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COASTAL COMMAND REVIEW

October 1943

Vol. II, No. 6

HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE

COASTAL COMMAND REVIEW

Vol. II, No. 6—October 1943

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Summary of the Month's Work—October 1943

1. October was Coastal Command's third best month on record, with a provisional total of at least ten kills. The pack tactics against the Northern Convoys have continued, but can have brought little comfort to the enemy High Command. With the exception of one in Southern Approaches to the Bay, all the kills were against packs on the Northern Convoy routes.

2. Following the attack on ON. 202 and ONS. 18, mentioned in last month's summary, a pack was so unwise as to select a hunting ground within easy striking range of Iceland. The result was that in an action covering the 3rd to 5th October, three U-Boats were killed, one by 120 Squadron, one by 269 with the R.P. weapon and one as first blood to the P.V.I.s of No. 128 Squadron, U.S.N. Three days later, on the 8th, Coastal Command had its record day, killing three U-Boats out of a pack threatening an East-bound convoy, SC. 143, the Squadrons concerned being 86, 120 and 423 (R.C.A.F.). And the following week-end, on the 16th and 17th, a further three certain, plus one probable, out of the pack following two West-bound convoys were killed by 86, 120 and 59 Squadrons; in addition two U-Boats were sunk by the surface escorts. Thus in a fortnight the enemy lost at least 11 U-Boats, not counting the probables, of which at least 9 were sunk by Coastal Command, at a cost to ourselves of one destroyer, the Polish "Orkan," whose loss we all regret, two merchant ships and three aircraft, from which 12 members of the crews were saved. This is not a rate of exchange that can possibly be regarded as profitable by Doenitz, and still less by the seagoing personnel of the U-Boat Service.

3. Apart from that, the high light of the month was, of course, the Anglo-Portuguese agreement by which we obtain the use of the Azores as a base in the U-Boat war. The Senior British Officer in the Azores is Air Vice-Marshal G. R. Bromet, C.B., C.B.E., D.S.O., in whose tenure of command of No. 19 Group some 30 U-Boats were killed in the Bay in the first seven months of this year, and the Air Forces in the Azores now constitute No. 247 Group of this Command. The strategic advantages of our use of the Azores will be obvious to anyone with a chart and a pair of dividers; one advantage, perhaps not so obvious, is that it will enable the Trans-Atlantic convoys to use more southerly routes where the weather in the winter is less appalling than in the far North Atlantic, which will reduce the delays and damage to shipping which have been such an unfortunate feature of the first four winters of the war.

4. In the Bay we have again experienced an unusual run of bad weather in October. Incidentally, the weather records show that Spring and Autumn are always the worst periods for weather in the Bay, the Winter months comparing not unfavourably with the Summer. This, and a continuation of the cautious tactics referred to in last month's summary, have resulted in another relatively lean month for the Bay offensive, with 13 sightings and 10 attacks; of the latter six were by Leigh Light Wellingtons, one resulting in a kill and the others as yet being unassessed. By the time this issue is published No. 304 (Polish) Squadron should be fully operational with Leigh Lights, and at least a high proportion of the Liberators of No. 53 Squadron will be available for the long-range work at night in the southern reaches of the Bay; we may hope with some confidence that this will go far to restore our former rate of kills in this area. Three Liberator squadrons of the 7th Fleet Air Wing, U.S. Navy, are now operational in the Bay.

In the Gibraltar area there were six sightings and three attacks at night, excluding those by Gibraltar aircraft included in the Bay figures. Actually the one kill included in those figures was a South-bound U-Boat in transit which was disposed of in an excellent attack by a L.L. Wellington of 179 Squadron.

5. Anti-shipping operations in October were severely restricted by lack of cloud cover on the Norway coast and lack of targets on the Dutch coast. A Rover patrol in force from the North Coates Wing turned the grounded *Strassburg* into a total loss on October 19, setting fire also to a tug and damaging an armed trawler for the loss of one Beaufighter.

6. Enemy air activity in the Bay was less marked than in previous months. A patrol of No. 143 Squadron on October 7 destroyed two and damaged one of a formation of six Ju.88's. And on October 26 "D" of 311 (Czech) Squadron fought a notable action with seven Ju.88's, destroying one and damaging two for no damage or casualties to the Liberator.

7. Avoidable accidents continue to take a regrettably high toll. No. 17 Group, however, can point to a remarkable achievement in that accidents in their O.T.U.s dropped from 87 in August to 50 in September and 39 in October, a rate per ten thousand hours flying of 36·4, 23 and 23 respectively. If this can be done with crews under training in an O.T.U. Group, something like it should certainly be possible in operational Groups by constant and meticulous attention to the subject in Group H.Q., and by a proper sense of responsibility on the part of Station and Squadron Commanders.

To the U.S. Army Air Corps

The following signal was sent to the Commanding Officer of 479 A/S Group, VIII Air Force, by the A.O.C.-in-C., Coastal Command, on October 25, when the Group was preparing to leave the Command for duties elsewhere.

The time is approaching that will bring to an end the association of Squadrons of the U.S.A.A.F. with Coastal Command in the war at sea against the U-Boats.

In that campaign your squadrons have earned the respect and affection of all ranks in Coastal with whom they have come into contact. They have earned, too, in no uncertain terms, the respect of the enemy who has recently gone to extreme lengths and accepted a considerable reduction in the offensive efficiency of his U-Boat patrols in the attempt to evade the counter-offensive to which you have contributed so much. Both in direct damage inflicted on the enemy and in forcing him largely under the surface across the Bay, the squadrons of 479 A/S Group have played an outstanding part in the Bay offensive.

I am only sorry that they will not be with us to join in the renewed action to which we are determined to bring the enemy again. But I know they will give the same good account of themselves in their new operations, for which I would like you to give them all my best wishes on behalf of Coastal Command.

The following reply to the above signal was received from the Commanding Officer of 479 A/S Group, VIII Air Force, on November 1.

Permit me to convey our appreciation of your kind message and our gratitude for all the courtesies and help given us by Coastal Command, and we leave with sincere regret and hope your memories of our stay will be as pleasant as ours.

(Signed) HOWARD MOORE,

Colonel,

479 A/S Group.

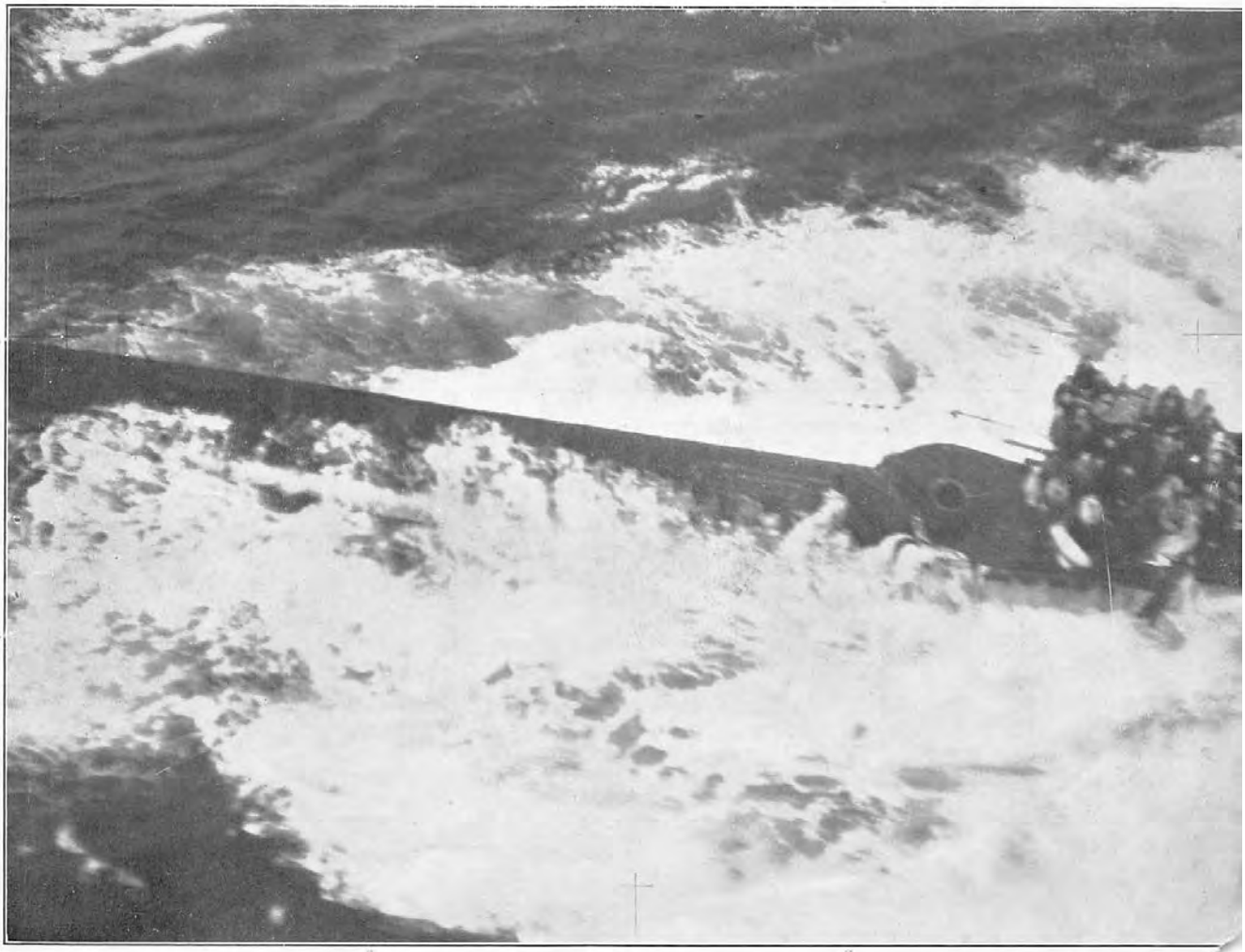
Note: Webber was K in FA in Canada Nov 44

Ref AHB/I 28/205/85

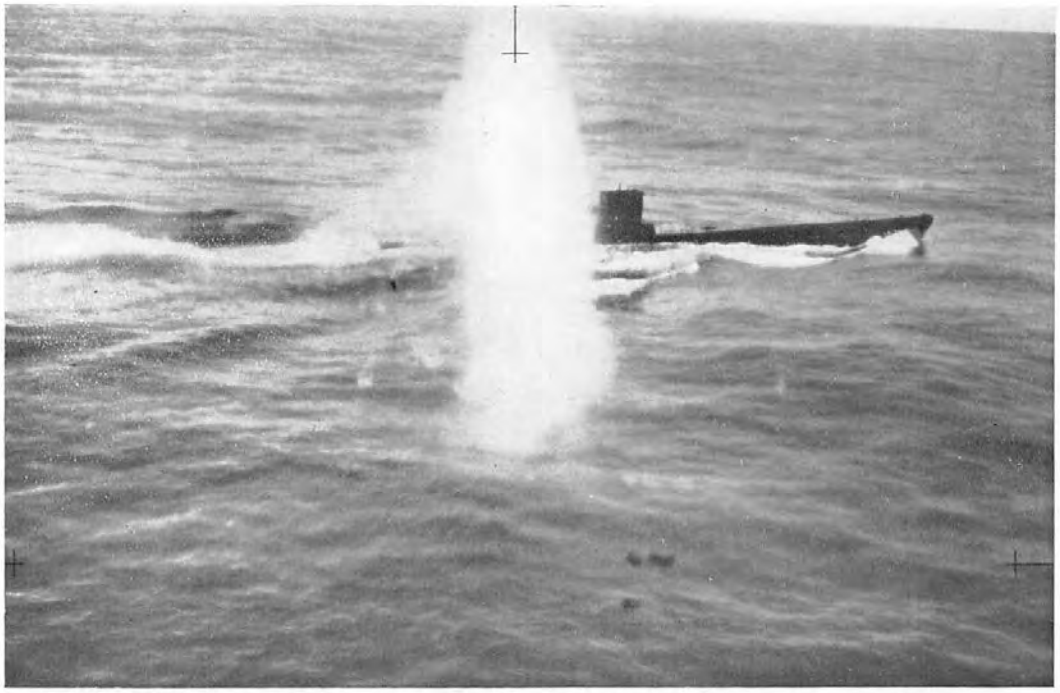
U643 - Lieut D C L WEBBER RNVR

U-Boat attacked by Z/86 and T/120 on October 8. (*See* letterpress, page 7.) The top photograph shows a large part of the crew in the conning tower, with the German naval ensign hoisted. In the lower photograph the after gun position is seen empty, the gun having been broken from the deck by explosions.

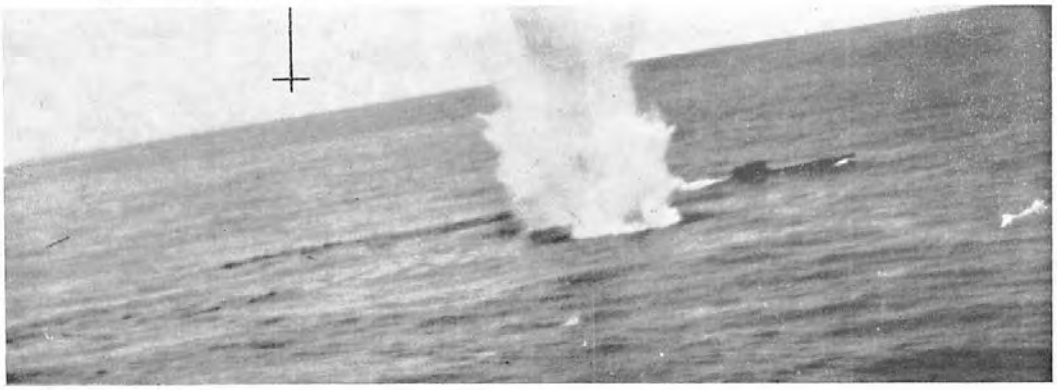
PLATE 1



Surfaced 500-ton U-Boat attacked by G/120 on October 8. The twin A.A. mounting may be clearly seen on the upper step of the conning tower; also a multiple mounting, presumably of four 20-mm. guns, on the lower step, with its armoured shields fully extended.



An incident in the attack on a U-Boat by E/120 on October 17.



Another incident in the attack on a U-Boat by E/120 on October 17.

I.—ANTI U-BOAT

(*See* notes below.)

ANTI U-BOAT SCORES FROM APRIL TO SEPTEMBER, 1943 — **PERCENTAGE FIGURES OF MERIT IN BIG NUMERALS**

63 Sq. U.S.N.	10 Sq.	48 Sq.	53 Sq.	58 Sq.	59 Sq.	86 Sq.	120 Sq.	172 Sq.
0/10 = NIL	46/170 = **27**	33/60 = **55**	33/60 = **55**	118/210 = **56**	19/90 = **21**	95/320 = **30**	110/240 = **46***	90/170 = **53**
179 Sq.	**190 Sq.**	**201 Sq.**	**202 Sq.**	**206 Sq.**	**210 Sq.**	**220 Sq.**	**224 Sq.**	**228 Sq.**
78/150 = **52**	38/100 = **38**	13/30 = **43**	9/40 = **22**	46/100 = **46**	22/50 = **44**	13/40 = **32**	65/260 = **25**	40/50 = **80**
233 Sq.	**269 Sq.**	**304 Sq.**	**311 Sq.**	**330 Sq.**	**333 Sq.**	**407 Sq.**	**423 Sq.**	**461 Sq.**
46/80 = **57**	93/260 = **36**	6/20 = **30**	13/20 = **65**	—	—	32/70 = **46**	23/50 = **46**	46/80 = **57**
502 Sq.	**547 Sq.**	**612 Sq.**	**236 Sq. (R.P.)**					
26/140 = **19**	6/50 = **12**	26/80 = **32**	10/20 = **50**					

* Seven attacks made by 120 Squadron have yet to be assessed.

Attacks on U-Boats

Note on Table above, showing Squadron Scores for the Six Months, April to September, 1943

The tables are based on the Admiralty assessments of all attacks by squadrons. Attacks are divided into the following categories :—

(1) Misses. (2) Insufficient evidence of damage. (3) Damage.

The assessment Damage includes : **Known sunk, Probably sunk, Damage A, Damage B, Slight damage.** For the purpose of arriving at the result, the following system has been adopted :—

For each attack assessed as **No Damage** 0
For each attack assessed as **Insufficient Evidence of Damage** 3
For each attack assessed as **Damaged, or Known Sunk** 10

There have been no outstanding scores during September. However, as noted above, there are still seven attacks still to be assessed, made by 120 Squadron which played a very active part in the defence of convoys ONS 18 and ON 202.

No. 179 Squadron made the greatest number of attacks during the month and obtained 55 points out of a possible one hundred.

SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT

(Including Gibraltar, Iceland and U.S. Moroccan Sea Frontier Aircraft)

OCTOBER 1943.

Duty and Base or Area.	Total Sorties. (1)	Hours Flown. Base to Base. (2)	Hours Flown. On Patrol. (3)	U-Boats Sighted. Day. (4)	U-Boats Sighted. Night. (5)	U-Boats Attacked. Day. (6)	U-Boats Attacked. Night. (7)	Hours per Sighting. Base to Base. (8)	Hours per Sighting. On Patrol. (9)	No. of Sorties. When U-Boat Sighted. (10)	No. of Sorties. When U-Boat Attacked. (11)	Col. 10 Sorties with Flak. (12)
Convoy Cover												
United Kingdom	105	1,507	463	8	—	8	—	188	58	8	7	7
Iceland	62	692	263	20	1	15	1	33	12	17	15	15
Gibraltar and Moroccan Sea Frontier	223	1,881	944	1	—	—	—	1,881	944	1	—	0
Azores	6	60	27	1	—	—	—	60	27	1	—	0
TOTAL CONVOY COVER	396	4,140	1,697	30	1	23	1	133	55	27	22	22
A/U Patrols												
Northern Transit												
United Kingdom	184	1,946	698	—	—	—	—	—	—	—	—	—
Iceland	154	834	325	—	—	—	—	—	—	—	—	—
Northern Convoy												
United Kingdom	32	356	166	2	—	1	—	178	83	1	1	1
Iceland	69	417	261	6	—	5	—	69	43	8	7	7
Azores	4	37	10	—	—	—	—	—	—	—	—	—
Bay of Biscay (Inc. adjacent patrols.)												
United Kingdom	960	9,323	4,035	3	7	2	5	932	403	9	7	7
Gibraltar and Moroccan Sea Frontier	215	2,469	754	—	3	—	3	823	251	3	3	1
Central Convoy												
Azores	36	212	105	—	—	—	—	—	—	—	—	—
Gibraltar and Moroccan Sea Frontier	297	2,232	1,548	1	4	—	3	446	310	5	3	3
TOTAL A/U PATROLS	1,951	17,826	7,902	12	14	8	11	686	304	26	21	19
ADD CONVOY COVER	396	4,140	1,697	30	1	23	1	—	—	27	22	22
TOTAL COASTAL COMMAND A/U EFFORT	2,347	21,966	9,599	42	15	31	12	385	168	53	43	41
				57 U-Boats sighted.		43 U-Boats attacked.						

Note.—In addition to the above there were five chance sightings by Transit aircraft.

Summary—*continued*

Assessments

Month.	Known Sunk.	Probably Sunk.	Damaged. A.	Damaged. B.	Slight Damage.	Insufficient Evidence of Damage.	No Damage.	Insufficient Evidence of U-Boat.	Unassessed.
August	5	—	—	2	—	1	5	1	—
September ..	1	1	1	2	—	14	2	1	2
October (provisional).	10	—	1	—	1	5	2	—	24

Analysis of U-Boats Sighted

For Reference.	Particulars of Incidents.	U-Boats.		Number of Sorties.	
		Sighted.	Attacked.	When Aircraft Sighted.	When Aircraft Attacked.
A	On 36 occasions 1 U-Boat was sighted by 1 aircraft—27 aircraft attacked.	36	27	36	27
B	On 2 occasions 1 U-Boat was sighted by 2 aircraft—all aircraft attacked.	2	2	4	4
C	On 2 occasions 1 U-Boat was sighted by 3 aircraft—5 aircraft attacked (*see also* Ref. E below).	2	2	6	5
D	On 4 occasions 2 U-Boats were sighted by 1 aircraft—1 aircraft attacked 2 U-Boats and 3 aircraft attacked 1 U-Boat.	8	5	4	4
E	On 3 occasions 3 U-Boats were sighted by 1 aircraft—each aircraft attacked 2 U-Boats (1 of the remaining U-Boats was attacked by a second aircraft included in Ref. C above).	9	7	3	3
	Totals	57	43	53	43

Squadron Results—October 1943

				Sorties when U-Boats Sighted.	*Sorties when U-Boats Attacked.*
(i) *United Kingdom and Iceland*					
58		Halifax	Holmesley South	1 (Night).	1 (Night).
502		Halifax	Holmesley South	1 (Night).	1 (Night).
269		Hudson	Reykjavik	6 (1 Night).	4 (1 Night).
59		Liberator	Ballykelly and Reykjavik detachment	4	4
86		Liberator	Ballykelly	5	4
105	(U.S.N.)	Liberator	Dunkeswell	1	1
120		Liberator	Reykjavik	13	12
224		Liberator	St. Eval	1	1
311		Liberator	Beaulieu	1	0
228		Sunderland	Pembroke Dock	1	1
422		Sunderland	Castle Archdale	1	1
423		Sunderland	Bowmore	1	1
128	(U.S.N.)	Ventura	Reykjavik	3	3
407		S/L Wellington	Chivenor	3 (Night).	2 (Night).
612		S/L Wellington	Chivenor	1 (Night).	1 (Night).
(ii) *Gibraltar and Moroccan Sea Frontier*					
92	(U.S.N.)	Catalina	Port Lyautey	1	0
179		S/L Wellington	North Front	7 (Night).	6 (Night).
127	(U.S.N.)	Ventura	Agadir	1	0
(iii) *Azores*					
220		Fortress	Lagens	1	0
				53	43

Recent Attacks on U-Boats

In the late afternoon of October 16 **Liberator Y/86** was on passage to Convoy ONS20, when a surfaced U-Boat was sighted 16 miles dead ahead. The U-Boat was a 740-tonner armed with quadruple 20-mm. cannon abaft the conning tower. The aircraft turned 15° to starboard and climbed into cloud. At 2,000 feet Y/86 broke cloud and found herself some 5 miles from the U-Boat. The enemy had evidently seen the aircraft and opened fire at a range of 2 miles. The Liberator Captain decided to go straight in to attack and approached from fine on the port bow, opening fire with the nose gun at 1,000 yards. The U-Boat turned to starboard, but Y/86 tracked over the conning tower at 50 feet and dropped three depth charges spaced at 90 feet. Neither the splash of entry nor the explosions were seen, but from the position of the explosion mark and the wake it was seen that the depth charges had exploded correctly, and it was estimated that the stick had straddled. However, the U-Boat appeared to be undamaged, although ten minutes after the attack she stopped and remained stationary for five minutes before getting under way again. She circled and put up very intense flak when the Liberator attempted a second attack. The Captain decided to postpone this and circled to port at ranges from 1,000 to 2,500 yards, constantly varying his height. He tried in vain to contact the convoy (then about 100 miles away) by R/T, and sent out W/T reports. The U-Boat took violent evasive action for 20 minutes and then set off north-west at about 15 knots. The Liberator made other abortive attempts to attack and then asked 15 Group for instructions in case a naval unit was being directed to the scene. Group ordered the aircraft to try to home the surface escort and, when this failed, to return to the convoy. It was not known at Group that "Y" had not yet met the convoy. It was then almost dark and with no prospect of surface aid the Captain decided to make another attack in spite of the flak. At 1900 hours he made two dummy attacks from ahead and in each case the U-Boat's gunners reacted promptly. He then came in a third time from ahead, altering course all the way in. The German turned to starboard and opened up at 1,000 yards. The aircraft altered to port and hit the conning tower and gun positions with fire from the nose. Then the Liberator swung to starboard and attacked from Green 10. Three depth charges were dropped, the third falling alongside the hull just forward of the conning tower. When the plumes subsided the U-Boat seemed to be on even keel but began making small circles and figures of eight. Flak came up intermittently as long as the aircraft was in range, and the vessel was apparently under control. Three quarters of an hour later the U-Boat's bows seemed low in the water and after a few minutes black smoke came from both sides of the after deck. She slowly lost way and at 2000 hours stopped with her bows well under water. Three minutes later the bows sank even lower and the U-Boat disappeared from sight heading north. Right up to this moment she kept up spasmodic fire but at no time in the whole action was the Liberator hit, though the Germans used a prodigious amount of ammunition. As soon as the U-Boat disappeared "Y" flew low over the scene of the attack. In the failing light the crew saw life jackets in the water and about twelve men clinging to one dinghy and sixteen or twenty to another. Clever tactics in the final approach contributed largely to this very satisfactory conclusion.

U279 SUNK Flew W J F McEWEN

A Clean Kill

At 1654 hours on October 4 **Liberator X/120** received orders to attack a U-Boat, and at 1910 hours, having reached the area, was flying just below cloud base at 3,000 feet when a U-Boat was sighted at about 6 miles. The aircraft immediately attacked, making good use of cloud cover and achieved a certain degree of surprise. Flak was encountered at about 1,000 feet, but good shooting with the nose gun from 800 feet silenced the U-Boat's gunners.

The aircraft tracked over the U-Boat and dropped three Mark XI Torpex depth charges, spaced 90 feet, with the Mark III bomb sight. The last of these entered the water about 40 feet short of the conning tower, exploding right underneath. When the plumes had subsided and black smoke had cleared away, the Pilot had the satisfaction of seeing 30–40 feet of the U-Boat sticking vertically out of the sea, and about twenty-five survivors wearing life jackets, in the water. Three "K" type dinghies were dropped, two of which fell among the survivors.

This U-Boat was probably making for the convoy at the time of this very excellent attack.

Patience Rewarded

At 1430 hours on October 4 **Ventura B/128** (U.S.N.) attacked a U-Boat and forced her to submerge. The aircraft then left to carry out baiting tactics and stayed away for twenty minutes. On returning there was nothing to be seen, so the Ventura again flew away and this time stayed for an hour. Coming back again the Americans began a search up the U-Boat's original course and their patience was rewarded with the sight of their quarry about 12 miles from the first position. They immediately increased to full speed and dived out of the sun dropping three depth bombs. It is stated that the first exploded under the stern, the next under the conning tower and the last under the bow. The Ventura circled to attack with machine gun fire and the crew saw bluish white smoke pouring from the conning tower. The decks seemed to be in great confusion. Holding his fire until he was very close the Ventura Captain raked the enemy from stem to stern until his ammunition ran out. He circled again and saw the conning tower sink and either the bows or the stern rise high in the air and slide back under the surface. Some of the German crew could be seen swimming in the water and others were clinging to four or five small rafts. There was also a very large oil slick and debris. The Ventura then set course for base having reached P.L.E.

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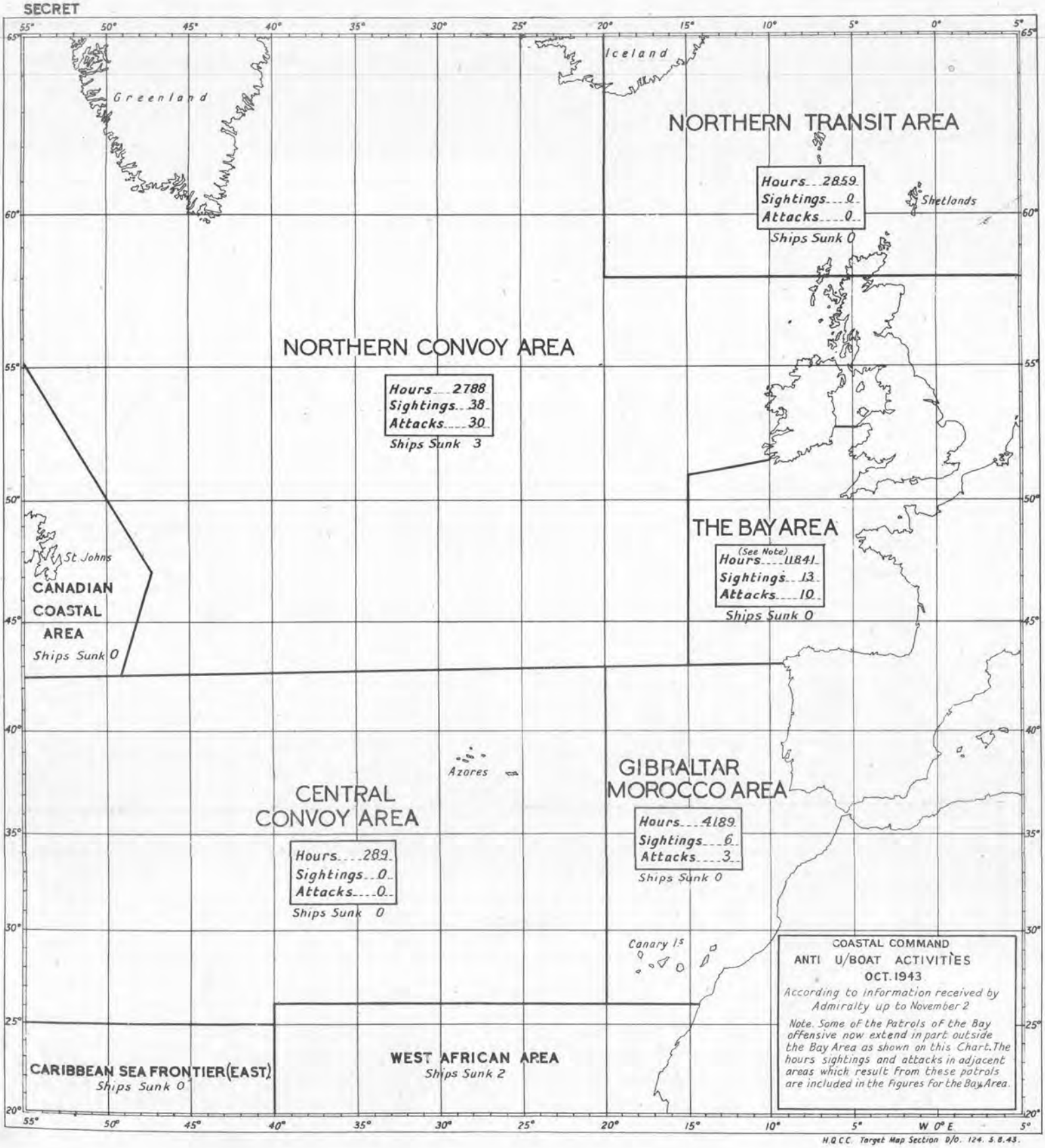


H.Q.C.C. Target Map Section D/O. 124. 5.8.43.

A Splendid R.P. Attack

At 0900 hours on October 5 **Hudson F/269** on anti U-Boat sweep, sighted a U-Boat at one mile range. The aircraft was flying at cloud base of 2,500 feet and immediately dived to attack. Fortunately the U-Boat was nearly ahead on sighting, so no violent alteration of course was necessary.

Very concentrated flak was immediately opened by the U-Boat with 20 mm. cannon and light armament, but it is interesting to note that the firing of the first pair of R.Ps. from 800 yards so scared the U-Boat's gunners that there was no further opposition. Of the eight R.P.s fired, evidence shows that five may have been direct hits and the remaining three should have hit underwater. Ten seconds after the attack the entire forward half of the U-Boat was enveloped in light blue smoke and the ship appeared to have stopped. Shortly afterwards the stern lifted out of the water at a very steep angle and the U-Boat slid under water. The guns' crews opened fire again as the U-Boat was diving and about 15 bodies were seen in the spreading oil patch. No large air bubbles or other evidence resulted, but this is not inconsistent with a successful R.P. attack.

This very good attack shows clearly the importance of the split-second in anti U-Boat attacks, and also how very effective the R.P. can be as a deterrent to the U-Boat gunners.

Two Kills round SC.143

Early in the morning of October 8 **Liberator R/86** was on a Cobra patrol round Convoy SC. 143. Though the light was not good, the Wireless Operator on the flight deck saw a wake six miles on the starboard bow and the aircraft set course to investigate. At four miles the wake was identified as a fully surfaced U-Boat which began to dive when aircraft was still three or four miles away. The swirl was clearly visible when at 0856 hours an attack was made with four 250 lb. depth charges. They were aimed 50 yards ahead of the swirl and straddled the U-Boat's course at an angle of 45° 12 seconds after she had submerged. While circling an R/T report was made to the S.N.O. At 0908 hours the S.N.O. instructed the aircraft to resume patrol. He then ordered the Liberator to return to the scene of the attack and at 0954 hours a wake was sighted eight miles away. The Captain went straight in and at three miles the U-Boat began zig-zagging. As the final run was made the enemy turned 20° to starboard presenting an almost stern-on target. Fifteen men were seen in the conning tower and the U-Boat was fully surfaced when two 250 lb. depth charges were dropped slightly to port, one 80 ft. and the other 60 ft. abaft the conning tower. When the depth charges exploded there was another and more violent explosion which produced a vivid white flash and a dense greyish black plume. The movements of the U-Boat were momentarily screened by the depth charge plume, but when this subsided 30 ft. of the bows were seen sticking up out of the water; after 12 or 15 seconds they sank vertically. Wreckage appeared immediately and the oil patch slowly expanded until at 1020 hours it was 350 yards across. Fifteen survivors were seen clinging to wooden debris, but during the next 20 minutes all but one disappeared. At 1021 hours three destroyers arrived, homed by " R ", and having picked up the sole survivor, informed the aircraft that this was the same U-Boat as the one previously attacked. However " R's " work was not yet finished, for at 1110 hours while continuing the patrol another U-Boat was sighted. The Liberator circled at 1,000 to 1,200 yards and began homing. The U-Boat put up ineffective flak to which " R " replied with machine gun fire.

As **Z/86** was homing on " R " by means of the radio compass, she sighted a surfaced U-Boat at seven miles. " R " could then be seen circling so the Captain decided on a direct attack. At three miles range the U-Boat began to dive. At 1140 hours an attack was made at 170° to the enemy's track and four 250 lb. depth charges were released 200–300 ft. ahead of the swirl. The depth charges straddled the track, but only a small amount of oil appeared and, as this did not spread, the S.N.O. at 1208 hours ordered the aircraft to resume patrol and return in an hour. Arriving at the scene of the attack at 1250 hours " Z " began a search and at 1310 hours was rewarded by a sighting at 7 miles; this was believed to be the same U-Boat as before. Another Liberator was about to attack and was meeting serious flak. At 1313 hours **T/120** was seen to attack and the depth charges appeared to straddle ahead of the U-Boat's track. Twenty seconds later " Z's " Captain began his run in and although he met intense flak, he pressed home the attack. He approached at right angles to the enemy's course and tracked over the U-Boat between the bow and the conning tower. Two depth charges were dropped and the U-Boat was straddled. Circling after the attack " Z " saw " T " deliver a second attack at 1315 hours which straddled the U-Boat's hull and lifted her noticeably. Both aircraft then made machine gun attacks. " Z " made four runs and registered hits. The U-Boat lost way and besides listing heavily to starboard she was badly down by the bows. At least 30 of the crew came up into the conning tower where they inflated dinghies and put on life jackets. Later they hoisted a German naval flag—red with a white circle and a black swastika. As " Z " was now an hour late in leaving, the Captain set course for base.

Meanwhile T/120 was homing escort vessels and keeping the S.N.O. informed of the situation. Ninety seconds after the last attack the U-Boat exploded forward of the conning tower and immediately sank by the bows. Survivors were thrown into the sea and many were killed by the upheaval of water which rose 150 ft. in the air. Three escorts arrived 20 minutes later and picked up 15 to 20 survivors. Altogether a very good day's work.

Bad Visibility

On October 8, **Sunderland J/423** was carrying out a convoy patrol as ordered by the S.N.O. The aircraft was flying just below cloud base at 500 feet in very poor visibility when a fully surfaced U-Boat was sighted right ahead, at only 100 yards. The aircraft flew on over the U-Boat, then turned to carry out a low level attack. Flak from the U-Boat was experienced on the turn, but this was inaccurate and was silenced by the aircraft's 0·5 nose gun by the time that the range had been reduced to 200 yards. Three depth charges were dropped, the fourth failing to release. Evidence shows that Nos. 1 and 2 depth charges fell to port and No. 3 depth charge to starboard, abreast the conning tower. The conning tower was seen to lift 15 to 20 feet as the depth charges exploded.

When the disturbance had subsided there was no sight of the U-Boat.

As the aircraft manœuvred for a second attack, fifteen members of the crew of the U-Boat were seen swimming in a rapidly spreading oil patch. There was a great deal of wreckage.

This excellent attack is another example of quick decision in bad visibility, showing a high degree of training and good gunnery.

An Equal Share

On October 17, **Liberator D/59** was returning to base on completion of anti U-Boat escort to a convoy when, at 1817 hours, a U-Boat was sighted at 10 miles. The aircraft was flying just below cloud base at 1,800 feet and visibility was about 30 miles. Radar was switched on but no contact was obtained.

The aircraft used cloud cover to approach, hoping to achieve surprise, and circled the stern of the U-Boat to attack from the starboard quarter. The U-Boat opened up inaccurate flak at about 2,000 yards and as the aircraft came in to attack, the pilot noticed for the first time that **Liberator H/120** was also coming in on a reciprocal course. D/59 attacked from the starboard beam, dropping four Torpex, Mark XI depth charges. This stick overshot, the nearest depth charge being 200 feet from the U-Boat.

H/120, who dropped no depth charges on his first attack, now came in for his second attack, which straddled at 30° to the U-Boat's track. D/59 then attacked again, but no depth charge was dropped owing to incorrect intervalometer manipulation. The pilot made certain of his third attack and dropped four depth charges, straddling the U-Boat midway between the conning tower and the stern. In every attack fierce and accurate fire from the aircraft was directed at the U-Boat's gunners, causing casualties. Immediately after D/59's third attack the U-Boat was seen to be down by the stern and to have lost speed. The railings of the bandstand were twisted and torn and several of the guns' crews appeared to be dead. Some men were seen jumping overboard. Almost immediately after this, H/120 delivered his third attack, which was a perfect straddle. The bows of the U-Boat reared up and the U-Boat sank immediately. Many other further survivors were seen in the water.

The concentrated and accurate fire from the aircraft undoubtedly caused casualties to the guns' crews and considerably affected the accuracy of the U-Boat's flak.

Attack when Engine was on Fire

While escorting a convoy on the morning of October 16 **Liberator S/59** sighted a U-Boat 10 miles away on the port bow. The U-Boat was circling at 9 knots and was about 20 miles south of the convoy. At the same time another Liberator (L/86) was seen circling the U-Boat. Flying at 4,000 ft. "S" turned towards the U-Boat and when he was 2 miles away the Captain decided to attack at once as the enemy gunners seemed to be concentrating on the other aircraft. He put the aircraft into a steep dive but realised that he could not possibly get down in time. Steep turns, first to starboard and then to port, put him in attacking position and he ran in from the enemy's port quarter. Using the low level bomb sight, four depth charges, spaced at 45 ft., were dropped from 70 feet. During the approach the enemy put up intense flak and hit the aircraft's No. 3 engine when it was still 300 yards away. Two depth charges exploded on each side of the U-Boat forward of the conning tower and the vessel was completely hidden in spray. The Liberator turned steeply to starboard to get into position for another attack, when the Captain was told that No. 3 engine was on fire. Meanwhile the U-Boat began to submerge and only the conning tower and stern could be seen. Continuing his turn the Captain saw a deep red explosion shooting out of the conning tower. He went in again and dropped four more depth charges, 300 yards ahead of the swirl, 29 seconds after the U-Boat had disappeared. It was seen that the swirl was brownish in colour. The Liberator then climbed away and the damaged engine was feathered. While trying to assess the damage to his aircraft the Captain received an R/T message from a destroyer asking him to circle the position. Deciding that his aircraft was in no immediate danger he remained on the scene until the destroyer arrived. A first-class show. The aircraft Captain is to be congratulated on his tenacity.

U-Boat Campaigns

The beginning of the fifth year of the war gave us the opportunity for a brief comparison between the U-Boat campaigns of 1914–1918 and 1939–1943. In appreciating this comparison, it is essential to realize first that the circumstances, military and geographical, are entirely dissimilar. Below is a summary of these differences which must be borne in mind throughout :—

1914–1918.	1939–1943.
(1) Germany began the War with 143 U-Boats, some of which were out of date.	(1) Germany began the War with about 100 U-Boats, all of which were modern.
(2) Building remained fairly constant at about 9 a month.	(2) Building reached the enormous rate of 30 a month, but probably averaged about 20.
(3) Bases available were all in the North Sea.	(3) Bases available were along the whole coast from Norway to the west coast of France.
(4) There was practically no opposition from aircraft.	(4) Steadily increasing opposition by aircraft operating from U.K., Iceland, Gibraltar, Canada, U.S. and W. Africa.
(5) Allied Fleets consisted of British, French, Italian (1915), American (1917) and Japanese against German only.	(5) Allied Fleets consisted of British, French (up to 1940) and American (Dec. 1941) against German, Italian and Japanese (Dec. 1941).
(6) Great Britain had the use of Southern Irish ports.	(6) U-Boats had longer range and greater armament.
	(7) Asdic and other countermeasures much more highly developed.
(7) Unrestricted U-Boat warfare was declared on February 1st 1917.	(8) Unrestricted U-Boat warfare was declared at the outbreak.

As in the Great War, so in this war, the enemy has openly declared that he stands or falls by the success or failure of his U-Boat campaign. As the period of unrestricted U-Boat war is the only comparable period in the two wars, this period only is covered in this review.

Germany declared unrestricted U-Boat warfare on February 1st 1917 in a Zone A around the British Isles, leaving a passage to the neutral ports of Holland and N. Spain ; and in a Zone B in the Mediterranean, east of a line drawn south from the port of Cette on the French coast, leaving a passage of 20 miles round Greek territory. On November 2nd 1917 Zone A was extended to the westward and Zones C and D declared covering Madeira and the west coast of Africa (*see* Diagram 1, page 10). The shipping losses rose steadily and reached their peak in the second half of April of that year. During this month the total world's loss of shipping amounted to 444 ships of 881,000 tons, of which 545,000 tons was British.

The situation was even worse than it appears, since the chief losses occurred to ocean-going vessels of 1,600 tons or over. The losses during this fortnight were at the rate of 50 per cent. per annum, and it was estimated that the chances of an individual ship leaving the U.K. and returning were one in four. In May 1917 the Ocean Convoy system was introduced and this rate of loss was never again approached. The critical issue of the war was whether this country could maintain her imports from North America and her exports to her Allies : a question simply of shipping. The "available tonnage" figures fell with alarming rapidity in 1917 and, in fact, the figures for British tonnage were still falling at the end of the war. The world tonnage only turned the corner in April 1918.

During the whole war 199 U-Boats were sunk. Destroyers were credited with 72, mines and explosive nets 43, our own submarines 20, and decoy ships 8. Other causes, the remainder. Of the weapons used, mines killed 40, depth charges 37, torpedoes 20 and gunfire 18. The monthly rate of U-Boat losses for 1917–1918 only once exceeded 10 and averaged just under 7. The number of U-Boats built remained fairly constant, at 9 per month, thus giving the enemy a steadily increasing U-Boat fleet. It is probable, therefore, that the defeat of the U-Boat effort was due less to the actual destruction of U-Boats than to a decrease in effectiveness of each U-Boat. This drop in efficiency was probably caused by the success of direct defensive measures—convoy —and by the lowering of morale due to increased offensive action causing losses and dilution of trained crews. It is interesting to note that this loss rate (under 7 a month) caused the U-Boat fleet to crack before any other branch of the enemy's armed forces. In its turn this undoubtedly hastened the general collapse.

We can say then that the U-Boats were given a great hammering in the last war by the offensive action of our destroyers, submarines and decoy craft, and our defensive measures, such as mines and nets. But history's verdict is that the main single reason for the failure of the U-Boat campaign was *defensive*—the adoption of the Convoy System.

At the outbreak of war in 1939, Germany may have had about 100 submarines. The Convoy system was adopted at once and for a considerable period very few ships were lost to U-Boats in convoy. A large percentage of casualties were to individual ships, at sea when war broke out, or which were sailing independently for one reason

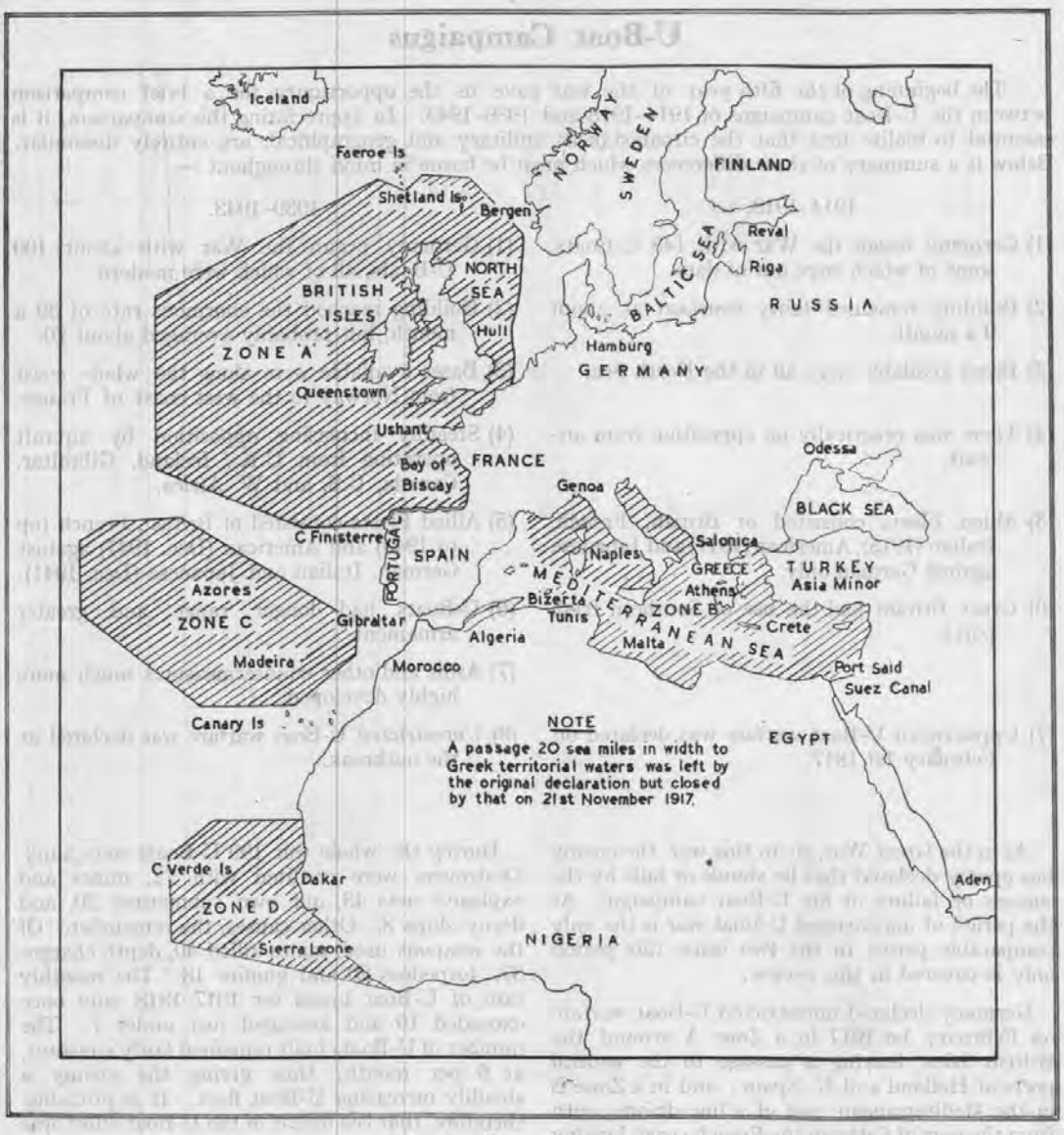


Diagram 1.

or another. From the very first day, Germany adopted unrestricted U-Boat warfare. In addition, our ships had to contend with contact and magnetic mines, and aircraft. It became immediately apparent that, once again, shipping was going to be the critical problem. The efficiency of our Asdic undoubtedly surprised the enemy. Nearly all the early sinkings occurred in and around coastal waters of Great Britain and nearly all fell to surface craft.

The expansion of Coastal Command had the immediate effect of driving the U-Boat further away, and this process has gone on steadily. For a U-Boat to patrol within 40 miles of our coast today would be exceptional and would almost certainly be suicide.

Shipping losses have fluctuated from month to month, due to such divergent causes as the evacuations from Dunkirk and Greece, the magnetic mine, E-Boat and the surface raider, and many forms of air attack. But each new weapon, after initial success, has to some extent been countered or dropped. Now, in 1943, the main issue has clearly become the U-Boat.

By 1943, the U-Boat building programme had reached enormous proportions and it was clear that the enemy was once again to stake everything on success in the Battle of the Atlantic. It was obvious that so long as he even held his own in this battle, there could be no question of an invasion of the Continent. But by the spring of this year the great American shipbuilding programme had got into its stride, and during the year, new construction caught up and passed the sinkings for the first time. This, however, was not victory. Large and urgent cargoes were still going to the bottom and the U-Boat Fleet was still expanding. The U-Boats were hunting in packs under resolute and skilful commanders and tremendous battles took place around the convoys.

All this time the strength of Coastal Command was steadily being built up and more and more squadrons were trained in anti U-Boat detection and attack. In May 1943 we were at last in a position to "flood" an area with aircraft. This meant that U-Boats could be denied a passage through a particular area on the surface by day;

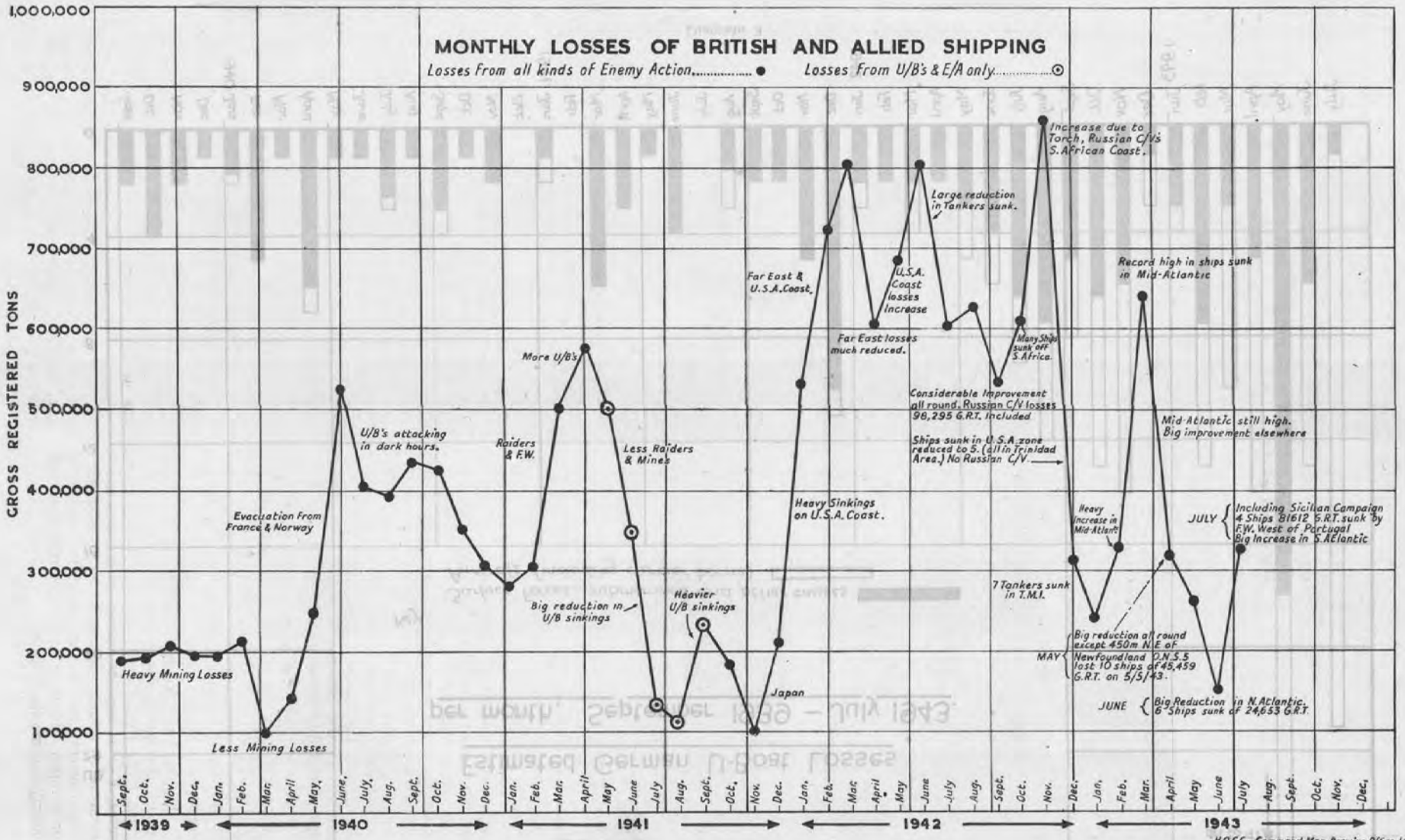

MONTHLY LOSSES OF BRITISH AND ALLIED SHIPPING
Losses from all kinds of Enemy Action.....●
Losses From U/B's & E/A only.....⊙
GROSS REGISTERED TONS
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
Heavy Mining Losses
Less Mining Losses
Evacuation From France & Norway
U/B's attacking in dark hours.
Raiders & F.W.
More U/B's
Less Raiders & Mines
Big reduction in U/B sinkings
Heavier U/B sinkings
Heavy Sinkings on U.S.A. Coast.
Far East & U.S.A. Coast.
Japan
Far East losses much reduced.
U.S.A. Coast losses increase
Large reduction in Tankers sunk.
Increase due to Torch, Russian C/V's S.African Coast.
Many Ships sunk off S.Africa.
Considerable Improvement all round. Russian C/V losses 98,295 G.R.T. included
Ships sunk in U.S.A. zone reduced to 5. (all in Trinidad Area.) No Russian C/V.
7 Tankers sunk in T.M.I.
Heavy Increase in Mid-Atlant.
MAY { Big reduction all round except 450m N.E. of Newfoundland O.N.5.5 lost 10 ships of 45,459 G.R.T. on 5/5/43.
JUNE { Big Reduction in N.Atlantic. 6 Ships sunk of 24,653 G.R.T.
JULY { Including Sicilian Campaign 4 Ships 31612 G.R.T. sunk by F.W. West of Portugal Big Increase in S.Atlantic
Record high in ships sunk in Mid-Atlantic
Mid-Atlantic still high. Big improvement elsewhere
Sept. Oct. Nov. Dec. Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec.
1939
1940
1941
1942
1943
H.Q.C.C. Command Map Drawing Office 149. 9.43

Diagram 2.

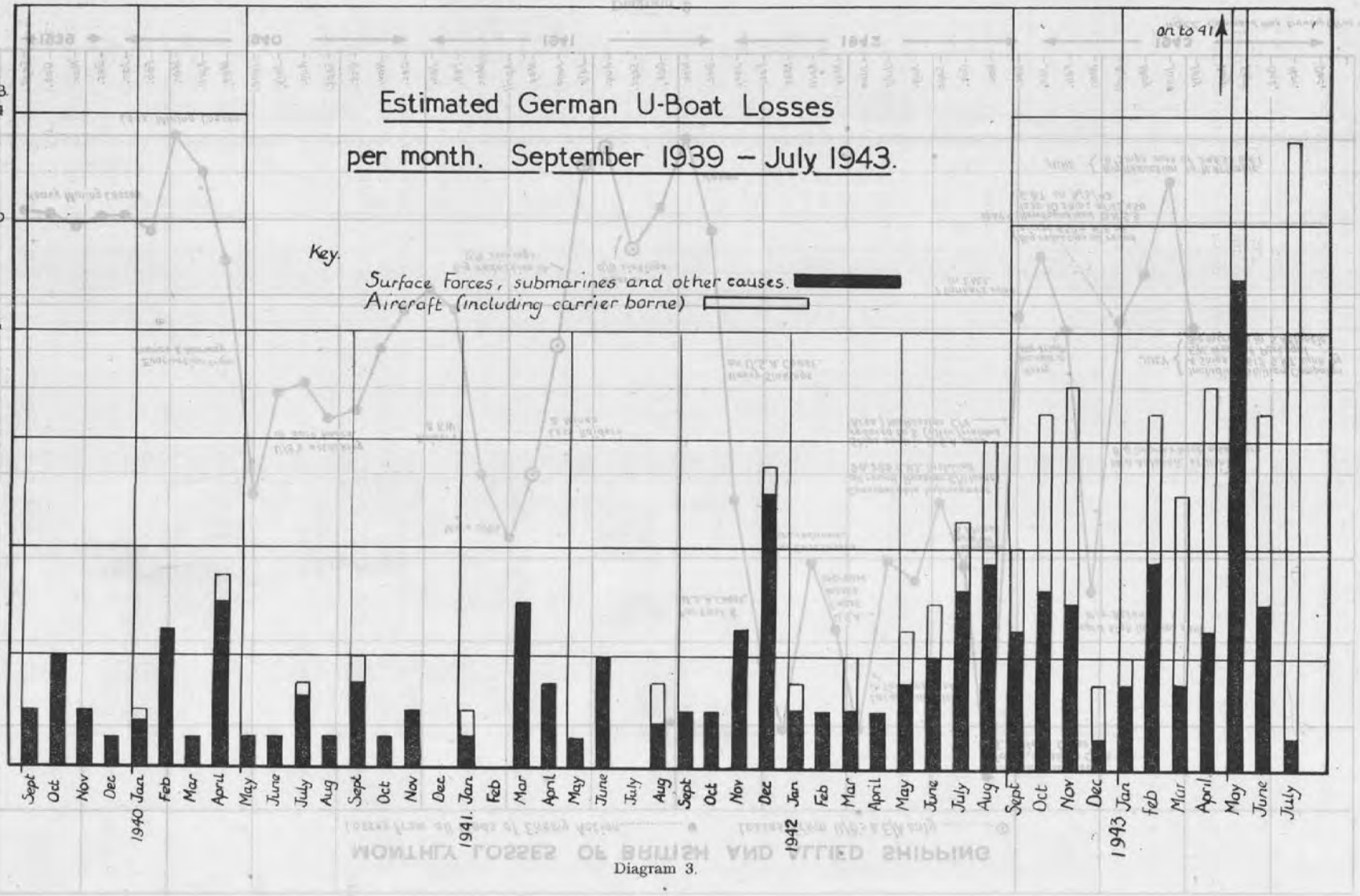

Estimated German U-Boat Losses
per month. September 1939 – July 1943.
Key.
Surface Forces, submarines and other causes.
Aircraft (including carrier borne)
on to 41
U.B.
24
20
16
12
8
4
0
Sept Oct Nov Dec 1940 Jan Feb Mar April May June July Aug Sept Oct Nov Dec 1941 Jan Feb Mar April May June July Aug Sept Oct Nov Dec 1942 Jan Feb Mar April May June July Aug Sept Oct Nov Dec 1943 Jan feb Mar April May June July

Diagram 3.

a denial that could never be enforced by surface craft. This also meant the end of the period when the U-Boat held the initiative.

A straightforward graph of shipping losses 1939–1943 does not give a really true picture of the U-Boat offensive, since losses have been so affected by geographical conditions, by the advent of new enemies and allies, by the acquisition of new bases, by the increases in convoy escorts and ships convoyed and by the variety of other anti-shipping weapons. Diagram 2, however, gives the shipping losses from all causes. If this is read in conjunction with the notes appended to it, it shows very clearly how and why the pendulum has swung since the end of the phoney war.

Diagram 3 shows the known and probable destruction of German U-Boats since the outbreak of this war. It will be seen that, as in the last war, the actual destruction of U-Boats does not appear to have the decisive effect on the U-Boat campaign that one might imagine. An individual U-Boat, however, can now be expected to sink only a fraction of the tonnage that would have been sunk by an individual U-Boat during the early part of this war. As in the last war, this is probably due to two main causes, *i.e.* (i) reduction of efficiency due to lowering of morale and greatly increased counter action, and (ii) destruction of U-Boats, which, of course, materially affects the lowering of morale. This is borne out by the undoubted fact that although the German U-Boat Fleet is numerically much stronger now than at the outbreak of war, the total of sinkings is reduced.

It is fair to say that by 1943 the first part of the Battle of the Atlantic—the defensive part—had been won and that the emphasis was switched more and more to the winning of the second part —the offensive. The brunt of this offensive falls fairly equally on Coastal Command and the Navy. Coastal Command aircraft achieved the majority of their successes in the Bay of Biscay, and the Naval Forces theirs, mostly, around the Convoys and with Support Groups of sloops in the Bay of Biscay.

The results of this offensive can be seen in the figures for U-Boat losses in the three months May–July 1943. May, 41, June, 13, and July, 24. These sinkings were approximately in the ratio of 60 per cent. to aircraft, 40 per cent. to Naval Forces. This forms an interesting comparison with the last war losses and their causes, which have been shown early on in this paper. Furthermore, it is clear that it was not until the middle of 1942 that the air became a major menace to the U-Boat.

The tactics adopted by the U-Boats on this route to and from areas of operation remained more or less constant until the air offensive forced them to change. Since that day, tactics have changed frequently. Sailing in packs for mutual protection, heavily increased A.A. armament, diving by day, or diving by night, have all reflected an increased nervousness of the air offensive, and it seems true to say that U-Boat crews are now more frightened of aircraft than of surface craft.

No mention has been made yet of the available shipping tonnage figures at the end of the fourth year of war. It is not possible to give these figures in detail, but broadly speaking, the situation is extremely good, allowing now for a considerable reserve to cover the inevitable losses of any amphibious operation.

It has been shown how a monthly loss rate of 6·8 U-Boats in 1917–1918 caused a total breakdown in morale. The loss rate for the period May–July has been about 27. These figures are startling, but may be deceptive, since morale will depend more on percentage losses than on actual losses. If we take the average number of U-Boats operating per month during this period at 120—a figure which is probably on the high side—it will be seen that these losses are at the rate of about 22½ per cent. Admiral Sir M. Horton, with his experience of submarines and operating submarines has said that no submarine fleet can stand a loss rate of 33⅓ per cent. We have not reached that figure yet, but we are approaching it on a steadily rising graph.

The enemy has resumed his concentrated attacks on convoys, and will probably start by trying to knock out the escort vessels. If he succeeds in doing this, we shall once again suffer heavy losses. But if he fails, it is not beyond the bounds of possibility that he will cry *enough* in this U-Boat campaign, and then intensify his air attacks on shipping. He is known to have new and ingenious anti-shipping weapons for aircraft. This will entail a public admission of failure of the U-Boat campaign. It is at least open to doubt whether the German home morale will take it, as the U-Boat war has been held out to them throughout as the major weapon with which they hope to defeat the Allies.

As the U-Boats see us

Attacking U-Boats from the air has until now been rather an incomplete business with a lot of loose ends and unanswered questions left in the minds of the crews. In many recent cases it has been certain that the U-Boat has been sunk, but aircrews rarely find out how or why The U-Boat massacre in the summer of this year yielded us many prisoners and some of them have supplied the answers to these questions.

U 558, for instance, was sunk on July 20 by **Liberator F/19 A/S Squadron, U.S.A.A.F.,** on her tenth patrol. The vital factor in the sinking apparently was chlorine gas. The aircraft achieved a large measure of surprise and although hit in No. 2 engine, dropped an accurate stick. Although, according to the prisoners, the nearest depth charge fell 50 ft. away, the explosion was near enough to cause a serious entry of water. This water got into the batteries and quantities of chlorine were generated. The U-Boat was unable to dive. Then **Halifax E/58** appeared and relieved the damaged Liberator. This was particularly unfortunate for the Germans as the Halifax engaged in a gun duel so effectively that the Germans used up all their ready-use ammunition and were prevented by the gas from going below to fetch more. Most of the casualties were caused by this chlorine.

When the boat finally sank, the few survivors spent five days in a dinghy. They seem to have been very depressed by the sight of "innumerable" Allied aircraft and only one German, a F.W.200.

The Second Lieutenant, one Jürgen Scheller, had some interesting opinions. He no longer believed in the possibility of a German victory and said that the best thing Grossadmiral Doenitz could do would be to recall all U-Boats and give them two months rest at their bases to be fitted with "better equipment." By this he implied the hypothetical discovery of some "better equipment" which does not yet exist. He also said that U-Boat commanding officers did not greatly fear depth charge attacks by surface craft, but dreaded attacks from the air, particularly from searchlight aircraft.

Another interesting fact about *U 558* was that she had had her engines sabotaged at a French base.

U 459 (Korvettenkapitän von Wilamowitz-Möllendorf) had also been sabotaged. When she dived the air quick-release valve failed to close properly and water entered quickly. On surfacing it was found that saboteurs had put a piece of thick copper wire round the valve seating.

This boat, a 1,600-ton supply vessel, was sunk on July 24 by **Wellingtons Q/172** and **V/547.** About 1715 hours she was surprised and attacked from fine on the starboard bow. In spite of fire from the single 20-mm. gun the aircraft pressed home a very determined attack. (This was Q/172.) There was no time to bring the quadruple 20-mm. gun to bear and ratings were still trying to get additional ammunition supplies up through the conning-tower when there was a tremendous explosion. Few prisoners have been able to give any coherent account of what actually happened, but it is known that the aircraft struck the bandstand on the starboard side, and that after carrying away the single 20-mm. gun, it slewed round and tore the quadruple gun from its mounting and finally crashed into the sea. Three depth charges became detached, two falling on the bandstand and one right aft. All ratings abaft the bridge were killed by the impact of the aircraft. Because of this it has not been possible to establish whether the aircraft was brought down by A.A. fire, or by the dry explosion of a depth charge, or whether it crashed owing to an error of judgment by the pilot.

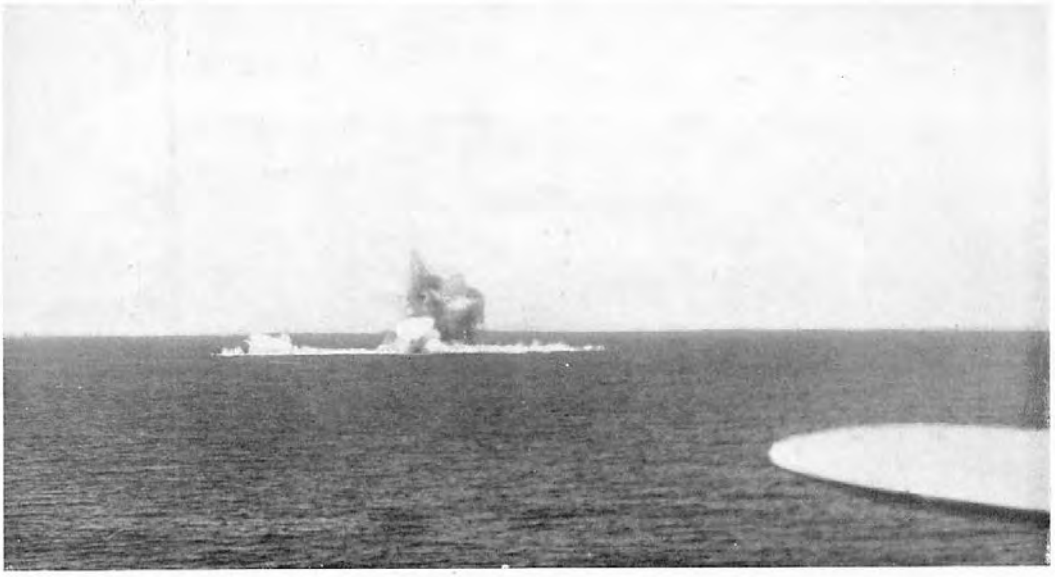
At the time of the crash *U 459* was proceeding slow ahead. In the brief moment of panic, the three depth charges were thrown overboard. At least one exploded under the stern, wrecking the steering gear and causing considerable damage in the engine room. Switchboards in the electric motor room caught fire and the Diesels were jolted from their bases. The U-Boat was then out of control and began to turn in circles. But Wilamowitz-Möllendorf was still reluctant to abandon ship. He believed that he still had a chance and that the damage might be repaired and that the U-Boat might possibly make base on the surface. As a precaution, however, he ordered all rubber dinghies to be brought on deck. The fire in the electric motor room was put out although acetylene bottles beside the bridge, which had been fired by the aircraft, were still burning.

Hope died when a second aircraft appeared, dropping two or three depth charges wide of the U-Boat and then returning to machine gun the decks. (This was V/547.) Machine-gun fire destroyed a considerable number of the dinghies and penetrated the external tanks. Some ratings tried to clear away the 37-mm. gun, but they were either killed or wounded by a further burst of fire. It was this attack which made Wilamowitz-Möllendorf decide to abandon ship. He therefore ordered every man into the water while he remained on the bridge. After saluting his men as they pulled away in the remaining rubber dinghies, he went below to scuttle the U-Boat. He was not seen again and it was thought that he made no attempt to save himself. The U-Boat remained above water about five minutes. Then there was a sharp explosion and black smoke poured from the conning tower. *U 459* then settled rapidly and sank by the stern.

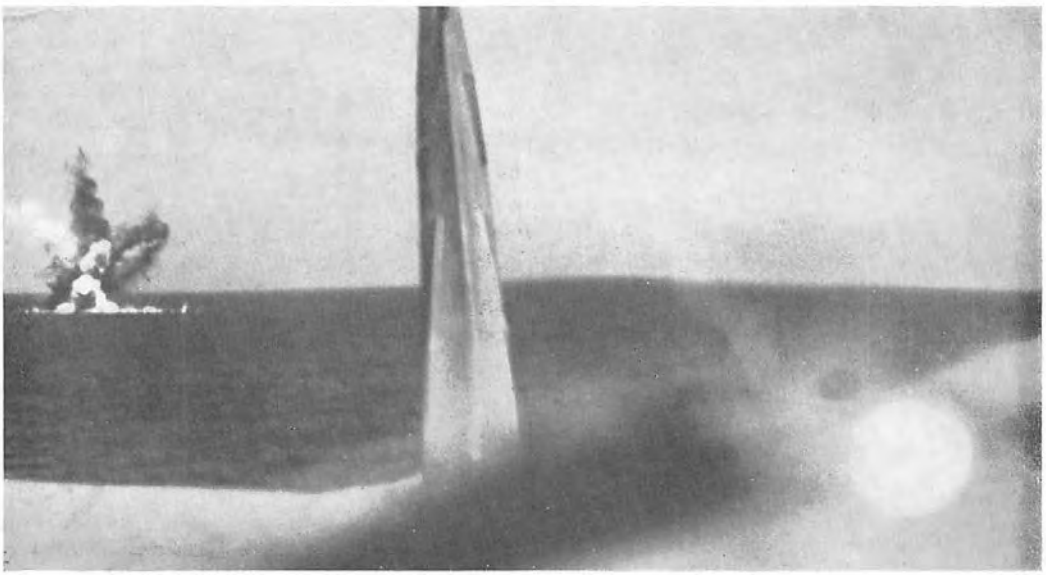
U 706 (Kapitänleutnant von Zitzewitz) went to the bottom on August 2 after leaving La Pallice on her fourth patrol, in company with *U 454* which was sunk on August 1 by **B/10.** *U 706* was destroyed by **Liberator T/4, A/S Squadron, U.S.A.A.F.** and was one of the U-Boats in the pack of three, all of which were sunk the same day. She was first attacked by a Hampden **(A/415)** but the depth charges missed astern. While the watch was looking at the Hampden the Liberator surprised them and dropped a stick of twelve depth charges. Two were direct hits and the fire from the aircraft killed the Commanding Officer. The blast of the first explosion blew in the bridge fairing and imprisoned the Second Lieutenant between it and the periscope casing. The next explosion blew him and three ratings into the sea. The boat sank in a few seconds.

Prisoners from *U 706* said that in future as many U-Boats as possible would carry medical officers. This was because of the heavy casualties which were being caused by fire from aircraft. *U 706* herself carried a medical officer, and so did *U 459*. This should encourage front gunners who will no doubt provide the German doctors with as many patients as possible.

The Baltic port of Danzig is the third largest builder of U-Boats in German controlled territories. A U-Boat flotilla is also based there, to which all boats working up are attached for a short time. There is usually a large number of U-Boats to be seen at Danzig, and this photograph taken by No. 540 squadron shows more than 20, afloat or in floating docks.



Probably a munitions ship. (*See* letterpress, page 15.)



Another view of the above.

Avoiding action starboard to no avail. (*See* letterpress page 15.)

II.—ANTI-SHIPPING

A Torpedo Squadron in the Mediterranean

The following is a brief account of a Coastal Command Torpedo Squadron which was sent to the Mediterranean as a reinforcement to cover a period during the invasion of Sicily.

The Squadron had arrived back from a short detachment in Iceland when orders came through to prepare for another move. The requisite number of ground crews were sent to an embarkation point and 16 selected aircrews went by train to a station in the south of England where a certain amount of speculation was caused by the issue of tropical clothing and the allotment of tropicalized Beaufighters.

Sixteen Beaufighters were airborne on June 12, 1943, and 15 arrived at Port Lyautey about six hours later. It is worth noting that flak is a possibility from Spanish Morocco and one aircraft was slightly damaged by fairly accurate H.E.

Transit from Port Lyautey to an operational base midway between Tunis and Biserte was completed by June 17, and the main body of ground crews arrived by road on June 19 after an interesting journey of 600 miles over mountainous country which had been covered by the First and Fifth Armies a few months earlier.

The landing ground at Protville, already prepared by Army engineers, consisted of graded earth strips 2,200 yards long by 300 yards wide. In the dry season the terrain, which is a cultivated plain, makes ideal landing grounds and very little preparation is necessary. Stubble has to be burned off to reduce fire risk in tented, dispersal, fuel and explosives areas. In the winter months, however, the Tunisian plain is waterlogged.

All members of the crews were accommodated in tents, and until equipment arrived from the United Kingdom originality and improvisation were necessary for domestic comfort. There was a certain amount of enemy equipment and German field-kitchens and Italian hospital cots. These helped to solve the problems of cooking and sleeping. German mobile field-kitchens are beautifully equipped.

The average day shade temperature was 92° to 106° with low humidity and cold nights. In a Sirocco, however, the temperature is much higher and tents have to be securely pegged down to stand up to gusts of 50 miles per hour.

All drinking water had to be transported by road from Tunis, a distance of 20 miles. A 400-gallon water tanker made two trips per day. The unit just missed acquiring a German 2,000-gallon tanker, which would have reduced the number of water runs.

The French and Arab farmers were friendly and generous with their eggs, vin rouge and chickens, which had obviously led very athletic lives. Beer was poor and scarce.

The Unit was part of a Wing which comprised day and night Torpedo and Reconnaissance Squadrons. The primary work of the Wing was to deal with units of the Italian Navy, if there was an opportunity, before or during operations in the Sicilian area. Italian naval units were located at Taranto, Brindisi, Trieste and Spezia. The secondary work of the Wing was to attack enemy merchant shipping operating in the Tyrrhenian Sea. In the first part of their work the Torpedo Squadrons in the Wing were to operate as a combined striking force. In the secondary part Squadrons, in rotation, were to provide strike-forces for targets as and when enemy shipping was located by the Reconnaissance Squadrons.

The primary part of the plan did not lead to anything, as the enemy Navy remained in port. But there was considerable success against merchant shipping.

As preparation for a combined strike against the Italian Fleet there was intensive Wing Drill for a week, to exercise Squadrons in getting off the ground and forming up quickly in all weather conditions. The very wide runways made it possible for four Beaufighters to take off in line abreast. This was desirable, not only to speed up take-off, but also because of the dust clouds which took some time to settle after aircraft had taken off. Another unusual feature of take-off drill was that Squadrons took off in directions 90° and 180° opposed from one another, whatever the wind direction. Once again this method reduced time and minimized dust interference. The "opposed" method of take-off is feasible only on very long run-ways and it requires highly efficient ground control and flying drill.

Each crew did at least one Rover patrol to become accustomed to Mediterrannean flying conditions, which are different in almost every respect from those on the coast of Norway. For instance, cloud cover did not exist and visibility was usually 30 miles. The very high ground temperatures and dust demanded a different technique in the handling of engines and aircraft before take-off and after landing and finally the flat, calm sea, accompanied by slight haze, made judgment of height difficult. Long patrols were very arduous when one had to fly at a height of 200 ft. or thereabouts.

Very few worth-while targets were located on Rovers, but cannon was used on barges, schooners, ferries and small coastal vessels. The most profitable areas were off the ports of Naples, Bastia, La Maddalena and about Elba. This phase ended on July 9. From July 10, all crews stood by each day from dawn to dusk and, when desirable, small strike-forces were sent out to attack merchant shipping located by the reconnaissance aircraft which were covering possible movements of the Italian Fleet.

As time went on and a sortie by the enemy Fleet became less and less likely, the tempo of attacks on merchant shipping increased. The usual composition of a strike-force was four torpedo

aircraft and six anti-flak Beaufighters. Wherever possible all 10 aircraft were drawn from the same Squadron.

All plotting was done in the air. Squadrons were at certain states of readiness, dependent on a strike rota, which gave each Squadron a periodical stand-down. The duty strike of six to ten aircraft was airborne on an average of 20 minutes after a sighting report had been received. The only information required by strike crews was composition, position, course and speed of the convoy. All other briefing had already been done at the beginning of the readiness period as applicable to the Squadron. The rota system worked very well and although individuals in a Squadron did four strikes in as many days, they were assured of 24 hours complete rest on the fifth day.

The Squadron to which this article refers was withdrawn from the line on July 28. During the period July 10 to July 28 it made nine sorties. Three were abortive for the following reasons :—

(i) A four-vessel convoy heading for Salerno made port before interception. (ii) A large convoy off the west coast of Corsica proved to be on *a reciprocal course* to that given in the sighting. It was attacked later by a second strike-force, which was despatched when the mistake was discovered. (iii) The third " target " turned out to be a hospital ship. It was located but not attacked.

The Rover Patrols referred to and the six successful sorties produced the following results :—

Damaged.

One 3,000-ton M/V (hit by torpedo).
Two Destroyers (cannon fire).
One Destroyer (hit by torpedo. Stern blown off).

Sunk.

One M/V 5,000 tons.
One M/V 4,000 tons.
One Tanker, 1,500 tons.

On Fire.

One Escort Vessel.
Two Barges.
One Schooner.

Aircraft Destroyed.

One Three-engine Flying Boat.
Two Six-engine Me.323.*

Left in Sinking Condition.

One M/V 3,000 tons.

* One Me.323 was carrying troops. A number were seen to fall into the sea as aircraft broke up under cannon fire.

Torpedoes expended 21

Own Casualties.

Two Anti-flak aircraft down in sea (one survivor from each seen in dinghy).
One Torpedo aircraft down in flames.
One Anti-flak crew wounded.

Note.—All told, *the Wing* by night and day accounted for 60,000 tons of shipping sunk or badly damaged and 30 enemy aircraft destroyed or damaged between June 19 and July 28, 1943. Fighter escort was not provided on shipping strikes. Beaufighter torpedo aircraft did not operate by night.

Tactics were simple and consisted of intercepting from ahead ; anti-flak aircraft accelerating on sighting and gaining as much height as possible, at the same time endeavouring to engage the escort vessels and target shortly before the torpedo aircraft got into dropping range. A typical convoy consisted of two to three 2,000–4,000-ton ships with at least two destroyers and one or more small escort vessels. The enemy seemed to be plentifully supplied with destroyers. It is an interesting point that shooting-up the depth charges at the sterns of the destroyers caused no end of confusion. On at least one occasion the charges appeared to be on fire.

At the beginning of the operational period the destroyer escort was obviously disposed to ward off attack by submarines. It was only towards the end of July that convoys began to take intelligent avoiding action. Targets were found to be sailing closer and closer inshore. This made an attack on both bows impossible. The destroyer escort ahead and astern of the M/V's would turn seaward and aircraft approaching to drop did so through a barrage of cross-fire from both destroyers. This was never very pleasant. Convoys inshore sometimes had an air escort consisting of very slow land-plane or flying-boat aircraft. It is thought that they acted as aircraft or submarine spotters. They were shot down if they remained in the vicinity.

Fighter opposition was negligible, even around important ports such as Naples, La Maddalena or Palermo. The impression gained was that, compared with the Norwegian or Dutch coasts, Italian shipping was " easy." The Squadron returned to the United Kingdom early in August.

Enemy Shipping in Northern Waters

Perhaps in no respect is the totality of the present war so clearly demonstrated as by the magnitude of the efforts which the belligerent nations have made to develop their own communications and to disrupt those of their enemies.

The magnitude of the Allied problem and the attention paid it by the enemy have tended to distract from the even greater one which faces Germany. Whereas our own problem is mainly one of sea communications, Germany's embraces sea and land transport, running, as they do, in parallel.

Whilst in the last year the Allied shipping position has shown a marked improvement, Germany's position, both as regards sea and internal transport, has continued to deteriorate. Attacks on shipping have limited Germany's imports from overseas, have increased their cost in terms both of the tonnage needed to carry them and the Naval and Air effort needed for their protection, and, by denying access to the most convenient ports and by the destruction of coastwise shipping, have increased the strain on inland transport. The very nature of land communications make them difficult to attack but there is no doubt that the increasing scale and scope of Allied bombing during the present year has gradually caused a widening disorganisation in this arm of the enemy's transport system, and that this in turn has added to his concern for his sea communications.

The enemy's shipping position in Northern Waters at the end of 1942 was one of considerable stringency. In three years the constant attacks by Coastal and other Commands of the R.A.F. and the Royal Navy, had so reduced the size and quality of the enemy's merchant fleet and so restricted its movement that a shortage of tonnage had become an appreciable limiting factor in his Supply Programme.

The only means open to the enemy for obviating this stringency were :

(*a*) a ruthless rationalisation of his shipping services, and

(*b*) the institution of an emergency shipbuilding programme.

Resort was had to both these measures.

As regards the former the appointment of a Reich Commissioner of Shipping with drastic powers to secure the most economic use of existing tonnage became effective at the end of 1942 and it appears that he has made some progress towards the fulfilment of his task.

As regards the second measure it is significant that whereas Germany had only laid down one new merchant ship of over 1,000 tons for at least two years, ten or more of such vessels have been started since 1942. Steps have also been taken to speed up the repair of the large accumulation of damaged tonnage. Owing, however, to the preoccupation of German industry with other tasks, the effects of action in both these fields has been extremely limited and such new building as has been done has only been achieved at the expense of minor warship and escort craft construction.

However, the effects of these measures on the German shipping situation cannot be compared with the gratuitous good fortune for Germany that occurred in the shape of an abnormally mild winter 1942–43. The absence of a substantial freeze-up in the Baltic and Swedish Waters extended the trading period at the beginning of 1943 by three months, equivalent to a bonus of some 600,000 g.r.t. of shipping on the year's programme.

Fortunately the heavier and more effective attacks on her shipping have in a large measure offset this favourable start to Germany's shipping programme for the current year. In this, the bombing attacks on ports and inland communications have been complementary in so far that they have prevented Germany from using her ports in the manner which would give the greatest relief to her shipping situation.

The efforts of the Axis Nations to develop sea communications between Europe and the Far East to the very limited scale necessary for the satisfaction of the more important deficiencies of Germany, Italy and Japan have been a singular failure. Nevertheless active preparations for this, the most dangerous of all forms of blockade running, continue.

The picture of enemy shipping in Northern Waters, while fundamentally unchanged since the beginning of 1943, has altered considerably in detail, and the present moment is an interesting one at which to make a brief examination of this branch of his transportation system.

Enemy shipping in Northern Waters is here taken as embracing all merchant shipping entering, leaving and plying between ports in the occupied territories of Northern Europe and in Germany. It therefore covers the shipping in two distinct but important areas, (*a*) the Bay of Biscay, and (*b*) the North Sea, by which is meant the area extending from the coasts of Holland and Germany as far as the North of Norway.

These areas are important for apparently opposite reasons : the Biscay area because it is the terminal of Far Eastern blockade running by means of which comparatively small quantities of extremely valuable cargoes, urgently needed by Germany and Japan, can be exchanged ; the North Sea because, through it, vast quantities of cargoes of little intrinsic value, of which iron ore is the principal, pass from neutral and occupied territories to German industry. Comparatively little shipping is involved in the Biscay traffic, though the interception and destruction of an important part of it has made those ships that remain assume an enhanced value. But above all it is the value to the enemy of the cargoes that makes this traffic outstanding in importance, and if lost they can only be replaced, at best, by a voyage half round the world. Cargoes of North Sea shipping on the other hand can generally be replaced from sources near at hand, but their replacement from overseas make yet another demand on Germany's limited tonnage resources, while substitution from sources accessible by land transport results in further demands on her already overtaxed labour and transport facilities and not infrequently in a loss in quality.

The fundamental difference, then, between the two areas is cargoes in the case of Bay of Biscay shipping, and hulls in the case of that of the North Sea. During 1943, substantial changes have occurred in both areas.

Bay of Biscay

The development of blockade running in and out of ports on the West Coast of France during 1942 and early 1943 overshadowed all other shipping activity in that area, and while the transport of Spanish iron ore and a small contraband trade from Portugal and Spain (which is also carried on there), are in themselves important, they do not warrant consideration in comparison with this far more important activity.

The present war needs of Japan and German Europe are in important respects complementary. By the occupation of Indo-China, Malay and the N.E.I., Japan has acquired, far in excess of her own requirements, resources of Germany's main deficiencies—rubber, tungsten, tin and vegetable oils.

From Germany, Japan not only can obtain much of the machinery and special components and materials, such as machine tools, ball-bearings and mercury that she cannot herself produce, but also the heavy machinery that she needs for expanding her war potentials by exploitation of the resources of the Occupied Territories. By the acquisition of modern German equipment, including aircraft and their components, W/T apparatus and bombsights, Japan benefits not only from German technical skill but also is able to economise in the time she would otherwise require for evolving new weapons.

Just as the pooling of their mutually complementary resources must rank as an Axis war aim of the highest order, so the need to thwart them presents the United Nations with a strategic problem of the first importance.

The initial success of this traffic in 1942 clearly illustrated its importance to the enemy, since it is tolerably certain that the increase that took place in the proportion of real rubber in certain German manufactured goods and tyres, was due to the supplies of rubber that had reached Europe by the end of that year. Equally, the almost complete frustration of the traffic early in 1943, by denying Germany some 30,000 tons of rubber, is believed to have precipitated a critical situation, which has no doubt been aggravated by damage done by bombing to the Huls Artificial Rubber Plant in Germany itself.

The urgency of this traffic is clearly shown by the decision when merchant ship sailings were brought to an untimely standstill early in 1943, to allocate a number of specially adapted Italian submarines for blockade running. A small number of these boats have undoubtedly made the West/East voyage, but in view of the fact that these vessels are crewed by Italians it is doubtful whether they will continue to operate. More recently it has been reliably reported that a large Japanese U-Boat had reached a Biscay port and that its cargo included rubber.

Although attempts at blockade running by merchant ships has ceased since the Spring of 1943, Germany's and Japan's economic position, and the preparations being made by suitable ships in French harbours, are sure pointers to a recrudescence of the traffic at the first favourable opportunity. The urgency of the Axis need, and the energy with which Germany and Japan prosecute the traffic, stress the need for its frustration by the Allies, so that it is fortunate that as far as the European end is concerned, it starts and ends in the Bay of Biscay, where concentration on interception of blockade runners, whether inward or outward bound, can make a major contribution towards the solution of the problem.

North Sea

As has been indicated, at times when blockade running is being actively prosecuted through the Bay of Biscay, the intrinsic value of the cargoes carried places the shipping of that area in a class above all other in Northern Waters.

At all other times, shipping in the North Sea ranks first. This shipping carries iron ore from Sweden and Norway to Germany, and in the reverse direction, coal and coke for Scandinavia. In addition, there is an important military traffic from Germany to Norway. The vast dimensions of Germany's imports of Swedish iron ore engage a correspondingly large fleet of shipping, and since by far the greater part is required in the industrial area of the Ruhr, transport of this commodity to North Sea ports relieves the railways of a substantial commitment. Equally, since two-thirds of Germany's coal and coke production are situated in the Ruhr, it is convenient to her to route her exports of these through the same ports.

Germany has a number of sources of iron ore other than Sweden, but Swedish ore, which is of high iron content is particularly suited to her methods of smelting, since it enables coke supplies, on which smelting depends, to be utilised to the best advantage.

The heavy strain on her railway system has compelled Germany to make the fullest possible use of water communications, and it is therefore very attractive to her to be able to route her iron ore imports through such North Sea ports as are, not only in close proximity to the Ruhr but connected to it by a system of canals. Of these ports, Rotterdam is in every way the most conveniently situated, since a lock-free canal system, and the Lower Rhine, place it in direct contact with the Ruhr, and its handling facilities have in consequence become outstanding. Second only to Rotterdam in convenience, is Emden, which is linked to the Ruhr by the artificial, and more vulnerable, Dortmund–Ems Canal.

Germany for long has been compelled to depend on Swedish shipping for the carriage of a large proportion of her iron ore imports, and it is estimated that 40 per cent. of this trade was to have been carried in Swedish ships during the current year. Her dependence on Swedish shipping has been a source of strength and weakness; it has eased her own shipping requirements at a time of stringency, and enabled her import programme largely to be completed, but it has left her dependent on the goodwill of Swedish shipowners.

So long as adequate supplies of coal and coke could be made available at Rotterdam, Germany was able to exploit Sweden's complete dependence on imports of the two commodities, to compel her

to continue trading with that port, in spite of the reluctance of her shipping owners and crews to face the hazards of this route. In 1943, however, a combination of two factors have defeated this important aspect of the German Shipping Plan. They were (*a*) the increased weight and effectiveness of direct air attacks on the convoys themselves, and (*b*) the inability of the Germans to provide sufficient coal at Rotterdam, which can probably be traced to a disorganised system of inland communications due to bombing. It can be readily appreciated that the Swedes were hardly likely to face the dangers and losses entailed by sailing to Rotterdam, if there were none of the precious return cargoes available, and by June it was clear that virtually the whole of Rotterdam's traffic had been transferred to Emden. A small amount of traffic to the Hook still continues, but the increasing resistance of Swedish owners and the magnitude of German efforts to increase the capacity of Emden and its inland communications suggests that Rotterdam is unlikely to regain the hegemony of North Sea ports.

In contradistinction to the Dutch and German Coasts, all major shipping that operates along the Norwegian Coast is under German control, and no neutral shipping ventures there. In 1943, the amount of shipping moving in the Norwegian area has shown a substantial increase over that of previous years, and while this increase has largely been due to the movement of military supplies, fortification materials and coal, it has also been reflected in augmented exports to Germany. The recent suspension by Sweden of transit rights that allowed the Germans to move certain quantities of troops and military supplies over Swedish railways *en route* to the North of Norway, suggests that the volume of shipping is likely at least to be maintained, if not increased, and indications of an attempt to reinforce fighter strength in Southern Norway testifies to German apprehensions for its safety.

Conclusions

The distinctive natures of the shipping operating in the two main areas of Northern Waters have been demonstrated; that operating North of the Straits of Dover is an integral part of Germany's continental transport system; that operating in the Biscay Coast provides Germany's last appreciable link with the outside world. By frustrating the latter, economic collaboration, probably the most positive aspect of combined Axis strategy, is prevented. The denial of quite small quantities of such important deficiencies as rubber, tin, and tungsten has an effect on Germany's declining war potential quite out of proportion to the effort needed to achieve it. In the North Sea by reducing still further the volume of shipping moving between Germany and her neighbours, subject and subservient, the strain on the enemy's supply and transport system is aggravated. The effects of attacks on shipping in this area, in themselves considerable, are essentially complementary to those of the war of attrition which is being waged over and around Germany. One and all they limit accretions to Germany's capital, while simultaneously forcing up the rate of her expenditure. As would be expected their effects as regards the latter are more easily discernible, and it is probable that not less than half of Germany's Naval effort in Northern Waters is devoted to the protection of her shipping. The heavy demands which this makes on her manpower and material resources are constantly increasing. Any further increase in these embarrassments, in addition to those being experienced by inland communications, might have far-reaching results.

Anti-Shipping Operations—October

Anti-shipping operations during October have been restricted owing mainly to the lack of suitable cloud cover in the Norwegian Coast area and to the lack of targets for the North Coates Wing, on the Dutch Coast. In the latter area the enemy has not only reduced the number of convoys to Rotterdam, but also, largely because of the attacks made by the Wing on any convoy sailing in daylight from Ijmuiden to Texel, he has been forced to sail this stretch of the coast in darkness and risk attack by Light Naval forces and by roving Beaufighters. Up to the time of writing only two torpedoes have been dropped, one on the night of October 17 **Beaufighter Y/254** against a Dutch Coast Convoy and one at dawn on October 25 **Hampden M/489**, against a large M.V., which was stationary in convoy off Egero. Owing to the darkness and the need for evasive action no results could be seen, but we hope to receive information that these attacks were effective.

During the attack on October 17, **Y/254** fired a burst of cannon at an M.V. of about 1,000 tons and saw strikes and smoke amidships. Apart from these torpedo actions, activity has been confined to a Rover in force by the North Coates Wing, described below, and other uneventful Rovers and reconnaissances, in one of which armed trawlers were attacked.

While on Dutch Coast reconnaissance on October 22, **Beaufighter F/236** sighted three M.V.s near Schiermonnikoog with two armed trawlers covering the only position from which good photographs could be taken. With more courage than wisdom, since the primary object of reconnaissance is to bring back information, the pilot attacked the nearest trawler with cannon, straddled her, and then photographed the convoy. On the way out two other armed trawlers were in the way and **F/236** again attacked one with cannon and set her on fire from bridge to stern. Photographs of the trawler were taken

On October 19, fifteen **Beaufighters of 254 Squadron** with twelve **Beaufighters of 236 Squadron,** escorted by **Spitfires of No. 12 Group,** carried out a Rover patrol in force in the Ijmuiden area. Six Beaufighters of 236 were armed with R.P. and the remaining aircraft with cannon. The object of the Rover was to attack any shipping which could be found, since the enemy's present convoy tactics had deprived the North Coates Wing of a convoy target for some considerable time: an excellent testimonial to the Wing.

Off Ijmuiden, the stranded liner *Strassburg* was sighted with a tug, an armed trawler and a T.L.C. in the vicinity, probably salvaging material from her.

The Wing leader decided to attack and the Wing turned in, with cannon and R.P. Many cannon strikes were obtained on the *Strassburg*, which caught fire. A few R.P. hits were also claimed. The armed trawler and the tug were also raked with cannon fire, the tug being set on fire. Accurate and fairly concentrated flak was met from ships and shore and one of our Beaufighters failed to return. A photograph of the *Strassburg*, after the attack, appears on Plate 5.

A Note on the North Coates Wing: Searching and Striking

The first work of the North Coates Beaufighter Wing is to locate enemy shipping. Its second work is to attack the ships whenever practicable.

The principal field of operations for the Wing is in the southern North Sea, off the coastline west of the Elbe, as far as Flushing. Soon after the Wing began operations in April 1943, the enemy made far-reaching changes in his shipping arrangements for that area.

The Wing is a development of earlier experiments, in this Command and in the Mediterranean, in opening the way for torpedo aircraft with attacks by anti-flak aircraft on the vessels escorting the torpedo target. These experiments showed that this was a promising way of lessening casualties and of securing torpedo hits. The formation of the North Coates Wing was therefore the obvious result of the experiments.

North Coates have since played an important part in practising, changing and perfecting the tactics of the strike wing in operation against enemy convoys, and these tactics are now the basis of Coastal Command's shipping attacks. The task has not been easy. The enemy has increased the number of his escort vessels in proportion to the success of the Wing, and there have been as many as 17 escorts to a convoy of four merchant vessels. The loss of an anti-flak squadron was a sad blow to the Wing, but this was made necessary by heavy fighter policy in the Bay of Biscay. With the present limitation of man-power we cannot afford to be strong everywhere and action against the U-Boats at this time is more important in the war effort than the sinking of extra ships off the Dutch coast.

The North Coates Wing has been greatly helped in its operations by the excellent single-engined fighter escort provided by No. 12 Group of Fighter Command. The enemy soon took to escorting his convoys with single-seater fighters and the Spitfires and Mustangs of 12 Group have given us magnificent protection, and they have accounted for a number of enemy fighters in the process.

There is still a small traffic to Rotterdam, but there is no immediate sign that the port will reassume its old importance. Prudence suggests that the enemy will continue, for as long as possible, to keep the bulk of his convoys as far from our air attack as the handling capacity and facilities of German ports will allow.

The convoys that continue to sail to Rotterdam vary their time-tables considerably so as to confuse our predictions of their movements, and to avoid being caught in waters where they might be torpedoed by daylight. They frequently put into the anchorage at Den Helder, where they wait until the moment seems favourable for proceeding further.

The assessed results of the attacks that have helped to achieve this change in enemy tactics, between April and September, are as follows :—

Beaufighter Wing.—Six ships totalling 24,167 G.R.T. sunk. One ship of 6,800 G.R.T. seriously damaged. Two ships totalling 4,609 G.R.T. damaged.

In addition, at least one armed trawler has been sunk, and some thirty-four minesweepers and armed trawlers damaged ; some seriously.

In the same period No. 415 Squadron sank three ships totalling 9,821 tons, and damaged another ship of 2,092 tons.

The damage to the escort force in the southern North Sea is an important secondary achievement. The offensive against her convoys has caused Germany to make a considerable increase in providing escorts at a time when it was least convenient to do so. This has forced her to provide more craft of a suitable type, and to convert others. All have to be manned. Damage to escort craft means the use of space in repairing yards which might be used for building new escort vessels or merchant shipping. Casualties to crews further accentuate Germany's shortage of skilled manpower.

III.—OTHER OPERATIONAL FLYING

D/311 in an Exceptional Combat

The combat between D/311 *and seven Ju.88's is an excellent example of the tactics which this type of enemy aircraft are adopting when they meet a single anti U-Boat aircraft which cannot escape quickly into cloud. It should be studied with care by all crews operating in the Bay area, and for this reason the combat report is printed below, in full.*

The white aircraft was obviously co-ordinating the attacks of the remainder of the formation, so that simultaneous attacks should be delivered from one bow and the opposite quarter, thus causing the anti U-Boat aircraft to present a no-deflection shot to one section by turning into the attack from the other.

Considering that the attacks were well pressed home by the Ju.88's, the Liberator's corkscrew evasive action must have been carried out with exceptional skill. It is the only form of evasive action which will effectively counter such an attack.

It should be noted that the pilot of this aircraft had done fighter affiliation with the Spitfire Circus, which was undoubtedly of great help to him in his evasive action.

This skilled evasive action and the accurate shooting of the gunners successfully disorganised what began as a model attack and ended with individual aircraft making " tentative passes." Every successful combat of this kind does untold good to the cause of Liberators in general because once the Hun gets the idea that Liberators are " dynamite," he will not press home his attacks against them with enthusiasm or determination.

D/311 was flying across a large gap in cloud at 2,300 ft., when it sighted three Ju.88's. One of them was painted white. They were in loose formation, stepped up in height by 300 ft., 120° starboard, at a distance of about 2 miles, 2,000 ft. above. Shortly after, four more Ju.88's were sighted, 110° starboard, at the same height and distance, flying in two formations of two. Immediately after being sighted, the enemy aircraft altered course towards D/311, the white Ju.88 flashing dashes by an orange light situated in the cockpit. The enemy aircraft broke their formations and assumed the following positions in relation to D/311.

Four Ju.88's on port bow (30° port), distance 1,000 yards, about 2,000 ft. above, in tight echelon, port formation, flying on a course parallel to that of D/311 (Numbers 1 to 4).

Two Ju.88's on starboard quarter, 120° starboard, distance 1,000 yards, about 1,500 ft. below, in a tight echelon starboard formation, on a course parallel to that of D/311.

One Ju.88 (the one camouflaged white) astern 1,000 yards, about 2,000 ft. above.

The enemy aircraft carried out their first attack in the following manner :—Numbers 1 to 4 broke off to the right in a steep diving turn, and attacked in rapid succession, in formation line astern from port bow, opening fire from about 900 yards and closing to 200 yards. After the attack they passed below D/311, made a wide turn to their starboard, and resumed their previous positions.

Numbers 5 and 6 attacked immediately after the attack by Number 4, in line astern, formation, from starboard quarter, from below, opening fire from 1,000 yards, and closing to less than 200 yards. After the attack they passed below D/311, made a turn to their port, and resumed their previous position (120° starboard, 1 mile, 1,000 ft. below).

The white Ju.88 kept station astern 1,000 yards, 2,000 ft. above, throughout the combat, making no attempt to attack. All the available guns of D/311 were engaged in attacking the enemy. The Captain adopted the corkscrewing method of evasive action, turning against the attacking aircraft. During this (first) formation attack, the mid-upper gunner got a burst into the attacking Number 1. A burst of fire was observed on the Ju.88's port engine, with a trail of smoke behind it.

The other Ju.88's were attacking in rapid succession and no further results were observed. But when the enemy aircraft resumed their positions only three of them were counted on the port bow, two on the starboard quarter, and the white one in its position. The Ju.88's carried out another attack, using the same tactics. When Number 5 was passing behind, and below D/311, after its attack, the rear gunner and the beam gunner got in a burst. Number 5 was then seen to make off on a westerly course and it was not seen again. The remaining Ju.88's resumed their positions ; three on port bow, one on starboard quarter and the white one astern. But it seemed that the organisation had broken down, for the enemy then began attacking singly from all directions, with the exception of the white one which never attacked. The enemy aircraft attacking singly delivered 10 attacks in all. In the last attack but one, the attacking aircraft was hit by both rear and beam gunners while it was breaking off in a turn. The enemy aircraft was seen to straighten up, fly level for a second, sideslip, and then dive into the sea. The impact was violent, causing a big splash.

On some occasions D/311 managed, by steep diving turns, to get below the enemy aircraft going into attack, so that they had no chance to open fire. At the time of the single attacks of the Ju.88's, D/311 reached patchy cloud, making use of it by altering course and successfully dodging the enemy aircraft, one of which seemed to be so annoyed, by waiting at the wrong end of the patch of cloud that, after three unsuccessful attempts, it dived to sea level and sent a long burst into the sea. It was then seen that this was the only Ju.88 armed with two cannons (situated in the leading edge of wings, close to the propellers) firing explosive shells. This was the Ju.88 which was later shot down. Shortly after, D/311 entered a solid mass of cloud. While entering this cloud the white Ju.88 was seen making a wide turn to its starboard and apparently making off.

The speed of D/311 during the combat was from 160 to 280 miles an hour.

Other Combats during September and October

On September 8 **Liberator B/4 A/S Squadron U.S.A.A.F.** was flying at 4,000 ft. on anti U-Boat patrol. In position 48° 00′ N., 10° 52′ W. the second pilot sighted eight Ju.88's flying on a parallel course 500 ft. above the Liberator. Three Ju.s were on the starboard side with a fourth lagging behind, and four were in echelon on the port side about 300 yards away. The enemy flew ahead of the Americans and the starboard group made the first attack, coming in on the starboard bow. The Liberator turned towards the first enemy aircraft which opened fire at 1,000 yards. The Germans flew right over the top of the Liberator, but only the first aircraft was seen to fire. This fire hit the radio and put No. 1 engine out of action. The Liberator then turned to port, a manœuvre which upset the port group of Germans who found themselves too far ahead to attack. The Liberator then went into a shallow dive and increased speed to 230 m.p.h. About 10 minutes later the attacks were resumed. Single aircraft flew ahead of the Liberator, peeled off, and came in from both bows. The first few attacks were ineffective as the Germans broke off at 600 yards. Then one closed in from the port bow to 200 yards and shot away the rudder controls, trimming tabs and hit the top turret. The gunner, however, stuck to his guns and shot his

attacker down in flames. Another Junkers closed in on the starboard bow to 50 yards but was caught in the cross fire of the top and beam guns and was also seen to crash, after nearly colliding with the Liberator. These bow attacks now became continuous but the enemy kept his distance and did no damage. Then one German tried a beam attack and closed to 100 yards on the starboard side. His fire was very accurate, but as he broke away forward the nose gunner caught him at 100 yards and shot him into the sea. Unfortunately he had all but finished the Liberator. Big holes were made in both the inboard and outboard fuel tanks on the starboard side, and one shell shattered the instrument panel and seriously wounded the pilot. No. 1 engine was already out of action and after this attack Nos. 3 and 4 were out of fuel and had to be feathered. The second pilot then prepared to ditch. As he was gliding down another enemy aircraft closed to 500 yards on the starboard bow and shot away the port dinghy. The Liberator hit the sea, which was rough, at about 92 m.p.h. and broke in half. Seven members of the crew got out, four on the starboard side and three on the port side. The starboard dinghy was released but only partially inflated. The second pilot saw a three-man dinghy about 50 yards away, retrieved it and towed it back to the other dinghy, where it was inflated. By then, however, the three men on the port side had disappeared and were not seen again. One of those remaining had been seriously wounded during the engagement and died before the dinghy's crew was rescued by a British sloop nearly three days later.

Liberator A/224 flying in the Bay on anti U-Boat patrol on September 9, sighted six Ju.88's. The pilot dived to port to gain cloud cover which he had seen in the distance. The enemy aircraft tried to position themselves to carry out frontal attacks, but as the Liberator was flying at 240 m.p.h., the enemy had to content themselves with attacks on either quarter and beam. More than eight attacks were made. A/224 countered with corkscrew evasive action and diving turns towards the attacks. Fire control by an experienced gunnery leader made the evasive action more successful and helped the gunners, who seriously damaged one enemy aircraft. No damage was done to the Liberator or crew.

On September 16 **Sunderland E/461** was flying at 4,000 ft. on anti U-Boat patrol when enemy aircraft were sighted 17 miles away fine on the starboard quarter. They were at the same height as E/461 and came up fast. The Sunderland promptly headed for the nearest cloud bank, which unfortunately was 30 miles away. On overtaking our aircraft the enemy formed up for the attack. Four Ju.88's positioned themselves in stepped-up echelon on the starboard bow and two in echelon on the port quarter. The nearest aircraft of each group was about 1,000 yards away. The leader of the formation on the starboard bow directed the attack, in which he took little part. The attack was begun by No. 2 on the starboard bow, who turned in and attacked from about 80° on the starboard bow. As the Sunderland made a diving turn towards this attack the nearest German on the port quarter came in. With E/461 still corkscrewing No. 3 on the starboard bow and No. 2 on the port quarter made simultaneous attacks in the same way. No. 4 on the starboard bow followed while the Sunderland kept up the corkscrewing. The enemy then re-formed and repeated these tactics.

During the first attack the tail turret hydraulics were put out of action, and though the gunner operated his turret manually, the violent evasive action greatly hampered his efforts. Moreover only one gun in the mid-upper turret was firing. However, the volume of fire forward seemed to take the enemy by surprise.

The next attacks came from the beam. Half the formation attacked from one beam and when the Sunderland turned towards them they broke away. At the same time the other formation came in taking advantage of the easier target presented to them when the Sunderland was committed to one form of evasive action. By attacking on the beam the enemy avoided the galley guns, and at no time did they approach from below.

By this time both port engines of the Sunderland had been hit, the tail turret was out of action, and manœuvrability had been largely lost. The enemy soon discovered this and concentrated their attacks from fine on the quarters with an occasional attack from the beam. One German retired with a continuous stream of black smoke pouring from his starboard engine, and at least three others were hit. But the rest continued their quarter attacks until the Sunderland had only one engine working and only one gun which would bear. The aircraft was therefore ditched—very successfully—and the whole crew rescued.

It is thought that the enemy must have rehearsed his tactics well beforehand. They were carefully controlled and adapted to meet changes in the situation. The Ju.'s broke away at 300 yards and always above E/461, and whenever possible in the opposite direction to that taken by the Sunderland. Head-on attacks were the most successful until the Germans realized that the tail turret was out of action, when attacks on the stern were obviously better.

This fine effort on the part of the entire crew enabled them to hold off a superior and skilful enemy force for 45 minutes and then to ditch the aircraft without casualties.

Liberator N/53 flying on anti U-Boat patrol on September 23, was attacked by five Me.110's. Two enemy aircraft were first seen flying low on the port bow and climbing to attack. N/53 immediately climbed for cloud cover. The enemy aircraft closed and attacked from below, opening fire at 600 yards to 700 yards range. Three more Me.110's were then seen, which also attacked from the port and below. The port beam gunner of N/53 returned the fire, and as the enemy aircraft formed line astern after the attack, it was seen that one of the Me.s had both engines on fire, and another the port engine on fire. The Liberator made cloud cover, and the remaining enemy aircraft were not seen again. N/53 received slight damage and two of the crew were wounded.

Liberator B/22 A/S Squadron U.S.A.A.F. on September 27 was investigating a smoke float on the water when six Me.110's were sighted 2,000 yards to port. Two enemy aircraft attacked on the port bow opening fire at 600 yards and breaking away above at 200 yards. B/22 jettisoned the depth charges and turned into the attack. The four enemy aircraft then made an attack on the port quarter. The tail gunner of the Liberator returned the fire and hit one of the enemy aircraft. The action lasted about one minute. The Liberator was slightly damaged, but the crew was uninjured.

Liberator B/103 A/S Squadron U.S.N. flying on anti U-Boat patrol on September 24 sighted five Ju.88's in line astern on the starboard beam. The enemy aircraft were flying 1,500 ft. above the Liberator and peeled off to attack. B/103 countered with a diving turn to starboard. Three more enemy aircraft were then seen, making a total of eight. One Ju.88 kept station above and did not attack: it was either acting as a decoy or, more likely, directing the attack, which lasted for 15 minutes. The gunners of the Liberator opened fire whenever a target presented itself, and they succeeded in damaging two enemy aircraft, and probably destroyed a third. B/103 eventually reached a medium sized cloud and after flying in this for 20 minutes set course for base. No damage was done to the Liberator or crew.

Beaufighters, Y, U, R, H, A, Q/143 on a fighter direction operation in the Bay on October 7, sighted five Ju.88's flying in open Vic formation at 5,000 ft., 6 miles ahead. The enemy aircraft immediately broke formation and attempted to evade combat. Y/143 opened fire at 1,000 yards, closing to 400 yards. No hits were seen and no return fire was met. A second Ju.88 emitting black smoke from its starboard engine was seen being chased by R/143. Y/143 succeeded in getting in a burst of cannon at this aircraft from 150 yards, but again no hits were seen. An enemy aircraft now approached head-on and Y/143 opened fire at 400 yards down to 50 yards, the Ju.88 breaking below. The Navigator of Y/143 saw it crash into the sea, leaving a large patch of green oil. U/143 sighted a Ju.88 being followed by a Beaufighter and as the enemy aircraft appeared to be out-turning the Beaufighter, dived to attack. Fire was opened on the port quarter at 600 yards, but no hits were seen. R/143 attacked a Ju.88 on the port beam opening fire at 600 yards and closing to 400 yards. Strikes were seen on the fuselage, wing roots and rear of the cockpit. The enemy aircraft turned sharply to port and R/143 stood off while another Beaufighter went into attack from astern. At this moment "R" saw an enemy aircraft on his tail and had to make use of cloud where the enemy aircraft was lost. H/143 managed to attack two enemy aircraft and damaged one of them. A/143 made four attacks on one of the enemy aircraft. The first and third attacks on the starboard quarter, and the second and final attacks on the port quarter. After the last attack the Ju.88 was seen to burst into flames and crash into the sea, leaving the mainplane afloat. No survivors were seen. Thus two Ju.88's were destroyed and two damaged in this action for the loss of one Beaufighter, Q/143, which failed to return to base.

Halifax R/58 on anti U-Boat patrol on October 8 sighted a B. & V. 222 flying boat. R/58 intercepted the enemy aircraft and made an attack on the port quarter, opening fire with the V.G.O. in the nose at 600 yards and breaking away on the port beam to allow the tail gunner to bring his guns to bear. R/58 then dropped astern and passed over to the starboard quarter where the mid upper and nose gunners opened fire again. The enemy aircraft took no evasive action, but returned the fire with cannon from the two top turrets and a cannon on each beam. Strikes were seen on the enemy aircraft in the fuselage and belly, and the rear upper cannon position was silenced. The enemy aircraft then drew away from the Halifax.

Liberator J/311 (Czech) flying on anti U-Boat patrol on October 11, sighted four Ju.88's on the port quarter 3 miles away. The enemy aircraft closed and attacked first on the starboard beam, fire being opened at 1,000, yards closing to 300 yards. No damage was done to the Liberator which countered with a skidding diving turn to starboard. During this manœuvre the three remaining enemy aircraft attacked. The second aircraft hit J/311, put the rear turret out of action and wounded the rear gunner in the leg. During the second attack which was made by a single aircraft from either beam, the Liberator received further damage, but the mid-upper and side gunners returned the fire and, although wounded, succeeded in hitting one of the enemy aircraft. After the sixth attack the Ju.88's broke away and set course eastwards. The Liberator received damage to the fuselage, tail plane, elevator, rear turret and flaps. The pilot made a successful crash landing in spite of the difficulties of landing without flaps and with a punctured tyre.

Photographic Reconnaissance

During the first part of the month photographic reconnaissance continued the high level of activity of September, but bad weather at base and over the targets limited operations towards the end of the month.

The usual routine reconnaissance of ports and airfields produced useful information on shipping movements, particularly in the Channel, where the enemy appears to be engaged in his customary autumn pastime of bringing merchant shipping through the Straits to northern waters. Similarly, the movements of new or refitted vessels from the Low Countries to the Baltic was carefully watched, as well as the increased traffic on the Norwegian coast. A special low level reconnaissance, known as a "Dice" (described below), was flown to obtain low oblique photographs of the ex-hospital ship *Strassburg*, now beached off Ijmuiden (*see* Plate 5).

The daylight bombing attacks on Gdynia, Danzig and Marienburg were followed up within a few hours by a reconnaissance aircraft which took photographs of Gydnia and Danzig. Marienburg was obscured by smoke and the sortie had to be flown again the following day. The first sortie proved its worth by establishing that the liner *Stuttgart* was burning fiercely. At the time of photography it was being towed out of Gdynia, possibly to be sunk outside the port.

The advancing armies in Italy have opened up a new field for photographic reconnaissance from this country and long range sorties were flown, including Prague, Brno, Vienna and Budapest.

Photographic reconnaissance played a notable part in the attack by midget submarines on the German fleet in Alten Fjord. Photographs of these vessels disclosed some of the damage inflicted, including a severe oil leak from the *Tirpitz*.

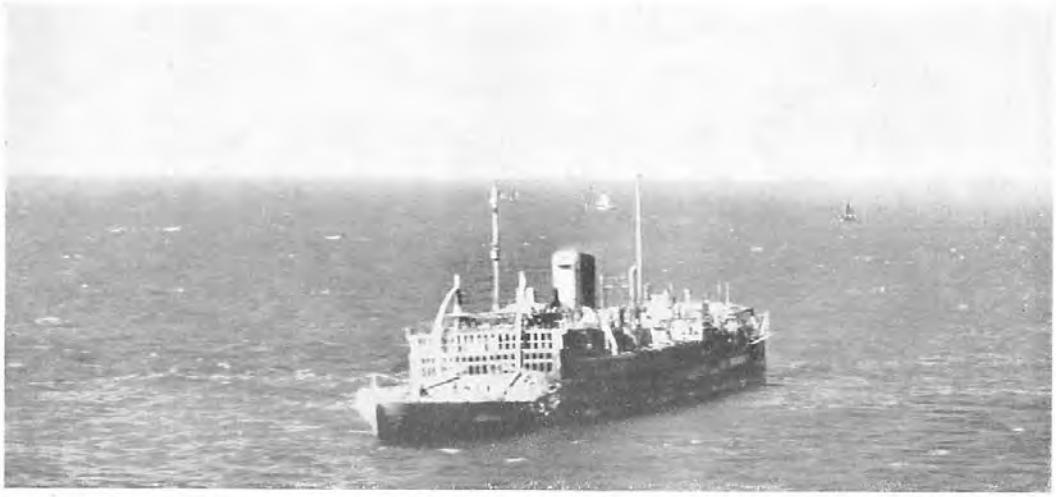
The following selection of reports of Photographic Reconnaissance were written by members of the crews.

541 SQUADRON (SPITFIRE)

On the morning of October 20, I got permission to "dice" the German liner *Strassburg*, which was lying damaged, about a mile off Ijmuiden harbour. (*See* Plate 5.) I was briefed at 1115 and took off for a forward refuelling base at 1200. Having refuelled I was airborne at 1310 and set course for Ijmuiden beneath 5/10 stratocu. I crossed over the English coast and carried on across the North Sea on the deck, hoping to escape the Hun R.D.F. About twenty miles from the target the weather cleared completely and the sea was calm. I increased revs and boost and saw the docks and buildings of Ijmuiden when I was still about ten miles from the coast. Travelling at a pretty good speed I soon made landfall and identified my target, which was surrounded by about twenty small fishing smacks—or so I thought! It seemed to me, that approaching from the sea and on the deck, I could use these boats to conceal my approach; but whilst weaving in and out I suddenly found to my horror that they were armed and were letting fly with light machine-gun and cannon fire. I was still about two miles from the *Strassburg* when some black flak bursts appeared, one slightly ahead of me. My aircraft was hit by a fragment which came through the cockpit hood and missed my head by about three inches. I decided that as I would have to turn in order to photograph my target, and thereby expose the aircraft to the gunners, it would be advisable to carry straight on and map out a new plan of campaign. Before I had time to figure things out Ijmuiden docks appeared in front of me. With the aid of my guns I vented my feeling on the local shipping.

By this time with throttle and pitch controls were well forward, I did a steep turn and headed north-west out to sea, turned, and photographed the target from about a quarter of a mile. Things were humming and I was really surprised at the heat of my reception. As I still did not know whether my aircraft had been holed in any other place, I decided to stay near land in order to watch temperatures and pressures before setting out across the long stretch of water for home. In order not to waste this time, and as there was the chance that I might have missed the target on the first run, I turned round and approached the *Strassburg* from the south-west. During these few minutes—which actually seemed like hours—the gunners did not waste their time. Feeling a bit peeved, as I had thought that the fishing boats were friendly Dutchmen, I engaged four separate boats with machine-gun fire and shot them up. I felt much better.

I continued on this run, taking another photograph of the target from the landward side, which again brought me into the heavy Ack-Ack. I was surprised to see the water, which was 5 ft. below, spraying up with the shrapnel. When I was within about fifty yards of the ship I could see that she was in a very bad way, well down at the bows, battered and rent, with the tiered super-structure in a dilapidated condition. I must have been doing well over 300 m.p.h. and my run carried me over the land to the north of Ijmuiden, which once again brought a hail of abuse from the local defences. The sky seemed full of bursting shells and red tracers, and as the aircraft seemed to be all right, I decided to head for home. I was followed by fairly accurate shore-based flak for about four miles out to sea, when things returned to normal. I crossed the English coast at 1415 after an uneventful trip back, and tried to reach my base. I was rather afraid that if I landed to refuel the local Engineering Officer would put



The German liner *Strassburg* aground off Ijmuiden. She was first seen in this position on September 3. She has since been severely damaged by Coastal Command aircraft. (*See* letterpress, page 24.)

Wiener-Neustadt Nord airfield where Me.109's are assembled. Approximately 100 aircraft are present. Fuselages and other component parts are also visible. Damage during Fortress raids can be seen on factory buildings. (*See* letterpress, pages 25–26.)

PLATE 6

Above: An aircraft and a train on the new runway at Ballykelly.

Below: A dead whale with birds in attendance, photographed by 86 Squadron in position 57° 52′ N. 28° 10′ W. on October 16.

my aircraft U/S, and delay the processing of the films. Unfortunately, I had to force land at Luton with no petrol, but the ground staff were so helpful and efficient that I was airborne again within a quarter of an hour, eventually landing at base at 1529 hours.

540 SQUADRON (MOSQUITO)

At 1050 hours on September 17 we were airborne to photograph targets in the Vienna and Linz area. As we climbed south-eastwards towards the English coast, on a typical September morning, diurnal cumulus cloud was already forming, and higher multi-layer cloud had moved in from the west. Our climb was mainly through cloud with occasional glimpses of the ground. At 1112 hours we crossed the English coast, and we did not see the ground again until we pin-pointed at Basle in Switzerland. Heavy cloud and frontal conditions covered France, with cloud tops to 21,000 feet. We were flying level at 28,000 feet. Switzerland was clear save for some strato-cu. on the Alps, and we were able to map-read our way to Linz and Vienna along the Danube. Our photographic runs over Vienna were brightened by the formation of heavy vapour trails, but we hoped to fly on, unnoticed. Leaving Wiener Neustadt we flew south, and soon entered dense cirro-stratus cloud. The cloud cleared as we approached the Dalmation coast. The sky was then blue and visibility generally good, apart from slight haze over the mainland of Italy. We crossed the Adriatic Sea and flew into Italy, over Foggia, at 1420 hours. The country below appeared barren, sandy and mountainous. Soon we crossed out from the mainland, just south of Salerno. On the beaches below we could see many landing craft—small black objects creeping in from the sea. Considerable flak was seen near some aircraft flying over Naples, and we heard the voices of the American Air Force on the R/T. It was cheering to hear such friendly sounds.

Italy was soon lost in the haze and after some minutes flying we called up Palermo Control and checked our course for Sicily. All was well and at 1620 hours we arrived at Palermo town, to find that diurnal cumulus cloud with base 1,000 feet was covering the airfield. As the haze was thick and the surrounding hills over 3,000 feet we plugged on to a clear area and finally landed at Bo Rizzo, some few miles south of the port of Trapani.

We met with extreme kindness and generosity from the small community of R.A.F. stationed at this airfield.

Next day, after much labour on the part of the ground crews, we were able to set off for a further trip, despite a broken exhaust stub which could not be replaced locally. Further trouble developed with the aircraft as we were approaching the Italian mainland, so we had to return to Bo Rizzo. It seemed sorry repayment for the good work that the ground crew had just done. The spares required to make another sortie possible were not available and as we had cleaned up the local supply of oxygen and glycol we set off to Malta, where we understood there were aircraft of the same type. Flying at 1,000 feet we tracked down the Sicilian coast to its southernmost point and then hopped over the narrow stretch to Malta. Lying in Malta harbour were two battleships of the Italian Navy.

Next morning, September 19, saw us climbing north-east, past Catania and Mount Etna, over the Bay of Taranto and Brindisi and out across the Adriatic Sea to the Dalmatian coast. We crossed into Jugo-Slavia and came to Belgrade at 1212 hours. After taking photographs we turned inland and south to small targets nestling among the Jugo-Slav mountains. It was beautiful country over which to fly ; small villages at the foot of green foliage-covered mountains. Ideal country for guerilla warfare. Crossing out we photographed targets in Albania, and at 1445 hours, back at Malta. Here we stayed the night.

Next morning the weather was still fine and the hot sun shining when we left the Island and climbed towards Tunis. We crossed the island of Pantellaria and flew on over the North African coast in fine weather until we came to Oran, where heavy multi-layer cloud forced us to come down from 28,000 feet to 9,000 feet. Then we flew along the African coast to Gibraltar. Strato-cumulus cloud at 1,000 feet, combined with haze, made the visibility rather poor over the Rock.

At 1135 hours next morning we climbed from Gibraltar through the Straits. Soon we were picking our way through towering cumulo-nimbus cloud, both thundery and violent. Our first pinpoint was near Oporto on the Portuguese coast. Adjusting course, we made for Cape Finisterre. The north of Spain was obscured in cloud, so we altered course for base on D.R. position. Conditions were bad for flying. Ten-tenths cirro-stratus was met most of the way with tops to 35,000 feet in patches. On E.T.A. we came down through multi-layer cloud and received a homing from a station near Newquay. The air speed indicator had been faulty for most of the trip, reading various speeds, as the whim so moved it, but fortunately it began to behave as we came down to about 5,000 feet. Finally we broke cloud at 1,000 feet just off the South Devon coast. It was raining hard, so we guessed it must be England. We had passed five enjoyable days made easier by the good spirit and helpfulness with which we were met at all places on our way.

540 SQUADRON (MOSQUITO)

We were airborne at 0900 hours on September 23 and set course, passing over London at 15,000 feet Still climbing, we crossed out at 25,000 feet. The weather was perfect over the Channel as we levelled off and hurried across to Dunkirk, then setting course for Brno. Just east of Brussels we met 10/10ths strato-cumulus, and we lost sight of the ground until, at 1123 hours, we pin-pointed at Plattling, well south of track. We altered course again and found that we had an alternative target marked, directly on the new track, which we duly covered on the way.

The cloud had now diminished to 3/10ths and it cleared altogether at Brno. The target was photographed and we set off for Vienna, taking further pictures on the way. The Danube and Vienna looked marvellous in the bright sunshine as we made our runs, but again, to the Flight Commander's disgust, the " Fischmarkt " eluded our cameras.

On to Vienna, Neustadt and Graz, thence to Klagenfurt and other targets. Klagenfurt had to be .photographed through 5/10ths strato-cu., which increased to 10/10ths further south. We decided to call it a day and go on to Sicily to refuel—then on to Malta. We discovered on checking the petrol that we had stooged around the target areas longer than originally intended in the Flight Plan, and that Sicily was "out." Before setting out we had been told that there were possibilities of landing at Brindisi, so we decided to try our luck. Once more the strato-cumulus diminished until over Jugo-Slavia when it disappeared altogether. Obliques were taken of Split.

The weather continued fine, and at 1440 hours, Brindisi loomed up. We lost height rapidly off the coast, hopefully calling on the V.H.F., but with no result. We did not feel too certain of how we would be received so we selected a lonely looking stretch of coast ten miles south of the town. We crossed in, timidly, at 1,000 feet, waggling our wings and firing off Verey cartridges, hoping that the A.A. gunners were otherwise engaged.

We flew to the aerodrome north-west of the town to find that it had been well and truly pranged. Back to the aerodrome on the edge of the town, where we found about thirty aircraft on the ground, all with Italian markings. Several big Cant. transports, a Savoia Marchetti or two, a couple of Fieseler Storches, and, could they be Me.109's? We did three circuits at 500 feet, passing each time over the seaplane base where about fifteen Italian seaplanes rode at their moorings. There was no sign of any British aircraft; only one American and that a damaged Liberator.

There was nothing for it but to go down and see. The runway was somewhat rough but we made a good landing and taxied over to the Liberator. Fifty or sixty unshaven Italian troops gathered about our aircraft and we noted that they bristled with revolvers and light automatic rifles! We had our escape knives.

We disembarked and looked the Italians over, hoping to see at least one Britisher in charge. But there was none.

The Pilot said "Petrol" and pointed to the aircraft. One tattered warrior answered "Americanos?"

We said, "No, Ingleeses," and prepared to run. But there were smiles all round.

We took another stab at the language, which is obviously too easy. "Nous sommes thirsty —agua—gracias mucho."

Stony silence greeted this outburst, but we were not surprised.

Finally the Pilot pointed to the Liberator, and said, "Americanos?"

One or two of our new Allies pointed vaguely to some buildings in the distance and the Pilot decided to walk over and learn the worst. He left me to carry out a very intelligent conversation.

Me. "Have you any water?"

They. "Si. Si."

Me. "Very thirsty. Have you anything to drink?"

They. "Si. Si."

For variety I tried, "How far away are the Germans?"

Chorus. "Si. Si."

A few of the bolder types began to examine the aircraft. One of them then shook me by announcing, "Mosquito."

Summoning all the Italian I now commanded, I replied, "Si. Si."

"Bom-ber?" he asked. I nodded, but a few moments later he was back with a hurt look in his eyes. He muttered, "Fotografi"—in a melancholy voice.

The Pilot returned with two R.A.F. ground crew. One of them conferred with the Italians, and off they went, bringing back a Bowser containing 87 octane fuel. Meanwhile, we learned that there were 150 gallons of 100 octane fuel left behind by the Germans in five gallon drums. We organized this petrol to get us to Malta. The Italians were eager to help and they transferred the petrol from the drums to the main tanks. We were told that we had time to reach Malta in daylight. At 1620 hours we took off, but at 1650 hours it was already twilight. As our V.H.F. was then unserviceable, we decided to return to Brindisi for the night. At 1720 hours it was dark and we were just able to make out the harbour. We flashed the navigation lights and were relieved to see the boundary lights go on, but no flare path. A quick circuit, landing lights "on" and down we went. We motored in, hoping for the best, but on touching down, we hit a rough patch and bounced badly with the tail well up. Eventually we stopped, parked the aircraft near the damaged Liberator and stowed things for the night. By the light of a torch the Pilot found that the two blades of each airscrew had curled after their encounter with the runway in landing. Somewhat depressed, we made for the aerodrome buildings in search of food, drink and a well earned bed. We found the Italian Officers Mess and after being warmly welcomed we made our needs known by waving our hands and speaking a confusion of Pidgin Italian and bad French. After a great deal of shouting and running about, we were confronted with macaroni soup, some cheese, rolls, a strange collation on a plate, a quart bottle of champagne and several flagons of Chianti.

At 2300 hours we retired to a very comfortable bed, but the terrific heat was not conducive to sleep and we were awakened at 0500 hours by the clatter of machine-gun fire. We nipped out to find that a Liberator had forced landed on the aerodrome and caught fire. It was returning to North Africa after a leaflet raid on Belgrade. The noise we heard was from the exploding ammunition.

The time was then 0700 hours so we went across to our aircraft to inspect the props. The Pilot then asked the one R.A.F. man who could speak a little Italian, to recruit a couple of labourers from among the Italian ground crews. He requisitioned two and, armed with the Italian equivalent of one 9 lb. hammer and two 41–21 lb. hammers, they went to work. I shudder to think what our ground crew back at base would say if they had been able to view the proceedings and the subsequent D.I. We also required a further supply of "Benzino." This time it was 87 octane or nothing, so we settled for that.

The Pilot stayed to supervise this procedure while I made a rapid sortie down to the town. There were many soldiers, sailors and airmen walking about, all very friendly, and smart in throwing up salutes. The civilian population were polite and they seemed to be very happy that the war was over as far as they are concerned. Their clothing was inferior, and they looked rather a poor collection. There was quite a crowd gathered in front of the best hotel in the main street. I learned that the King and Queen and Marshal Badoglio were in residence and the crowd was waiting to get a glimpse of the Royal Party. I returned to the aerodrome just as the Pilot had finished running up the engines He voted the aircraft serviceable, with no vibration whatsoever.

We then returned to the Mess to say " Adios " to our hosts, and the Camp Commandant gave us a badge each as a souvenir, which we now wear on our battledress as our particular line-shoot. For the first time we met a young Italian fighter pilot who spoke quite fair English. We heard his views on the war situation generally and he told us that he had fought right up to El Alemain and back to Tripoli, continuing the fight until the fall of Sicily. He was a member of a Squadron equipped with Macchi 205's, and he considered them as good as the Spitfire IV, but stated that the engines do not stand up to the job very long under combat conditions. What we had at first mistaken for Me. 109's were in fact these same Macchi 205's. He explained that his Squadron has now reformed to fight against the Germans. They were to have their first engagement that day with a sweep against the Hun who had taken over Corfu in the night. His family suffered in the Rome raids, and this probably accounts for his seeming indifference as to which side he fights for.

We landed at Malta at 1525 hours feeling very disappointed that we had not had better luck with the weather over the target area. Met. seemed surprised with our report, but could offer no better conditions for some days to come.

We decided that there was no future in waiting about at Malta so we decided to return home *via* Gibraltar, which we did.

Air/Sea Rescue

FIRST AUTO-GYRO CREW SAVED

In spite of bad weather during the latter part of the month, Air/Sea Rescue was responsible for saving 138 aircrew during October.

On many days it was impossible to carry out air searches in areas where dinghies might have been, but as soon as the weather cleared searches were laid on. Many were flown after returning bombers had reported flashing lights, but none of these sorties was successful. It is and always will be very difficult for the Air/Sea Rescue Service to decide whether a search shall be laid on after lights have been reported. If these lights cannot be traced to lighted buoys or surface craft known to be in the vicinity, an attempt will always be made. This will continue to be done in spite of meagre dividends from hundreds of sorties flown after reports of flashing lights.

At 0105 hours on the morning of October 23 an S.O.S. was received from Lancaster D/207. This aircraft was fixed in position 53° 34′ N., 08° 20′ E., well over Germany. The aircraft continued to transmit and ground stations were able to obtain a series of good MF/DF and Gee fixes. From then until the aircraft sent, " Ditching," at 0303 hours, Air/Sea Rescue, through its liaison with the Navy, was able to keep surface craft informed of the position of the distressed aircraft. It was realised that the aircraft would probably ditch before reaching the English coast, so two destroyers, which were on its approximate track, were diverted to meet it. As a result, very soon after the aircraft ditched all but one of the crew were safe aboard a destroyer. The missing man went down with the aircraft.

The correct ditching procedure is continually being stressed by Air/Sea Rescue, and correct ditching procedure includes correct W/T drill. In this case both Captain and Wireless Operator knew what to do and when to do it. The task of rescuing them was thereby made comparatively easy. From the first S.O.S. to the eventual ditching the position of the aircraft was known and a perfect rescue resulted.

On October 24 the pilot of an Auto-Gyro was rescued off Worthing by a Walrus. This is the first Auto-Gyro crew that Air/Sea Rescue has saved.

IV.—SPECIALIST AND GENERAL ARTICLES

Landing in the Faeroes

The type of Briton who " hates abroad " and who looks upon the cliffs of Dover as the fringe of civilization, often knows very little about the islands off his coast. Coastal Command has helped to break down this insularity through its activities, and has taught the average Briton a little more of what lies between him and Labrador to the west, Iceland in the north and Gibraltar in the south.

But it is still easy to find people who think of, say, the Faeroe Islands, as something beginning with Ph and belonging to the King of Egypt. An airman serving in the Faeroes recently received a letter from a friend asking him to bring some oranges when he went home on leave. And it is whispered that one P.D.C. wished to provide tropical kit to airmen posted here. For the sake of those exiles in the Command who do not know the sight of Vaagar and its inland fresh water lake, we must first explain where the Faeroes are, before we describe what they are and the part they play in the work of Coastal.

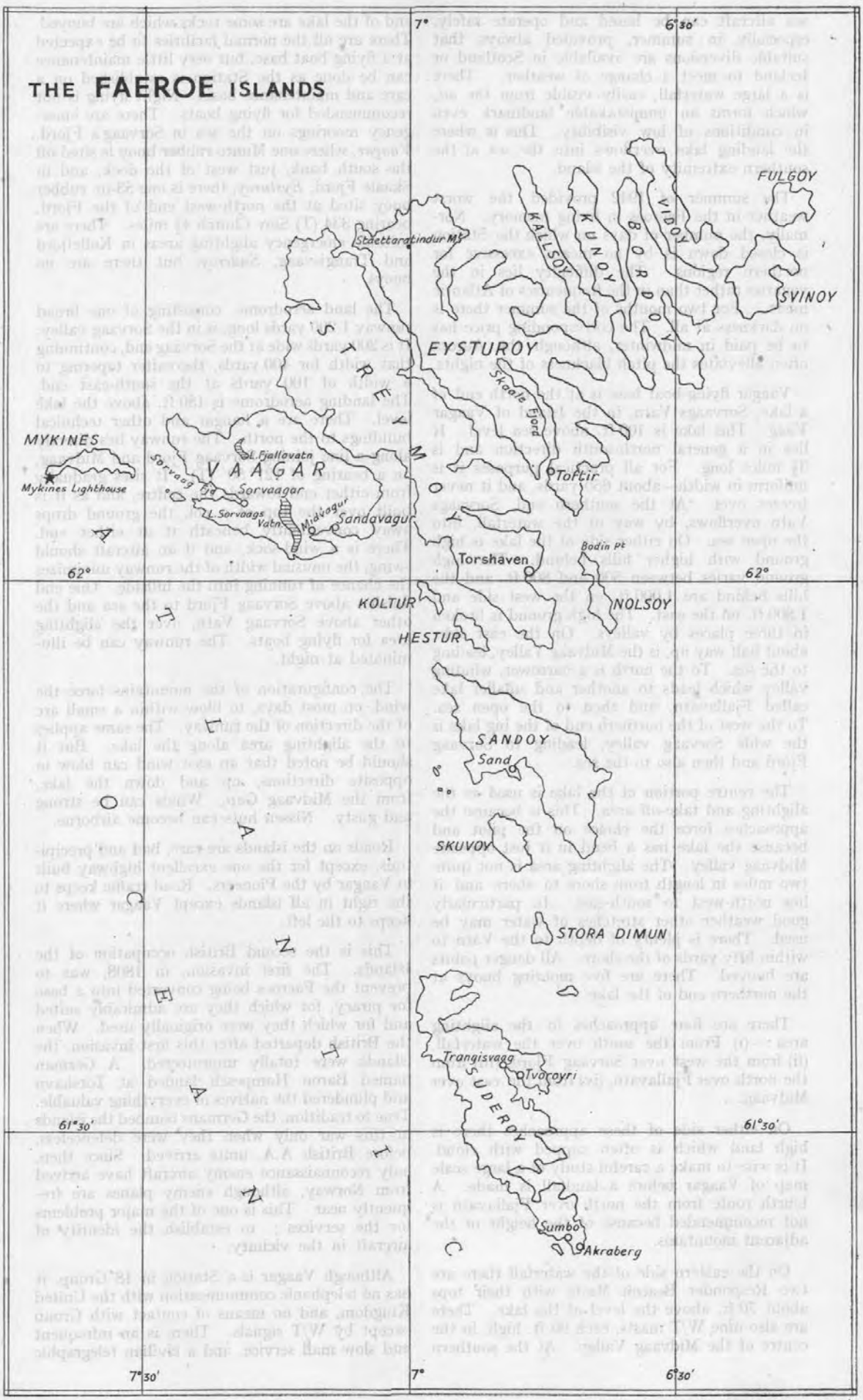
Roughly speaking, the Faeroes are equidistant between Scotland, Norway and Iceland, and they lie wholly between latitudes 61° 20′, and 62° 24′ N. and longitudes 6° 15′, and 7° 41′ W. There are twenty-one islands in the group and seventeen of these are inhabited, with a population of 26,000. Their chief occupation is fishing. All the islands are mountainous and the total area of the group is 1,399 sq. kilometres. The capital, Torshavn, with over 3,000 inhabitants and one cinema, lies in a big bay facing east, towards the south-east tip of the largest island Streymoy, *Strömö*. There live the British Naval Officer-in-charge, who is the Fortress Commander, and the O.C., Troops, who commands the Army. There is also a small R.A.F. Transit Camp, concerned mainly with administering the five R/D/F stations on the outlying islands.

The airbase is on Vaagar Island, the most westerly of the three large islands. The western-most island of all, adjacent to Vaagar, is Mykines, *Myggenaes*, an inaccessible outpost on which the inhabitants, R.A.F. and Native, are frequently marooned by high seas for long periods. A clergyman who went there for a day had to stay 14 weeks. Map-reading is complicated because every place in the Faeroes is spelled in at least two ways; the one Faeroese, the other Danish, given in *italics*, above and below. The official spelling of Vaagar adopted by the R.A.F. does not appear on any map. The place is called Vágar in Faerose, Vaagø in Danish (or Vaago), and Vogar in Icelandic, each of which is a plural form meaning " creeks " or " inlets "; something bigger than a bay but not grand enough to be described as a fjord. There are three of these creeks, each blessed with a tiny village and with nothing else whatsoever. Such are the living contents of the island to which the R.A.F. have come; in addition to lots of trout and some sheep. The name Faeroe Islands means Sheep Islands, from the Icelandic *fé*, genitive *fjár*, as in the case of Fair Isle, half way between Orkney and Shetland. But the sheep population originally imported into the Fa roes by Norsemen, to feed on the grass-covered cliffs, has steadily diminished and what are left have come to look like goats.

Vaagar was chosen as the R.A.F. base because it is the only island with an inland freshwater lake big enough to accommodate flying-boats. The turbulent North Atlantic and the high mountains do not encourage aircraft landings on the numerous sea-fjords. The difficulties of flying revolve about the twin problems of mountains and weather. All the islands are mountainous, the highest being Slaettaratindur on Eysturoy, *Österö*, with an elevation of 882 metres, or, in plain English feet, a little over 2,900. Vaagar is only 10 miles from north to south and 15 miles from east to west, but it embraces half a dozen summits between 2,000 ft. and 2,500 ft., as well as numerous satellites. The coastline is exceedingly precipitous with sheer drops up to 2,000 ft. Numerous sea-fowl are forever taking off and landing here, with contemptuous ease. Unlike Iceland, none of the mountains in the Faeroes are volcanoes. No additional islands are, therefore, likely to appear suddenly as did Nyey, not far from Reykjanes in Iceland, in 1783, only to submerge again the following year, during a violent earthquake.

Little knowledge of meteorology is needed to realize that a collection of small mountainous islands in the middle of the North Atlantic will be the victims of an unstable climate. The sun is a rare visitor to the Faeroes and rain is plentiful. The average at Vaagar is 85 inches a year. By comparison, the climate of Iceland is quite agreeable. Iceland is large enough to enjoy some of the characteristics of a continental climate. For example, a north wind which comes overland usually gives sunshine to Reykjavik, but in the Faeroes every wind must approach over the sea. The islands are a surprising and lofty interruption in the broad waters of the Atlantic Ocean. The result is that they are usually shrouded in cloud with rain, more often than not, and sometimes snow, travelling horizontally at anything up to 100 knots. As the Faeroes lie right in the fairway on the main track of transatlantic depressions, the winds can blow from all quarters of the compass within 24 hours. The mountains help them to blow in short bursts from several directions at once. There is no prevailing wind; it comes from all quarters, impartially and sometimes simultaneously.

In spite of this, it must not be thought that conditions in the Faeroes are hopeless for flying. The strategic position of the islands is very useful for aircraft operating in " U-Boat Alley," between the Faeroes and Iceland. At all seasons Vaagar is a convenient refuge for anyone in trouble and pilots who operate in adjacent areas would do well to learn a little about Vaagar's approaches. Facilities now exist at Vaagar whereby land and



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sea aircraft can be based and operate safely, especially in summer, provided always that suitable diversions are available in Scotland or Iceland to meet a change of weather. There is a large waterfall, easily visible from the air, which forms an unmistakable landmark even in conditions of low visibility. This is where the landing lake overflows into the sea at the southern extremity of the island.

The summer of 1942 provided the worst weather in the Faeroes in living memory. Normally, the number of days on which the Station is closed down is by no means excessive for northern regions. The difficulty lies in the vagaries rather than in the frequencies of Atlantic mists. For two months of the summer there is no darkness at all. The corresponding price has to be paid in midwinter, although the Aurora often alleviates the pitch blackness of the nights.

Vaagar flying-boat base is at the north end of a lake, Sorvaags Vatn, in the Island of Vaagar *Vaag*. This lake is 100 ft. above sea level. It lies in a general north-south direction and is 3½ miles long. For all practical purposes it is uniform in width—about 650 yards, and it never freezes over. At the southern end, Sorvaags Vatn overflows, by way of the waterfall, into the open sea. On either side of the lake is high ground with higher hills behind. The high ground varies between 500 and 800 ft. and the hills behind are 1,000 ft. on the west side and 1,800 ft. on the east. The high ground is broken in three places by valleys. On the east side, about half way up, is the Midvaag Valley, leading to the sea. To the north is a narrower, winding valley which leads to another and smaller lake called Fjallavatn, and then to the open sea. To the west of the northern end of the big lake is the wide Sorvaag valley, leading to Sorvaag Fjord and then also to the sea.

The centre portion of the lake is used as the alighting and take-off area. This is because the approaches force the choice on the pilot and because the lake has a bend in it just opposite Midvaag valley. The alighting area is not quite two miles in length from shore to shore and it lies north-west to south-east. In particularly good weather other stretches of water may be used. There is plenty of depth to the Vatn to within fifty yards of the shore. All danger points are buoyed. There are five mooring buoys at the northern end of the lake.

There are four approaches to the alighting area :—(i) From the south over the waterfall, (ii) from the west over Sorvaag Fjord, (iii) from the north over Fjallavatn, (iv) from the east over Midvaag.

On either side of these approaches there is high land which is often capped with cloud. It is wise to make a careful study of a large scale map of Vaagar before a landfall is made. A fourth route from the north over Fjallavatn is not recommended because of the height of the adjacent mountains.

On the eastern side of the waterfall there are two Responder Beacon Masts with their tops about 70 ft. above the level of the lake. There are also nine W/T masts, each 90 ft. high, in the centre of the Midvaag Valley. At the southern end of the lake are some rocks which are buoyed. There are all the normal facilities to be expected at a flying boat base, but very little maintenance can be done as the Station is established on a care and maintenance basis. Night flying is not recommended for flying boats. There are emergency moorings on the sea in Sorvaag's Fjord, *Vaagar*, where one Munro rubber buoy is sited off the south bank, just west of the dock, and in Skaale Fjord, *Eysturoy*, there is one 53-in. rubber buoy sited at the north-west end of the Fjord, bearing 334 (T) Siov Church 4½ miles. There are suitable emergency alighting areas in Kollefjord and Trangisvaag, *Suderoy*, but there are no buoys.

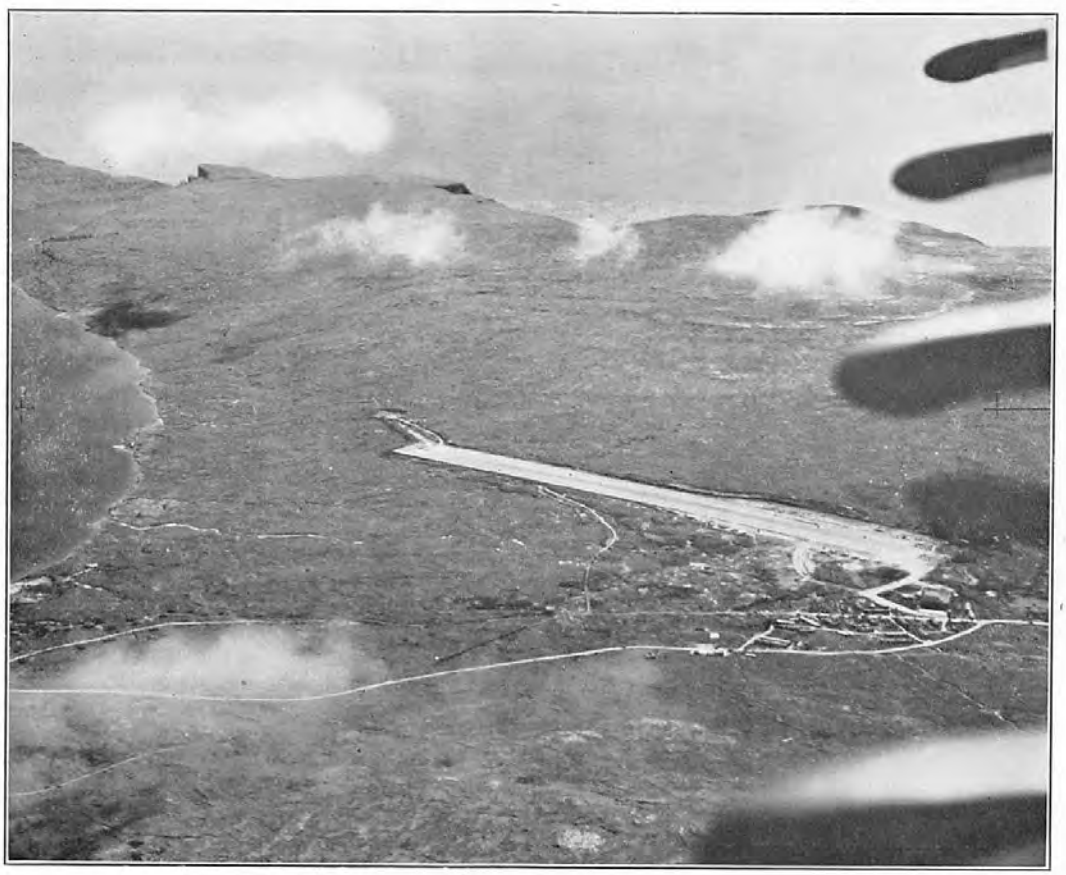
The land aerodrome, consisting of one broad runway 1,200 yards long, is in the Sorvaag valley. It is 200 yards wide at the Sorvaag end, continuing that width for 400 yards, thereafter tapering to a width of 100 yards at the south-east end. The landing aerodrome is 150 ft. above the lake level. There are a hangar and other technical buildings to the north. The runway lies directly along a line joining Sorvaag Fjord and Midvaag, on a bearing of 121° 50′ (T). It rises gradually from either end towards the centre, and as it is built over the top of a col, the ground drops away conveniently beneath it at either end. There is a wind-sock, and if an aircraft should swing, the unusual width of the runway minimizes the chance of running into the hillside. One end finishes above Sorvaag Fjord to the sea and the other above Sorvaag Vatn, over the alighting area for flying boats. The runway can be illuminated at night.

The configuration of the mountains force the wind, on most days, to blow within a small arc of the direction of the runway. The same applies to the alighting area along the lake. But it should be noted that an east wind can blow in opposite directions, up and down the lake, from the Midvaag Gap. Winds can be strong and gusty. Nissen huts can become airborne.

Roads on the islands are rare, bad and precipitous, except for the one excellent highway built in Vaagar by the Pioneers. Road traffic keeps to the right in all islands except Vaagar where it keeps to the left.

This is the second British occupation of the Islands. The first invasion, in 1808, was to prevent the Faeroes being converted into a base for piracy, for which they are admirably suited and for which they were originally used. When the British departed after this first invasion, the islands were totally unprotected. A German named Baron Hompesch landed at Torshavn and plundered the natives of everything valuable. True to tradition, the Germans bombed the islands in this war only when they were defenceless, before British A.A. units arrived. Since then, only reconnaissance enemy aircraft have arrived from Norway, although enemy planes are frequently near. This is one of the major problems for the services ; to establish the identity of aircraft in the vicinity.

Although Vaagar is a Station in 18 Group, it has no telephonic communication with the United Kingdom, and no means of contact with Group except by W/T signals. There is an infrequent and slow mail service, and a civilian telegraphic



The runway at Vaagar. (*See* letterpress, page 28.)

Another view of the runway at Vaagar.

Sorvags Vatn, Vaagar.

Seaplane base at Sorvags Vatn, Vaagar.

cable line from Torshavn. It would be tactless to suggest that there are any advantages in this splendid isolation from Headquarters, but one of the decided disadvantages is that it is not possible to pass detailed up-to-date information of aircraft movements to Vaagar. It is therefore often a matter for speculation, especially for the A.A., as to which side a plotted aircraft belongs.

The inhabitants are very friendly and most of them understand a little English. Their interest in our language began in the eighteenth century when they wished to improve their smuggling trade with Scotland. They speak their own tongue of Faeroese, almost identical with Icelandic, when written, but different in pronunciation. Danish is the official language. Politically, the islands form a county of Denmark, under a Danish Government and with a special council which may suggest legislation to the Danish Parliament. Coinage and stamps are Danish. But the union with Denmark is uneasy for a variety of reasons, both material and sentimental. The ancestors of the Faeroese were of the same blood as the Norsemen who colonized both Iceland and the Faeroes in the ninth century. The Norse strain is still predominant. The natives were governed as Norwegian territory until 1709. Some say that the islanders were forgotten when Norway was separated from Denmark in 1814 and that they therefore remained with Denmark. But Norway also forgot them for a number of centuries, with the result that they escaped paying their taxes.

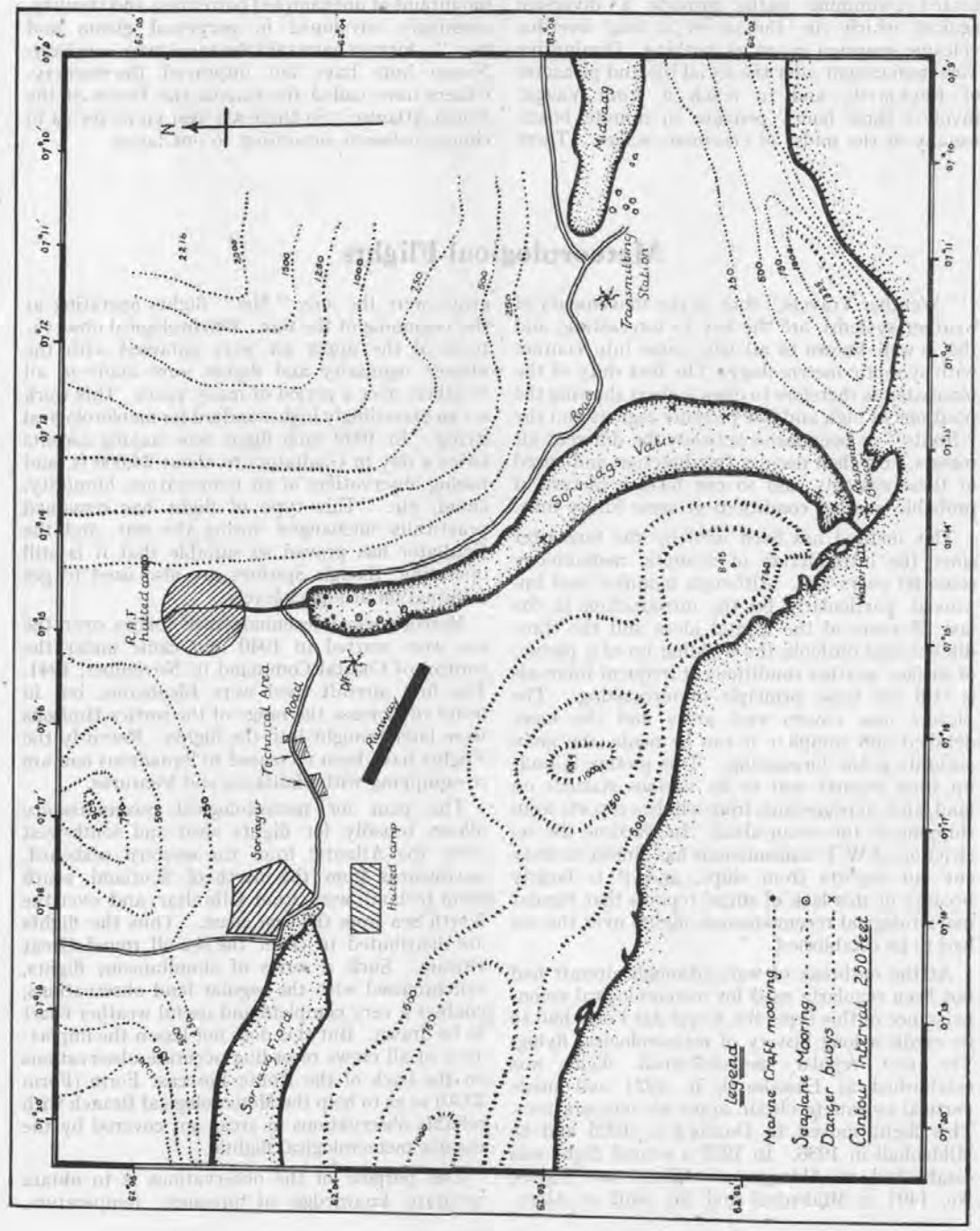


Chart showing landing facilities at Vaagar.

The peculiarities of life here that attract our attention are the way the islanders house their few cattle on the ground floor of their own houses, their habit of sitting on a precipice with a large species of butterfly-net to catch sea-birds as they fly past, and their bloody and uproarious whale hunts when up to 300 are killed with harpoons, from a flotilla of small boats.

In one whale hunt in September of 1942, about 400 out of 600 whales were killed. The excitement is intense as all the killing is done by means of knives wielded by fishermen who jump on the whales and execute the *coup de grâce*. The whales measure between 15 and 25 feet long and are divided amongst the inhabitants.

Life in the Faeroes is not as pleasant as in Iceland. Nature denies even the ration of sunshine allotted to Iceland, where the volcanically heated swimming baths provide a diversion against which the threats of a long overdue volcanic eruption count as nothing. Diminutive Torshavn cannot offer the social life and pleasures of Reykjavik, and to reach it from Vaagar involves three hours' penance in minute boats, usually in the midst of enormous waves. There are only three tiny villages Sõrvágur, *Sórvaag*, Midvágur, *Midvaag* and Sandavágur, *Sandevaag*, on Vaagar, and a few small outlying habitations. The highway to one of these is a steel hawser descending a cliff vertically for 300 ft.

The scenery is impressive, and the islands are full of interest. It is the gloom and lack of sunshine which is most felt by the majority of what the British Press recently called the "Forgotten Garrison." An early nineteenth century traveller from Britain described the Faeroes as "of wild and rugged aspect, lonely and treeless, which might seem to have destined them only for the retreat of savages or pirates, albeit now the home of a mild and virtuous race." He goes on to describe the actual site of the airbase as "a melancholy and desolate lock, enclosed in a grim, forbidding valley, surrounded by repulsive black mountains of unexampled barrenness and sterility, seemingly enveloped in perpetual gloom and rain." Airmen have said the same more concisely. Nissen huts have not improved the scenery. Others have called the islands the Pearls of the North Atlantic. So there are two views for us to choose between, according to our fancy.

Meteorological Flights

"Weather Travels," that is, the movements of weather systems, are the key to forecasting, and this is well known to all who come into contact with synoptic meteorology. The first duty of the forecaster is therefore to draw a chart showing the positions of high and low pressure regions and the "fronts" or boundaries between the different air masses. He then decides the direction and speed of these systems, and so can form a picture of probable weather conditions at some future time.

This method has been used by the forecaster since the introduction of synoptic meteorology some 80 years ago. Although modified and improved, particularly by the introduction in the last 25 years of the frontal ideas and the three dimensional outlook, the building up of a picture of surface weather conditions at frequent intervals is still the basic principle of forecasting. The picture now covers vast areas and the more detailed and complete it can be made, the more accurate is the forecasting. This picture is built up from reports sent in by various stations on land, and, in peacetime, from wireless reports from shipping in the ocean areas. In wartime the restriction of W/T transmissions has almost entirely cut out reports from ships, and it is largely because of this lack of ships' reports that regular meteorological reconnaissance flights over the sea had to be established.

At the outbreak of war, although aircraft had not been regularly used for meteorological reconnaissance of this type, the Royal Air Force had to its credit a long history of meteorological flying. The first regular meteorological flight was established at Eastchurch in 1924 and made vertical ascents to obtain upper air temperatures. This flight moved to Duxford in 1925 and to Mildenhall in 1936. In 1937 a second flight was established at Aldergrove. These two flights, No. 1401 at Mildenhall and No. 1402 at Aldergrove were the only "Met." flights operating at the beginning of the war. Meteorological observations of the upper air were obtained with the utmost regularity and flights were made in all weathers over a period of many years. This work set an exceedingly high standard for meteorological flying. In 1939 each flight was making ascents twice a day in Gladiators to about 24,000 ft. and taking observations of air temperature, humidity, cloud, etc. This type of flight has remained practically unchanged during the war, and the Gladiator has proved so suitable that it is still operating, though Spitfires are also used to get information at higher levels.

Meteorological reconnaissance sorties over the sea were started in 1940 and came under the control of Coastal Command in November, 1941. The first aircraft used were Blenheims, but in order to increase the range of the sorties Hudsons were later brought into the flights. Recently the Flights have been increased to Squadrons and are re-equipping with Halifaxes and Venturas.

The plan for meteorological reconnaissance allows broadly for flights west and south-west over the Atlantic from the western seaboard, northwards from the north of Scotland, south from Iceland, west from Gibraltar, and over the North Sea from the east coast. Thus the flights are distributed to cover the sea all round Great Britain. Such a series of simultaneous flights, synchronised with the regular land observations, enables a very complete and useful weather chart to be drawn. But this does not lessen the importance of all crews recording accurate observations on the back of the Route Forecast Form (Form 2330) so as to help the Meteorological Branch with reliable observations in areas not covered by the regular meteorological flights.

The purpose of the observations is to obtain accurate knowledge of pressure, temperature,

humidity, weather, clouds and wind velocity from regions which are not otherwise accessible. A flight normally consists of a reconnaissance at a given pressure level, with variation above and below, to determine the level of the top and base of low cloud. The aircraft also descend to sea level on specified occasions to measure sea level pressure, which is one of the fundamentals of the weather chart, and observations are taken at fixed points along the track. At the outward turning point the aircraft climbs from as near the surface as possible to about 19,000 ft. and observations are taken at minimum height and then at fixed pressure intervals during the ascent. These observations help the forecaster to complete his three dimensional picture of the atmosphere. The accuracy of the observations (and accuracy is essential) depends to a large extent on the team work of the Pilots and Observers. Though the observations, both instrumental and visual, are made by the observer, they cannot be correct unless during the observation the pilot flies straight and level at exactly the required height, and follows other special instructions. Other members of the crew help by telling the Observer of the first signs of ice formation, and of condensation trails, etc. The secret of accurate meteorological observation lies in the whole crew having a keen and intelligent grasp of the job they are doing. The recent formation of the Meteorological Air Observer Branch allows trained meteorologists to be carried in the aircraft.

As the weather picture is changing all the time all the observations taken on the outward flight and ascent must be transmitted to base as soon as possible. The figures are quickly distributed over the meteorological teleprinter circuit to all forecasting officers. The supreme importance of these observations, which alone allow an accurate weather chart to be drawn and vital forecasts made, needs no emphasis. Lack of accurate forecasts may mean that a bomber operation over Europe is cancelled or that Coastal Command may lose an opportunity to attack U-Boats. It cannot be too strongly emphasised that meteorological reconnaissance observations made by aircraft, although organised by Coastal Command, are not primarily for the use of Coastal Command or indeed any one Command. The observations help to form a complete picture for all meteorological officers at home and on many stations abroad.

Month in, month out, the Met. Flights continue their invaluable operations ; the work is unspectacular and it is only by realising its importance that the crews can retain a high standard of efficiency. The sorties must be made no matter what the state of the weather, and it sometimes happens that Met. aircraft are flying when other operational aircraft are grounded by bad weather. It is essential for the forecaster to know the extent of the bad weather so that other operations may begin again as soon as possible. In certain areas the monotony of the flights is sometimes broken by enemy aircraft, but after beating off the attack the aircraft usually manages to carry on with the job.

Meteorological sorties are now regarded as fully operational, and the ambition of everyone in the flights is to achieve an unbroken series of sorties. In the past this has not always been possible for various reasons, but when it has been necessary the same aircraft has been used day after day and ground crews, after the aircraft has landed, have worked through the night in order to finish a minor inspection in time for the take-off in the morning. The record of the vertical ascents is particularly worthy of mention. In one flight from January to June, 1943, the number of ascents ordered was 724 of which 722 were carried out.

In spite of the difficulty of keeping the flights equipped with suitable aircraft for the reconnaissance sorties, they have carried out slightly more sorties per month for aircraft strength than the average in the Command. Cancelled or shortened sorties are far fewer than is usual in other operational activities. These results speak for themselves and are a tribute to both flying and ground personnel.

Realism in Training

A large amount of training must inevitably be carried out in artificial conditions—the cricketer practices in nets ; the soldier fires on ranges and you bomb wooden targets, not U-Boats. Only in this way can accuracy be measured. A certain amount of dullness is inevitable, but the training is none the less valuable.

At the same time, realism is important in training. At one stage of the war, very few men had seen a submarine, let alone practised with one. For anti U-Boat work it is ideal to have a tame submarine with which to practise. H.M. submarines are available for this purpose and anyone who has not had this opportunity should ask whether exercises may be arranged. In most cases there is little excuse for people who have never seen a submarine under way, or a diving swirl. But there are some squadrons, unfortunate in their location, who have to be content with substitute targets, such as towed periscope targets and others. The best of these is the Luard-Waite submersible target (*see Coastal Command Review*, Vol. II, No. 3, July). This target, now being provided as widely as possible, can carry out most of the evolutions of a submarine. It can dive, leaving a swirl, or be stopped and surface so that the accuracy of attacks on submerged submarines may be judged. These Luard-Waite targets have been manufactured and distributed.

The Luard-Waite target is realistic, but it can be used only in comparatively sheltered waters and not in the open sea where U-Boats operate. It is one thing to fly low when the water is sheltered and the coast line is in sight. It is another to judge your height accurately in the open sea. On each sortie, therefore, crews should carry practice bombs and practise their bombing on sea markers in the open sea. The few minutes spent on such practices will pay their dividend when the time for a real attack comes.

Although much training must be artificial, the more realistic you make it, the more profitable will be your day when your real attack is made.

Distribution and Migrations of Whales in the North Atlantic

Whales are sometimes mistaken for U-Boats and eager crews have often attacked them with well-placed depth charges. The shape, habits and migration of whales are therefore of interest to all crews of anti U-Boat aircraft. In the Coastal Command Review, No. 4, *for July-August, 1942, we published an article, "Whales, not Submarines," describing and illustrating the several species of whales. The following article, by the same eminent authority, adds further to our knowledge with a description of where and at what seasons whales may be found.*

It is generally accepted that whales in the North Atlantic, as elsewhere, undertake major movements from one region to another and that these movements are connected with feeding, breeding, climatic variations and other less obvious factors. The migrations affect the majority of the whales of any species, but not usually all the animals concerned, so that although there may be a general movement in one direction, stragglers may behave contrarily.

In the main, however, it may be said that the larger whales go to higher latitudes in the summer when food is plentiful and to more temperate regions during the winter months for the purpose of calving and breeding.

The range of these migrations varies with species. Rorquals may cover 50° to 60° of latitude; the Greenland Right Whale which is very rare nowadays is never found very far from the Arctic ice-edge; the Sperm is primarily a warm-water animal and those that do journey to high latitudes are exceptional in their behaviour.

Sperm Whale

In the days when Sperm whaling was at its height, and it may be assumed that general distribution has not changed much since then, there was a great belt of summer whaling grounds in the North Atlantic, limited in the north by about the 40th parallel of latitude, extending from the African to the American continent, and southward to about the 24th parallel, and then continuing in diminishing extent nearly to the equator. Only one considerable area was exploited north of the 40th parallel; the Commodore Morris Ground in 47°–51° N., 20°–25° W. In the winter no Sperms were found in this last area; the catches between 24° and 40° N. were greatly reduced, and those between 24° and the equator augmented, particularly off the west coast of Africa, and on the Twelve-Forty Ground, the position of which is given in its name.

The whaling statistics for Iceland, Faroë, Shetland and Western Ireland have all included Sperm whales in their catch, but large numbers are never recorded. Forty-two were taken off the Scottish coast between 1908–14. August was the best month and most of the whales were caught in the neighbourhood of St. Kilda and Rockall, or "in general along the line of the warm current which corresponds roughly to the position of the 100 fathom line."

The Sperm, which is a most infrequent visitor to the North Sea, is the only very large toothed whale. The remaining species to be dealt with are all whalebone whales.

North Atlantic Right Whale

The North Atlantic or Biscayan Right Whale like the Greenland Right, has been depleted in numbers after being pursued for several hundred years. It was formerly hunted on the Basque coast during the winter and spring months, but is rarely seen in the Bay at the present time. There is evidence, however, that the species is re-establishing itself and it has contributed to the catch of the Irish and Scottish Whaling stations since the beginning of the century.

At the Azores the whaling season for this species was from December to April; on the New England coast from November to April. It is accepted that the winter months are spent in the more temperate parts of the North Atlantic.

On the British coast in whaling seasons extending from April to October, the North Atlantic Right Whale was in greatest abundance in June and in lesser numbers in all the remaining months from May to August.

Although there were stations on Harris, Outer Hebrides and the Shetlands, nearly all the whales were taken by the first named in a limited area to the west and south of the Hebrides and beyond St. Kilda as far as about 10° W.

To the north of Norway where the whales were formerly very common, they were hunted in the summer. July was an especially profitable month at Iceland.

Sei Whale

Although the Sei Whale is second in abundance only to the Finner or Common Rorqual in the recorded catches of whales taken by northern whaling stations, very little is known about its migrations. Variations in number, in successive years, make a general statement almost impossible. It is known that in the South Atlantic there is a high latitude—summer, and low latitude—winter movement and it may be assumed that the northern stock behaves similarly.

In the statistics of the European whaling stations, the Sei is recorded from Finmark, West Norway, Iceland, the Faroë Islands, Shetland, Harris and West Ireland. They pass South Innishkea I., West Ireland from the last half of May to the middle of June. The Harris figures show a high maximum in June, very small numbers in April, September and October, and considerable numbers in May and August.

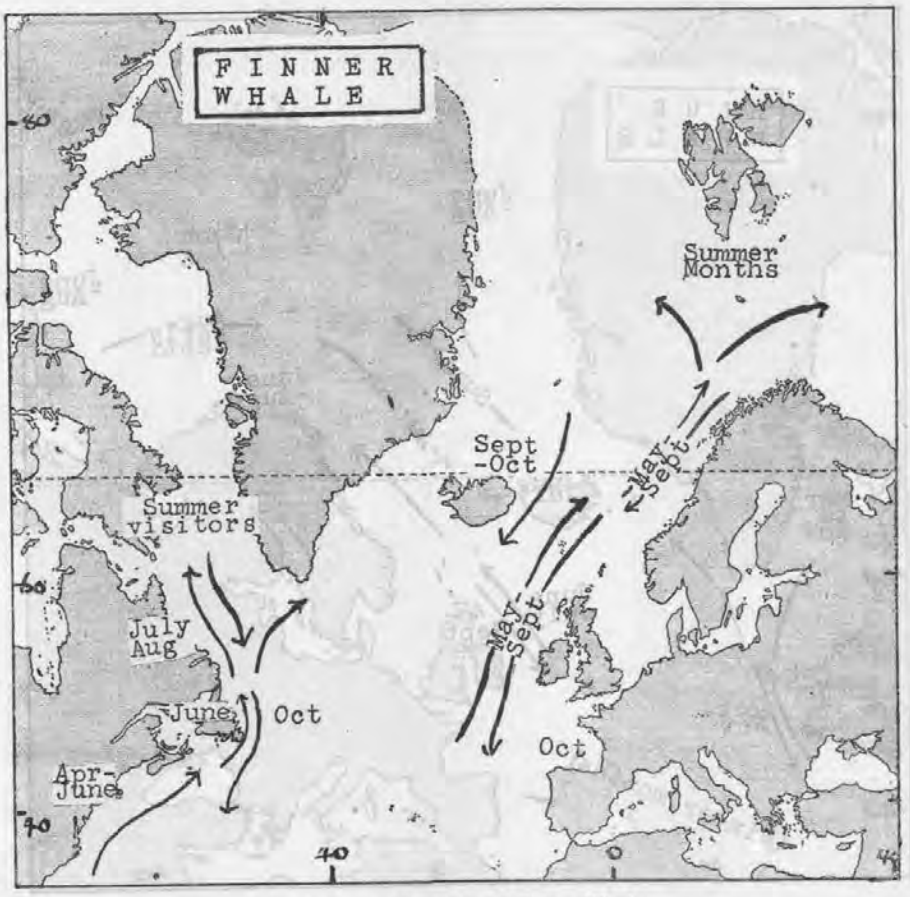


Chart showing Migration of Finner Whales.

The area in which the Scottish catch was taken extended from about a hundred miles south of St. Kilda to about midway between Shetland and Norway, and it is quite closely associated with the 100 fathom line.

Off Finmark these whales were hunted mainly between June and August, and they have been recorded between Spitzbergen and Nova Zemlya in the summer months also. Nothing definite is known about their movements or regions of concentration during the winter months.

Finner Whale or Common Rorqual

The Finner is the predominant species in the North Atlantic. It has figured prominently in the whaling statistics of all the northern stations, from Spitzbergen to the south of Spain. Its range extends even as far south as the Azores.

Off the American coast, Finners have been observed in the Gulf of Maine going north early in March and good sized schools have been observed in May and June. They appear in Newfoundland waters as early as June; most of them leave again by October. However, some remain throughout the winter. North Newfoundland and Labrador are visited by mid July and the whales are most numerous there in August. They are summer visitors to Davis Strait.

Finners have been seen off the west of Ireland, almost all going in a north-easterly direction during the earlier half of the season whereas later this trend is reversed.

Scottish Whaling returns show that Finners have been caught in every month from April to October, the largest catches between May and August, appreciable numbers in April and September, and a marked decline in October.

From June to September, Finners occur off Shetland and then disappear to the south-west. For the British Isles generally, there are records of strandings for every month of the year. Similarly on the Norwegian coast they may be found at all seasons, their occurrence coinciding with the shoaling of herring, other fishes and shrimps that make up their food. They are most common from May to September. Large numbers congregate near Spitzbergen in summer and "thousands have been observed, near the close of the whaling season (September–October), between Iceland and Faroë."

The south-westerly trend off our coasts in September has been mentioned, and in October they have been observed heading south in the Bay of Biscay.

Finners enter the Mediterranean and have been caught in the neighbourhood of Gibraltar at all times of the year.

It thus appears that although there is a migratory trend, all Finners are not affected by it.

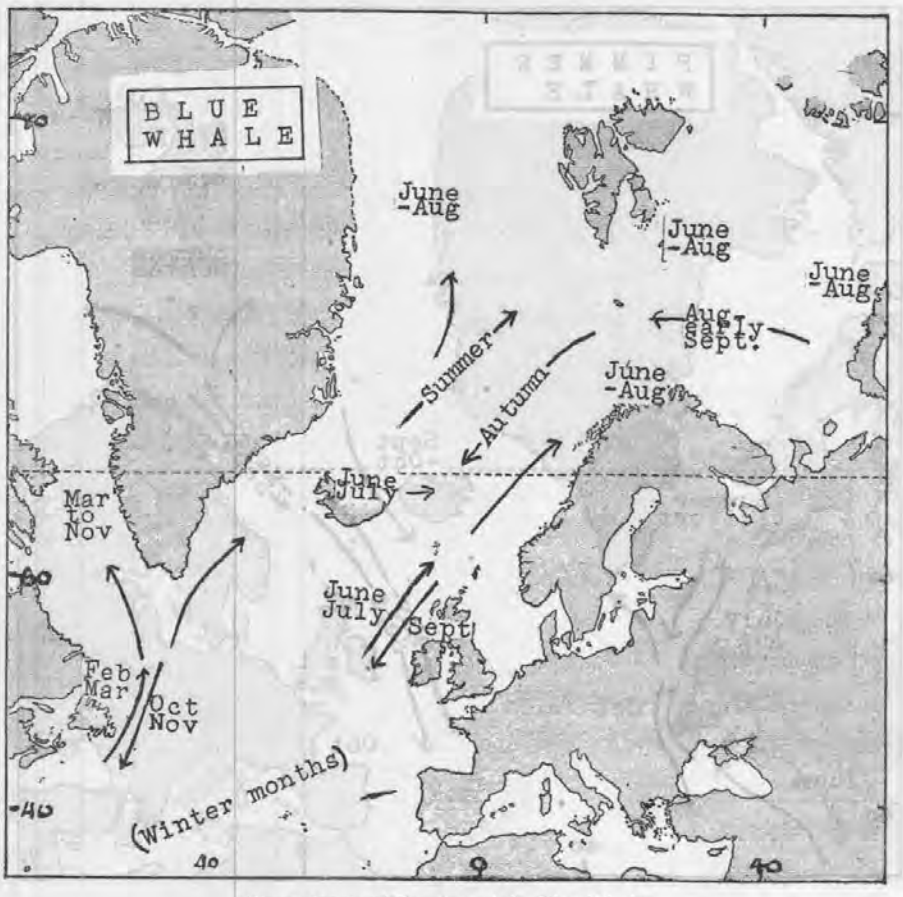


Chart showing Migration of the Blue Whale.

Blue Whale or Sibbald's Rorqual

The Blue Whale, the largest of all the cetaceans, although not so abundant as the Finner, is nevertheless common in the North Atlantic. Unlike the Finner it does not usually move in large schools.

Off the American coast Blue Whales journey in early spring from the Newfoundland banks northeast towards the Arctic Ocean and they reappear again migrating south in October–November. From March to November they are found off the west coast of Greenland, generally south of the Arctic circle.

The movements of the Blue Whale off the Irish coast are similar to those of the Finner—northeast in the early summer months and south-west in the autumn.

The Scottish whaling records give more detail about time and place of capture. None were taken in May, very few in October, but in the months between they were killed in greater quantity and almost equal numbers. The numbers taken in successive years varied very irregularly. The great majority of the whales were killed in the neighbourhood and chiefly to the west of St. Kilda to about 10° W. Only a small number were got north of Shetland and none at Rockall where the Sperm Whales were usually caught.

They are commoner off the Faroës, Iceland and Finmark than off the British coast. At the Faroës they have been seen in March and April, coming from the south-west. They are most abundant near Iceland in June and July, and in the Finmark region from June to August. In Iceland, the trend observed in June is from west to east.

During June, July and August they may be found in any part of the Arctic Ocean from Greenland to Nova Zemlya. In August and early September they migrate from the eastern Arctic towards the west and south between Iceland and the Faroës. The movements of the Blue Whale have been described quite aptly by one writer who comments: "We can scarcely speak of their route as a definite 'migration.' It is rather a trend or tendency, a sort of general drift and not a single migration in a compact body with definite dates of arrival and departure." The quotation indeed is a fitting description of the behaviour of most of the big whales.

It is conjectured that the Blue spends the winter in the more temperate parts of the North Atlantic.

Humpback Whale

The migrations of the Humpback are more definite and consequently more certainly known than those of most of the other whales, which are economically useful. In the North Atlantic, on the American side, females with calves have been seen as early as February in the vicinity of Bermuda; and near the West Indies between March and May. All have left by June, moving north along the east coast of the United States,

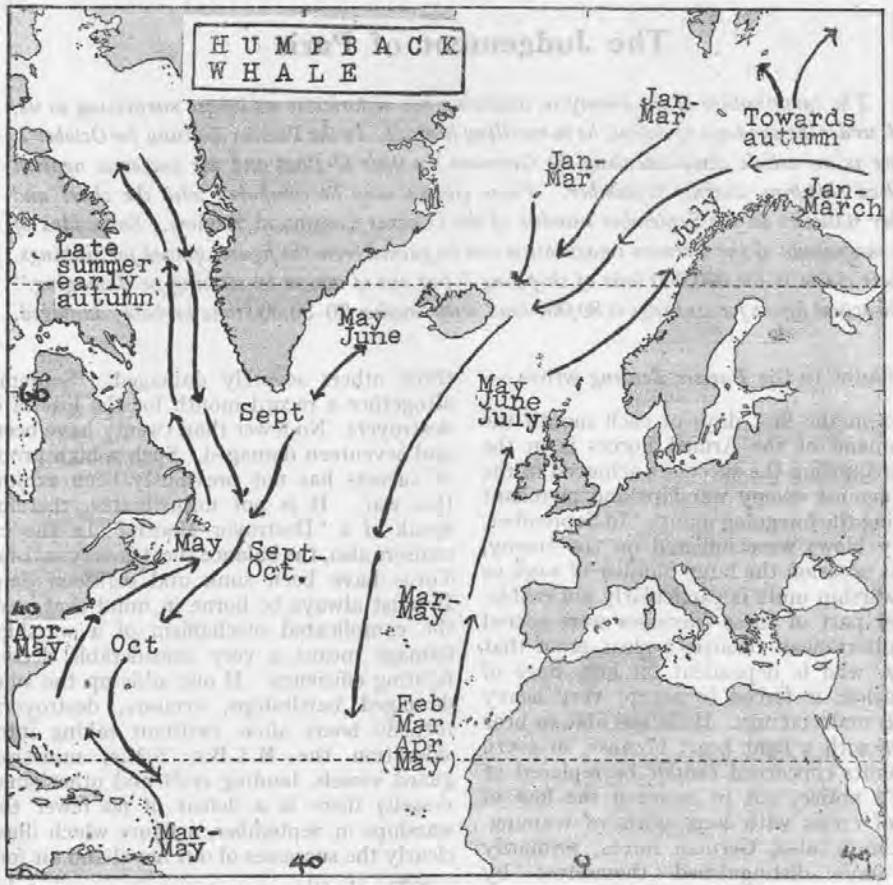


Chart showing Migration of the Humpback Whale.

sometimes in large numbers 200 miles off shore and chiefly in April and May. Off Newfoundland, north-going Humpbacks are rarely seen between January and April. Then the north run begins. In the Davis Strait they are found in late summer and early autumn when they move south before the drifting ice. Large numbers have been seen 70 miles south-east of Cape Farewell, migrating south in September.

Icelandic waters are visited during May and June. On the southward run Newfoundland is passed in late September and October and the New England coast in October.

In the eastern North Atlantic and Arctic, the Humpbacks migrate along the Finmark coast in January, February and March, coming from the east. They have also been seen off Bear Island, Jan Mayen and Northern Iceland during these three months. At this time females are in calf, with large foetuses which are born when the animals reach the north-west African coast in April and May. On the northward run, in the past, the whales have passed close enough to the Hebrides and Shetlands to be recorded in the whaling catch of British stations. But the numbers killed were small compared with those of Murmansk and Norway.

About two-thirds of the Scottish specimens were got to the north of Shetland, the rest near St. Kilda. July was the main month of capture, and between 60 and 70 per cent. of the total were for July and August.

Large herds were often seen 60 miles west of the Shetlands in June and July. They are in the region of Bear Island and Spitzbergen towards autumn and later they move to the more open parts of the Arctic Ocean.

Other Species

The migrations of such species as the Blackfish, Killer, Bottlenosed Whale and Lesser Rorqual, all of them medium-sized cetaceans, are even less clearly known than those of their bigger relatives. With the exception of the Killer, they are all apparently subject to the same north trend in summer and south trend in winter, already noted in other species.

The Blackfish enters the bays and fjords of the Orkneys, Shetland and the Faroë Islands in considerable numbers and most often in the summer time. The Lesser Rorqual too is a coast frequenting species, found in British waters and along the Norwegian coast as far as Spitzbergen. Most of the British strandings of the Bottlenosed Whale have been in autumn and winter without obvious concentration on any particular part of the coast.

The Killer, which has a world-wide distribution, gives no indication of migration from British strandings, which have been reported at all times of year, and indiscriminately along the coast.

The Judgement of Paris

The imagination of the enemy in assessing his victories is no longer surprising to us, but, under the shadows of defeat, he is excelling himself. In the Pariser Zeitung *for October 2, there is an article complimenting the Germans on their U-Boat and air successes against Allied shipping during September. These claims may be compared with the chart and other statistics in the September number of the* Coastal Command Review. *Some idea of the magnitude of the German imagination can be gained from the figures quoted for sinkings. Their claim is for 900,000 tons of shipping "put out of action by sinking or damaging." The actual figure for sinkings is 89,000 tons, with another 20–30,000 tons probably damaged.*

The contributor to the *Pariser Zeitung* writes :—

"Always in the first days of each month the High Command of the Armed Forces is in the habit of announcing the successes achieved in the campaign against enemy warships and merchant navies during the foregoing month. In September, also, heavy blows were inflicted on the enemy, and on this occasion the large number of sunk or damaged warship units is particularly noticeable. The greater part of these successes were scored in the Mediterranean theatre, a clear proof that the enemy, who is dependent on long lines of communication, is forced to accept very heavy losses in his undertakings. He is less able to bear these losses with a light heart because, in every case, the units concerned cannot be replaced at a moment's notice, not to mention the loss of members of crews with long years of training. In the Atlantic also, German forces, primarily U-Boats, have distinguished themselves by successful operations.

"In this connection the battle with the convoy proceeding to the U.S.A. may be recalled. In this convoy alone, twelve destroyers were sunk and three others severely damaged. September is altogether a record month for the loss of enemy destroyers. No fewer than twenty have been sunk and seventeen damaged. Such a high proportion of success has not previously been achieved in this war. It is not unjustifiable, therefore, to speak of a 'Destroyer Month.' In the case of cruisers also, the balance sheet is very satisfactory. Three have been sunk and eighteen damaged. It must always be borne in mind that, owing to the complicated mechanism of a warship, any damage means a very considerable decrease in fighting efficiency. If one adds up the sunk and damaged battleships, cruisers, destroyers and torpedo boats alone (without taking into consideration the M.T.B.s, S/M.s, minesweepers, guard vessels, landing craft and other small war vessels) there is a deficit of no fewer than 64 warships in September, a figure which illustrates clearly the successes of our naval and air forces.

"The battle against enemy supply shipping also showed a very satisfactory balance sheet during the past month. More than 900,000 G.R.T. were put out of action either by sinking or damaging."

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