be encountered. German naval constructional policy, in line with other policies, was, until September 1939, committed to the support of this programme, and had not seen the need for any practical departure from the theory of the fleet as a homogeneous unit.

Consequently, in September 1939 German strategy, compelled to accommodate itself to a war with two great naval powers, had to employ its forces in the only practical way possible against a nation whose existence depended on sea communications. Realists such as Doonitz

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13 NID 1/GP/10.
14 NID 1/GP/13.
15 It is interesting to note that, even as late as 1938, the German Navy’s anxiety to avoid a war with England was so great that its staff was forbidden to carry on studies envisaging war with England.
had long before 1939 appreciated the possibility of war against England, and had urged the construction of more U-boats, but their pleadings had fallen on deaf ears.

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carry out a similar operation, but was sunk before she could comply. Thereafter, no more boats were sent until June 1940.\(^{16}\)

Probably the most important single factor during the first nine months of the U-boat war was B.d.U.’s campaign to free his commanders from the restrictions imposed on them by international law. Within this period, the U-boat arm had “progressed” from the stage of strict observance of the rules laid down in peacetime by international agreement to the stage of unrestricted submarine warfare. The process was a gradual one. It has already been described\(^{17}\) how, at the beginning of the war, U-boats were not permitted to sink merchant ships without giving sufficient warning to enable the crew to reach a place of safety, and how this was supplemented after the sinking of the “Athenia” by a ban on attacks against passenger ships. By the end of September, U-boats had also been forbidden to attack French ships.

Such a respect for the rules of war contrasts oddly with the behaviour of the German Army and Air Force during the attack on Poland. It might appear at first sight that the German Navy was more humane than its fellow services. In general, this is probably true; in World War II, as in World War I, the naval struggle was characterized by far less brutality than the land struggle. But, in view of the fact that the chief of the U-boat arm bent every effort towards abandoning restrictions, it is probable that the reasons were more political than humanitarian. One must remember that this was the period of the so-called “phony” war, when there was practically no fighting on land or in the air between Germany and the western Allies. The political strategy which lay behind this inactivity falls outside the scope of the present work, but it is an open secret that at the time Germany still hoped to come to an agreement with Britain and France if she could persuade them that Poland was not worth a European war. In this context, the prohibition against unethical conduct on the part of the U-boat commanders may be seen as part of a general desire by Germany not to provoke her western enemies. There is no clear explanation of the especially favourable treatment of French ships, but it is possible that the Germans believed the French to be more open to persuasion than the British.

B.d.U. was not concerned with politics. He knew only that he was charged with the duty of waging war against two greatly superior naval powers, and that he could not do so effectively while he was hedged in with restrictions. In his view, there was a fundamental contradiction between the nature of the U-boat and the rules governing its behaviour in time of war. The U-boat’s only advantage over surface warships was the power to render itself invisible by diving, and thus approach the target and elude pursuit unobserved. In all other respects the U-boat was inferior to its surface opponents; in particular, it was slower, much more vulnerable and more lightly armed. For a U-boat to break surface, stop a merchant ship, and wait until the crew

\(^{16}\) See p. 95.

\(^{17}\) See pp. 45-47.
of its victim had taken to the boats before firing a shot, was to surrender its chief weapon, the power of invisibility. Risky as this was in the case of independent merchant ships, it was entirely impossible in the case of escorted ships or ships in convoy.

The arming of merchant ships by the Allies was another source of danger. In surfacing to stop a merchantman, the U-boat laid itself open to a hit which, though not serious in itself, might render the boat unable to dive and so make it an easy target for enemy surface warships. In a review of losses as early as October 1939, B.d.U. concluded from the high proportion of U-boat men taken prisoner that several boats had been destroyed on the surface, otherwise fewer men would surely have been picked up. He ascribed this cause to the danger of operating in accordance with the “Law of Prize”, and in particular to the danger of surface engagements with armed merchantmen.18 While admitting that some losses were due to other causes—surprise encounters with the enemy in conditions of bad visibility perhaps or failure to keep a good lookout—he saw the “Prize War”19 as an additional danger and cause of loss, which could only be avoided if:--

1. “Either the Prize War is abandoned, that is to say, only such ships are attacked as may be attacked without warning, or
2. Unrestricted warfare is declared.

“In either case U-boats must be forbidden to use their artillery:
(a) to stop ships (or to overcome resistance)
(b) to sink ships.

“The U-boat is by its nature a torpedo weapon and not an artillery weapon. Its strength lies in unobserved, surprise attack; its defence in the depth and extent of the ocean. Great success awaits its full operation in torpedo attacks; no commensurate prospect of success awaits its operation as a gunboat...”

B.d.U. was clearly in favor of the second alternative, namely unrestricted submarine warfare, since the first alternative meant to all intents and purposes the abandonment of the anti-commerce war, which he had always held to be the major task of the U-boat arm. In pressing for a declaration of unrestricted warfare, he was able to use the argument that the policy of the British admiralty had made such a declaration justified20. In the first place, he could claim that the institution of the convoy system, by placing merchant ships under the protection of vessels of war, had put them outside the “Prize Law”. Similarly, by arming merchant ships and ordering them to use their guns against U-boats, the Admiralty had deprived them of the benefits of international law, since they could now be regarded as warships. Again the precaution of darkening ships made it impossible for U-boats to distinguish between merchant sips and warships, so that all had to be treated as warships.

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18 B.d.U.’s War Log, entry for 23.10.39
19 This is a literal translation of the German word “Prisenkrieg”, and neither it nor the English equivalent has a precise connotation. It is probable that B.d.U. used it as an abbreviation for “Handelskrieg nach Prisenerdnung” -- “the anti-commerce war in accordance with the Law of Prize”.
20 We are not concerned here to discuss the rights and wrongs of the controversy, but simply to give facts in so far as they are relevant to an operational history of the U-boat war.
These arguments carried weight with the Naval War Staff, which was persuaded gradually to remove the restrictions. In October 1939, it lifted the ban on attacking darkened ships in an area round Great Britain\textsuperscript{21}, a decision which B.d.U. accepted as a considerable relief for his U-boats, although he complained that the area was very narrow. Later in the same month, the prohibition on attacks against passenger ships, imposed after the sinking of the “Athenia”, was lifted in respect of escorted passenger ships, and this was further extended to passenger ships recognised to be armed. Once again, B.d.U. was glad of the relief, but pointed out the difficulty which U-boats normally had in recognising the type and armament of a ship until the last moments of an attack.\textsuperscript{22}

A much more important step was taken in the new year. On 18th February 1940, the German Government declared unrestricted submarine war on Britain and France, which meant that in future merchant ships sailing under the flags of the two powers would be attacked and sunk without warning. In justification, it was held that the British Admiralty’s declared policy of arming all merchant ships as soon as possible amounted to turning them into warships. Theoretically, neutrals were still entitled to be treated in accordance with international law, but the number of attacks on them without warning showed that the Germans were not over-careful to make distinctions of nationality. In part, this was no doubt due to the difficulty of doing so under operational conditions, but in part also to the knowledge that the great majority of neutrals encountered on the high seas or in the blockade area were trading on enemy account, so that the sinking of a neutral ship was just as big a loss to the Allies as the sinking of one of their own. In practice, therefore, U-boats attacked almost all ships, although this was not acknowledged officially until August 1940, when the German Government declared a total blockade of Britain, under which even neutrals were liable to be sunk if encountered within the blockade area. Thenceforward neutrals were unmolested only so long as they sailed on certain prescribed routes to a schedule, of which

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unsettling difficulty had now been added to the general problem of finding convoys in the absence of full German intelligence. This was the gear of Allied intelligence, a fear previously experienced in 1941 but now brought to its sharpest point both by the U-boat failures of January 1943 and by the discoveries of the “B” service.

On 28th January and again on 2nd February, B.d.U. made entries in his log calling attention to evidence that U-boat dispositions were known by the enemy. The main source of the evidence was in United Stated and British U-boat estimates decrypted by the German “B” service. In addition, there were striking instances of successful convoy diversions, including the route of HX

\textsuperscript{21} That is, within the blockade area. The German right to declare a blockade, which they could maintain only with U-boats, is a nice legal question too complicated for discussion here. It was never admitted by the British, who were thus able to claim that certain U-boat activities carried on in the name of blockade were in violation of international law.

\textsuperscript{22} B.d.U.’s War Log, entries for 29.10.39. and 17.11.39.
224 established by U 456’s contact on 1st February.

“This HX followed a course which by-passed “Haudegen” to the south and which would have gone to the north of the former group “Landsknecht”. No HX convoy has steered such a course for many months, as far as is known from “XB” reports.”

The manner in which the German authorities analysed these evidences of Allied intelligence, conjuring away the possibility of Allied decryption of the Enigma cypher, is studied in another section of this history. Here we are concerned only with the effect of the evidence on B.d.U.’s operational plans. On 2nd February, he added to his review of the facts a statement significant for the future disposition of North Atlantic U-boats.

“With respect to further U-boat operations aiming at the interception of convoys, the fact of a continued partial compromise of our intentions must for a time be taken in account. This will in all probability lead to loose, mobile dispositions, widely spaced, which the enemy will not be able to evade as he would a contracted fixed disposition.”

This consideration may have affected the wide spacing of the dispositions of the “Haudegen” Group around Newfoundland for the week preceding 15th February. It was reflected more significantly, however, in the type of north-south reconnaissance line, sweeping south-westward from about 30° W that became a feature of the U-boat pattern for the remainder of the winter and spring. This new reconnaissance measure was really a development of the westward sweep of the “Haudegen” Group. The difference was that the idea of a fixed line south-east of Cape Farewell, in which the “Haudegen” Group’s sweep was originally to end, was abandoned, presumably because of the danger of compromise to which fixed dispositions were now thought to be exposed.

The new sweeping line was first exemplified in the “Ritter” and “Neptun” Groups, comprising together about twenty-five U-boats newly out from port, drawn up in mid-February along the 30th meridian, roughly between the latitudes of 50° N and 60° N. “Ritter”, the more southerly of the groups, was ordered to begin sweeping on course 235° at 1200 on 17th February. The “Neptun” Group, formed a few days later in a position to the north and slightly to the east of the “Ritter” Group, was likewise ordered to sweep on course 235°, beginning at 2000 on 18th February.

In his log for 15th February, B.d.U. gave his reason for this staggered formation of two overlapping lines, one sweeping behind the other. His aim was to secure the widest possible reconnaissance and at the same time, by keeping the groups in motion, to reduce the danger of discovery by the enemy’s airborne radar. The latter point is of interest. It was the first of many instances in B.d.U.’s log in which Allied radar was singled out as the means of detection most to be feared and avoided by the U-boats. This was the beginning of a process of self-deception by which the German Naval Command was able to attribute to the British and American technical

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23 B.d.U.’s War Log, entry for 2.2.43
24 G.C. & C.S. Naval Sigint, Vol. VII “German Navy’s Use of Special Intelligence and Reactions to Allied Use”, Part 2, Chapter X.
superiority in radar all responsibility for the recurring evidence that U-boat dispositions and plans were compromised.

In the midst of his preoccupations with the long-term problems of reconnaissance and security, B.d.U. remained a tireless and often reckless opportunist in practice. Sometimes, in the paucity of contacts at hand during this period, his willingness to pursue any target that offered itself led to pointless operations. This was the case when one of the ex-“Haudegen” U-boats, on return cruise, encountered ON 165 a few hundred miles from the end of its run on 17th February. Abandoning his own strategic principles, according to which ample fighting space in mid-ocean was a prerequisite for a

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the basis of two fragmentary “XB” reports, one giving on 16th February the convoy’s position (but not its course or speed) as at the 14th, HX 226 was expected in the area of the “Ritter” and “Neptun” patrol-line on the night of 17th-18th February. The originally planned south-westward sweep of the two groups was cancelled in favour of this specific target and both “Ritter” and “Neptun” Groups were put through elaborate shifts as B.d.U.’s plotting room attempted to advance the convoy by dead reckoning.

Meanwhile, Allied Special Intelligence of U-boat traffic had been currently available until noon of 17th February. Thus the dispositions of the “Ritter” and “Neptun” Groups were known in time to permit a diversion of HX 226. Up to this point, the Allies had the advantage in the hidden battle of intelligence. But the position was soon reversed. On the evening of 18th February, B.d.U. received from the Lufthorchregiment25 the D/F’d position as at 1400 on the 18th of a westbound convoy, actually ON 166, though he identified it as ONS 167 on the basis of cycle plotting. By this time, B.d.U. evidently feared that HX 226 might already have evaded his patrol-lines and this, added to the operational advantages of the westward-moving target, determined his decision to act on the normally unreliable D/F. Sending three orders in less than an hour on the night of the 18th, he reformed his U-boats to intercept ON 166, adding to the long north-south line of the “Ritter” and “Neptun” Groups a small tail slanting to the south-east. called the “Knappen” Group, consisting of four U-boats. Because of a 19-hour lag in the decryption of U-boat traffic for the 18th, these new dispositions were not known to the Allies until the morning of 20th February, a few hours too late. ON 166, whose original route had passed directly through the earlier “Neptun” and “Ritter” concentration, had already been diverted to the south-west on 17th February on the strength of U-boat traffic read up to that time. A very slight further diversion, as late as dawn on the 20th, would have saved the convoy from the south-easterly extension of the patrol-line. ON 166 was intercepted when U 604 of the “Knappen” Group picked up a faint hydrophone bearing at 1055 on the 20th.

The contact obtained after so many reversals of situation and by such a narrow margin led to one of the most destructive operations of the winter. B.d.U. acted quickly to utilise his U-boats

25 Apparently a German Air Force D/F unit.
without waste. The “Neptun” Group and the two north-west boats of the “Ritter” Group were too far from the point of contact to make pursuit economical, and were put on course 260° to carry out part of the originally planned reconnaissance sweep against north-eastbound convoys. The remaining twelve boats of the “Ritter” Group and the four of the “Knappen” Group were ordered to close the convoy. During the night of the 20th, the original shadower, U 604, was driven off, but other boats of the “Ritter” Group were now making contact, and by the afternoon of the 21st, claims of sinking began to appear in traffic. As the day wore on, former “Haudegen” U-boats began to join from ahead. By the afternoon of the 22nd, some twenty U-boats were on the convoy. Many were low on diesel oil, but two U-tankers were rushed to the area. As a consequence the U-boat Command was able to throw aside all caution:

“You can therefore continue to operate without worrying about fuel consumption, concentrating solely on getting at the convoy as quickly and as often as possible.”

Sinking reports were now streaming in. B.d.U. exhorted his U-boats in his habitual manner:

“Don’t give in. The rest must fall” and this time they were able to respond, hanging doggedly on to the convoy across the mid-Atlantic to 45° 00’ N, 45° 00’ W. On the morning of 26th February, the score was counted and the participating U-boats commended for exceptionally stubborn and energetic fighting during the six-day pursuit. Twenty-three ships were claimed sunk and seven torpedoed. Of the nineteen boats ordered against the convoy, thirteen had “a direct share in this great success”.

B.d.U. was clearly somewhat intoxicated by his first unqualified victory in convoy warfare since the operation against ON 154 in December.

On 21st February, as the ON 166 operation was moving into full swing, a chance contact in 51° 00’ N. 24° 00’ W. led to a hastily contrived disposition against ON 167. Here the inaccuracy of German convoy intelligence, which had earlier confused ON 166 and ON 167, had to be paid for in the unplanned and haphazard character of the attempt against the second convoy. ON 167 was soon lost after the early contact, and contact was never reestablished, despite a long effort which involved the diversion of fresh U-boats bound for the new “Burggraf” formation (the intended successor to the “Neptun” Group in carrying out the south-westerly sweep from mid-Atlantic). The failure of the ON 167 operation set the unique success against ON 166 into greater relief, and showed once again how dependent B.d.U. was, in the existing state of German and Allied intelligence, upon the chances of circumstance and improvisation.

The beginning of March saw the battle of the convoy routes entering its most critical phase. The swift growth of British and American power in the Atlantic was presenting a decisive challenge to the U-boat. The volume of convoyed shipping was increasing rapidly as anti-submarine defences, particularly in the air, grew stronger. Twice as many ships were sailed in convoy in March as in February. This doubled the targets available to the U-boats, but also intensified the weight of their task. Every increase in the flow of shipping meant an increase in the rate at which the invasion army in England was being built up and equipped.

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26 ZTPGU/6813.
27 ZTPGU/6959.
28 ZPGU/7234.
In the face of this challenge, B.d.U. had to utilise
---end pg. 308 here, start pg. 350---

CHAPTER XIV

THE THIRD BATTLE OF THE CONVOY ROUTES

The third battle of the convoy routes lasted for approximately seven months: from the departure of the newly equipped U-boats from their bases on or about 1st September 1943 to the order dispersing the “Preussen” Group on 22nd March 1944. The narrative is one of initial success followed by constant deterioration. The long recital of frustrated endeavour on the convoy routes in this period does not of itself, however, justify an inference that the U-boat arm was now failing in all respects for all time, and the reader is warned against the conclusion that a losing battle means a flagging effort. The two principal sources of the account -- the signals and B.d.U.’s log-- reveal a persistence and determination which must be understood against a background of long-term resistance to expected Allied invasion, and of long-term confidence in expected German technical improvement. The seven months’ battle against the convoys was the last concerted attempt to sever Allied supply lines before the invasion and was the major action in this phase of the U-boat’s resistance; but it was not the U-boat’s only function, and the technical improvements which it introduced were not the last.

---skip to pg. 355---

second day, a fog settled down, hindering not only the Allied aircraft, but also the U-boats, so that, although several boats were able to come closer to the convoy, and although they reported fewer escort groups than at first and only solitary destroyers, visibility was too poor to allow the hoped-for major attack against the ships, of which, now that ONS 18 and ON 202 had joined, there was a total of sixty-three
29 Surface and air defences, moreover, were out in far greater strength than B.d.U. had expected. By late afternoon of the third day, aircraft runs were again harassing the U-boats, and the weather was clearing. However, when the fog came on again shortly after midnight, B.d.U. considered that the proximity of the Newfoundland Banks and the fatigue of his boats required him to break off the operation. He gave the order on the morning of the fourth day (23rd September), adding that any boats still in good position should take what parting shots they could
30.

The battle had been a hard one, under severe conditions of weather and defence, but the claims were very high: twelve destroyers sunk, three probably sunk; nine ships, totalling 46,500 tons, sunk; two ships, totalling 16,000 tons, torpedoed
31. Actual Allied losses were four escorts and seven merchant ships. The number of U-boats sunk was three, and six were severely

29 C.B. 0450/43(9), p. 7.
30 ZPTGU/17116.
31 B.d.U.’s War Log, entry for 23.9.43.
damaged. B.d.U., who counted his own losses as two at the time, was well satisfied with the total result, claiming the operation as a great victory. With clearer weather, he thought, it could have been considerably greater\textsuperscript{32}.

The expectation had been met. The U-boat, German science, German ingenuity, and German daring had, to judge from the congratulatory message just cited, been vindicated. But B.d.U. did not lose his head. His log shows that the achievement bore certain inadequacies which he felt obliged to explain--principally the failure to destroy more than nine (actually seven) merchant ships. He attributed this failure to the unusually large number of escorting destroyers and to the dirty weather. He was pleased, on the other hand, that the attack on the destroyers had greatly reduced the number of depth-charges, and that the order to remain surfaced had resulted in successful maintenance of contact. The log for the same day concluded with a lengthy and detailed section on the "Zaunkoenig" torpedo, this first use of which the Admiral termed "a complete success", but further use of which called for one improvement: commanders should be able to adjust the arming range and extend it to 800 metres at least, in order to do away with the necessity of diving immediately after firing. The plans for further use are then given: from 3rd October on, all outgoing U-boats were to be armed with "Zaunkoenig"\textsuperscript{33}. By that time, however, as B.d.U. appears not to have realised, this torpedo's limitations were known to the Allies, and the streaming of "Foxer" \textsuperscript{34} gear tended to ward off is destructive power.

Writing a month later, though he still called the operation a "complete success", B.d.U. felt less satisfied with the order to remain surfaced. The circumstances of stronger enemy air escort than usual should, he pointed out, have made the success of this order to the "Leuthen" Group even more striking, but he declared himself forced in retrospect to assume that the small figure for his losses resulted from protection afforded by fog.

"For whereas 'Zaunkoenig's' good showing against destroyers was confirmed in the time which followed, the same is not the case with defence against aircraft."\textsuperscript{35}

Again, writing five months after the event, B.d.U. adhered to this more considered view; the false impression gained of the "Leuthen" Group operation was responible for repetition of the "remain surfaced" order to the next two groups, "Rossbach" and "Schlieffen"\textsuperscript{36}.

There was another reason for the "Leuthen" Group's comparative success. The new U-boat offensive and the final period of continuous and regular reading of U-boat traffic by the Allies began approximately at the same time, but the U-boats unwittingly beat the cryptanalysts to the draw. True, the Allies did know that the group was on its way out, since some of the messages

\textsuperscript{32}B.d.U.'s War Log, entry for 24.9.43.

\textsuperscript{33}Ibid., entry for 24.9.43.

\textsuperscript{34} A noise-making device, designed to produce a greater volume of noise than a ship's propellers and thus attract the 'Zaunkoenig'. Allied countermeasures to an acoustic torpedo were developed in the Spring of 1943 owing to an erroneous appreciation that the DAT which first appeared at the end of 1942 was an acoustic torpedo. See Vol. VII., "The U-boat Arm", Part 2, Chapter XVI.

\textsuperscript{35} B.d.U.'s War Log, entry of 2.11.43.

\textsuperscript{36} Ibid., Supplement of 20.2.44.
already cited were as early as 2nd September; but the formation set for 20th September was not known in time for the convoys to be diverted, and the action could thus begin on the date and at the place which B.d.U., with his eye on the ON and ONS of the moment had selected.

This situation now changed. The regular breaking of the settings of Atlantic U-boat signalling had presented considerable difficulty during the summer of 1943 by by September the new cryptanalytic machinery coming into service made regular reading a probability. From this date Special Intelligence, even with occasional time-lags of several days, enabled the Allies to anticipate the dispositions, the patrol areas, and the line shifts of the Atlantic U-boat fleet. The history of the long series of group formations now to be drawn up, of which the “Rossbach” and “schlieffen” Groups were the first, is one of repeated failures which were never understood by B.d.U. He persisted in having “good reason to suppose that enemy air reconnaissance picks up our disposition lines by methods of location which in part were still not able to get on to”37 and in hoping that some new search receiver would protect against surprise attack from the air. He hoped further to reduce the possibility of being spotted by ordering his U-boats to keep radio silence except for messages of the utmost tactical importance, to refrain from using beacon signals, and to cease altogether the use of the old (pre-“Hagenuk”) search receiver equipment. Against Allied D/F, he inaugurated an elaborate off-frequency system, which, had it not become known ahead of time through Special Intelligence, would have presented a serious obstacle to the Allies. Similarly, all these countermeasures missed the point. While war vessels and aircraft, now available in far greater numbers that they had been during the spring offensive of 1943, were being directed to the scene of impending operations to meet the U-boats as they searched for their targets, the convoys in question were being regularly diverted.

These are the conditions under which surviving U-boats of the “Leuthen” Group were ordered to withdraw to the east, join outward-bound boats and, on 26th September, from the “Rossbach” Group. With this group, B.d.U. hoped to operate on ON 203, ON 204, ONS 19, HX 259 and SC 143. The first position taken up extended from 58° 00’ N. 31° 00’ W. to 54° 00’ N. 29° 00’ W., and during the next fortnight the line was shifted nine times in a fruitless search. All the convoys passed unscathed, with the exception of SC 143, from which one destroyer (C.R.P. “Orkan”) and one merchant ship (S.S. “Yorkmar”) were sunk38. Escorting aircraft sunk U 643, U610 and U419 during this action; and U 279, U 336 and U 389 were sunk earlier during the search.

On 30th September, B.d.U. received an “XB” report of a straggler route alteration for ON 204, which he expressly recognised as a clear evasion of the “Rossbach” Group’s line. In his log, he introduced tentative explanations for this move by the phrase, “If the assumption of a cypher

37 ZTPGU/19196. Of. also B.d.U.’s War Log, entry for 5.11.43, paragraph VI, which is a one and a half page discussion of presumed Allied location activity and of German countermeasures planned. Specially equipped U-boats, under cover-name “Feldwache”, were to set out on about 25th November to study the frequency bands of Allied radar activity.
break is rejected …..”\(^{39}\). Then, two days later, after the first week of the group’s existence, he wrote:

“The extraordinarily extensive evasion actions of the enemy and the constant alterations of straggler routes give rise to the following considerations:

1) It is possible that enemy aircraft, unobserved by the boats and using centimetre radar keep contacting the line, so that the convoy is being diverted to the north accordingly.

2) As a result of Italy’s treachery, the enemy now has his hands on intelligence groups who know that we have broken into English cyphers. It is therefore not impossible that the enemy is making use of this knowledge by putting convoy and straggler routes on to the air which in reality are not being used, thus consciously misleading the German “B” service and, in consequence, the U-boat Command.

Once more it is evident that the main problem in U-boat warfare is a problem of finding, and that a final solution of this problem is possible only through constant use of long-range aircraft of our own.”\(^{40}\)

In words similar to those of the concluding paragraph just quoted, the need for strong air reconnaissance became the main emphasis of most U-boat situation reports of this period, especially those of 1st November 1943 and 20th February 1944, in the latter instance emphatically underlined\(^ {41}\). Adequate air reconnaissance would not only find the convoy, but would do so in time to permit a timely disposition of boats in its path. As it was, in spite of the use of all possible reconnaissance boats, including some hardly seaworthy, and of the very long-range aircraft which did operate as far as 20°W. from Norwegian and French airfields, and in spite of intelligence gleaned from analysis of convoy voice traffic by special “B” service personnel aboard the U-boats, and from an occasional decrypted convoy routeing despatch, U-boats were forced to attempt most of the finding themselves; and in their attempt, they themselves were found and attacked by the Allies.

The “Schlieffen” Group was even less successful that the “Rossbach”. Placed, on 16th October, directly across the route of two convoys (ON 206 and ONS 20), it gained good contact with one; but, as ordered by B.d.U., it had to carry on a surface battle with aircraft, and while the group managed to sink one merchant ship, it lost six (out of fourteen) U-boats. Writing the following February, B.d.U. called this operation “the worst set-back” and went on to say that, in retrospect, it showed two things: first, that a U-boat armed with 0.79” flak was no match for a heavily armed bomber or flying boat, and second, that flak armament of eight 0.79” barrels was no longer enough for waging a mobile convoy battle requiring a daytime manoeuvre into advance positions.

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\(^{39}\) B.d.U.’s War Log entry for 30.9.43

\(^{40}\) B.d.U.’s War Log entry for 2.10.43.

\(^{41}\) Ibid., entry for 2.11.43. and Supplement of 20.2.44. This is a frequency theme throughout the logs. For another example, see B.d.U.’s War Log, entry for 10.11.43.
“But this”, he wrote, “was not this clearly appreciated at the end of the ‘Schlieffen’ operation, since in the total evaluation the positive results of the ‘Zaunkoenig’ convoy [i.e., the ‘Leuthen’ Group] outweighed the negative ones of the operations which followed.”

By the end of October, however, the Admiral had appreciated the full force of the flak inadequacy. He estimated that he had lost fifteen boats since the operation of the “Leuthen” Group, and that a good two-thirds of these had succumbed to aircraft attacks on surface patrol-lines, still being located in the mysterious way which he did not understand. The losses, he said, were “not tolerable”, and until 1.46” flak could be installed, they would compel him to resort to tactical measures, including immediate cessation of day-time operations as soon as strong enemy aircraft appeared. He would also have to resort to keeping his patrol-lines submerged during the day, and as far as the problem of ?? was concerned, accept the handicap which this would ??

The “Schlieffen” Group was the last mid-North Atlantic group in the old style. Innovations, later to become?? wide?? spread??, appeared in the signals ordering the formation?? of the next groups, “Siegfried”, “Koerner”, and “Jahn”. instead of lying across the paths of convoys in the area of 30° W., there exposed to the strong aircraft patrols from Ireland and Greenland, these groups were set up for eastbound convoys off Newfoundland. On 14??th October, the “Siegfried” Group was formed in the old style, but in the new position, to which it was ordered to remain submerged by day, surfaced by night. The Germans’?? sources of information failed them, however, and the reunited convoy (HX 263) passed far to the south.

Late in October, considerable Anglo-American convoy traffic off Canada was routed in two lanes, one running due east approximately along the 41st parallel, the other in a roughly north-easterly direction from Virgin Rocks. To intercept this traffic, and still in the hope of catching HX 263, B.d.U. disbanded the “Siegfried” Group and formed the “Koerner” and “Jahn” groups on 31st October. These were ineffectual, and three days later were replaced by the “Tirpitz” Group, the orders to which marked the first appearance of the new formation.

No longer concentrating all U-boats of the group in a straight unbroken line, these orders called for a crescent-shaped arrangement of five short lines, containing four boats each, and for four single scouting U-boats out ahead, one opposite each of the major gaps. The scouting boats were to report any approaching prey and to give warning of any threatening aircraft. The offensive advantages of this whole disposition were that every possible convoy lane in a given area was covered and that, in the event of contact by one of the closely formed lines, several boats were available at once for concerted attack. On the defensive side, the principal advantage was that the enemy, should he discover one of the short lines, would presumably suppose he had located the main body, and the other lines would remain undetected.

42 B.d.U.’s War Log, Supplement of 20.2.44.
43 B.d.U.’s War Log, entry for 2.11.43.
It is interesting to note that the offensive and defensive considerations which this single tactical reform reveals include as well the double problem of concealment and finding which arose from the mystery of the Allied method of location. If B.d.U. could only fathom that, he would keep his dispositions concealed, convoys would not be diverted, and he would find his prey.

Loosening the lines had its disadvantages: a rapid combined action with many boats participating was not possible, while escape of a convoy through the gaps

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The average number of two was increased to three in December 1944. The number of weather signals increased to a marked extent just before the German counterattack on 16th December and the U-boats concerned were afterwards told:

“Your recent weather reports were a decisive factor in fixing the commencement of our great offensive battle in the west.”

These signals continued at a high level during the rest of December and into January, but by February there was a decline. A United States destroyer escort task group operated against the weather reporters and sank U 248 on 16th January 1945. From April until the surrender, one U-boat continued the weather reporting task.

The German Navy, as we have seen, was able to renew with vigour the U-boat war in the midst of collapse on the Continent. In a sense, it was a false vigour, if only because supplies were short and outward-bound U-boats could not be certain of a port for return. U-boats were forced out to sea by attack on the land side. The working centres in the Baltic were paralysed by the Russian advance in February 1945. As from 17th February, a total of 157 U-boats had been evacuated from East Baltic ports to western Baltic and North Sea ports. By 25th March 1945, the entire U-boat arm, including many unfinished type XXI U-boats, was removed from the Danzig-Gdynia area. The resultant overcrowding in the west was the occasion for Allied air bombardment, which destroyed more than the Germans could accurately count in the confusion. During the last week of April, Bremen, Hamburg, and Heligoland ceased to function so far as U-boats were concerned. There was no serious break-down in organisation, however; demolitions were set, U-boats were rushed for sea duty, routines were generally maintained. On 1st May 1945, supplies in Norway were sufficient for about six weeks of further operations. Even on the morning of 4th May, when all northern Germany surrendered, two U-boats left Bergen for war cruises.

When Hitler was succeeded by Admimral Domenitz as Chief of State, there were seventy-four U-boats operating at sea. Generaladmiral von Friedeburg was placed in command of the Navy, and technically assumed the office of B.d.U. on 2nd May 1945. Early indications of

44 B.d.U.’s War Log, entry for 9.11.43.
45 ZTPGU/34612.
the surrender negotiations appeared in U-boat traffic of the morning of 4th May, in which destruction of German merchant ships when enemy action threatened was forbidden, except in case of action by Russian forces. Then, in the afternoon of the same day, Admiral Doenitz himself ordered all U-boats to cease war activity and secretly begin return to Norway. At 2158 on 5th May, after Keitel had surrendered North Germany, Admiral Doenitz again signalled all U-boat men:

“Six years of U-boat warfare lie behind us. You have fought like lions. An overwhelming superiority in material has forced us into a very narrow space. From this small basis a continuation of our battle is no longer possible ….. Keep your U-boat spirit …..”

At 1204 on 8th May:

“Triton and Niobe cypher data are being handed over to the Anglo-Americans and Russians...”

Plain language orders followed, cancelling the return to Norway, and ordering surrender in accordance with Allied instructions.

It should be borne in mind that the U-boat arm was not, in May 1945, defeated at sea. The “pre-Schnorchel” U-boat had been decisively swept from the Atlantic in the summer of 1943; but the loss was remedied and the U-boat reappeared in force, exhibiting characteristics that must mark all future submarines.

Some concluding statement may be made at this point in regard to the campaign waged by the German Air Force in the war against the merchant fleet. The campaign failed because those units assigned to the task were constantly shifted to other tasks and were inadequate in numbers as well as in kind. No aircraft types, except seaplanes, were designed specially for this work; civil and military types were adapted. This policy was adequate as long as Allied defences were weak; it was suicidal in the teeth of Allied countermeasures. As for numbers, even at the height of its power in 1940-1941, the German Air Force was not strong enough to conduct a proper campaign against docks and shipping on the one hand, and against industrial targets on the other. The parcelling out of the Air Force to the various battle fronts meant that only small forces were available for anti-shipping strikes; even these forces were subject to abrupt transfer of units and crews that were gaining experience to reprisal bombings or to transport duties. Under these conditions, no sustained anti-shipping war was possible. Add to these considerations the underlying fact that German recognition of the value of aircraft as an anti-shipping weapon came too late -- witness the belated arrival in the west of the aerial torpedo in the latter part of 1942 -- and the general failure of the campaign becomes

46 ZTPG/368849.
47 ZTPGU/39138.
48 ZTPGU/39043.
49 ZTPGU/39083.
understandable.

**ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>B.d.U.</td>
<td>Befehlshaber der Unterseeboote -- Head of the U-boat Arm</td>
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<td>BV</td>
<td>German Blohm und Voss aircraft</td>
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<td>Ctm.</td>
<td>Cubic metre</td>
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<td>C. in C.</td>
<td>Commander in chief</td>
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<td>D/f</td>
<td>Direction finding</td>
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<td>Dc</td>
<td>German Dornier aircraft</td>
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<td>FAG</td>
<td>Flugzeugabwehrkanonne - Anti-aircraft gun</td>
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<td>FW</td>
<td>German Focke Wulf aircraft</td>
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<td>G.A.F.</td>
<td>German Air Force</td>
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<td>GR</td>
<td>Gruppe - Wing (German Air Force)</td>
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<td>G.R.T.</td>
<td>Gross registered tonnage</td>
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<td>He</td>
<td>German Heinkel aircraft</td>
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<td>H.M.A.S.</td>
<td>His Majesty’s Australian Ship</td>
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<td>H.M.S.</td>
<td>His Majesty’s Ship</td>
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<td>Ju</td>
<td>German Junkers aircraft</td>
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<tr>
<td>k/c</td>
<td>kilocycle</td>
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<td>KFG</td>
<td>Kuestenfliegergruppe - Coastal wing</td>
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<tr>
<td>KG</td>
<td>Kampfgeschwader - Bomber group</td>
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<td>LS-boat</td>
<td>Luerssen Schnellboot - Luerssen motor torpedo-boat</td>
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<tr>
<td>R.A.F.</td>
<td>Royal Air Force</td>
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<td>R.F.P.</td>
<td>Radio finger print</td>
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<td>S-boat</td>
<td>Schnellboot - Motor torpedo-boat</td>
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<tr>
<td>Term</td>
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<tr>
<td>Skl.</td>
<td>Seekriegsleitung - Naval War Staff</td>
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<tr>
<td>S.O.</td>
<td>Senior Officer</td>
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<tr>
<td>S.S.</td>
<td>Steamship</td>
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<tr>
<td>TMA</td>
<td>Type of German mine</td>
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<td>TMB</td>
<td>Type of German mine</td>
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<td>TMC</td>
<td>Type of German mine</td>
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<tr>
<td>U/B</td>
<td>U-boat</td>
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<tr>
<td>U.S.S.</td>
<td>United States Ship</td>
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<tr>
<td>W/T</td>
<td>Wireless telegraphy</td>
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**GLOSSARY**

**ASDIC??**
An apparatus designed to receive and transmit supersonic sound directionally in water. It can detect and obtain ranges of submerged objects by means of transmitting at these objects and receiving echoes from them.

**“Ausserheimisch” (of a cypher)**
“Outside Home Waters”: a German Naval Enigma setting used by raiders.

**Beacon Signal**
A characteristic signal on a given wavelength [usually H/F] transmitted by an automatic apparatus and used for navigational purposes. By taking bearings on one or more beacon transmissions a ship is able to plot its course or its position.

**Break?? (of a cypher)**
To establish the plain language equivalents of the groups of a code-book or to reduce a cypher to plain language; to reconstruct (any code or cypher system).

**B. Service**
“Beobachtung” - (German) Observation or Monitoring Service. That part of German Naval Intelligence dealing with the interception and decrypting of foreign W/T traffic.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Callsign</td>
<td>A group usually of three or more letters and/or figures, sent either in clear or in cypher, either in the preamble or in the body of the message, and serving to identify the sender and/or the recipients.</td>
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<td></td>
<td>Inner:- Callsign used in the address of a message.</td>
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<td></td>
<td>Outer:- callsign used by the station transmitting or receiving a message.</td>
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<tr>
<td>CAM Ship</td>
<td>A catapult armed merchant vessel: that is a merchant ship fitted with discharge gear for aircraft.</td>
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<tr>
<td>Coastal Command</td>
<td>The Royal Air Force Command responsible among other things for the R.A.F. contribution to the anti-U-boat war.</td>
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<tr>
<td>Code</td>
<td>A substitution system having groups (usually of a fixed number, e.g. 3, 4 or 5, of letters, figures, or letters and figures) as the equivalents of phrases, words, syllables, letters, numbers, punctuation marks, etc., common phrases and even whole sentences of plain language.</td>
</tr>
<tr>
<td>Cryptanalysis</td>
<td>The art or science of ascertaining the essential nature of codes and cyphers and reconstructing the systems and operations used by the encoders and encyphers, or enough of these, to enable the messages to be read.</td>
</tr>
<tr>
<td>Cypher</td>
<td>Any system whereby the individual letters, figures, punctuation marks, etc. of plain language, or the individual letters, figures or other symbols of an encoded message are rearranged among themselves (transposition), or with an admixture of other figures or letters (dummies), or replaced by different letters, figures, etc. (substitution), with a view to making the message unintelligible to anyone not in authorised possession of the knowledge or apparatus necessary to reverse the systematic process and so restore the order of letters, figures, etc. of the original plain language or encoded message.</td>
</tr>
<tr>
<td>Decrypt</td>
<td>A foreign communication which has passed through the stages of cryptanalysis and decryption.</td>
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and is in its original language prior to translation. (Sometimes used to include translation also.)

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<thead>
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<tr>
<td>Degauss</td>
<td>To submit a ship to a demagnetising process designed to counter the magnetic mine.</td>
</tr>
<tr>
<td>D/F</td>
<td>Direction-finding. The taking of a bearing or bearings upon a W/T transmission. A bearing or location obtained by this means.</td>
</tr>
<tr>
<td>Encypher</td>
<td>To substitute cypher for plain language and/or code groups either by a hand or a machine process.</td>
</tr>
<tr>
<td>Enigma</td>
<td>Machine cypher used principally by the German, but also by the Italians and the Spanish.</td>
</tr>
<tr>
<td>Force H</td>
<td>The British battleship and carrier force based on Gibraltar.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Classification of wireless waves according to number of cycles of complete undulations completed in a second.</td>
</tr>
<tr>
<td>Geschwader</td>
<td>A German Air Force formation.</td>
</tr>
<tr>
<td>Grid Reference</td>
<td>An encoded position expressed in terms of a grid or pattern of reference lines imposed on a chart for that purpose, either as a measure of security or for convenience in signalling.</td>
</tr>
<tr>
<td>Gruppe</td>
<td>A German Air Force formation; the nearest English equivalent is a wing.</td>
</tr>
<tr>
<td>Gruppe Nord</td>
<td>The supreme German naval command for Northern Waters, the Baltic and North Seas between July 1940 and May 1944.</td>
</tr>
</tbody>
</table>