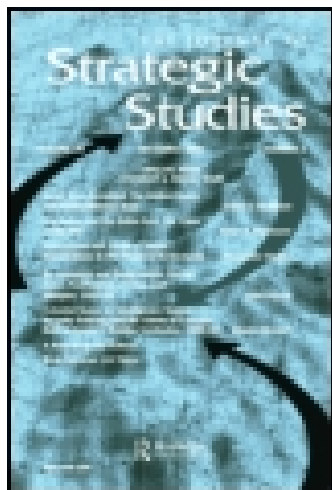


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David Syrett ^a

^a Distinguished Professor of History at Queens College, City University of New York,
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Communications Intelligence and the Battle for Convoy OG 71, 15–23 August 1941

DAVID SYRETT

In 1941, the British instituted a comprehensive system of convoys in the Atlantic. One of the first convoys, OG 71, while sailing between Britain and Gibraltar, was shadowed by German aircraft and attacked by U-boats. In the ensuing August battle, while no U-boats were sunk, the British lost, out of a convoy consisting of 22 vessels, two escorts and eight merchant ships. The German victory was not complete owing to the inability of the German aircraft and U-boats to cooperate successfully as well as the failure of the U-boats to fight the battle effectively and aggressively. The British also made many mistakes during the defence of Convoy OG 71. The surface escorts made many errors of tactics; as for the British aircraft, owing to an inability to cooperate with the surface forces, they became almost totally ineffective. One bright spot for the British during the battle, however, was communications intelligence. The battle saw the first use of high frequency direction finders and on several occasions skillful use was made of information obtained from enemy radio transmissions. In fact important lessons were learned by the British from such use of communications intelligence which would pave the way for a more effective implementation of such information in future convoy battles.

The first half of 1941 was a time of defeat for the British in the war against the Germans and the Italians. Everywhere in Europe, from the Pyrenees to Russia, the Axis were victorious. While 1941 had begun with the British rout of the Italians in Egypt, this victory was quickly followed by a series of British defeats and disasters. The hapless Italians had been reinforced in North Africa by Rommel, the *Deutsches Afrika Korps*, and in April, the British were defeated by these forces and driven from Cyrenaica back into Egypt. In April and May, the Germans invaded Greece and Crete expelling a British expeditionary force. And in June, the Germans invaded Russia and appeared to be on the verge of conquering the country. In the midst of these defeats and disasters the only British victories in the war occurred at sea.

Indeed, in the spring and summer of 1941 the British appeared to be winning the war in the North Atlantic: for not only had the Royal Navy sunk the German battleship *Bismarck* but, more importantly, the balance of power in the region was beginning to shift in favor of the British. During this time the British forces in the North Atlantic were increasing in strength as new escort vessels, especially corvettes, which had been ordered at the

beginning of the war under the terms of the war emergency ship building program, began to enter into service.¹

Moreover, during the spring of 1941, the United States was moving towards active large scale participation in the Battle of the Atlantic as a non-belligerent ally of the British. In March 1941, under the terms of the newly enacted Lend Lease Act, the Americans began to give massive material assistance to the British. In the same month, the eastern edge of the American 'security zone' was moved eastward across the Atlantic to 26°W. In April American shipyards began to repair battle damaged British ships. At the same time the United States began to establish naval bases on the island of Bermuda and at Argentia in Newfoundland. And on 15 May American forces occupied Iceland. These measures, and others, not only placed the United States on a collision course with Germany, but also gave the United States Navy a major responsibility for the protection of shipping in the North Atlantic.²

And there was another important development: at the beginning of 1941 the British codebreakers had at last deciphered the U-boat codes. As a result, the British were able for the first time, to decrypt and to systematically read the coded radio messages to and from U-boats at sea.³ It is no wonder then that in the spring and summer of 1941, with increasing numbers of escort vessels, the advent of large scale American assistance, and the breakthrough in communications intelligence, the British appeared to be gaining the upper hand in the war against the U-boats. Statistics of ships sunk reinforce such a picture: in July 1941 U-boats sank in the North Atlantic only 22 Allied ships compared to 61 vessels sunk in June.⁴

Key to the British conduct of the Battle of the Atlantic was the strategy of convoy.⁵ The increasing number of escort vessels was to prove crucial in enabling the British to effectively implement such a strategy. The histories of maritime wars clearly show that the best way to protect merchant shipping from attack, with the least expenditure of effort, is by adopting a strategy based upon a system of convoys. This is the lesson of the great maritime wars of the seventeenth and eighteenth centuries as well as of the First World War. In the late 1920s, Winston Churchill had already put forward the argument that losses to U-boats in the First World War would have been less if British shipping, instead of sailing independently, had sailed in convoys even when they had not been escorted by warships.⁶

The concept of convoys is simple. If, for example, 50 merchant ships are sailing independently, then an enemy has 50 different points to attack while the defender has 50 different points to defend. If, however, these 50 merchant ships are grouped together into a convoy, it is much more difficult for an enemy to locate and intercept them than if the 50 ships are scattered across the ocean at random. Further, a convoy gives the defender only one

place to defend – the convoy itself – and the attacker only one place to attack. An enemy attacking a convoy is open to counter attack by the convoy's escort. Therefore, in order to mount a successful attack on the convoy the enemy must first find the convoy and then either overpower or elude the convoy's escort. Locating and then attacking a convoy in the face of an armed escort is a much more difficult problem than attacking merchant ships sailing independently.

Furthermore, if a convoy's escort deters altogether an enemy from attacking the merchant ships under escort, then the ultimate objective of the convoy, namely the ability to pass merchant ships across bodies of water without loss from enemy attack, is manifestly achieved.⁷

At the beginning of the Second World War many British officials, besides Winston Churchill, knew that convoys were the most effective means of protecting merchant shipping. However, such knowledge, by itself, was not of much help, if there were not enough warships available to set up an all-embracing system of convoys. For instance, in July 1940, owing to the shortage of escorts, British convoys were only escorted westward out into the Atlantic as far as 17°W.

However, in the spring of 1941, with increasing number of warships coming into service the British were permitted, for the first time, to institute a comprehensive system of convoys in the North Atlantic. In May the British began continuous escort of convoys all the way across the North Atlantic and in July warships, also for the first time, began to accompany throughout the voyage, convoys back and forth between Gibraltar and Britain.⁸

Yet the situation in the North Atlantic was not as positive for the British as it appeared. Readers of secret intelligence reports in the Admiralty knew that the decrease in the number of ships sunk in the North Atlantic by U-boats, during July, was a passing phase in the battle to protect British merchant shipping from U-boat attack. Intelligence reports, especially those based on communications intelligence, indicated that the Germans would increase the number of operational U-boats in the Atlantic from an average of 26 in April, to 60 in July, and potentially 'as many as' 100 by the end of 1941.

Further, in 1941 the Germans had introduced wolf pack tactics: these were massed night attacks on convoys by U-boats operating on the surface. It was soon discovered by the British that when a convoy was intercepted and attacked by a group of U-boats operating on the surface at night, then heavy losses could result. For the available escorts lacking radar were, on many occasions, not capable of protecting the ships of a convoy from this type of attack.

In order to counter wolf pack attacks the British adopted the only strategy that they could. This was to employ, whenever it was available,

information obtained from communications intelligence on the deployment of U-boats in the Atlantic to route convoys away from known concentrations of U-boats.⁹

However, on some occasions, owing to the destination of a convoy, the locations of the U-boats, and the availability of communications intelligence, it was found to be impossible to route convoys so as to avoid the U-boats. In these circumstances the British had no alternative other than have a convoy fight its way through against the German forces to its destination. One such convoy, which had to fight its way past, not only the U-boats, but also the German air force, was Convoy OG 71 which sailed from Britain for Lisbon in August 1941.

Convoy OG (UK-Gibraltar) 71 originated at Liverpool. At 1400 on 13 August 1941 five merchant ships and two escorts sailed from Liverpool. As the British vessels preceded northward, through the Irish Sea and the North Channel, additional merchant ships and escorts joined the convoy from various west coast British ports and as well as from Belfast in Northern Ireland.¹⁰ Off Northern Ireland, late on 15 August the convoy, now consisting of 22 merchant ships, formed into seven columns, escorted by one sloop,¹¹ a Norwegian destroyer,¹² and six corvettes,¹³ began its voyage to Lisbon. It did so preceding west out into the North Atlantic to the westward of Ireland, and then at 2300 on 16 August by turning to the southward for the run to the Iberian Peninsula.¹⁴

British knowledge of German activities in the North Atlantic, at the beginning of the third week of August 1941, was at best spotty. The British were reading the coded radio messages to and from the U-boats.¹⁵ However, at this time, there were considerable delays in the decoding process owing to difficulties in determining the correct settings of the German Enigma cipher machine. One of the results of these delays in the decoding process was that most decoded German U-boat messages, during the battle for OG 71, arrived in the hands of British intelligence officers two,¹⁶ and in some cases even six or seven,¹⁷ days after transmission.

There were those who, without knowledge of communications intelligence, would later argue that perhaps OG 71 should have preceded further out into the Atlantic, than approximately 17°W, before turning to the south.¹⁸ However, there were indications, mostly from communications intelligence, of a group of U-boats operating further to the westward out in the Atlantic.¹⁹ Nevertheless, the decision for OG 71 to precede south, along 17°W, would mean that the convoy would not only sail through an area west of Ireland where German reconnaissance aircraft were known to be operating,²⁰ but it would also pass in close proximity to German naval and air bases in western France.

Further, any U-boats attacking OG 71 could be quickly reinforced by other U-boats, which were passing through the Bay of Biscay to and from

their bases in France. Moreover, in the past other British convoys, such as OG 69, while proceeding across the western approaches of the Bay of Biscay had been attacked by the Germans. No doubt all of these factors were weighed and calculated by the British convoy routing authorities before making the decision to turn OG 71 south along 17°W.

There were several reasons why the Germans deployed U-boats into the Eastern Atlantic during the summer of 1941 in order to attack British convoys sailing to the Iberian Peninsula, Gibraltar, and the South Atlantic. The Germans, owing to the British strategy of employing information obtained from communications intelligence to route convoys away from concentrations of U-boats, were encountering increasing difficulties in locating enemy trans Atlantic convoys. It was believed by the *Befelshaber der Unterseeboote* (BdU), Commander of U-boats, that searches by aircraft would enable the U-boats to easily and quickly obtain contact with British convoys in the region eastern Atlantic to the west of the Bay of Biscay.²¹ This deployment, being close to German air force bases in western France, would give aircraft the opportunity to operate in conjunction with the U-boats. It was intended by the BdU that German aircraft would locate, shadow and then, using radio signals, home the U-boats in on to British convoys. German standard operating procedure called for an aircraft, upon locating a convoy, to shadow the British vessels transmitting homing signals. The waiting U-boats would then begin closing with the source of the signals while at the same time, sending by radio to the BdU their positions and the bearings obtained from the aircraft's homing signals. These bearings, together with those obtained from shore-based radio direction finders, would be plotted by the BdU and the resulting position of the British convoy would then be transmitted by radio to the U-boats.²²

At 1002 on 17 August OG 71, in 50°50'N, 15°50'W to the west of Ireland, was sighted and shadowed for about an hour and a half by a German aircraft.²³ Several hours before the arrival of the German aircraft over OG 71, the BdU had warned the U-boats in the region of the convoy of the arrival of the aircraft and had directed them to stand by to take bearings on the aircraft's beacon signals.²⁴ Upon receipt of the aircraft's sighting report, the BdU immediately concluded that the British convoy was bound for Gibraltar²⁵ and the U-boats were then informed that the 'Convoy [was] according to uncertain cross bearings at 1130 in square AM 7142.'²⁶

Later, at 1120, the BdU ordered those U-boats in the area 'to operate against the convoy'.²⁷ Several hours later, at 1958, the U-201 reported sighting OG 71 'steering southwesterly course'.²⁸ And at 2136 the BdU told the U-boats that, beginning at 1000 on 18 August, the convoy would be shadowed by a German aircraft and that all U-boats south of 54° should

obtain and then report the bearings of the radio beacon signals transmitted by the aircraft.²⁹

The British in OG 71 were aware that the convoy had been sighted, not only from the presence of a shadowing enemy aircraft, but also from intercepting the radio transmissions made by the *U-201*.³⁰ During 17 August the *U-201* made at least three radio transmissions of sighting reports from the immediate vicinity of OG 71.³¹ Given the realization by the British that OG 71 had not only been sighted by an enemy aircraft, but also by U-boats given the interception of radio transmissions coming from the immediate vicinity of the convoy it was decided to alter the course of the ships, at 2300, to 236 degrees and then, at 2400, to 170 degrees in an attempt to force the Germans to lose contact with OG 71.³²

During 18 August OG 71 continued steaming south on a course of approximately 170 degrees. Moreover, several 'evasive' alterations of course were made by the convoy during the forenoon 'to put off possibly shadowing'. Aircraft of RAF Coastal Command had escorted the convoy ever since the British ships had left the North Channel. In particular, during the afternoon of 18 August a RAF Catalina aircraft accompanied the convoy. At 1816, two German Ju 88 aircraft appeared over OG 71, forcing the escorting RAF Catalina aircraft away from the British ships. They then, proceeded to ineffectively attack with bombs the *Grelhead* and *Empire Stream*, two merchant ships of the convoy. At 1851A the Admiralty informed OG 71's escort that 'D/F bearings at 1548Z and 1644Z indicate that 4 or 5 U-boats are in the vicinity of OG 71.' During the remaining hours of 18 August, OG 71 continued steaming to the southward.³³

The Germans during 18 August would maintain contact, both by U-boats and aircraft, with OG 71. At the end of the day three U-boats were still in contact with the convoy. At 0150 on the same day the *U-201*, probably owing to alterations made in the course of the convoy, reported that she had lost contact.³⁴ The BdU at 1054 informed the U-boats of the convoy's estimated position 'according to cross bearings' and that the 'destination is thought to be Gibraltar'. The BdU also added to this message the information that the British force consisted of 21 merchant ships, 4 destroyers, and a cruiser.³⁵

Several hours later the BdU informed the U-boats that Ju 88 aircraft would be conducting 'offensive operations' against the convoy and that aircraft would arrive over the British ships at 1800.³⁶ Several minutes later the U-boats were directed to 'watch out' for radio beacon signals made by the Ju 88 aircraft and to 'forthwith' report the bearings of these radio transmissions.³⁷ At 1636 the *U-201* reported regaining contact with OG 71 and added that the convoy was 'steering southwesterly course'.³⁸

At 1725 the BdU requested that the *U-124* and *U-126*, already positioned ahead of OG 71 to the southsouthwest, to report whether or not

they could operate against the convoy.³⁹ Several hours later both U-boats informed the BdU that they could, indeed, operate against OG 71⁴⁰ and began steaming to intercept the British convoy. The *U-559* and *U-204*, at 1914 and 2308 respectively, after approaching the convoy from the northwest, reported being in contact with OG 71.⁴¹

At 2332 the BdU informed the U-boats, operating against OG 71, that beginning at 1300 on 19 August, aircraft would shadow the convoy and that the U-boats were to report the bearings obtained on the radio beacon signals made by the aircraft. At the same time the U-boats were further informed that it was intended that the aircraft would attack the convoy at 1500 on 19 August.⁴² At 2340 the *U-201* radioed a sighting report to the BdU stating that the convoy was steering a course of 180 degrees.⁴³ Finally, at 2400 on 18 August the *U-201*, *U-204*, and *U-559* reported being in contact with OG 71.

In the meantime, at 2100, on 18 August, HMNorS *Bath* was detached from OG 71 to sweep astern of the convoy. The Norwegian destroyer had orders to rejoin at dusk.⁴⁴ However, for reasons which are not known, HMNorS *Bath* remained astern of OG 71 after dark. When the destroyer was approaching the rear of the convoy, some four miles astern of OG 71, a radar contact was obtained and then a U-boat was sighted. At 0110, as the Norwegian destroyer was turning towards the U-boat, HMNorS *Bath* was hit by a torpedo fired by *U-204*.⁴⁵ The torpedo struck HMNorS *Bath* in the engine room on the starboard side, as a result of which the stern of the ship broke off, and the vessel sank within two minutes. As HMNorS *Bath*'s stern section was sinking, the vessel's depth charges exploded killing men in the water.⁴⁶

The explosion of the torpedo hitting HMNorS *Bath* was seen by the other escorts of OG 71 and HMS *Hydrangea* was ordered to the site of the sinking to rescue survivors from the Norwegian destroyer. While picking up survivors from HMNorS *Bath*, HMS *Hydrangea* was joined by the destroyer HMS *Wanderer*. This ship, while proceeding independently, had sighted the sinking of HMNorS *Bath*, and joined the rescue operation. Both vessels remained in the area of the sinking until daylight when HMS *Hydrangea* steamed to rejoin OG 71 and HMS *Wanderer* departed for the British Isles.⁴⁷

Some three minutes after the torpedoing of HMNorS *Bath*, the *U-559* fired a four torpedo salvo into the main body of OG 71 hitting the merchant ship *Alva*.⁴⁸ One torpedo hit *Alva* forward of the bridge in number 3 hold. The ship was reduced to a sinking condition and was quickly abandoned by her crew who were picked up by the tug *Empire Oak* and the merchant ship *Clonara*.⁴⁹

When the German torpedoes hit HMNorS *Bath* and *Alva*, the escorts of OG 71 conducted, firing star shells, a search with sonar for the U-boats. Nothing was sighted however and the British warships soon returned to

their stations on the screen of the convoy. At 0200, OG 71's course was altered from 232 degrees to 192 degrees in an attempt to lose contact with the U-boats.⁵⁰

At 0300, the course of the convoy was again altered from 192 to 162 degrees.⁵¹ About nine minutes later, the *U-201* fired a salvo of four torpedoes into the main body of the convoy.⁵² The merchant ship *Ciscar*, the leading ship in the 2nd column of the convoy, and the merchant ship *Aquila*, the leading ship in the 4th column, were hit by torpedoes. Both ships quickly sank. HMS *Leith*, immediately after the attack, conducted a search, without result however, ahead of the convoy for the U-boat while the merchant ship *Petrel* and the tug *Empire Oak*, screened by HMS *Wallflower*, rescued the survivors from *Ciscar* and *Aquila*. As a result of this rescue operation, a total of 50 merchant seamen were picked out of the water.⁵³

As the survivors of *Aquila* and *Ciscar* were being rescued torpedoes were observed by the merchant ships *Lapwing* and the corvette HMS *Campion*, at about 0335 passing from port to starboard, through the convoy.⁵⁴ No ships of OG 71 were hit as a result of this attack which consisted of the *U-204* firing a salvo of four torpedoes into the main body of the convoy.⁵⁵ The tactic of firing salvos of four torpedoes into the main body of a convoy was instigated by the BdU, who responding to the decrease in the rate of sinking of enemy ships by the U-boats, had urged in a number of radio messages that the U-boats do 'not economize torpedoes' and 'make full of every opportunity to attack'.⁵⁶ After the abortive attack made by the *U-204*, Convoy OG 71 continued to steam southward towards the Iberian Peninsula.

There were no attacks during 19 August on OG 71. The convoy was escorted for part of the daylight hours by a Catalina aircraft of RAF Coastal Command whilst from 1300 to 1700 German aircraft shadowed the British ships.⁵⁷ Throughout 19 August for reasons that are unclear, *U-201* and *U-559*, did not attack the British ships, although they remained in contact with the convoy.⁵⁸ At 1713, *U-204* informed the BdU that she was ending the operation and returning to base⁵⁹ while *U-106*, just out from Lorient, reported gaining contact with OG 71.⁶⁰ And at 1934 *U-564*, having recently departed from Brest, reported that she had taken up a position, at BE 5696, in the estimated track of OG 71.⁶¹ At 1934, the BdU urged the U-boats 'to attack tonight with all the means at your disposal. Air recce is uncertain for tomorrow.'⁶² Several hours later, at 2217, in the event that the U-boats might lose contact with the British ships, the BdU ordered *U-201*, *U-559*, and *U-564* to search for OG 71 on an arc of 160 to 220 degrees.⁶³ And at 2058 *U-201* reported that she was in contact with OG 71 and that the convoy was steaming on a course of 180 degrees.⁶⁴ On the night of 19 August, in conditions of heavy rain and poor visibility, the course of OG 71 'was

heavily snaked' in an attempt to break contact with the U-boats. No less than eight alterations occurred in the course of the convoy between 1600 on 19 August and 0400 on 20 August.⁶⁵ This tactic was successful for in the early hours of 20 August the U-boats lost contact with OG 71.

At 1200 on 19 August the destroyers HMS *Gurkha* and HMS *Lance* were detached from the escort of Convoy WS 10 in 50°36'N, 22°36'W and began steaming at 22 knots towards OG 71 to reinforce the escort of that convoy. Both of these destroyers were equipped with high frequency direction finders (HF/DF)⁶⁶ which were just being introduced into operational use by the British. A ship equipped with HF/DF was capable of obtaining a line of sight bearing on a ground wave of a radio transmission made by a U-boat. Indeed, HMS *Gurkha* and HMS *Lance* were the first ships equipped with the device and the battle for OG 71 would be the first convoy battle in which HF/DF was employed.⁶⁷ As the two destroyers, in the early hours of 20 August, approached OG 71 several radio transmissions were intercepted by the destroyers' HF/DF equipment indicating that there were U-boats in the vicinity. Before joining OG 71 at daylight HMS *Gurkha* and HMS *Lance* conducted without success several anti U-boat sweeps astern of the convoy. When HMS *Gurkha* and HMS *Lance* did join the escort of OG 71 it was decided that the commander of HMS *Leith* would remain in command of the close escort of the convoy and that the two destroyers would act 'independently' as a distant anti-aircraft screen by day and as an anti U-boat 'striking force' by night.⁶⁸

The weather during the forenoon of 20 August was misty and visibility was poor. At 1110 on 20 August HMS *Hydrangea*, on orders from the Admiralty, was detached from the convoy and sent to Gibraltar with the survivors from HMNorS *Bath*. Then at 1250 a German aircraft appeared over the convoy and shadowed the British ships for about an hour transmitting radio homing signals.⁶⁹ The British tracked the German aircraft on radar, as it ducked in and out of cloud cover, and then just as the German aircraft was departing from the region, at 1345, several radio transmissions from U-boats were intercepted although no attacks against the convoy were attempted.⁷⁰ The weather during the early afternoon cleared and visibility, until the convoy arrived off Lisbon, 'remained excellent'. In an effort to lose contact with the U-boats OG 71, during the night of 20 August, altered course five times.⁷¹

The U-boats during 20 August sought without success to regain contact with OG 71. At 0753 the BdU informed the U-boats that German aircraft would locate once more the convoy and transmit radio beacon signals to home the German vessels in onto the convoy. The U-boats were directed to report the bearings of the aircraft's radio signals.⁷² Then at 1249 the U-boats operating against OG 71 were directed 'to take bearings afresh and report'.⁷³

And at 1325 the BdU informed the U-boats that the aircraft operating over OG 71 had reported that the convoy's course was southwest and that the position of the British ships was BE 8326.⁷⁴ Nevertheless, at 1424, the U-boats were informed by the BdU that the aircraft's 'bearings are unclear and do not afford a clear picture'. The U-boats were at this time also told that at 1400 the BdU had assumed that OG 71 was in Square BE 8326, as reported by the aircraft, or to the southeast of that position, and that the mean course of the convoy 'is apparently still south'.⁷⁵

Several hours later, with no contact with OG 71 having been reported, the *U-201*, *U-564*, and *U-106* were directed to search to the southward, on an arc of between 160 and 200 degrees, assuming that the convoy was on a southerly course with a speed of 7.5 knots or less. At the same time *U-124* and *U-126*, who were approaching the estimated location of OG 71 from the southsouthwest, were ordered to 'operate freely' against the convoy.⁷⁶ However, for reasons which are unclear *U-124* did not comply with this directive and began to return to base.⁷⁷

Meanwhile the commanders of *U-564*, *U-106* and *U-201*, in an unprecedented move, probably owing to the frustration of failing to gain contact with the convoy, did not follow the directive of the BdU: they instead staged a mid-ocean rendezvous. At this meeting of the three U-boats, at 1851, it was decided to conduct a search, on the surface at a speed of 13 knots, until 1900 to the southward on an arc of 100 to 160 degrees.⁷⁸

The BdU reluctantly accepted this scheme, but at 1942 informed the U-boats that if the convoy was not located, the U-boats must conduct a search as previously ordered on an arc of 160 to 200 degrees assuming that OG 71 was further to the north than estimated and that the speed of the British ships was less than 7 knots.⁷⁹ Nevertheless, despite the best efforts of the Germans, the U-boats failed to gain contact during 20 August with OG 71.

On 21 August OG 71 among increasing indications of the presence of U-boats continued steaming south towards Lisbon. At 0742 a radio message was intercepted by HMS *Gurkha*'s HF/DF and then at 1125 another radio message, in what was thought to be 'Naval Enigma'⁸⁰ was intercepted on a bearing of 230 degrees at an estimated range of 12 miles. And at 1222 a third radio message was intercepted. However, because none of these radio messages contained what was known to the British as an E-bar,⁸¹ it was considered 'improbable' that the convoy had been sighted by the U-boats. It was further decided not to search for the U-boats because of a lack of accuracy of the estimated positions and distances from the convoy of the enemy vessels making the radio transmissions.⁸²

At 1325 in 43°46'N, 15°12'W the destroyer HMS *Boreas* joined the escort of OG 71. Following this development, about three hours later, at 1630 a German FW 200 Condor aircraft appeared over the convoy and

shadowed the British ships for about an hour. When the enemy aircraft was sighted, the convoy's course was altered to 193 degrees. Then after an hour and when the enemy aircraft had departed the convoy's course was changed back to 153 degrees.

Throughout the afternoon and early evening of 21 August additional U-boat radio messages coming from the vicinity of the OG 71 were intercepted. From this enemy radio activity as well as from the type and format of enemy radio messages the British concluded that the Germans, while having 'a shrewd idea of the convoy's position', had not actually sighted the British ships. It was also estimated that there were at least five and may be as many as seven U-boats in the vicinity of the convoy.

Again it was decided not to hunt for the U-boats, but rather to evade the enemy. To facilitate this effort, while OG 71 made several alterations in course, HMS *Bluebell* steamed for two hours northeast away from the convoy and just after 2400 staged a mock battle by firing off star shells, dropping depth charges, and sending a radio message to the Admiralty.⁸³ To the British this ruse appeared to be successful for no U-boat attack occurred during the night.

The U-boats during 21 August continued without success to search for OG 71. As on previous days the BdU at 0826 warned the U-boats that a German aircraft would appear over the convoy after 1200 and that the U-boats were to report by radio the bearings of the aircraft's radio beacon signals.⁸⁴ Some four hours later at 1714 the BdU informed the U-boats that the convoy was steering a course of 150 degrees and that the aircraft had reported that the British ships were in BE 9890.⁸⁵ This position was later corrected to Square BE 9598.⁸⁶ And then at 1739, apparently owing to the failure of the U-boats to gain contact with OG 71, the BdU ordered all the U-boats participating in operations against the convoy to report their positions and to state whether or not they could operate against the convoy as far south as Gibraltar.⁸⁷ By 2029 seven U-boats⁸⁸ had reported their positions to the BdU and *U-75* and *U-126* had also indicated that they could not operate as far south as Gibraltar.⁸⁹

Nineteen minutes later the BdU directed that five U-boats⁹⁰ should search, to the southward, on an arc of between 150 and 190 degrees from the position of the convoy given by the shadowing aircraft, to a point OG 71 could have reached if steaming at 9 knots. In the event the convoy could not be located then the U-boats were to turn around and search to the northward to meet the convoy, for this is where the British ships should be if they had been steaming at 5 knots.⁹¹ These searches, however, did not produce any contact with OG 71 other than *U-75* and *U-552*⁹² sighting the star shells fired by HMS *Bluebell*. Both of these U-boats were thereupon directed to operate 'in the direction of the star shells' while all the other U-

boats were ordered to operate 'on a mean course of 10 degrees greater than previously ordered'.⁹³ Only *U-75* and *U-552* were ordered to operate in the direction of HMS *Bluebell*'s star shells since the BdU perceived that 'The star shells probably were fired by the enemy in order to mislead us.'⁹⁴

At 2148 on 21 August the U-boats were informed that starting at 1000 on 22 August German aircraft would operate over OG 71.⁹⁵ It was intended by the BdU to employ a high frequency German Air Force radio, known as FUG 17 or *Gerat Y*, embarked in *U-201* to home the aircraft in on the British convoy.⁹⁶ The plan called for the *U-201* to transmit a continuous signal, from 0700, until the aircraft arrived over the U-boat. Then the *U-201* was to dive and transmit from periscope depth employing a special aerial on the FUG 17, another signal which would serve as a beacon for the aircraft while the latter was searching the area for the convoy.⁹⁷ However, this scheme fell apart when the *U-201* reported that the aerial of the FUG 17 was 'not radiating'.⁹⁸ Nevertheless, the failure of this experiment did not prevent the Germans from gaining contact with OG 71 on 22 August.

At 1130 a German aircraft reported the position of the convoy.⁹⁹ The U-boats were directed to 'continuously watch out for beacon signals' and to report hourly the bearings of these radio transmissions.¹⁰⁰ The course of OG 71 was estimated by the BdU to be 170 degrees.¹⁰¹ At 1324 the BdU informed the U-boats of the estimated position of OG 71 and of the fact that the British ships had altered course to 140 degrees.¹⁰² Finally in the early afternoon of 22 August, following a two-day long and frustrating search for the convoy, *U-564* reported sighting the ships of OG 71.¹⁰³

On receipt of the *U-564*'s sighting report, the BdU directed that the U-boats 'make the utmost use of the opportunity to attack'. The U-boats were further ordered to fire salvos of four torpedoes and 'on no account economize torpedoes' because opportunities for attacking are just 'too rare to justify such economy'.¹⁰⁴

At 0830 on 22 August a RAF Coastal Command Catalina aircraft arrived over OG 71. This was the first appearance in two days of a British aircraft operating in support of the convoy. However, about an hour later, in 42° 06'N, 12° 16'W, two German FW 200 Condor aircraft were also sighted by the British ships. The RAF Catalina, lacking the necessary speed and armament, was incapable of interfering with the German aircraft, which for the next several hours remained in the region of OG 71, transmitting homing signals for the U-boats.

When the German FW 200 aircraft had appeared over OG 71 the convoy's course was altered. To protect it further, at 1237, the destroyer HMS *Wivern* joined the convoy's escort. During the afternoon the first RAF Catalina aircraft, escorting the convoy, departed to be replaced by another Catalina aircraft. Four minutes after the arrival of the second RAF Catalina

aircraft, two German He 111 aircraft also appeared over the convoy and attacked with bombs, although scoring no hits, the merchant ship *Marklyn* which due to engine problems had fallen behind OG 71. And during the late afternoon the escorting RAF Catalina aircraft sighted and forced a U-boat to dive 25 miles from OG 71.¹⁰⁵

Throughout the daylight hours of 22 August, the British ships intercepted and obtained bearings with HF/DF on numerous U-boat radio transmissions coming from the immediate vicinity of OG 71. At 1900, it was estimated by Commander C. N. Lentaigne, the captain of HMS *Gurkha*, that there were six to seven U-boats in the vicinity of the convoy bearing from between 255 and 325 degrees. It was also believed that two more U-boats, whose exact whereabouts remained unknown, were in the vicinity of the convoy. Another problem confronting the British was the fact that a number of the escorts were running low on fuel. For instance, HMS *Gurkha* only had enough fuel to be able to remain with the convoy for another 18 hours.

Another fact influencing British tactical decisions was the lack of sea room, for the convoy would be off the mouth of the Tagus River by dusk on 23 August. In these circumstances it was concluded that any major diversion to the northward or attempt to evade the U-boats 'was unlikely to fox the enemy'. It was therefore decided that the British destroyers would conduct an offensive sweep 15 miles to the westward, in the hope that the U-boats would be driven off. Further, at 2300, the convoy's course would be altered to 120 degrees and then back to 150 degrees before steering directly to the Portuguese coast and the mouth of the Tagus River.¹⁰⁶

At 2100 the escorting RAF Catalina aircraft departed from OG 71 and the four British destroyers¹⁰⁷ began their planned sweep to the westward, while the sloop HMS *Leith* and the five corvettes¹⁰⁸ maintained positions for closely escorting the merchant ships of the convoy. At about 2154 some 120 miles northwest of Lisbon, while the British destroyers were some five to eleven miles from OG 71, the U-boats began to attack the convoy.¹⁰⁹ The first attack came when *U-564*, having taken a position between the convoy and the offensively sweeping destroyers, fired a salvo of four torpedoes at the formation of merchant ships hitting and sinking the tug *Empire Oak* and the Irish merchant ship *Clonlara*.¹¹⁰ Since the destroyers were still away, the close escort of the convoy carried out, without success, a search for *U-564*. Several hours later, HMS *Campion* and HMS *Campanula* rescued the survivors of the *Empire Oak* and *Clonlara*. After the escorts had returned to their stations, the convoy altered course to 120 degrees. The Norwegian merchant ship *Spind* failed to alter course with the other ships of the convoy and lost touch with OG 71.¹¹¹ The *Spind* would not rejoin OG 71 and several hours later was sunk by *U-552*.¹¹²

At 0116 on 23 August the second attack of the night on OG 71 began when the *U-201* fired a salvo of four torpedoes into the columns of merchant ships. The torpedoes hit the freighter *Aldergrove* and the tanker *Stork*. Before sinking the tanker burst into flames. Both ships sank almost immediately.¹¹³ The escorts fired off star shells and mounted a hunt for U-boats which was again not successful. Three hours later at 0400, while HMS *Gurkha* created a diversion by steaming to the north at 27 knots dropping depth charges and firing star shells, the convoy altered course to 150 degrees.¹¹⁴

However, this diversion did not throw off *U-564* who at 0420 fired three torpedoes at the convoy.¹¹⁵ HMS *Zinnia*, while on an inward leg of a zig zag and about 800 yards from the port side of the convoy, was hit by one of these torpedoes. The corvette broke in half and sank within 15 to 20 seconds. Only seven men belonging to HMS *Zinnia* were rescued by other escorts of OG 71.¹¹⁶

The *U-564*'s sinking of HMS *Zinnia* was the last attack on OG 71 for the BdU had to end the operation since OG 71 was about to enter Portuguese territorial waters.¹¹⁷ During the evening of 23 August the 14 remaining merchant ships of the convoy entered the mouth of the Tagus River.¹¹⁸

The Battle for Convoy OG 71 was a German victory. No U-boats were sunk while the British lost to enemy action 2 escorts¹¹⁹ and 8 merchant ships.¹²⁰ These losses were made on a convoy consisting of 22 merchant ships and while it was being protected by a powerful escort. Despite their overall victory the Germans greatly exaggerated the number of merchant ships sunk, claiming 15 ships totaling 90,000 tons, and a further another 5 ships damaged, when in fact the U-boats had actually sunk 8 merchant ships totaling only 30,000 tons.

There were several reasons for these exaggerations. First, the U-boat commanders overestimated the size of the ships in OG 71 believing them to be between 5,000 and 6,000 tons when the true size of the vessels was 1,000 to 2,000 tons.¹²¹ Further, the tactic of firing salvos of torpedoes into the convoy from outside the screen, at long range, made it difficult for the U-boats to correctly observe just what was hit by the torpedoes. The BdU recognized that the claims of ships sunk by the commanders of the U-boats were inflated.¹²²

While the battle for OG 71 was a German victory the conduct of the operation by the German forces was not as effective or aggressive as it could have been. German aircraft failed to hit or damage with bombs any British ships. More importantly the German tactic of employing aircraft to locate and then to home and direct U-boats to attack the British ships was, owing to communications failures and poor navigation, almost a total

failure. Further, the U-boats did not wage the battle against OG 71 as effectively or aggressively as they could have, given their numbers and other tactical advantages. Only five U-boats,¹²³ out of the eleven¹²⁴ U-boats operating against the convoy, actually attacked a British ship. None of the U-boats, who attacked OG 71, penetrated the screen of escorts to fire their torpedoes from within the main body of merchant ships which was the preferred as well as the most effective method of attacking a convoy. All in all while the battle for Convoy OG 71 was a German victory it could have been a much larger victory if proper coordination between the German Air Force and the U-boats could have been achieved, and more importantly, if the U-boats had conducted themselves much more effectively and aggressively.

The heavy casualties suffered by OG 71 did not render invalid the British strategy of convoy. The only alternative to sailing with convoy was for merchant shipping to proceed independently without escort. There were some people who argued that merchant shipping should proceed independently because sailing in convoy presented the Germans with a very valuable target, that it was more difficult for the enemy to locate a single ship than a group of ships, and that independent sailing would be a more efficient use of shipping. However, arguments of this nature just do not stand up to the record, namely that, overall fewer casualties were suffered by merchant ships proceeding in convoy than those sailing independently. Between June 1941 and October 1942 ships proceeding in convoy suffered an overall loss rate of 1.0 per cent while those sailing independently suffered 2.4 per cent casualties.¹²⁵ The problem with OG 71 for the British was not the strategy of convoy, but rather its application.

While chiding the Germans over exaggerated claims of sinkings of British ships a London newspaper, in an article entitled '14 SHIPS BEAT U-BOATS AND PLANES', proclaimed the fight for Convoy OG 71 to be in fact not a German victory, but rather a triumph of the British character.¹²⁶ Putting aside the war propaganda of the time, the Battle for Convoy OG 71, while not a defeat on the scale of the debacle in Greece, was nevertheless, a major British setback in the war against the U-boats. In the battle, the British also made mistakes. For instance, OG 71 should have been routed farther out into the Atlantic to the westward at a greater distance from German bases in France.¹²⁷

OG 71 was provided with an escort of aircraft on every day of the voyage with the exception of 20 and 21 August. Nevertheless, and like the Germans, the coordination between British aircraft and surface ships was almost non-existent owing mostly to poor communications.¹²⁸ The British aircraft escorting OG 71 did not prevent German reconnaissance aircraft from locating the convoy; moreover, they were incapable of driving enemy shadowing aircraft away from the British ships. Further, the British aircraft

accompanying OG 71, almost never sighted a U-boat, were able only to attack one of the enemy vessels, and proved to be singly incapable of impeding the operations of the U-boats near the convoy.

Besides aircraft OG 71 was given a powerful surface escort. A total of 12 warships¹²⁹ were deployed during various stages of the voyage to protect the convoy. Like the aircraft, although for different reasons, the surface escorts of OG 71 proved to be equally incapable of successfully shielding the convoy from enemy attacks. For instance they were ineffective at protecting the ships of the convoy from long range torpedo attack by U-boats. Moreover, during the operation, there was almost no contact by the surface escort with the enemy, much less any sinking or damaging of U-boats by warships.

The most criticized aspect of the defence of OG 71 was the decision to form the destroyers of the escort into a 'striking force' to conduct offensive sweeps. It was later thought, as in the offensive sweep conducted by destroyers on the night of 22 August, that this tactic opened the convoy to attack by U-boats which had successfully avoided the offensive sweep by the destroyers and had remained close to the convoy. This allowed the U-boats to attack the merchant ships at a time when their surface escort was in part deployed away from them on offensive sweeps. It was later concluded that the best method for a successful defense of OG 71 would have been to forgo offensive sweeps, and instead to have formed the ships of the escort into a single coordinated force for the defense of convoy.¹³⁰

The one bright spot for the British in the conduct of the battle for Convoy OG 71 was communications intelligence. It is true that no timely use could have been made of information obtained from the decrypting of German radio messages due to the delays in the decoding process. Nevertheless, the British made skilful use of any information obtained from radio traffic analysis, not only in the Admiralty but also at sea, to avoid U-boats. The evasion by OG 71 of the U-boats, on 20 and 21 August, was owing not only to radical alterations in course and poor visibility, but also to information from radio traffic analysis.

The commander of HMS *Gurkha* displayed an almost uncanny knowledge of German radio procedures.¹³¹ Even though HF/DF, as an anti-U-boat weapon, was still in its early stages German radio transmissions which were intercepted by this device were of great importance to the conduct of the battle. Not only was the intelligence that was obtained from German radio transmissions actually used during the Battle for Convoy OG 71, but the information obtained on German radio procedures during the OG 71 operation, as well as during other convoy battles such as those for convoys OG 69 and HG 70, provided the data required for subsequently formulating future tactics which were to prove crucial in effectively combating the U-boats in later convoy battles.¹³²

In concluding it can be stated that while the battle for OG 71 was a German victory, important lessons were learned from this defeat by the British, in the area of communications intelligence, which paved the way for a more effective use of such intelligence and for Allied victory in the Battle of the Atlantic.

NOTES

1. Peter Elliott, *Allied Escort Ships of World War II: A Complete Survey* (Annapolis, MD: US Naval Inst. Press 1977) pp.53–61.
2. For an account of United States naval operations in the North Atlantic see Patrick Abbazia, *Mr. Roosevelt's Navy: The Private War of the U.S. Atlantic Fleet, 1939–1942* (Annapolis, MD: US Naval Inst. Press 1975).
3. Public Record Office, HW 11/38, ff. 7–8. Hereafter the Public Record Office will be cited as PRO.
4. S.W. Roskill, *The War at Sea, 1939–1945* (London: HMSO 1954–61) Vol.I, p.616.
5. Eric J. Grove (ed.) *The Defeat of the Enemy Attack on Shipping, 1939–1945* (Aldershot, Hants: Ashgate for the Navy Records Society 1997).
6. Winston S. Churchill, *The World Crisis* (London: Thornton Butterworth 1929) Vol.IV, p.347.
7. Cf. National Maritime Museum, WTS/3/1, Notes on the Convoy System of Naval Warfare: Thirteenth to Twentieth Centuries.
8. Roskill, *War at Sea* (note 4) Vol.I, pp.453, 454.
9. F.H. Hinsley *et al.*, *British Intelligence in the Second World War* (London: HMSO 1979–88) Vol.II, pp.167–8.
10. PRO, ADM 237/57, CONVOY OG 71.
11. HMS *Leith*.
12. HMNorsS *Bath*.
13. HMS *Bluebell*, HMS *Campion*, HMS *Wallflower*, HMS *Zinna*, HMS *Hydrangea*, HMS *Campanula*.
14. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
15. The best account of the breaking of German codes is David Kahn, *Seizing the Enigma: The Race to Break the German U-Boat Codes, 1939–1943* (Boston: Houghton Mifflin 1991). Hinsley, *British Intelligence* (note 9) is an overview of the role of intelligence in the Battle of the Atlantic. Histories of the Battle of the Atlantic from the point of view of communications intelligence can be divided into several groups.

First there are the British and American official histories by S.W. Roskill and S.E. Morison which were written without a knowledge of codebreaking. This was also the case with two important and authoritative histories of the Battle of the Atlantic commissioned by and written for the British government. In the 1950s two navy officers, Lieutenant Commander D. W. Waters, RN and Temporary Commander Frederick Barley, RNVN, wrote an exhaustively researched and what would have been a definitive history of the Battle of the Atlantic for the Naval Historical Branch of the Admiralty in the absence of a knowledge of Allied codebreaking. This work was later published by Grove, *The Defeat of the Enemy Attack on Shipping, 1939–1945* (note 5). The other history produced by the Admiralty's Historical Branch, again without a knowledge of codebreaking, and the most authoritative German account, in English, of the Atlantic campaign, later published by the Ministry of Defense is Gunter Hessler, *The U-Boat War in the Atlantic, 1939–1945* (London: HMSO 1989).

A second group of histories of the Battle of the Atlantic are surveys dealing with communications intelligence only in general terms. This second group includes studies such as Dan van der Vat, *The Atlantic Campaign: World War II's Great Struggle at Sea* (New York: Harper & Row 1998); John Terraine, *The U-Boat Wars, 1916–1945* (New York: Patnau

1989); Correlli Barnett, *Engage the Enemy More Closely: The Royal Navy in the Second World War* (New York: Norton 1991); and Clay Blair, *Hitler's U-Boat War* (New York: Random House 1996–1998).

A third category includes books such as Ralph Bennett, *Behind the Battle: Intelligence in the War with Germany, 1939–1945* (London: Sinclair Stevenson 1994) pp.168–201 and W.J.R. Gardner, *Decoding History: The Battle of the Atlantic and Ultra* (London: Macmillan 1999), which provides an analysis of the impact of communications intelligence on the Battle of the Atlantic. David Syrett (ed.) *The Battle of the Atlantic and Signals Intelligence: U-Boat Situations and Trends, 1941–1945* (Aldershot, Hants.: Ashgate for the Navy Records Society 1998) shows what the British, at any given time, knew from communications intelligence of U-boat activities and deployments.

Indeed, there are few works which show in any depth the actual role of communications intelligence, including information from decryption, on the conduct of the Battle of the Atlantic. Two Canadian studies – W.A.B. Douglas, *The Creation of A National Air Force* (Univ. of Toronto Press 1986) and Roger Sarty, 'Ultra, Air Power, and the Second Battle of the St. Lawrence, 1944', *To Die Gallantly: The Battle of the Atlantic*, Timothy Runyun and J.M. Copes (eds.) (Boulder, CO: Westview Press 1994) – are among the few who show effectively how an Allied force, the Royal Canadian Air Force during the last years of the war, used communications intelligence to hunt U-boats. And David Syrett, *The Defeat of the U-Boats: The Battle of the Atlantic* (Columbia: Univ. of South Carolina Press 1994) shows the role of communications intelligence in defeating the U-boats in the North Atlantic convoy battles during the summer and autumn of 1943.

16. E.g., PRO, DEFE 3/25, intercepted 1757/16/8/41 decoded 2237/18/8/41.
17. E.g., PRO, DEFE 3/26, intercepted 2308/18/8/41 decoded 1616/25/8/41.
18. E.g., PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941.
19. E.g., PRO, DEFE 3/25, intercepted 1640/12/8/41 decoded 1314/14/8/41.
20. PRO, DEFE 3/25, intercepted 2252/15/8/41 decoded 1335/16/8/41.
21. Hessler, *The U-Boat War in the Atlantic* (note 15) Vol.I, pp.79–80.
22. PRO, ADM 223/2, Recent information on homing and intercommunication procedure – U-boats and aircraft 22 Aug. 1941; AIR 41/47, p.28..
23. PRO, ADM 237/57, Commanding officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
24. PRO, DEFE 3/25, intercepted 0755/17/8/41 decoded 0118/19/8/41.
25. *Befehlshaber der Unterseeboote* (BdU) War Diary of German U-Boat Command, 1939–1945. Microfilm edition of English translation; original at Naval Historical Center, Washington DC, 17 Aug. 1941.
26. PRO, DEFE 3/25, intercepted 1041/17/8/41 decoded 0126/18/8/41.
27. PRO, DEFE 3/25, intercepted 1120/17/8/41 decoded 0130/19/8/41.
28. PRO, DEFE 3/25, intercepted 1958/17/8/41 decoded 0149/17/8/41.
29. PRO, DEFE 3/25, intercepted 2136/17/8/41 decoded 0133/19/8/41.
30. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
31. PRO, ADM 223/1, OG 71: 17/8 – 23/8, p.xxxi..
32. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
33. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
34. PRO, DEFE 3/26, intercepted 0150/18/8/41 decoded 2112/25/8/41.
35. PRO, DEFE 3/26, intercepted 1054/18/8/41 decoded 2028/25/8/41.
36. PRO, DEFE 3/26, intercepted 1420/18/8/41 decoded 2041/25/8/41.
37. PRO, DEFE 3/26, intercepted 1457/18/8/41 decoded 2043/25/8/41.
38. PRO DEFE 3/26, intercepted 1636/18/8/41 decoded 0114/25/8/41.
39. PRO DEFE 3/26, intercepted 1725/18/8/41 decoded 2017/25/8/41.
40. PRO, DEFE 3/26, intercepted 1831/18/8/41 decoded 2055/25/8/41; intercepted 1856/18/8/41 decoded 2057/25/8/41.

41. PRO, DEFE 3/26, intercepted 1914/18/8/41 decoded 2120/25/8/41; intercepted 2308/18/8/41 decoded 1610/25/8/41.
42. PRO, DEFE 3/26, intercepted 2332/18/8/41 decoded 1628/25/8/41.
43. PRO, DEFE 3/26, intercepted 2340/18/8/41 decoded 1657/25/8/41.
44. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941.
45. Jurgen Rohwer, *Axis Submarine Successes of World War Two, German, Italian and Japanese Submarine Successes, 1939–1945* (Annapolis, MD: Naval Inst. Press 1999) p.62.
46. PRO, ADM 199/1708, Provisional analysis of U-boat operations in the vicinity of Convoy OG 71, 19–23 Aug. 1941, p.1.
47. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix A; Commanding Officer HMS *Hydrangea* to Captain(D) 13th Destroyer Flotilla, 22 Aug. 1941.
48. Rohwer, *Axis Submarine Successes* (note 45) p.62.
49. PRO ADM 199/1708, Shipping Casualties Section... Report of interview with Chief Officer Mr. Speller, S.S. *Alva*, 27 Sept. 1941.
50. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix A.
51. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix A.
52. Rohwer, *Axis Submarine Successes* (note 45) p.62.
53. PRO, ADM 235/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941; Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding North Atlantic, 30 Aug. 1941, Appendix A; ADM 199/1708, Shipping Casualties Section... Report of interview with the Master Captain E. L. Hughes, S.S. *Ciscar*.
54. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30th Aug. 1941, Appendix A.
55. Rohwer, *Axis Submarine Successes* (note 45) p.62.
56. PRO, DEFE 3/25, intercepted 2045/17/8/41 decoded 1029/19/8/41.
57. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
58. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xl–xli.
59. PRO, DEFE 3/26, intercepted 1713/19/8/41 decoded 2123/25/8/41.
60. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xli.
61. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xl.
62. PRO, DEFE 3/26, intercepted 1934/19/8/41 decoded 1917/25/8/41.
63. PRO, DEFE 3/26, intercepted 2217/19/8/41 decoded 1926/25/8/41.
64. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xli.
65. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
66. HF/DF like radar, was a spin-off from research into the nature of the ionosphere by means of radio equipment using cathode tubes. Brian Johnson, *The Secret War* (London: BBC Books 1973) pp.210–12. Shipborne HF/DF was developed simultaneously, but independently, by both the British and the Americans. Kathleen Broome Williams, *Secret Weapon: High-Frequency Direction Finding in the Battle of the Atlantic* (Annapolis, MD: Naval Inst. Press 1996).
67. PRO, AIR 41/47, p.54.
68. PRO, ADM 199/1708, Provisional Analysis of U-Boat Operations in the Vicinity of Convoy OG 71, 19–23 Aug. [1941].
69. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
70. PRO, ADM 237/57, Commanding Officer HMS *Gurkha*'s Report of Proceedings with Convoy OG 71.
71. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
72. PRO, DEFE 3/26, intercepted 0753/20/8/41 decoded 0133/23/8/41.

73. PRO, DEFE 3/26, intercepted 1249/20/8/41 decoded 0226/23/8/41.
74. PRO, DEFE 3/26 intercepted 1325/20/8/41 decoded 0226/23/8/41.
75. PRO, DEFE 3/26, intercepted 1424/20/8/41 decoded 0356/23/8/41.
76. PRO, DEFE 3/26, intercepted 1827/20/8/41 decoded 0209/23/8/41.
77. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xli.
78. PRO, DEFE 3/26 intercepted 1851/20/8/41 decoded 0318/23/8/41.
79. PRO, DEFE 3/26, intercepted 1942/20/8/41 decoded 0347/23/8/41.
80. A radio message encoded on the German Enigma cipher machine.
81. Most U-boat sighting reports, which were made by short signals, were usually prefixed by what the British called an E-bar. An E-bar was alpha in German Morse and rendered as 'dot dot dash dot dot'. See Ralph Erskine, 'Kriegsmarine Short Signal Systems — and How Bletchley Park Exploited them', *Cryptologia* 23 (Jan. 1999) pp.65-92.
82. PRO, ADM 237/57, Commanding Officer HMS *Gurkha*'s Report of the Proceedings with Convoy OG 71.
83. Ibid.
84. PRO, DEFE 3/26, intercepted 0826/21/8/41 decoded 0513/23/8/41.
85. PRO, DEFE 3/26, intercepted 1714/21/8/41 decoded 0455/23/8/41.
86. PRO, DEFE 3/26, intercepted 1729/21/8/41 decoded 0341/23/8/41.
87. PRO, DEFE 3/26, intercepted 1739/21/8/41 decoded 0411/23/8/41.
88. *U-201, U-106, U-124, U-75, U-126, U-564, U-552*.
89. PRO, DEFE 3/26, intercepted 2029/21/8/41 decoded 0443/23/8/41.
90. *U-201, U-124, U-126, U-554, U-106*. However, the *U-124* was already en route back to her base in France. PRO, DEFE 3/26, intercepted 1816/21/8/41 decoded 0424/23/8/41.
91. PRO, DEFE 3/26, intercepted 2058/21/23/8/41 decoded 0408/23/8/41.
92. PRO, DEFE 3/26, intercepted 2350/21/8/41 decoded 0953/25/8/41; intercepted 2341/21/8/41 decoded 0947/25/8/41.
93. PRO, DEFE 3/26, intercepted 0124/22/8/41 decoded 0958/25/8/41.
94. BdU War Diary, 22 Aug. 1941.
95. PRO, DEFE 3/26, intercepted 2148/21/8/41 decoded 0648/23/8/41.
96. CF. PRO, ADM 223/2, Experiments in the use of VHF for U-boat and aircraft 'homing' procedure, 27 Aug. 1941.
97. PRO, DEFE 3/26, intercepted 1450/21/8/41 decoded 0416/23/8/41; intercepted 2335/21/8/41 decoded 0941/25/8/41.
98. PRO, DEFE 3/26, intercepted 0655/22/8/41 decoded 1002/25/8/41.
99. PRO, DEFE 3/26, intercepted 0956/22/8/41 decoded 1010/25/8/41.
100. PRO, DEFE 3/26, intercepted 1042/22/8/41 decoded 1015/25/8/41.
101. PRO, DEFE 3/26, intercepted 1058/22/8/41 decoded 1022/25/8/41.
102. PRO, DEFE 3/26, intercepted 1324/22/8/41 decoded 1234/25/8/41.
103. PRO, ADM 223/1, OG 71: 17/8-23/8, p.xliii.
104. PRO, DEFE 3/26, intercepted 1524/22/8/41 decoded 1939/25/8/41.
105. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941; Commanding Officer HMS *Gurkha*'s Report of Proceedings with Convoy OG 71.
106. Ibid.
107. HMS *Gurkha*, HMS *Lance*, HMS *Boras*, HMS *Wivern*.
108. HMS *Wallflower*, HMS *Zinnia*, HMS *Campion*, HMS *Campanula*, HMS *Bluebell*.
109. PRO, ADM 237/57, Captain(D) 13 Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix B.
110. Rohwer, *Axis Submarine Successes* (note 45) p.62.
111. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix B.
112. Rohwer, *Axis Submarine Successes* (note 45) p.62.
113. Ibid.
114. PRO, ADM 237/57, Captain(D) 13th Destroyer Flotilla to Vice Admiral Commanding, North Atlantic, 30 Aug. 1941, Appendix B.
115. Rohwer, *Axis Submarine Successes* (note 45) p.63.

116. PRO, ADM 199/1708, Report of Torpedoing of HMS *Zinnia* whilst escorting OG 71.
117. BdU War Diary, 23 Aug. 1941.
118. PRO, ADM 237/57, Commanding Officer HMS *Leith* to Captain(D) 13th Destroyer Flotilla, 28 Aug. 1941.
119. HMNorS *Bath*, HMS *Zinnia*.
120. *Alva*, *Ciscar*, *Aquila*, *Empire Oak*, *Stork*, *Clonlara*, *Aldergrove*, *Spind*.
121. Hessler, *U-Boat War in the Atlantic* (note 15) Vol. I, p.80.
122. BdU War Diary, 23 Aug. 1941.
123. *U-201*, *U-559*, *U-564*, *U-204*, *U-552*.
124. *U-201*, *U-559*, *U-204*, *U-206*, *U-564*, *U-106*, *U-124*, *U-126*, *U-75*, *U-552*, *U-108*.
125. Grove, *The Defeat of the Enemy Attack on Shipping, 1939-1945* (note 5) p.303.
126. *Daily Telegraph*, 26 Aug. 1941.
127. Cf. ADM 237/57, Vice Admiral G.F.B. Edward-Collins to Secretary to the Admiralty, 23 Sept. 1941.
128. PRO, ADM 199/1708, Remarks on Escorting Convoy OG 71.
129. *Leith*, sloop; *Campanula*, *Bluebell*, *Zinnia*, *Wallflower*, *Campion*, *Hydrangea*, corvettes; *Gurkha*, *Lance*, *Boreas*, *Bath*, *Wivern* destroyers.
130. Cf. PRO, ADM 237/57, Draft of dispatch to Secretary of Admiralty [nd].
131. Cf. PRO, ADM 237/57, Commanding Officer HMS *Gurkha*'s Report of Proceedings with Convoy OG 71.
132. Cf. PRO, ADM 223/1, U-boat methods of combined attacks on convoys from February 1st to October 31st 1941.