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**HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE**

COASTAL COMMAND REVIEW

Vol. IV, No. 2—February 1945

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"While this book is, of necessity, issued as secret, and no part of it must be communicated to anyone outside the Services, it is intended for the information of all officers but principally of all members of aircrews, under conditions of security approved by the Commanding Officer. The whole purpose of producing it would be frustrated if it were relegated to the interior of an official safe."

*The Air Officer Commanding-in-Chief,
Coastal Command.*

The Month's Work—February, 1945

The Anti U-Boat Effort

1. February has seen the continuance of the enemy's inshore operations against our shipping. The bulk of our air and surface forces are at present concentrated in the inshore areas, with little or nothing to spare for harrying U-Boats on the passage routes round the Shetlands and the north-west coast of Scotland.

2. Close escort of the convoys in coastal waters by the surface forces has resulted in a number of tit for tat engagements wherein the U-Boat has disclosed itself by torpedoing a ship and the escorts have promptly counter-attacked. On several occasions convincing evidence of sinking has been produced after such attacks, and although some 12 or 13 ship targets have been torpedoed round our coasts, up to 9 or 10 U-Boats have been sunk, probably sunk or possibly sunk. Over half of these actions took place in the mouth of the English Channel.

3. Anti U-Boat aircraft have continued to obtain sightings of smoke and wakes, together with a few positive schnorkel pipes, but once again this type of target has lived up to its reputation of elusiveness and the attacks have provided very few cases of significant after evidence. There have, however, been three attacks which carry hopes of having inflicted damage or possible destruction. The full score for the month is 27 sightings (16 Grade A, 11 Grade B), of which 17 (9 Grade A, 8 Grade B) were attacked. All these, except a sighting off Gibraltar and the Baltic and Kattegat attacks (see below), belonged to the wisp of smoke and wake category. The sightings included three positive schnorkel pipes. The majority were in coastal waters around Scotland, Ireland, western and south-western England. In addition there were eight such sightings by unarmed aircraft on training or air/sea rescue sorties.

4. The brightest feature of the month has been a night sweep into the western Baltic by 14 Liberators of Nos. 206 and 547 Squadrons searching for some of the U-Boats working up in the enemy's exercising areas. This operation requires special mention as it provided the only old-fashioned surfaced U-Boats that have been seen for a considerable time. Four or five U-Boats escorted by surface craft were sighted, and four were attacked in face of flak from both the surface craft and the U-Boats. As the nature of the operation made it impossible to search for after evidence, and as there were no photographs, it is difficult to assess precise results. At least the attack must have been highly disconcerting to the enemy forces in these hitherto private waters, quite apart from the satisfaction the air crews must have felt at being given the opportunity to machine gun and depth charge surfaced U-Boats and so vent the feelings of frustration after months of flogging the air in winter weather conditions with no greater reward than the sighting of an occasional wisp of smoke.

5. The apparent non-appearance of Type XXI U-Boat is probably due to teething troubles and earlier bombing of U-Boat yards. Their active emergence into the U-Boat war cannot be much longer delayed if the enemy expects any results to be achieved that will seriously affect our land offensive in the west.

6. The U-Boats will undoubtedly try to maintain their pressure round our coasts as long as they can. Obviously the schnorkel will give them some help. The enemy may be cornered, but he is not finished. The final phase can only be achieved by maintaining an all-out effort right up to the end.

Anti-Shipping

7. There was a considerable improvement in the weather during the month, but suitable targets remained very scarce. Consequently our claims of two ships sunk and 16 damaged are unusually low.

8. Not a single daylight Wing attack was made in the 16 Group area, but on the 9th two North Coates Beaufighters surprised a small coaster off Wangerooge. They attacked it with R.P. and depth charges, and left the vessel smoking.

9. Wellingtons and Swordfish continued the good work against E-Boats and other patrol vessels, and more than 60 night bombing attacks were made, mostly off the Dutch coast. Results are notoriously difficult to see in the dark, and probably a good deal of damage for which no claim is made was inflicted on the enemy. Our claims for these attacks are three E-Boats and two other vessels damaged. This constant harassing of the E-Boat crews must have a serious effect on their morale.

10. Off the Norwegian coast there were two Wing strikes during daylight, and three other attacks by small formations of Mosquitos. The first of the Wing strikes took place in the narrow Fordefjord on the 9th, when 30 Beaufighters from Dallachy made a very gallant attack and damaged a *Narvik* class destroyer and two trawler type auxiliaries. They suffered very severe losses, however, and six Beaufighters were shot down by flak and three by enemy fighters.

11. On the 21st, 15 Banff Wing Mosquitos, using R.P. and cannon, sank a small ship south of Leirvik. They also caused serious damage to a merchant vessel of 1,500 tons.

12. Many night patrols have been flown in the Skagerrak by the Halifax Squadrons, who made over 30 attacks and on at least three occasions had a measure of success. A good attack was made on the night of the 20th/21st, when C/58 scored a direct hit on the bows of a 3,000-ton merchant vessel and left it blazing. Less than an hour later G/502 sighted a merchantman of 6,000 tons. The pilot attacked with 500-lb. bombs and scored four direct hits. The result was excellent, the ship was last seen down by the stern and blazing furiously, and is now known to have sunk.

13. Another successful night was on the 29th. In brilliant moonlight eight Beaufighters of the Dallachy Wing attacked a convoy with torpedo and R.P. in the Mandal area off southern Norway. They attacked up the moon path and R.P. hits were obtained on a 4,000-ton ship, and another merchant vessel of 4,000 tons was hit by a torpedo as well as by R.P.s. A violent explosion was seen aboard this latter ship and it was left on fire. As they left the target, the crew had the satisfaction of seeing the ship enveloped in flames from bow to stern.

14. The somewhat disappointing results of the month are largely due to the enemy's use of remote and narrow fjords, which makes attack by aircraft more difficult. The diminishing hours of darkness will shortly force the enemy to sail some of his convoys by day, thus presenting us with more accessible targets. Meanwhile our night operations have been stepped up and a new feature is the use of R.P. at night by Beaufighters.

I.—ANTI U-BOAT

SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT (Including Iceland, Azores, Gibraltar and U.S. Moroccan Sea Frontier)

FEBRUARY, 1945

Duty and Base or Area.	Total Sorties.	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per "A" and "B" Sighting.		Number of Sorties.	
		Base to Base.	On Patrol.	Day.	Night.	Day.	Night.	Base to Base.	On Patrol.	When U-Boat Sighted.	When U-Boat Attacked.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<i>Convoy Cover</i>											
United Kingdom	139	1,566	1,029	1	—	—	—	1,566	1,029	1	—
Iceland	16	143	90	—	—	—	—	—	—	—	—
Gibraltar	209	1,411	935	1	—	—	—	1,411	935	1	—
Azores	19	243	75	1	—	—	—	243	75	1	—
TOTAL CONVOY EFFORT	383	3,363	2,129	3	—	—	—	1,121	710	3	—
<i>A/U Patrols</i>											
<i>Baltic-Skagerrak</i>											
United Kingdom	53	535	214	—	5	—	5	107	43	4	4
<i>Northern Transit</i>											
United Kingdom	456	4,376	2,742	2 (5)	— (1)	— (4)	—	547	343	2 (6)	— (4)
Iceland	74	786	401	—	1	—	—	786	401	1	—
<i>Northern Convoys (including Irish Sea) (see Note 4)</i>											
United Kingdom	554	4,488	3,453	3 (4)	—	3 (4)	—	641	493	3 (4)	3 (4)
Iceland	9	86	39	—	—	—	—	—	—	—	—
<i>Bay of Biscay and Channel Approaches (see Note 4)</i>											
United Kingdom	504	3,255	2,567	2 (1)	—	1	—	1,088	856	2 (1)	1
<i>Central Convoys</i>											
Gibraltar and Moroccan Sea Frontier	166	927	598	—	—	—	—	—	—	—	—
Azores	9	86	44	—	—	—	—	—	—	—	—
TOTAL A/U PATROLS	1,825	14,549	10,058	7 (10)	6 (1)	4 (8)	5	606	419	12 (11)	8 (8)
ADD CONVOY EFFORT	383	3,363	2,129	3	—	—	—	—	—	3	—
TOTAL A/U EFFORT	2,208	17,912	12,187	10 (10)	6 (1)	4 (8)	5	663	451	15 (11)	8 (8)
				16 (+11) U-Boats Sighted.		9 (+8) U-Boats Attacked.					

Notes.—(1) Grade "B" targets (i.e. a swirl, wake or smoke believed caused by a U-Boat) are shown separately in brackets and are NOT included in the main totals.

(2) The above figures do not include 8 Chance Sightings (1 Grade "A" and 7 Grade "B") made by Coastal aircraft not carrying major weapons. Also not included are 8 attacks on an unseen target where the presence of a U-Boat cannot definitely be claimed.

(3) Hours per sighting under columns (8) and (9) include both Grade "A" and Grade "B" Sightings.

(4) During the month a considerable proportion of the operations in the Northern Convoys Area by home based aircraft was concentrated in the Irish Sea and its north-west approaches. Similarly flying in the Bay area was restricted to the Channel and south-west approaches. For further details of these operations in the home approaches see Chart, facing page 4.

Squadron Results—February

SIGHTINGS BY A/U. AIRCRAFT

				Sorties when U-Boat Sighted.	Sorties when U-Boat Attacked.
53	Liberator L.L.	Reykjavik	.. ..	1	—
59	Liberator	Ballykelly	.. ..	2 (1)	1 (1)
103 (U.S.N.)	Liberator	Dunkeswell	.. ..	— (1)	—
112 (U.S.N.)	Liberator	Upottery	.. ..	1	—
114 (U.S.N.)	Liberator	Lagens	.. ..	1	—
120	Liberator L.L.	Ballykelly	.. ..	1	1
206	Liberator L.L.	Leuchars	.. ..	2 (2)	2 (1)
224	Liberator L.L.	Milltown	.. ..	1	—
547	Liberator L.L.	Leuchars	.. ..	3 (1)	2
201	Sunderland	Castle Archdale	.. ..	— (1)	— (1)
330 (Norwegian)	Sunderland	Sullom Voe	.. ..	— (1)	— (1)
423 (R.C.A.F.)	Sunderland	Castle Archdale	.. ..	— (1)	— (1)
22 (S.A.A.F.)	Ventura	Gibraltar	.. ..	1	—
179	Warwick L.L.	St. Eval	.. ..	1	1
36	Wellington L.L.	Chivenor	.. ..	— (1)	— (1)
304 (Polish)	Wellington L.L.	Benbecula	.. ..	1 (2)	1 (2)
				15 (11)	8 (8)

Notes.—(1) In addition to the above, 8 attacks were made on targets (where the presence of a U-Boat cannot definitely be claimed) by the following Squadrons: 59, 63 U.S.N., 103 U.S.N., 120 (2 attacks), 206, 224, 311 (Czech).

(2) Grade "B" targets are shown separately in brackets.

CHANCE SIGHTINGS BY AIRCRAFT ON OTHER DUTIES

					<i>No. of Targets Sighted.</i>
3 S. of G.R.	Anson	Squires Gate .. ..	..	..	— (3)
517	Halifax	Brawdy .. ..	..	..	— (1)
201	Sunderland	Castle Archdale .. ..	..	..	1 (1)
228	Sunderland	Pembroke Dock .. ..	..	..	— (1)
279	Warwick	Fraserburgh .. ..	..	..	— (1)
					<hr/>
					1 (7)

Assessments

(Received up to 1st March, 1945.)

Month.	Known Sunk.	Probably Sunk.	Damaged "A."	Damaged "B."	Slight Damage.	Insufficient Evidence of Damage.	No Damage.	Insufficient Evidence of U-Boat.	Unassessed.
December	—	2	—	—	—	3	1	1	1
January	—	—	—	—	1	4	—	4	2
February	—	—	—	—	—	—	—	—	9 (8)

RECENT ATTACKS ON U-BOATS

A Promising Attack

During the morning of January 10, **Sunderland A 330 (Norwegian)** was patrolling on an easterly course at 1,500 feet in very fine weather with a calm sea when a cloud of Schnorkel smoke was sighted bearing Green 5° between 5 and 6 miles away, in position 59° 16' N., 04° 35' W., course 60°. Radar was unserviceable at the time of the sighting. The smoke appeared to be coming from a definite source, but at 2 miles the source seemed to disappear leaving the smoke visible until half a mile away when it disappeared entirely. The aircraft attacked from Green 90° releasing from 50 feet, four depth charges, set to shallow depth, spaced at 100 feet, one minute after the smoke had disappeared. The tail gunner thought that only one depth charge exploded. The points of entry of the depth charges were not seen. About 20 minutes after the attack thick fresh oil bubbles were observed spreading into a long patch approximately 200 yards by 40 yards, and a second oil streak was seen 4 hours later at a point

half a mile from the original marker. R/T was used to call up the 25th Escort Group and this Group arrived in the area at 1455 hours. At 2030 hours the aircraft set course for base, P.L.E. having been reached. Fresh oil bubbles were also seen by a Liberator aircraft in the area 4 hours after the attack.

Comment

This was a very accurate attack although no aiming mark was visible. It is thought that the U-Boat saw the aircraft approaching and dived deep. The description of the oil, confirmed by photographs, make it likely that the slick was placed close enough above the U-Boat to force oil from the external oil tanks by concussion.

The evidence of fresh oil bubbles spreading along a line east and west, and the presence 4 hours later of a second oil patch to the eastward, infer that damage to the oil tanks was inflicted and that the U-Boat made a slow getaway to the east.

A Veil of Trailing White Smoke

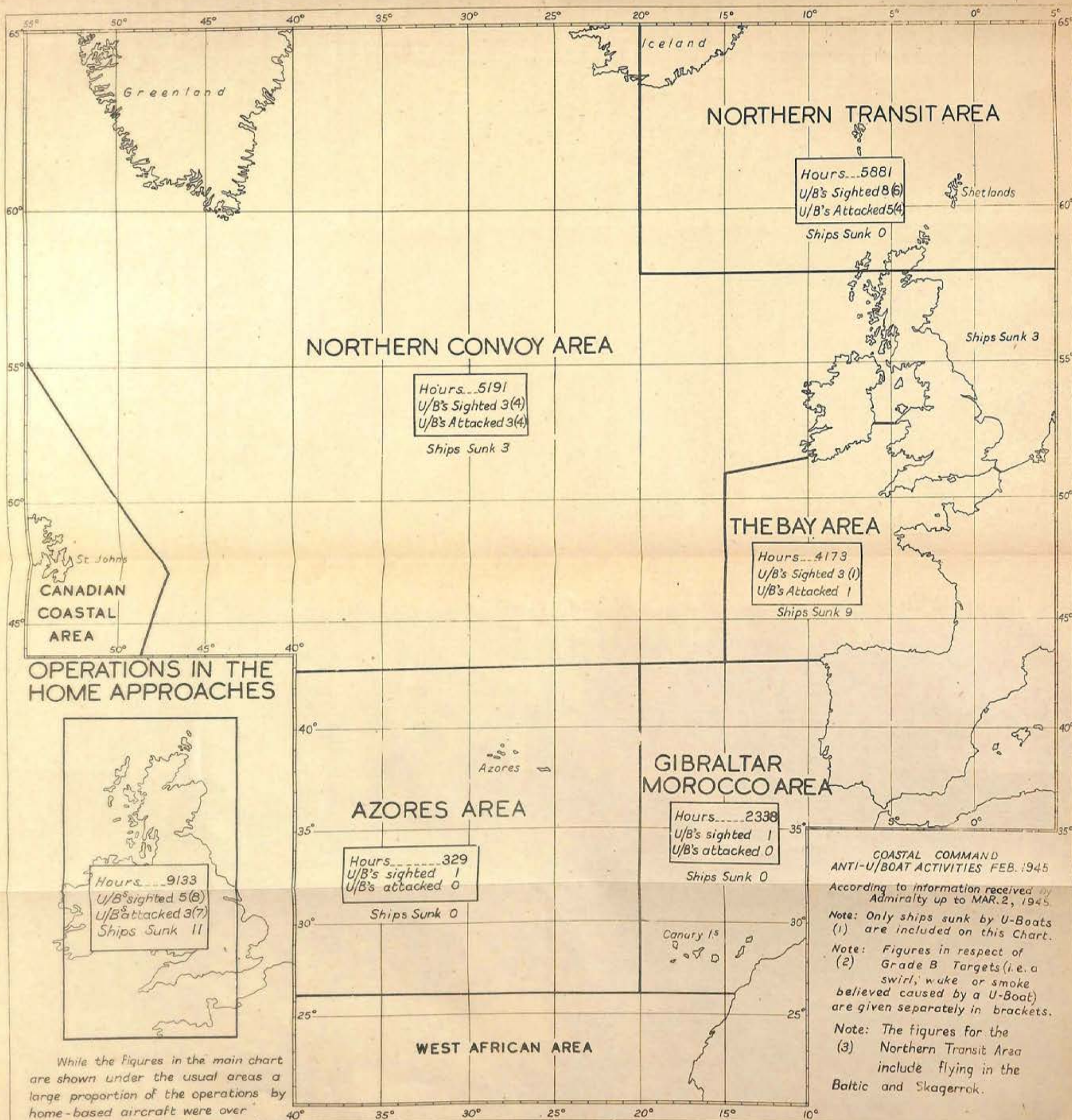
In the late afternoon of January 12, **Wellington E 304 (Polish)** was patrolling on track 225° at 1,000 feet when a veil of trailing white smoke was observed just above the surface of the sea bearing Red 35°, 7 miles away, in position 56° 48' N., 08° 38' W. The weather was fine with visibility 40 miles and a smooth sea. When within 1 mile the smoke disappeared and only a wake, 150 yards long and 3 or 4 yards wide, was observed. The aircraft turned 035° to port and lost height to 400 feet. Then a circuit was made dropping to 200 feet in preparation for an attack. The pilot and the crew noticed that the wake appeared to swerve Green 20°. The aircraft followed this wake and when flying on track 180° at 200 feet, ground speed 160 knots, attacked from Green 30° releasing two depth charges with Mark XIV star pistol, set to shallow depth, spaced at 60 feet. At the time of the attack the wake was clearly seen by all members of the crew. The rear gunner and the A.S.V. operator saw the first depth charge entering the water 20 yards ahead of the wake, and the second falling 60 feet ahead of the first. The depth charge plumes formed two pillars approximately 200 feet high. About 1 minute later the pilot and crew observed two black objects as if the U-Boat was about to surface. One object appeared triangular in shape and the other a log of wood, 20 yards ahead of the wake. The sea appeared to

boil within a circle of about 20 yards radius. Both objects, the size of which could not be estimated, stayed on the surface for 1 minute. No oil patches or streaks were observed. Two marine markers were dropped just after the attack; the second of which was set for 2 hours. On Group instructions the aircraft remained in the area of the attack and made Square "A" search for 2 hours and then resumed patrol. During the Square "A" search a disappearing contact was obtained in position 56° 48' N., 08° 38' W., on course 120°, 1 mile ahead. No further contacts were made throughout the patrol and the aircraft set course for base at 2000 hours.

Comment

Good visual lookout led to this attack, but there is evidence to show that the U-Boat saw the aircraft approaching and dived. It was a great pity that more height was not lost on the first run in so that an attack might have been made. The U-Boat could have reached a safe depth before the attack on the second run was made.

The two black objects seen 1 minute after the attack indicate the probability of the U-Boat breaking surface involuntarily, but it is impossible to give any assessment of the attack.



**COASTAL COMMAND
ANTI-U/BOAT ACTIVITIES FEB. 1945**

According to information received by
Admiralty up to MAR. 2, 1945

Note: Only ships sunk by U-Boats
(1) are included on this Chart.

Note: Figures in respect of
(2) Grade B Targets (i.e. a
swirl, wake or smoke
believed caused by a U-Boat)
are given separately in brackets.

Note: The figures for the
(3) Northern Transit Area
include flying in the
Baltic and Skagerrak.

Promising Night Attack in the Baltic

In the early hours of February 4, **Liberator J/206** was patrolling in the Western Baltic on a south-westerly course at 300 feet when the Radar operator picked up a contact bearing Red 70°, range 10 miles. The aircraft homed and contact was dead ahead at 9 miles from 300 feet: at 4 miles range contact appeared 10° to port. The aircraft lost height and altered course 18° to port and at 1 mile contact was 2° to starboard. Leigh light was then switched on and a fully surfaced U-Boat was illuminated bearing Green 2°, distant 1 mile, in position 55° 17' N., 16° 03' E., course 033° and speed 18 knots. The U-Boat was believed to be a 750 tonner, very high bow, and high freeboard, painted dark grey. The bows were streamlined and the hull cigar-shaped without the usual flat walk on the forward deck. The heavy gun forward seemed to be built in the forward base of the conning tower, which was long, low and streamlined. Four or five of the crew were seen on the conning tower. After the first illumination the Leigh light wandered owing to faulty elevating mechanism, but the operator again illuminated the U-Boat at half a mile range. The aircraft attacked from Red 90° releasing from 150 feet six depth charges, set to shallow depth, spaced at 55 feet. Mark III low level bombsight was used. The points of entry of the depth charges were not seen, but the rear gunner saw

the explosion of the first two. The second explosion occurred 50 to 60 feet off the U-Boat's port beam just aft of the conning tower. The explosion of probably the sixth depth charge was seen by the engineer through the bomb bay and he estimated it exploded 70 feet off the starboard beam of the U-Boat aft of the conning tower. The aircraft continued on course and the Radar contact was held dead astern for 3 to 4 miles and then disappeared. The aircraft returned to the area on a reciprocal course, but Radar contact was not regained, neither was anything seen in the area of the attack. When the aircraft returned there was intense light flak from three unidentified sources in the area.

Comment

This action will have had considerable effect on the morale of U-Boat crews in their training area. It is unfortunate, however, that photographs were not obtained to substantiate the aircrew evidence. The target bearing at 1 mile range differed by 5° from the relative drift and, in the past, this difference has been sufficient to cause a miss astern. From the visual evidence there is little doubt that the aircraft tracked astern of the conning tower, but it is difficult to estimate the magnitude of the tracking error. It may well be that damage was caused, but it is impossible to give a definite assessment at present.

Swirl attacked in the Baltic

At 0410 hours on February 4, **Liberator C/206** was on patrol in the area east of Bornholm Island in the Baltic when a Radar contact, bearing Green 90°, range 10 miles, was picked up. The aircraft had just attacked a 2,000 ton coaster with six depth charges. Five or more U-Boats with a destroyer in close proximity originally gave the Radar operator a hazy and indeterminate blip which only broke up into separate contacts during the later stages of the homing. This difficulty, in addition to intermittent failing in the inter-com system in the aircraft, resulted in the Leigh light being switched on too late to illuminate the U-Boat tracked over, while the other U-Boats and destroyer passed to port. The engineer, however, saw through the open bomb doors, in reflected light, a fully surfaced stationary U-Boat almost directly underneath the aircraft. The only special feature noticed was that a riding light was carried forward of the conning tower and this quite clearly showed up the forward jumping wires. At the same time the captain discerned a stationary surface vessel, believed to be a destroyer, about 200 yards away on the port beam with about five or six "hulls" in company, all within 400 yards of the destroyer and at the most 100 yards apart. The "hulls" all carried riding lights similar to the one seen by the engineer and are believed to have been fully surfaced U-Boats

at anchor. Realising that all element of surprise had been lost the captain decided to fly on for a distance of 8 miles on course 120° at 300 feet to ensure a good Radar homing on his run back. The aircraft then turned to port and returned on a course of 290°. Leigh light was not switched on as the captain anticipated that flak would be waiting to open up. Homing on the same group of contacts as before, from 8 miles, a wake was sighted visually bearing dead ahead distant 1 mile in position 54° 55' N., 16° 12' E., course probably northerly. The aircraft attacked from 300 feet, releasing from Green 90° to the U-Boat's course, six depth charges, spaced at 55 feet, set to shallow depth. All six depth charges were seen to explode at the head of the wake which was violently churned up, suggesting a good straddle. It was uncertain whether the wake was from the stern or from the conning tower. Immediately after the attack the destroyer opened up with very accurate flak from 100 yards on the port side. No riding lights were visible at the time of the attack and it is considered that the U-Boats were getting under way preparatory to diving. As the flak increased in intensity the aircraft took violent evasive action which prevented further investigation. The front gunner fired approximately 70 rounds of night tracer obtaining hits on the destroyer. As the aircraft left the area the

destroyer was seen firing at another aircraft, apparently **E/206**. The light conditions did not permit a clear description of the attack or of any of the sightings and their exact positions relative to the destroyer, but the captain thought that the depth charges may well have been effective against more than one of the numerous U-Boats in the small and congested area. He also thought that after his first approach, the U-Boats immediately got under way and subsequently crash-dived. This is supported by the experience of **E/547** who, apparently following on after **C/206** and homing on to the same group of contacts, suddenly found, when four miles distant, only one clear contact left on the screen and upon switching on Leigh light illuminated the destroyer alone which promptly opened up with intense flak scoring numerous hits.

Comment

The failure on the first run was indeed a tragedy. The already considerable effect on enemy morale would have been far greater if the first run could have ended with an accurate attack.

No technical inter-com. failure has been reported and it would seem that, in the excitement of the moment, the crew drill must have broken down to the extent of leaving too many microphones switched on. However, a good second run was made and, justifiably, the searchlight was not used as, obviously, the destroyer was on the alert. From the visual evidence the head of the wake was straddled but, as stated, the doubt as to whether it was then being caused by the conning tower or the stern makes it impossible to assess the results.

Attack on two fully surfaced U-Boats in the Baltic

During the early hours of February 4, **Liberator E/547** was patrolling the western Baltic on track 024° at 400 feet when a Radar contact was obtained bearing Red 45°, range 13 miles. The weather at the time was fair with 10/10 cloud, base 1,700 feet, sea slight and visibility, on illumination by Leigh light, not impaired. A few minutes later flak was seen in the direction in which the contact had been reported. The aircraft turned on to a course of 300° and then on to the reciprocal, contact being held throughout. When flying on track 118° at 250 feet, Leigh light was switched on at $\frac{1}{2}$ mile and showed two fully surfaced U-Boats and four escort vessels bearing dead ahead distant $\frac{1}{2}$ mile, in position 55° 15' N., 16° 50' E., course 300°, speed 8 knots. The aircraft immediately attacked from Green 10° to 15°, using Mark III low level bombsight, and released eight depth charges from 200 feet, set to shallow depth, spaced at 45 feet, the aiming point being 4 yards from the bow of the leading U-Boat at water line. Point of entry was not observed but the flight engineer, who was stationed at the Bomb Bay Utility Selector, observed one plume of water between the two U-Boats, the distance separating being considerably less than the length of the U-Boats. The engineer also heard numerous explosions. The aircraft appeared, both to the bomb aimer and the front gunner, to track directly over the bows of the two U-Boats. Immediately the Leigh light was switched on there was flak from both U-Boats and the four escort ships, which appeared to be one destroyer and three smaller ships. The gunner in the nose turret selected a large escort ship and raked the decks, firing approximately 200 rounds, the gunner in the rear turret fired

50 rounds in the directions from which the flak was coming. The mid-upper gunner fired about 50 rounds at the U-Boat. Tracer from the nose turret was seen to ricochet from the deck of the escort ship. Owing to the intense flak it was not possible to make any further observations and violent avoiding action was taken by the aircraft. The class of U-Boats could not be recognised owing to the light conditions but each appeared to have only one effective gun; the traces of these guns were very close together and in line with the track of the aircraft. One film exposure was made with no results as the wireless operator who was ready to fire photo. flash cartridge was unable to do so as he was thrown into the rear of the flight deck by the aircraft's evasive action. Numerous hits were made on the aircraft by light flak which also cut the starboard tyre, resulting in a burst on landing. The aircraft left the area at 0437 hours as P.L.E. had been reached.

Comments

A very good approach and excellent attack in face of flak and intense flak from the two U-Boats and from escort vessels respectively. Naturally any search to see what had happened was impossible, but the visual evidence indicates that the stick of eight depth charges exploded near to one, if not both, of the adjacent U-Boats. It is impossible to give a definite assessment of results, and no certain estimate can be made from the U-Boat report. The details of the approach are very scanty and from the sketch it would seem that the final run in was very short.

The whole attack was a gallant effort—particularly so when it is remembered that the enemy had already been disturbed by other aircraft.



On February 9, Beaufighters of the Dallachy Wing attacked a "Narvik" class destroyer which was lying up in the inaccessible Fordefjord. The difficult terrain can be clearly seen in the photographs. The destroyer and two trawler type auxiliaries were damaged. In the middle of the top photograph the destroyer can be seen lying close into the headland. The middle photograph shows the destroyer half hidden by smoke. (See letterpress, page 11.)



On February 12, four Mosquitos of the Banff Wing attacked a ship of about 4,500 tons, aground off Fladøe Island, with cannon and R.P. The ship was left on fire. (See letterpress, page 11.)

The lower photograph shows an attack off Leirvik on February 21 by Mosquitos of 235 Squadron with cannon and R.P. A merchant ship of about 1,500 tons received a number of rocket hits and was at least seriously damaged. (See letterpress, page 11.)



Good Work by the Radar Operator

During the morning of February 10, **Liberator Z/59** was on navigation exercise flying on course 235° at 800 feet when a Radar contact was obtained bearing Red 20°, range 5 miles. At the time the weather was poor with 7/10 cloud, base 1,200 feet descending to zero feet in hail showers, sea moderate to rough, visibility 5 to 6 miles and wind 235° at 35 knots. Almost immediately after the contact, smoke and vapour were sighted and the aircraft turned to home, losing height in a steep dive. Contact was lost at 2 miles in sea returns. The aircraft tracked over position and at 1050 hours all the crew sighted smoke and wake. The navigator in the nose and the flight engineer on the flight deck sighted the wake with spray and smoke at the apex, and in the midst of the spray a small dark blob—no funnel like structure could be seen. The smoke and wake were too far to starboard to make an attack, so two flame floats were released over the position and the aircraft turned to port, climbing to 600 feet. A wide circuit was made in an attempt to regain contact or sight the flame floats and at 1102 hours contact was regained bearing Red 20°, range 7 miles. The aircraft homed but contact was lost in sea returns at 1½ miles (sea returns 11 miles, visibility 1 mile). Ten minutes later Radar contact was regained, again bearing Red 20°, range 7 miles. The aircraft turned to home at once and the contact became 3° to 4° Red and was held almost dead ahead for the run in. At 2 miles, when the aircraft was on a course 200° at 400 feet, the navigator sighted smoke and then wake bearing Red 5°. The Radar operator lost contact in the sea returns at 1½ miles, sea returns were still 11 miles, and the Sea Return Discriminator was in use. The bomb aimer homed the captain to the target which was in plotted position 54° 45' N., 09° 19' W. course estimated to be 285° and speed unknown. The flight engineer who was on the flight deck thought the U-Boat was doing a sweeping turn on an approximate course of 030°, but the bomb aimer saw the apex of the wake or swirl which he said passed below the aircraft slightly to port and was moving from port to starboard. The position of sighting was approximately bearing 220° 20 miles from two escort vessels. An attack was made from approximately Green 90°, and six depth charges were released from 300 feet, spaced at 55 feet, set to shallow depth, while the wake or swirl and smoke were still faintly visible. Flame floats were released and photographs were taken with the rear facing camera. The rear gunner stated that two depth charges entered the water to starboard of the wake, and four depth charges to port. Coming out of the attack the aircraft turned to port and depth charge scum only was seen. Almost immediately a hail storm obscured the scene.

At 1121 hours another Radar contact was made in poor visibility, bearing Green 90°, range 3 miles, but it was lost at 2 miles and although the area was searched for 20 minutes nothing was seen. The pilot then released another flame float and set course to make landfall on Rathlin to check position. Having done so, he returned to the position of the attack and released a purple

sonobuoy and a marine marker. Visibility was still very poor and as the pilot was unsure of the position he again set course for Rathlin, a few minutes later results were heard on the sonobuoy—120 very strong, clear, regular beats. The pilot turned back to the position, and as the aircraft approached, the sonobuoy was still giving beats at 120 per minute, though not so strong, seven quick and three slow. Another sonobuoy (orange) and marine marker were released by D.R. 2,500 yards north of the original sonobuoy. A pattern was dropped, but, owing to very poor visibility, at no time were flame floats or markers visible. Strong beats were heard on purple, red and orange buoys, whilst faint beats were noted from the blue buoy. The purple buoy faded completely at 1430 hours and the crew assumed it had sunk. From 1515 hours no further beats were heard from the blue buoy. Fairly strong regular beats, 120 per minute, continued on the red and orange buoys, but intermittently the beats assumed the seven quick, and three slow characteristic, which lasted for approximately 30 to 70 minute periods, then reverted to regular beats for 10 minute periods. At 1650 hours the red buoy faded altogether. Twenty minutes later the beat on the orange buoy changed to 85 beats per minute, then, after a few minutes faded completely. Attempts to call escort vessels by R/T were unsuccessful and at 1810 hours the captain set course for base. "Z" was relieved by **O/120** which had been homed to the scene and continued the search without success.

Comments

This is one of the rare occasions where a Radar contact has been obtained with the now familiar smoke-spray target. The captain is congratulated on an excellent performance where good use was made of the information provided by a skilled Radar operator.

Although the "U-bat" does not report full details of the courses flown during the attempts to locate and home on the target, this attack emphasizes the need to make full allowance for the effect of relative drift during the approach. As far as can be ascertained from the Form U-bat, no attempt was made to carry out a constant bearing approach while homing on the Radar contact. In the first approach, the relative drift was about 8° port and the target was sighted to starboard. On the second run the course is not given, but it is likely that there was an appreciable relative drift for which no allowance appears to have been made. It is not surprising that the aircraft failed to sight the target in the conditions of poor visibility and heavy sea returns. On the final approach, the relative drift was about 10° port and, as the contact was held almost dead ahead for the run in, and no last minute alteration of course was reported, the target would be expected to pass to starboard of the aircraft.

On the rear gunner's evidence a straddle was obtained but any immediate results were impossible to see owing to the hail storm. Subsequent sonobuoy evidence seems to establish the presence of a live

U-Boat so that it appears that no serious damage was inflicted. The photographs do not show a definite target although there is a possible wake to the right of the explosion plumes.

The crew appears to have experienced difficulty in re-locating the target. This confirms the need for some definite procedure for returning to a target which has passed close to the aircraft. The procedure

given in the "Coastal Command Manual" of Anti U-Boat Warfare, Article 85, paragraph 14, was evolved when the need first became apparent; efforts are now being made to simplify this procedure—and, until further details can be issued, crews should adapt the present recommended procedure so as to enable them continually to return to a small target which has been detected.

A Tapering Oil Streak

On February 10, **Sunderland F/330 (Norwegian)** was on patrol flying on a south-westerly course at 2,000 feet when something was sighted on the surface and after careful checking with binoculars it was identified as Schnorkel smoke bearing Green 43°, 12 miles away in position 59° 33' N., 05° 12' W. The weather was good with unlimited visibility. The pilot decided to attack immediately. As he approached, a tapering oil streak 75 to 100 yards in length was seen. This was running in a general direction of 320°, speed 8 knots. A small Schnorkel wake and greyish white smoke were observed; the latter was coming up from the surface in puffs but ceased when the aircraft was approximately $\frac{1}{2}$ mile away. At 1750 hours the pilot attacked along the estimated track of the U-Boat. Four depth charges were released from 75 to 100 feet, set to shallow depth, spaced at 100 feet. The head of the oil streak was used as the aiming point. The first depth charge entered the water at approximately 200 yards ahead of the oil streak and the tail gunner thought

that all four depth charges exploded. Observation was very difficult owing to the height of the aircraft and the bad line of sight. No results were observed. Conditions for R/T were very bad owing to static interference, but after more than an hour contact was made with an Escort Group and the details of the attack were given. Just after midnight "F" left the area as the Radar was unserviceable. Other aircraft were in the area but no relief actually took place.

Comment

A good lookout and up-track attack. It is well known that attacks by depth charges on wakes after the smoke has ceased cannot hope to be lethal, but the nuisance value of the depth charges exploding is valuable from a morale point of view. It is useless putting a deeper setting on the depth charges as the position and depth of the U-Boat in plan are completely unknown after such an interval. The depth in fact might be anywhere between 100 and 360 feet.

The First and Last Patrol of "U 1006"

(The following account is based on the stories of prisoners of war.)

Having completed her fitting out and final trials **U 1006** arrived at Bergen on October 8, 1944. Here she provisioned and topped up with water and oil. She sailed from Bergen in the afternoon of October 9. **U 1006** was one of a group of six U-Boats known as "Rita." The group was to rendezvous on October 23 in a position off the west coast of Ireland. The object of the operation was to attack incoming convoys but the commanding officer had not been given the exact area. He had been ordered not to start any action, but to make every effort to avoid detection. All six U-Boats were instructed to proceed to the rendezvous on a course between the Faroes and the Shetlands. **U 1006** was expected to reach the area first because her speed was faster than the normal speed of U-Boats on passage. It was usual to proceed at a depth of 60 metres on passage, when not at Schnorkel depth, and **U 1006** proceeded submerged on a course approximately west by north.

On October 13, when at schnorkel depth, **U 1006** sighted a searchlight and starshells. The commanding officer thought he was near a destroyer

group and that he had been detected. He therefore submerged and steered north for two days. During this time screw noises were heard. On the night of October 15, thinking he had lost his pursuers, the commanding officer altered course to south-west.

The next night **U 1006** was proceeding slowly through an area to south-east of the Faroes at a depth of 60 metres, when screw noises were heard directly overhead. This was H.M.C.S. **Annan**, which attacked at 1911 hours with eight depth charges. As a result of the attack the hydroplanes were put out of action, a bulkhead was distorted and water entered between the bow torpedo tubes. The water was soon over the floor plates and the pumps were unable to check it.

The commanding officer ordered the tanks to be blown and, after nearly all the high-pressure air had been used up, the U-Boat shot to the surface. At first only one vessel, which prisoners described as a "frigate," was sighted. The order had been given to prepare the torpedo tubes for action, but when attempting to fire, the crew



In the past few months the Germans have been attempting to attack our convoys in the approaches to the Scheldt with several types of "midget" U-Boats. The above photograph, taken by an aircraft of 119 Squadron, shows a two-man U-Boat aground near West Kappelle on Walcheren. The Germans call this type a "Seehund."

The lower photograph, taken on an Atlantic Meteorological Flight shows a good example of "Glory"—a system of coloured rings surrounding the aircraft shadow on a cloud bank. This phenomenon is caused by diffraction of the sunlight reflected from cloud droplets. The colour effect is often striking in bright sunlight with merging shades of blue, green and red.



PLATE 4

This excellent photograph of Rockall was taken by a Liberator of 59 Squadron from a height of 50 feet on November 14, 1944.



found that tubes III and IV were damaged, and tubes I and II could not be used because the H.P. air line to the four forward tubes had been damaged.

They managed to fire, without success, one T.5 torpedo from tube V. At a range of 1,500 metres, the U-Boat opened fire on the "frigate" with both 20-mm. guns. The 37-mm. gun had been damaged. The U-Boat was kept stern on to *Annan* and at first avoided being hit, but more vessels approached and all opened fire. One of them tried to ram the U-Boat, but she was able to take avoiding action. Prisoners from the U-Boat described the attacking force as consisting of seven destroyers.

A 4-inch shell tore open the U-Boat's upper deck and forward ballast tank, causing the latter to leak and oil to pour out. Another hit was made on the conning tower and fire broke out. Lights

failed for a time but were repaired. At about 2000 hours the ship's company abandoned ship in orderly fashion, though the commanding officer was said to have jumped overboard in panic. He and the engineer officer were captured in an escape dinghy fitted with S O S transmitter. It was their intention to try to attract the attention of a Swedish steamer and then make their way back to Germany. Out of a total complement of 52, 44 were rescued.

During final adjustments, *U 1006* was fitted with a standard mattress aerial for "Hohentwiel," and should also have been fitted with a "Hohentwiel" set. This was unavailable, due, it was believed, to the factory having been bombed out. The commanding officer tried to obtain a set in Kiel and in Bergen, but without success. It is clear he wished to have a set with him, and this change in the attitude of commanding officers towards Radar is interesting.

II.—ANTI-SHIPING

SUMMARY OF ANTI-SHIPING OPERATIONS BY COASTAL COMMAND AIRCRAFT FEBRUARY, 1945

Weapons Carried. (1)	Number of Sorties.			Number of Aircraft to Attack.			Target.	
	On Reconnaissance. (2)	On Strike. (3)	Total. (4)	On Reconnaissance. (5)	On Strike. (6)	Total. (7)	M/V. (8)	Naval. (9)
DAY OPERATIONS								
Torpedo	16	—	16	—	—	—	—	—
R.P.	213	13	226	30	—	30	17	13
Bomb	32	19	51	—	11	11	11	—
D.C.	108	—	108	2	—	2	—	2
Cannon	171	9	180	8	—	8	2	6
TOTAL—DAY	540	41	581	40	11	51	30	21
NIGHT OPERATIONS								
Torpedo	51	—	51	3	—	3	3	—
R.P.	114	—	114	8	—	8	3	5
Bomb	307	11	318	89	5	94	26	68
D.C.	—	—	—	—	—	—	—	—
Cannon	12	—	12	—	—	—	—	—
TOTAL—NIGHT	484	11	495	100	5	105	32	73
ALL OPERATIONS								
Torpedo	67	—	67	3	—	3	3	—
R.P.	327	13	340	38	—	38	20	18
Bomb	339	30	369	89	16	105	37	68
D.C.	108	—	108	2	—	2	—	2
Cannon	183	9	192	8	—	8	2	6
GRAND TOTAL	1,024	52	1,076	140	16	156	62	94

Notes.—(1) Patrols directed against Midget U-Boats are included under D.C. Sorties.

(2) The figures in brackets represent attacks on shipping by aircraft on duties other than Anti-Shipping.

FINAL ASSESSMENTS FOR JANUARY, 1945

Day

R.P. and Cannon :—

- 5 M/V.s (totalling 6,956 tons) sunk.
- 3 T.T.A.s sunk.
- 2 M/V.s (totalling 5,665 tons) seriously damaged.
- 1 "M" Class M/S seriously damaged.
- 1 T.T.A. seriously damaged.
- 2 M/V.s (totalling 4,000 tons) damaged.
- 1 M/V hull (6,500 tons) damaged.
- 2 M/S.s damaged.
- 1 Tug (500 tons) damaged.
- 2 Barges damaged.

Tsetse or Cannon :—

- 1 M/S damaged.
- 3 T.T.A.s damaged.

Night

Bombs :—

- 2 M/V.s (totalling 7,000 tons) damaged.
- 2 Armed trawlers damaged.

RESULTS CLAIMED FOR FEBRUARY, 1945
(Subject to Assessment)

Day

R.P. and Cannon :—

- 1 M/V (490 tons) sunk.
- 1 M/V (1,500 tons) seriously damaged.
- 2 M/V (totalling 4,764 tons) damaged.
- 1 "Narvik" D.D. damaged.
- 2 T.T.A.s damaged.
- 1 Small coaster damaged.

Depth Charge :—

- 1 Midget U-Boat sunk.

Night

Torpedo :—

- 1 M/V (4,000 tons) seriously damaged.

R.P. :—

- 1 M/V (4,000 tons) damaged.

Bombs :—

- 1 M/V (5,000 tons) sunk.
- 1 M/V (3,000 tons) seriously damaged.
- 1 M/V (4,000 tons) damaged.
- 1 T.T.A. damaged.
- 3 E-Boats damaged.
- 1 Patrol vessel damaged.

Shipping Strikes in February

On February 9, 30 Beaufighters from Dallachy sighted a Narvik class destroyer and several other vessels in Fordefjord (see Plate 1). The fjord is narrow and is flanked by steep hills, consequently it was impossible for all the Beaufighters to attack together. The ships and land batteries put up an intense flak barrage, through which all the aircraft had to fly. Nevertheless, the Wing attacked, and damaged the destroyer and two trawler type auxiliaries. Six of our aircraft were shot down by flak, and a further three were destroyed by enemy fighters, who intercepted the Beaufighters as they broke away from the attack. S/404 put up a fine performance by destroying one F.W.190 and damaging another.

A successful attack against a merchant ship of 4,500 tons aground on Fladøe Island was made by four Mosquitos of the Banff Wing on February 12 (see Plate 2). They attacked the vessel with R.P. and cannon, and scored many hits with both weapons. An explosion, followed by a large column of smoke, was seen on the target.

On the night of February 20/21, Halifax C/58 obtained a Radar contact while on patrol in the Skagerrak. On homing, the pilot sighted six merchant vessels on an easterly course. He attacked one of them, a 3,000 ton ship, and scored a direct hit with a 500-lb. bomb on the bows. This was followed by flames and smoke, and the vessel was left blazing.

Less than an hour after the above attack, Halifax G/502 sighted a 6,000 ton merchant vessel, and four other vessels, about 40 miles east of Kristiansand South. The pilot attacked, and obtained four direct hits on the large ship. The ship became enveloped in flames, and ammunition appeared to be exploding. About an hour later, when "G" left the target area, the ship was still

burning fiercely, and was down by the stern. It is now known that the ship subsequently sank.

Two ships south of Leirvik were attacked by 15 Mosquitos of 235 Squadron on February 21. One of the ships, a small vessel of about 500 tons, was hit by 12 R.P.s and many cannon shells; she was left burning fiercely, and listing to starboard (see Plate 2). The other was a merchant vessel of some 1,500 tons. More than 40 R.P. hits, as well as numerous cannon strikes, were scored on this vessel, which was also left burning furiously. Information subsequently received indicates that the smaller vessel has sunk.

Shortly before midnight on February 22, Halifax Y/58 homed on to a Radar contact in the Skagerrak, and sighted two merchant vessels, one of 4,000 tons and the other 3,500 tons. The ships were on an easterly course, and were steaming at about 10 knots. "Y" attacked the 4,000 ton ship, and scored a direct hit with a 500-lb. bomb on the stern. The vessel slowed down and then stopped, at the same time emitting great clouds of dense black smoke.

On the night of February 24/25, Wellington B/524 was patrolling in the southern area of the North Sea, when eight E-Boats were sighted. The aircraft immediately attacked and a stick of six 250-lb. bombs straddled two of the boats. A direct hit was scored on one of them and this was followed by a bright flash and clouds of smoke. During the bombing run light flak was met so "B" took evasive action, and commenced to shadow. Forty-five minutes later the Wellington again attacked the E-Boats with six bombs, but was hit by flak and forced to ditch. The crew, however, were rescued by an H.S.L. about 8 hours later.

During the evening of February 26, eight Beaufighters of the Dallachy Wing made torpedo

and R.P. attacks against a convoy in the Mandal area off southern Norway. The convoy consisted of a 4,000 ton merchant ship, a tanker of 1,500 tons and three escort vessels. The aircraft sighted the ships visually in bright moonlight, and made independent attacks up the moon path. Two of the escorts were attacked with R.P., and several

wet hits were probably scored. A torpedo was launched at the merchant ship and a large explosion followed. The torpedo hit was seen by one of the R.P. pilots, who also attacked the merchantman and obtained hits. Subsequently the sea all around the target was a mass of flames. All the Beaufighters returned safely to base.

III.—OTHER OPERATIONAL FLYING

Combats with Enemy Aircraft

On the morning of February 11, **Mosquito O/235**, while on the way to carry out an anti-shipping patrol off the Norwegian coast, sighted a Ju.188 about half way across the North Sea. "O" turned towards the enemy aircraft which took evasive action and opened fire from 1,200 yards. The Mosquito continued to close the range and replied with a 2-second burst of cannon. Hits were seen on the enemy aircraft and its port engine began to smoke. Shortly afterwards it entered

cloud, started to climb, and then pulled up violently. "O" saw an orange coloured explosion and caught glimpses of the enemy aircraft diving vertically through the cloud. Although the Ju.188 was not actually seen to crash, the Mosquito, on searching the area, found only a large discoloured patch on the sea and drifting smoke in the area. It is considered that the Ju.188 was most probably destroyed.

Air/Sea Rescue

During the month of February, 62 members of aircrew were rescued by the Air/Sea Rescue Service.

Outstanding incidents were :—

(1) An Anson, flying a navigation exercise from Bishopsceort, ditched a mile south of Derbyhaven at 2300 hours on February 3. The accident was seen by the local coastguard, who reported it, and an Anson was scrambled from Jurby. In the meantime an H.S.L., which was despatched from Douglas, picked up the crew of five in quick time.

(2) Later on the same day, 18 survivors of three ditched American bombers were rescued. The first at 1417 hours when **Z/280** dropped an airborne lifeboat to two survivors in a dinghy in position 53° 01' N., 03° 22' E. Owing to poor visibility an H.S.L., which was in the area and approaching the dinghy, was not noticed by the aircraft, and the survivors were picked up by the H.S.L. before they had time to paddle to the lifeboat.

Warwick T/280 received a diversion from patrol to position 53° 20' N., 04° 12' E., where the second bomber had ditched. The aircraft sighted near this position two dinghies containing eight survivors. A Lindholme dinghy was dropped close to them, to which the other dinghies were tied. The aircraft made efforts to home an H.S.L., but before this could be accomplished an American Catalina from Halesworth landed, embarked the survivors, successfully took off, and flew back to base.

While this rescue was in progress a Thunderbolt sighted a dinghy, also with eight survivors from the third American bomber, in position 52° 50' N., 02° 22' E. An R.M.L. was informed by V.H.F., given the position, to which it quickly sailed, and took the survivors aboard.

(3) On February 23, **Warwick M/280** was on a standing patrol in support of Bomber operations when it was diverted to a position 10 miles north of Cromer, where a dinghy had been reported by a returning aircraft of the second Bomber Division. A Catalina, Thunderbolts and an H.S.L. were also searching and at 1820 hours M/280 reported that it was over the dinghy, which had been sighted a few minutes before by one of the Thunderbolts. The Catalina picked up the three survivors.

(4) **Wellington B/524** received a direct hit by a 40-mm. cannon shell while attacking E-Boats shortly after midnight on February 25, and was compelled to ditch at once owing to the failure of the port engine and fire in the port wing and fuselage. **Warwicks L and A/280** were scrambled. They were informed by control that a Mosquito was orbiting a dinghy in position 52° 05' N., 03° 12' E. and that a Swordfish from the Continent was to co-operate by dropping flares. At 0313 hours, A/280 saw two star red distress cartridges being fired from the sea. The aircraft circled, marking the position, and turned its I.F.F. to distress. At the same time control sent a message to the effect that two H.S.L.s had been despatched and were due to arrive between 0500 and 0530 hours. F/280 picked up the distress blip at 0330 hours, homed on it and at 0342 hours was also orbiting the pyrotechnics. An hour and a half later one of the H.S.L.s was contacted by V.H.F. and the Warwicks began leading her to the area by flares and pyrotechnics. The survivors continued to fire their cartridges and at 0623 hours a definite silhouette of a dinghy was seen by the

light of one of the cartridges. A few minutes later two Wellingtons of 524 Squadron arrived and helped to guide the H.S.L. to the dinghy. The two survivors were taken aboard at 0805 hours.

(5) **Warwicks A and T/280**, while patrolling on February 28, saw a large column of smoke 10 miles away, which they thought was coming from a

crashed aircraft, and as they approached, six parachutes were seen descending. H.S.L. 189 and R.M.L. 596 raced to the spot and rescued the six survivors. The other three members of the crew of nine were missing, and although aircraft and H.S.L. 2613 searched for 5 hours, no sign was seen of them, and it is considered that they crashed with the aircraft.

Photographic Reconnaissance

February's photography has revealed the withdrawal of many German main naval and auxiliary units from the eastern Baltic, but weather has prevented a complete determination of their present whereabouts. The cruisers "Hipper" and "Emden," an incomplete "Elbing" class destroyer, and several liners and large merchant vessels have arrived at Kiel, an incomplete destroyer at Hamburg, a liner and several merchant vessels at Bremerhaven, the cruiser "Koln" and a U-Boat depot ship at Wilhelmshaven, and the light cruiser "Nurnberg" at Copenhagen. U-Boat training flotillas and incomplete U-Boats on trials are now located at Bremerhaven and Wilhelmshaven.

Reconnaissance of Dutch ports has shown the presence of operational midget U-Boats at IJmuiden and Rotterdam.

Oil targets retained high priority for photography. In addition to the synthetic oil plants and oil refineries, coking plants producing benzol as a by-product have been photographed after attacks and subsequently at intervals for indication of repair and resumed production.

Damage assessment sorties have also covered Berlin, Dresden, Munich, Duisburg and many other German cities, in addition to such pinpoint targets as the Dortmund Ems Canal at Ladbergen, the Mittelland Canal at Gravenhorst, various railway marshalling yards, viaducts and bridges.

542 Squadron, Spitfire

On February 21, I was briefed to photograph targets in the Hamburg area. I was airborne at 1000 hours and climbed on course to 25,000 feet, just below trail height.

There was very little cloud over northern Germany and I arrived over Hamburg to find it practically free from cloud. After doing six runs over the docks and U-Boat pens I photographed three airfields and an oil refinery in this area and then went up the estuary to Brunsbittel. After doing runs over the target there I was about to set course for base when I saw an Me.262 about a mile to starboard at the same height. I immediately opened up to 3,000 r.p.m. and whipped round into a steep diving turn to port heading for some cloud to the south, at the same time looking behind me to see another twin jet aircraft chasing me.

I kept the turn and dive as steep as possible and partially blacked myself out, not being able to see but not losing consciousness. I then eased a little out of the turn so that I could see and had a quick look round, but there was no sign of them. I was then at 18,000 feet. I headed south towards the cloud cover for some minutes, keeping a sharp look out for them, then set course for base and landed at 1400 hours.

540 Squadron, Mosquito

I was airborne at 1010 hours on February 3, and set course climbing steadily. My targets consisted of the railway lines running from Osnabruck to Wesel, and the marshalling yards at Munchen/Gladbach, Krefeld and Gravenbroich.

We made landfall at IJmuiden, crossing in at 28,500 feet and making slight non-persistent trails. I made one run over the port before continuing to Zwolle and thence to Osnabruck. At Osnabruck we set course along the railway lines to Munster, photographing as we went. As we crossed over Munster I checked my height as 28,500 feet, and course as 230° T. A few minutes later, at 1130 hours, I made a routine "sweep" of the sky for any hostile aircraft and observed two aircraft 3,000 feet below me at 2 miles range on my starboard quarter. I was unable immediately to identify them, but to make certain I recalled my navigator from the nose of the aircraft and by the time he had joined me I was able to identify the aircraft as Me.262's. I increased revs. and boost to 3,000 and plus 16 meanwhile watching the enemy aircraft climbing very rapidly towards me emitting short but very black trails. When 300 feet below, one Me. broke off his climb, disappearing beneath my aircraft, and the other continued to my height and 100 yards behind before breaking off and turning in. I immediately adopted offensive tactics, turning as if to attack, but at that moment large black puffs of flak appeared just astern causing the Me.'s to turn away and make off to about 5 miles range where they continued to circle as if awaiting any results the flak might have made upon my aircraft. I successfully evaded the flak and made off very rapidly in the direction of my next targets, which were, luckily, away from the Me.262's and I did not see them again.

I obtained photographs of Krefeld marshalling yards and the area around Krefeld, but further photography was rendered impossible owing to layers of strato-cu. so I set course for base, photographing Dunkirk as I crossed the coast. I landed at base at 1335 hours.

MONTHLY ANALYSIS OF ANTI-SHIPING RESULTS BY COASTAL COMMAND AIRCRAFT

March, 1941, to December, 1944, inclusive

Note.—No Anti-Shipping Assessments were made prior to March, 1941.

Month.	Merchant Vessels.						Naval and Other Vessels.		
	Sunk.		Seriously Damaged.		Damaged.		Sunk.	Seriously Damaged.	Damaged.
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.			
1941									
March ..	5	16,800	2	4,500	4	11,200	2 Escort Vessels.	1 Destroyer.	12 Small M.B.s. 1 Fishing Vessel. 3 E-Boats. 2 Destroyers. 1 Fishing Vessel.
April ..	2	6,703	2	3,500	7	21,200	—	1 Destroyer.	—
May ..	2	4,126	1	5,000	2	3,800	—	—	—
June ..	2	5,100	2	7,000	3	5,400	—	1 Cruiser.	—
July ..	4	8,881	3	8,700	10	35,250	1 Minesweeper. 1 E-Boat.	—	—
August ..	1	2,095	3	6,000	5	23,000	—	—	—
September ..	2	10,989	2	7,500	5	23,941	—	1 Escort Vessel.	—
October ..	6	17,247	11	21,479	7	32,000	—	—	—
November ..	3	1,742	3	4,276	13	64,800	—	—	1 Flakship. 1 Escort Vessel.
December ..	6	26,391	4	14,500	13	44,350	—	—	—
Totals ..	33	100,074	33	82,455	69	264,941	4	4	21
1942									
January ..	2	6,920	4	8,500	7	19,403	—	—	—
February ..	3	793	1	1,200	6	6,400	—	—	—
March ..	1	500	—	—	7	8,400	—	—	—

April ..	..	1	1,494	2	5,500	9	25,500	—	—	1 Escort Vessel.	—	1 Destroyer.
May ..	..	12	33,266	9	27,194	28	108,260	—	—	—	—	—
June ..	..	3	3,297	3	5,500	1	6,000	—	—	—	—	—
July ..	..	1	4,000	2	6,000	5	14,100	—	—	—	—	—
August ..	..	—	—	—	—	3½	13,500	—	—	—	—	—
September ..	..	1	4,974	—	—	9	32,998	—	—	—	—	—
October ..	..	2	8,081	—	—	3	10,473	—	—	—	—	2 E-Boats.
November ..	..	1	3,347	1	3,000	4	19,523	—	—	—	—	—
December ..	..	1	1,059	2	8,000	1	2,000	—	—	—	—	—
Totals ..	..	28	67,731	24	64,894	83½	266,557	—	—	1	3	—
<i>1943</i>												
January ..	..	3	5,519	1	2,000	4	10,000	—	—	—	—	—
February ..	..	—	—	1	4,000	2	4,000	—	—	—	—	—
April ..	..	7	35,506	2	9,500	3	10,836	—	—	2 Minesweepers. 2 Armed Trawlers. 1 Escort Vessel. 1 Minesweeper.	5 Minesweepers. 2 Armed Trawlers.	—
May ..	..	3	9,420	2	5,000	3	17,000	—	—	—	—	—
June ..	..	1	5,180	1	2,500	—	—	1 Armed Trawler.	—	4 Armed Trawlers.	1 Naval Tender.	—
July ..	..	—	—	1	3,500	—	—	1 Escort Vessel.	—	1 Escort Vessel.	1 Armed Trawler.	—
August ..	..	1	2,700	—	—	1	2,109	1 Escort Vessel.	—	—	—	—
September ..	..	2	3,513	1	5,965	—	—	—	—	1 Minesweeper	1 Sperrbrecher. 3 Minesweepers. 3 Escort Vessels. 3 Armed Trawlers. 1 Tug.	—
October ..	..	1	17,001	—	—	—	—	—	—	2 Minesweepers.	2 Minesweepers.	—
November ..	..	1½	7,825	—	—	2	8,700	—	—	2 Minesweepers.	2 Armed Trawlers. 1 Escort Vessel.	—
December ..	..	2	9,073	1	500	4	9,000	—	—	—	1 Destroyer. 1 Escort Vessel.	—
Totals ..	..	21½	95,737	10	32,965	19	61,645	3	14	36	—	—

MONTHLY ANALYSIS OF ANTI-SHIPPING RESULTS BY COASTAL COMMAND AIRCRAFT—continued

Month.	Sunk.			Merchant Vessels.			Naval and Other Vessels.		
	Sunk.		No.	Sunk.		No.	Sunk.		No.
	Tonnage.	Tonnage.		Tonnage.	Tonnage.		Tonnage.	Tonnage.	
1944									
January ..	4	15,658	2	4,000	—	—	2 Escort Vessels.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
February ..	1	3,096	—	—	6,500	2	1 Escort Vessel. 1 E-Boat.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
March ..	4	11,598	3	6,898	2,500	2	—	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
April ..	1	2,159	1	3,303	—	—	1 Sperrbrecher. 1 Minesweeper. 3 Armed Trawlers. 2 Minesweepers. 1 Torpedo Boat. 1 Small Vessel.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
May ..	2	3,310	—	—	—	—	—	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
June ..	2	11,900	—	—	1,000	1	1 Minesweeper. 2 E-Boats. 1 Auxiliary. 1 Motor Launch.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
July ..	6	18,936	1	1,900	13,749	7	2 Minesweepers. 6 Trawler Type Auxiliaries. 5 E/R-Boats. 1 Coaster. 1 Landing Craft.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.
August ..	5½	28,453	1	2,000	10,986	6	2 Destroyers. 5 Minesweepers. 7 Trawler Type Auxiliaries. 1 Escort Vessel. 1 E/R-Boat.	—	1 Destroyer. 1 Minesweeper. 6 Escort Vessels. 1 Coaster. 1 Minesweeper. 2 Escort Vessels. 3 E-Boats. 3 Minesweepers. 7 Escort Vessels. 2 Armed Trawlers. 2 Tugs. 1 Oiler. 1 Sperrbrecher. 1 Minesweeper. 6 Escort Vessels. 2 Minesweepers. 3 Escort Vessels. 2 E-Boats. 1 Coaster. 1 Destroyer. 6 Minesweepers. 3 Trawler Type Auxiliaries. 4 Escort Vessels. 7 E-Boats. 1 Unidentified Vessel. 2 Minesweepers. 15 Trawler Type Auxiliaries. 6 E/R-Boats. 1 Landing Craft. 3 Unidentified Vessels.

September ..	5	7,270	1	563	2	4,323	1 incomplete Destroyer. 3 Minesweepers. 1 Trawler Type Auxiliary. 1 Lightship. 1 Torpedo Boat. 2 Trawler Type Auxiliaries.	3 Minesweepers. 3 Trawler Type Auxiliaries. 4 E/R-Boats. 1 Landing Craft. 1 Trawler Type Auxiliary. 1 E/R-Boat. 1 Coaster. 1 Gunboat. 1 Minesweeper. 1 Escort Vessel. 1 E/R-Boat. 1 Coaster.	4 Minesweepers. 10 Trawler Type Auxiliaries. 4 E/R-Boats. 2 Coasters. 4 Tugs. 2 Minesweepers. 1 Trawler Type Auxiliary. 1 Coaster. 1 Torpedo Boat. 3 Tugs. 1 Ocean-going Barge. 5 Minesweepers. 2 Escort Vessels. 1 Trawler Type Auxiliary. 1 Landing Craft. 1 Tug. 3 small Vessels. 2 Trawler Type Auxiliaries. 1 Escort Vessel. 1 Tug.
October ..	5	6,693	3	6,189	4	5,632			
November ..	6	18,716	1	307	6	11,063	2 Armed Coasters. 1 Trawler.		
December ..	8	16,489	4	5,808	9	28,673	1 Trawler Type Auxiliary.	—	
Totals ..	49½	144,278	17	30,968	39	84,426	60	67	180

(C55060)

SUMMARY BY YEARS

Year.	Merchant Vessels.						Naval and Other Vessels.		
	Sunk.		Seriously Damaged.		Damaged.		Sunk.	Seriously Damaged.	Damaged.
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.			
March-December									
1941 ..	33	100,074	33	82,455	69	264,941	4	4	21
1942 ..	28	67,731	24	64,894	83½	266,557	—	1	3
1943 ..	21½	95,737	10	32,965	19	61,645	3	14	36
1944 ..	49½	144,278	17	30,968	39	84,426	60	67	180
Totals ..	132	407,820	84	211,282	210½	677,569	67	86	240

Note.—Fractions indicate cases where the assessment is shared with surface forces.

IV. SPECIALIST AND GENERAL ARTICLES

Norwegian Squadrons in Coastal Command

When the Germans invaded Norway on April 9, 1940, the Norwegian Air Forces were too small to put up any considerable resistance. They were unable to stem the overwhelming masses of hostile aircraft which attacked their country by day and night. They were beaten, as a force, but some of their officers were able to escape from Norway to Britain during the spring of 1940. They had gone on operating in Norway until lack of petrol forced them to withdraw to British bases. They flew over four Heinkel 115's, four MF 11's (Norwegian built) and one captured Arado 196. Stations of Coastal Command welcomed them.

These Norwegians immediately began the immense task of rebuilding and reorganising their Air Forces, with the valuable help of the experience gained from war in Norway and on the Continent.

The recruiting question was difficult at first. But a steady flow of young Norwegians began to cross the North Sea in all sorts of craft. Many of them crossed the Swedish border and began their long journey around the world. They all met in Canada where a Norwegian Training Centre had been created. From a joint manning pool they were distributed to the Norwegian Army Air Force, which was concentrating on single-engined fighters, and to the Norwegian Naval Air Force, which trained first on floatplanes and later on multi-engine aircraft.

330 (N) Squadron

The Naval Air Force were equipped with Northrops and trained in Toronto and Vancouver, and when finished, were sent to Iceland. Here on April 25, 1941, they established the first operational Norwegian Squadron, 330 (N), with 100 per cent. Norwegian aircrews and 80 per cent. Norwegian ground crews. This was one year after the Germans had invaded their country. To say that they were trained and operational within a year dismisses a fine achievement in a few words. Anybody concerned with training knows the amount of hard work which lay behind this. It was a programme of difficulty, improvisation, and boundless enthusiasm. The men had first to get out of Norway. Then came the difficulties of organisation. Then the endless conferences and dealings with the British and Canadian Governments and with the R.A.F. Then the setting up of the Training Camp and the planning of the training, getting instructors and equipment, and endless hours of work. All this was built from nothing, without foundation or framework.

In Iceland, 330 (N) Squadron was given the task of providing air protection against a possible German attempt at invasion. They also took part in the Battle of the Atlantic. They were equipped with Northrop floatplanes and as this aircraft is not well known, a brief description may be useful.

The Northrop was originally designed for Norwegian coastal defence in close co-operation

with Norwegian Naval and Coastal Defences—not for extensive navigational flights across the ocean. It was a patrol bomber with a crew of three. It had a single engine and two floats, and at the time it was the fastest war seaplane in the world—powerfully armed with four 0.5-inch guns fixed in the wings and two 0.3-inch rear guns, flexible, pointing aft, one on the dorsal and one in the ventral. It could carry a load of almost one ton of bombs. This powerful aircraft had a cruising speed of about 150 m.p.h., and with this speed it could stay in the air for seven hours, fully operational loaded. The top speed at the most favourable height, 3,000 feet, was about 255 m.p.h. It could be used for practically any job demanded of a seaplane and although it carried two heavy and solid floats, it was a match against most bombers and reconnaissance aircraft of its time. It had dual control so that in emergency the navigator could take over flying to relieve the pilot, or make an emergency landing when the pilot was unable to do so himself.

When the Northrops began operations from Iceland, the airfield at Reykjavik was still being constructed, and the aircraft were therefore especially useful and necessary for the defence of the island and for the protection of Atlantic convoys. There were few other operational aircraft available in Iceland during the spring of 1941.

330 (N) Squadron was organised in three flights; A-flight, of 6 plus 2 aircraft was stationed in Reykjavik with the squadron headquarters; B-flight of 3 plus 1 aircraft was set up in Akureyri. C-flight was established in Budareyri, at the end of Reydarfjord on the east coast. From these bases the Norwegians flew their Northrops, built and tested in California. They flew them over the Arctic Ocean and the Atlantic, between Greenland, Iceland, Jan Mayen, Faroes and the British Isles, often 300–400 miles from land. (See Plate 6.)

During two long years they flew in snow storms, rain, fog, icing conditions and frequent gales of hurricane force in the fjords. In winter there were sometimes icefloes in the fjords from which the aircraft operated. They protected convoys in the Atlantic, or to and from Russia, and shipping along the coast of Iceland. Careful navigation, with limited facilities, was necessary when the task was to find a convoy whose position was uncertain, hundreds of miles from land, in strong and changing winds and low visibility.

Several hundred patrols were flown to guard shipping from the ever-growing menace of U-Boats and the Battle of Atlantic was being fought from both sides; a long, bitter, but decisive battle in which the Norwegian squadron played its part.

On the north and east coasts the Northrops were used as fighters and many patrols were flown to intercept the German long range aircraft, FW.200, Do.217, B.V.138, sent out for shipping and weather reconnaissance. Radar and other equipment for



A typical landfall on the Norwegian Coast. The still was from a film taken by an R.A.F. Film Unit cameraman flying with the Banff Wing.



The top photograph shows a Northrop of C. Flight, 330 (Norwegian) Squadron, coming up the beach at Budareyri, Iceland, in the winter of 1942.

Corbett Camp, near Reykjavik, is shown in the lower photograph. This station was used by the Royal Norwegian Air Force till the beginning of 1943. (See letterpress, page 18.)



detecting and reporting approaching hostile aircraft did not exist on the north and east coasts of Iceland and this made interception difficult. Nevertheless, eight big aircraft were engaged and damaged by Northrops, among them the four-engined FW.200. Others were driven off.

The Navy wishes to know about ice-formations and ice-limits in the Denmark Strait between Iceland and Greenland, and many ice-recco patrols were flown by the Northrops during the short winter days.

The Northrops were also used for other jobs, such as a communication link between the armed forces spread over Iceland, as an ambulance aircraft and sometimes even as supply aircraft. They thus helped to streamline the defences of Iceland, by decreasing the transport and communication difficulties on the island where cross-country roads were scarce and railways did not exist.

The squadron had no hangars, so the Northrops had to remain in the open through all kinds of arctic weather. The ground crews therefore had a hard job in keeping the machines serviceable in the wet, cold climate. They deserve the highest praise for having done so.

In the spring of 1942, 330 (N) Squadron was equipped with Catalina Amphibians in addition to the Northrops. The instructors had a busy time training aircrews for this flying boat type, because the change over was made while the squadron was operating with the Northrops.

Six Catalinas, one with a British crew, were ready for operations in the summer, and they provided convoy escorts and anti-submarine sweeps in the Atlantic and the Arctic Sea. The squadron's operational area was then enlarged, and more and more monotonous sea-surface was covered by day and night. The Norwegian Catalinas were then flying several hundred miles into the Arctic Sea to protect large and valuable Russian convoys, which were repeatedly attacked by U-Boats and torpedo-carrying aircraft during the summer of 1942.

During the autumn of 1942 it was decided to convert 330 (N) Squadron to Sunderlands, and in the first winter months one after the other of the Catalinas flew from Iceland down to the mainland to be delivered. The remaining Northrops were concentrated at the station on the east coast, Budareyri, where a detachment operated until May, 1943. The main force of the squadron went to Oban in the last days of January. Two of the senior officers were qualified as Sunderland instructors and they checked out all the other pilots during the winter.

There was intense training, in the air and on the ground, for all categories of aircrews, and on April 17, 1942, the first Norwegian Sunderland took off from Oban for anti/U-Boat patrol in the Atlantic. This sortie began a new phase in the history of 330 (N) Squadron. From then on the squadron went into the "heavy-weight" class of four-engine aircraft.

One after the other of the crews became ready for operations and detachments in Northern Ireland and Shetlands to operate from these forward bases.

(C55060)

Towards the end of June, 1943, the whole squadron moved again, to Sullom Voe, a slow but gradual approach towards their home country. From the new base the Norwegian Sunderlands flew mostly in the Northern Transit Area, and in the autumn and winter 1943-44, they made patrol after patrol in the famous but boring "Rosen-garten," between the Faroes and Iceland.

As is well known, the Germans increased their U-Boat efforts before and after D-day, in the area between Shetlands and Norway. But Coastal Command was ahead of them and had already shifted patrols to within sighting range of the Norwegian coast. These patrols paid a rich dividend in U-Boat sightings, attacks and kills, but they demanded a heavy toll of aircraft within range of the Norwegian-based German fighters. 330 (N) Squadron had both their victories and their losses in this battle, which still goes on.

333 (N) Squadron

333 (N) Squadron, the only one of its kind in Coastal Command, consists of two flights with two types of aircraft, engaged in widely different types of duty. "A" flight operates from Woodhaven with Catalina flying-boats on anti/U-Boat patrols, convoy escorts, transport and special operations. "B" flight operates from Banff with Mosquito aircraft used for reconnaissance along the Norwegian coast.

To-day there are four Catalinas at Woodhaven, "Vingtor II," "Jøssing II," "Viking" and "Ulabrand." "Vingtor II," the successor of "Vingtor," is named after the ancient heathen viking god, Tor, the god of thunder who rode a wagon drawn by two rams. "Vingtor" was the oldest flying boat on operations after it had done its two years of service at Woodhaven. It had already served one year of operational flying at Gibraltar before 333 (N) Squadron took it over. After these three years of valiant service the aircraft was transferred to a training unit.

"Jøssing II" is named after the Norwegian patriots, who after the Nazis invaded Norway invented the name Quislings for the Norwegian traitors and collaborators, and these in turn named the patriots "Jøssinger." "Jøssing" also had a long tour of duty in the squadron, more than two and a half years, before it ended its days at Woodhaven on May 17, 1944. This was Norwegian Independence Day and appropriately, on that day "Jøssing" attacked and seriously damaged a Nazi U-Boat. But the aircraft was hit by a cannon shell, and shrapnel riddled the fuselage so that while it was landing at Woodhaven, early in the morning, it sank and was a complete loss.

"Viking" is named after the old Vikings of Norway who used to raid this country. There is a story running in Norway to-day regarding the Vikings.

A group of German officers were admiring the famous old Viking ships at a museum near Oslo. "So you like our Viking ships, do you?" a small boy asked. "Yes, it is magnificent," came the answer, "Wunderbar." "Well, we used to take England every spring with such boats."

"Ulabrand" is named after Norway's best known coastal pilot, an appropriate name for a flying boat which flies along the coast of northern Norway.

There are six Mosquitos at Banff, engaged in reconnaissance of the Western Norwegian coast, from Lindesnes in the south to the Trondheim Fjord in the north. They are occasionally engaged in anti U-Boat patrols, or as a striking force on U-Boats in the Norwegian shipping Leads. Lately, the Mosquitos have been used as outrider and leader aircraft for striking forces of Beau-fighters and Mosquito squadrons. Thus, one or two Norwegian Mosquitos go out to reconnoitre the lanes and after reporting a sighting, the strike force goes out, led by one Mosquito to take them in for attack. With their knowledge of the coast, it is easy to approach the target, avoiding coastal batteries and flak positions as much as possible.

It has taken a long time to build up 333 (Norwegian) Squadron. As far back as February 8, 1942, Norwegian Detachment, Woodhaven, was founded. One Catalina flying boat, the "Vingtor" was engaged in special duty trips. A number of Catalina amphibians also passed through Woodhaven, during the first year, but after a short time of service, they were passed on to Iceland for operations with 330 (N) Squadron. Towards the end of the year "Jøssing" arrived and training of torpedo dropping from flying boats was begun. It was considered worth while trying out this scheme, attacking enemy supply ships in the

Leads north of Trondheim, where they least expected interference. After many months of training, operations were begun early in 1943, but without any success, and the scheme was abandoned.

On February 11, 1943, 1477 (N) Flight was formed with three Catalinas at Woodhaven. Operations were mainly switched to anti U-Boat patrols and convoy escorts, working mostly together with 210 Squadron, Sullom Voe.

Preparations were made to enlarge the flight with a squadron and "B" flight with Mosquito reconnaissance aircraft was set up at R.A.F. Station, Leuchars. A couple of months elapsed, converting the pilots to landplanes and training of WOP/NAV. was begun. Finally, on May 10, 1943, 333 (N) Squadron was a fact and now they can look back on more than 4,500 flying hours on anti U-Boat sweeps, reconnaissance, convoy escorts, ice-reconnaissance strikes and special duties. They have had many engagements with the enemy and have had a favourable number of victories over aircraft and U-Boats.

During these years of war 333 (Norwegian) Squadron's motto has been: "For King, Fatherland and the Honour of the Flag." The squadron has lived up to this motto.

A Forced Landing in Sweden

(The following Report was made by the Pilot of the aircraft.)

I was pilot of a Halifax engaged on anti-shipping patrol in the Skaggerak and Kattegat. On the night of January 13, 1945, we took off and set course for the patrol area at approximately 1450 hours. On the way to the area the radio altimeter became unserviceable and could not be repaired.

At 1750 hours we reached our position and began to search for enemy shipping. We obtained several contacts, which proved on investigation to be fishing vessels. There were several big fog patches which prevented identification of other contacts.

At approximately 1940 hours, whilst flying on a northerly course, about 20 miles north-west of Gothenburg, we were illuminated from above by four parachute flares, and immediately afterwards met intense and accurate light flak from several ships. To avoid this I dived the aircraft to 450 feet and turned to port. Boost was +4 and r.p.m. 2,000. Whilst turning, the aircraft sideslipped to port and I felt the power going from the port engines. The port outer boost dropped to 0 and the r.p.m. to about 1,000. The port inner revs. dropped to zero, but the boost remained normal. This was due to hits by the light flak. I levelled the aircraft laterally and pulled back the control column, but the aircraft continued to sink and the rear portion of the aircraft hit the water, tearing off the S.E. cover and half the port fin and rudder, and part of the starboard fin and rudder. Thinking we were going to ditch, I had throttled back, but the aircraft rebounded into the air. The second pilot opened the throttles and pitch to full, while I trimmed. The S.E. operator reported that there had been an explosion in the S.E. aft of the rear spar, and that it had

blown a large hole in the roof of the aircraft and started an intense fire, from the mid upper turret to the rear parachute exit. He was attempting to put it out. I ordered the wireless operator to send S.O.S. and put I.F.F. to distress. After about four or five minutes the S.E. operator succeeded in putting out the fire with the help of the engineer.

By this time, I had climbed to 1,000 feet and the aircraft was vibrating badly. I levelled out and was told that the fire had broken out again, this time with more severity. I ordered the gunner, S.E. operator and engineer to put the fire out, and the navigator gave me a course for base. We encountered more flak and I took what evasive action I could. The fire burnt for about ten minutes before it was under control, and eventually completely extinguished by the rear gunner using the contents of the Elsan.

I climbed to 1,500 feet and we inspected the damage, which was as follows:—

- (1) Port inner u/s., so this was feathered.
- (2) Port outer working, but doubtful as to whether it was giving full power, the oil pressure being down to 40 and the temperature high.
- (3) D.R. compass u/s.
- (4) Transmitter u/s.
- (5) Gee u/s.
- (6) Radar u/s.
- (7) A.S.I. and gyro horizon u/s.

Owing to the doubtful condition of the port outer, I decided to set course for Gothenburg and land there. I climbed to 2,000 feet, which was as high as the aircraft would go and a few minutes

later we saw the lights of Gothenburg and flew towards them, over the sea. We met more flak and jettisoned our bombs. I ordered the crew to destroy all secret equipment and documents and throw them overboard. I then flew near Gothenburg harbour, and we were fired upon by light and heavy flak from the shore defences. This was not very accurate, so I put on my identification lights and fired distress cartridges and flashed S O S. Four searchlights were put up and we were caught temporarily in one of them. There were no lights in the estimated position of the aerodrome, so, after three attempts to find it, I flew out to sea again. As I had no A.S.I. and the altimeter was probably not reading correctly I decided to bale out the crew over Sweden. I ordered them to stand by to bale out and flew inland for four or five minutes. The vibration became worse, the port outer failed, and the aircraft started to break up, so I ordered the crew to abandon aircraft.

When down to 1,000 feet I noticed that I was heading towards a lot of lights which I thought must be the suburbs of Gothenburg. With great difficulty I managed to turn away from the lights and saw the top of a hill ahead. I pulled back the control column and the aircraft mushed over the hill, through some high tension wires, hit a tree and plunged into a river, breaking the ice on impact. I was thrown forward and hit my head several times on the cockpit framing, and my legs on the bottom part of the instrument panel. I released myself and stood up in my seat, the hatch having previously been jettisoned by the

second pilot, and collapsed into the river. I had great difficulty in getting out of the river as I found myself alongside a big tree trunk about 4 feet in diameter, but eventually I managed to haul myself over this and fell on the river bank. I thought I heard a moan from the direction of the aircraft and tried to find it. I began, with great difficulty, to climb back over the tree, but on hearing voices behind me I shouted "Stay where you are! I'll get help!" I started to shout at some people who were standing about 50 yards away. They helped me into their house and laid me on the floor, and I explained to them that I had some comrades in the aircraft. The men appeared to understand and went away. The women dressed my wounds and a fireman arrived, who spoke English. He said that they had only recovered one body, and were applying artificial respiration and he thought he was all right, or would be.

I was given clean clothes and put to bed. The Police Chief arrived and said he would inform the British Consulate-General at Gothenburg. Later an army officer arrived and took my number, rank and name. I told him there were no bombs on the aircraft. I was taken in the ambulance to the police station at Landvetter, where I found the other members of the crew. They told me that the unknown occupant of the aircraft was the engineer, and that he had since died.

We were then taken to hospital in Gothenburg, where we were given medical treatment and put to bed.

Telling the Time by the Stars

No apparatus is needed for this exercise except a good memory, a head for figures, and the ability to recognise the Pole star and the "Pointers of the Plough." The local navigation officer may be able to help over the latter.

Imagine that the Pole star is the centre of an enormous 12-hour clock face, and that the Pointers are the hour hand of the clock. There is no minute hand, of course, but a little practice with an old alarm clock enables one easily to tell the time quite accurately from the hour hand alone.

Facing the Pole star, "tell the time" from the Pointers, to the nearest quarter-hour, as if from an ordinary 12-hour clock; multiply this by two (to transfer it into the 24-hour system); and subtract from 2400 hours. The final answer is what the time would be if the date were March 7.

This might seem to restrict the use of the process to one particular night of the year. The difficulty about the date arises because the sun and the stars do not appear to "go round the earth" at the same speed. The sun completes the circuit in 24 hours on the average, and is in fact the original 24-hour clock; but the stars get round a bit quicker, and manage to do the journey in some 23 hours 56 minutes and 4.091 seconds. It so happens that at midnight

on March 7, the Pointers of the Plough appear to stand vertically above the Pole star in the position that the hour hand of an ordinary clock would occupy at midnight, and the star clock is then "right" with the sun.

The reason for multiplying the time "as told" by two is simply because the stars are a 24-hour clock. One could, of course, tell the time as from a 24-hour dial; but since there is no minute hand to complicate matters, it is far easier to pretend that it is a 12-hour dial, tell the time accordingly, and multiply the answer by two.

The reason for subtracting the answer from 2400 hours is not quite so obscure. Patient watching of the heavens will convince almost anyone that the Plough appears to move around the Pole star in an *anti-clockwise* direction; so that in addition to the Pointers being a "24-hour-clock-that-gains-four-minutes-a-day," the clock is also going backwards. Admittedly, it is quite possible to tell the time as from a 24-hour "Looking Glass" clock; but it is really far simpler to carry out the directions given above.

Now comes the difficult bit. As the date probably isn't March 7, and it might be a laborious business trying to work out how many four minuteses the heavenly clock has gained, the

following procedure is adopted instead. For each month *after* March, *subtract* two hours; for each month *before*, add two hours. Thus, if the date were May 7, and the time worked out at 2330 hours after doing the multiplication and subtraction, four hours must be subtracted to allow for the date, making the real time 1930 hours. Similarly, if the date happened to be December 7, six hours must be added, making the time 0530 hours.

This only gives the time if the date happens to be the seventh of the month; but it is possible to get a little closer. For each week *after* the seventh of the month, *subtract* half an hour. In

the examples quoted above, if the date were May 21, the true time would be 1830 hours; if May 14, 1800 hours, and so on. Likewise for December; if the date were the 28th, the time would be 0400 hours instead of 0530. If it were December 1, half an hour would be added, making it 0600 hours.

One further warning—all times thus told are in local mean time. In England, this is nearly enough Greenwich mean time, and all that is needed is to add an hour to get British summer time. But if you're out in the middle of the Atlantic somewhere—better ask your navigator for the longitude.

A Perfect Ditching off the Portuguese Coast

(This account was written by the Navigator of the aircraft, Halifax Q/520.)

We were airborne at 0125 hours on November 24 on a shortened "Nocturnal" meteorological sortie to position 9. After levelling out at 1,800 feet the second pilot took over the controls, and the captain took up a position in the astro dome taking bearings on the marine lights along the Spanish coast, whenever visible. At position 3 we descended to 200 feet to take the first sea-level pressure, and after regaining patrol height, obtained a good fix on St. Vincent Light. Shortly after, the engineer got a star sight which gave me a good ground speed cut, and subsequent Consol position lines from Seville (although not too reliable), gave a check on the Track. At position 6 we took our second sea-level pressure, and soon afterwards the cloud above began to break, and the second pilot was able to obtain two astro shots before cloud again obscured the sky.

At approximately position 8, the cloud again cleared, and I was able to obtain a perfect three star fix which put our position ten miles north of our D.R. Using this fix, I gave an alteration of course from position 9, and, at approximately 0450 hours, after taking our third sea-level pressure we began to climb up and down track to 500 mbs., levelling out every 50 mbs. to enable the meteorological observer to take his readings. We levelled out at 500 mbs. (18,300 feet) and as soon as the last meteorological reading had been taken we set course for base, descending along track to 10,000 feet to conserve our oxygen supply.

At approximately 0605 hours when at 10,000 feet, the starboard outer engine developed trouble in the constant speed unit, and had to be feathered. The wireless operator immediately sent a WJR signal to base giving our position, which I had passed to him. The captain then gave the order to jettison all the ammunition, and spare flame floats, and decided to continue at 10,000 feet to base.

Base had acknowledged our WJR signal and requested us to send our position every 20 minutes. At 0635 hours our second MTB was sent giving our position, track, ground speed and ETA base. I then began a series of astro shots to fix our position more accurately, and with the first sight I obtained a good longitude P/L from Jupiter. Whilst I was taking a second shot the aircraft

swung violently, due to the port outer engine suddenly cutting without any warning whatsoever. I continued taking the shot, and when the second pilot had steadied the aircraft, I began a third shot. This, however, was taken with difficulty, as the port inner engine began to vibrate rather badly on being opened up. We were losing height at approximately 200 feet per minute. Immediately the second engine had cut, the wireless operator originated a third MTB at 0640 hours, informing them that numbers 1 and 4 engines were unserviceable and number 2 was doubtful, also giving our height and ground speed.

The captain then gave orders to jettison the remaining flame floats and any other non-essential equipment. The other two wireless operators did this by jettisoning all the flame floats, spare radio receiver and transmitter, power packs, and also the Radar transmitter, as this was unserviceable owing to the loss of the starboard outer engine.

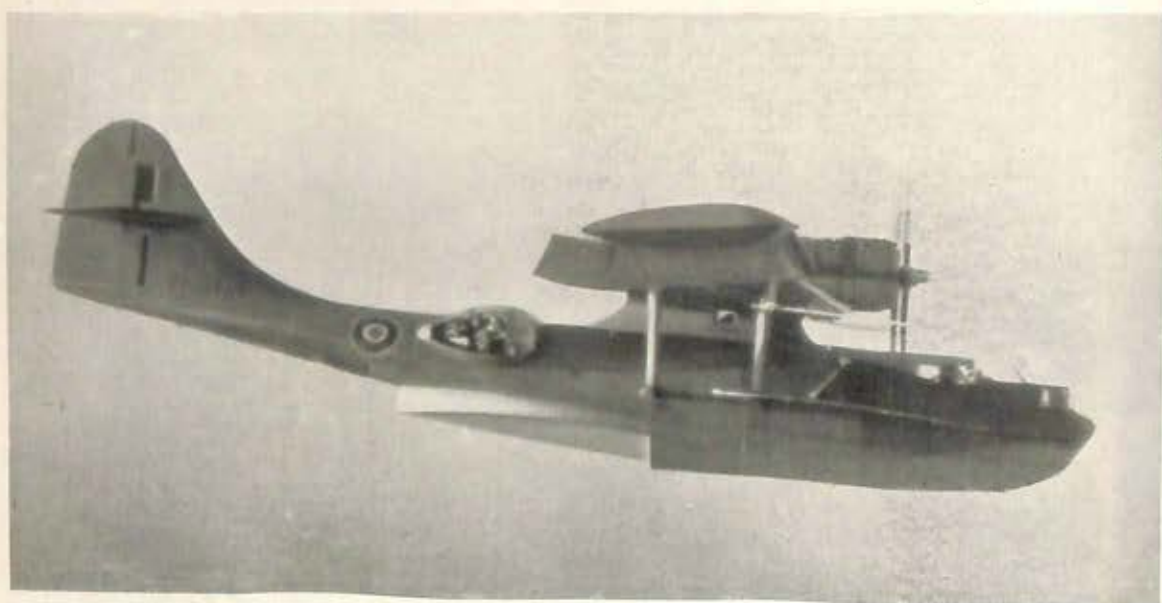
Meantime, I worked out the astro shots. The first and third shots fixed our position ten miles ahead of my D.R. position, whilst the second shot I discarded, being approximately sixty miles north. I used this second star fix to amend our position, and at 0700 hours passed an MTB to the wireless operator giving our latest position, track, ground speed and height. The port inner engine was still vibrating badly, so the second pilot throttled back to conserve it, although we were still losing height and the IAS had dropped to 110 knots. At 0705 hours the captain decided that it was very doubtful if we could make base, and therefore he altered course to make a landfall on the Portuguese coast, hoping to be able to land at Lisbon.

An MTB to this effect was sent, giving an alteration of course and ETA Lisbon of 0805 hours. Immediately afterwards an SOS was transmitted giving our position, course and speed. Our height was now 5,000 feet.

The captain took over the controls and at 5,000 feet we were running into the tops of 10/10 cloud. At 0720 hours a further SOS was sent, giving our position as being amended by the A.P. 1. Five minutes before ETA landfall, we



These photographs show the rescue of a crew from a ditched Halifax off the Portuguese coast on November 24. In the top photograph the ditched aircraft can be seen. The middle photograph shows the crew in their dinghies. The Portuguese trawler which rescued the crew can be seen in the bottom photograph. (See letterpress, page 22.)



The top photograph gives a side view of a Liberator, the excellent facilities of this beam lookout position have never been fully used by visual lookouts. In the middle photograph of a Catalina it can be seen how the flight engineer can make a valuable addition to the beam lookout from his window. A number of sightings have been made by the lookouts from the galley hatch of Sunderlands. A side view of one is shown in the bottom photograph. (See letterpress, page 24.)

were still in 10/10 cloud and so turned on to a course of 320° to avoid the possibility of crossing over the land.

This alteration, of course, was not sent to base because I expected to sight marine lights on breaking cloud which would enable me to fix our position.

At approximately 0740 hours we broke through the cloud at 1,500 feet and although there were still some patches below us, we could see a marine light flashing over on our starboard bow. I identified this as Cape Espichel, and passed a position taken as a rough bearing and distance from the light, to the wireless operator. Unfortunately this position was not picked up by base probably because of our distance and low height. We learned later that a Spanish merchant vessel which was near that position, did pick up the message on 500 kc/s.

The port inner engine was now vibrating very badly, and the captain decided that it would be better to ditch the aircraft as soon as possible on two engines, than have the possible risk of having to do so on one. Accordingly he ordered the whole crew to ditching positions. The wireless operator clamped the key down before he came back to his position.

Dawn was breaking and the captain was just able to see the swell on the sea. He turned to put the aircraft in, along it, giving a running commentary of his actions over the inter-com.

Just before we hit the water those crew on inter-com. warned the remainder to brace themselves and prepare for impact. At approximately 0750 hours, after what seemed an eternity, the captain ditched the aircraft perfectly, not one of the crew being moved from his position on impact. The nose immediately broke off, and a large wave swiftly rushed through the whole length of the aircraft. A shower of water which entered the front and rear emergency escape hatches, threw the first two of the crew who were already clambering out, back into the aircraft.

After this first inrush of water no more seemed to enter and even when everyone was out of the aircraft, there was only about 4 feet of water inside.

We salvaged six K type dinghies, two parachutes, dinghy radio and kite, etc., along with two large ration containers, a pair of binoculars and the camera, and also the Nav. bag. The sextant, which I had placed ready to take out with me,

had been washed to the rear of the aircraft by the first inrush of water, with our diversion bags in which we had packed our ordinary operational sandwiches, etc.

The impact must have broken a petrol pipe line as the fuselage was soon filled with petrol fumes, and a wireless operator who went back into the fuselage to salvage more kit was so overcome by these fumes that he had to be helped out of the rear escape hatch in an inebriated condition. On being put into the large "Q" type dinghy, he completely passed out for a few seconds. Under these conditions, it was inadvisable to stay too near the aircraft, so we cut loose the dinghy and paddled about 30 yards away.

Two lights could be seen in the distance, one to the north, and the other to the east. As it became lighter we identified these as two ships. We fired a red Very cartridge every five or ten minutes in order to give our position if we had been sighted by either of the ships.

There was a heavy swell running which lifted the dinghy 15 to 18 feet. This made a few of the crew sea sick for a short time. Meantime the six "K" type dinghies had been blown up and we fastened them to the "Q" type. Into these we transferred part of our equipment. There was a good deal of water in the dinghy so we baled, one of the crew using a boot for the job. Another member of the crew, a wireless operator, took some photographs of the aircraft in the water with the K.20 camera we had salvaged.

About an hour after ditching, one of the ships which we had sighted could be seen heading in our direction, and after spending 1 hour 40 minutes in the dinghy, we were picked up by this ship approximately 20 miles south-west of Lisbon. It turned out to be a Portuguese fishing trawler, and so we dumped everything into the sea, except the dinghies, binoculars and camera. One of the wireless operators, being first on the trawler, took some more photographs of the crew being helped aboard (see plate). He then unloaded the camera, and handed the spool of film to the air attaché at Lisbon when we finally arrived there.

The crew of the trawler attempted to tow the aircraft into Lisbon, as it was still floating quite well, but after their first attempt the aircraft sank, having floated for 2 hours 40 minutes. The trawler then landed us in Lisbon, where we stayed for four days before we finally got a passage on an aircraft back to Gibraltar.

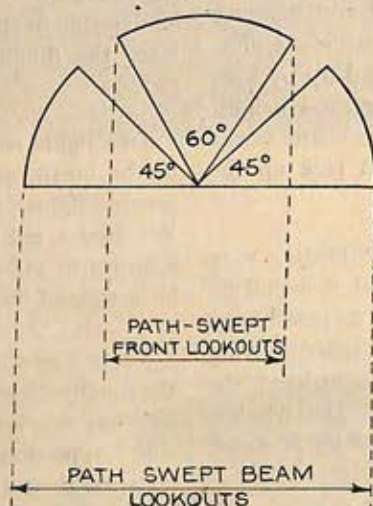
Beam Lookouts

A study of visual sightings over the past few years shows that, to increase the efficiency of lookouts, attention should be paid to improving scanning on the beams. The way in which beam lookouts can supplement the forward lookout is shown in *Figure 1*. It should be noted that while the size of the sector scanned by the front lookout

has a great effect on the path swept, this is not so on the beam.

Unfortunately the design of the aircraft is such that the beam lookout is unlikely to be very active unless a special effort is made to overcome the difficulties.

Figure 1



THE IMPORTANCE OF BEAM LOOKOUTS

The lookouts who see most targets are those in the nose and in the cockpit. This is partly due to the fact that they are facing forward and have on the whole a fairly unobstructed field view, and partly because they have other jobs to do which require them to keep a good lookout (e.g., the pilot is flying the aircraft).

The disadvantage of these positions is that the field of vision is restricted on the beams (*i.e.*, nose lookouts do not pick up many targets more than 40° from dead ahead) and while the pilots can see round on the beams, this requires a special effort as they are facing forwards and in most aircraft the beam windows in the cockpit either do not open far enough or when closed are so scratched that little can be seen through them.

The rear gunner cannot be expected to see many U-Boats or Schnorkels, mainly because he is facing aft and others can see the targets before him, and furthermore his beam lookout is restricted in much the same way as that of the nose gunner.

The mid-upper turret when manned, although capable of rotating through 360°, is not a suitable position for searching on the surface of the sea because part of the fuselage restricts the field of view.

It is from the front lookout positions that the majority of sightings of Schnorkel have been made; in fact 25 of the 30 shown in *Figure 2*. Of the remaining five only one was made from a beam lookout position.

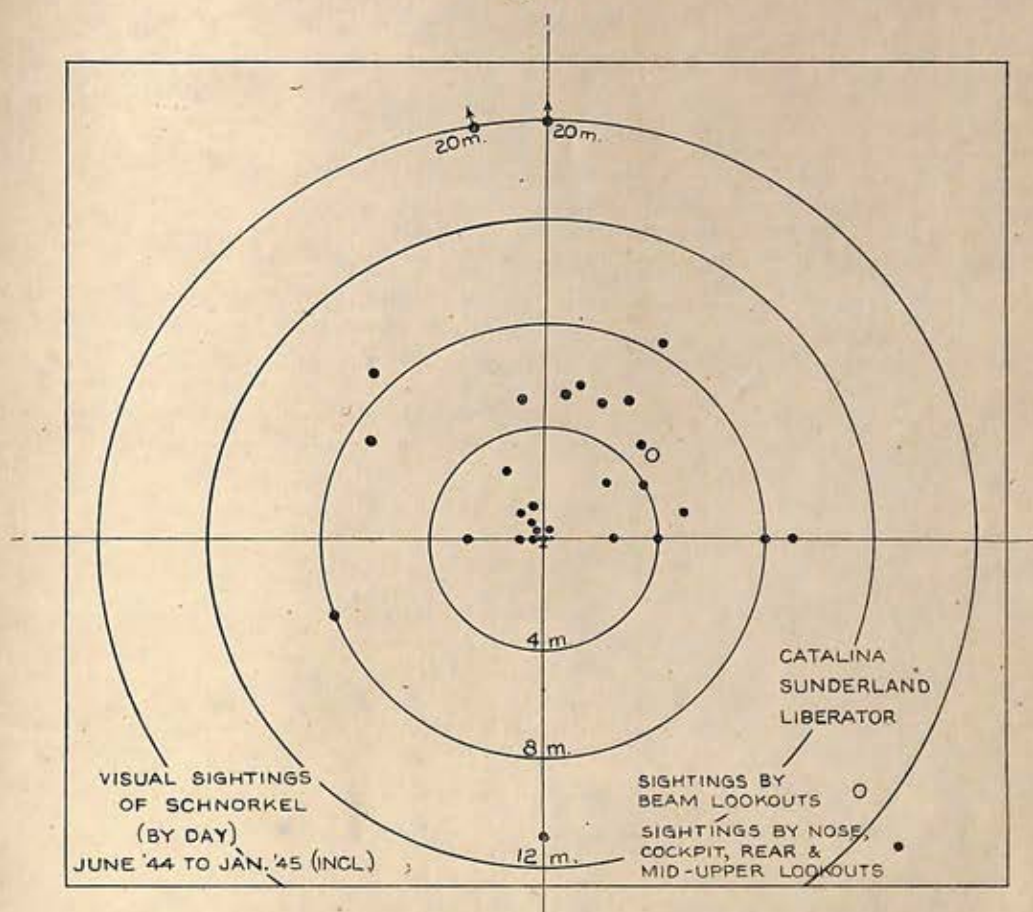
This means that three members of the crew, the nose lookout and the two pilots, are responsible for over 80 per cent. of the sightings. To improve the efficiency of visual lookouts by increasing the watch on the beam clearly cannot be done to any great extent by improving the lookout kept from the front positions as the very nature of their positions makes scanning on the beams difficult. Improvement can only be attained by establishing active beam lookouts in other parts of the aircraft manned by other members of the crew.

Beam Lookouts in Liberator, Sunderland and Catalina aircraft

Of the three aircraft illustrated in Plate 8 the Liberator has the best beam lookout positions. When the side windows are open, the lookout has a clear view over a wide angle. It is the intention of the Command to carry out modifications of the seat and provide warm clothing so that this position can be manned at all times. Captains should take steps to keep this position manned, and if binoculars are used then this additional lookout will, more than any other measure, improve the efficiency of visual search.

In the Sunderland the facilities for keeping a beam watch are very poor, although sightings have been made by lookouts at the galley hatch. Attempts should be made to man some beam lookout position, even a porthole would be valuable.

Figure 2



In the Catalina, the blister is the principal lookout position on the beam. The flight engineer can keep a watch in this direction, though proper scanning is difficult from his position. In spite of this, many objects on the sea have been sighted by the flight engineer which otherwise would have been missed.

The Technique of the Beam Lookout

The beam lookout has a much simpler task than the forward lookout because he need not scan over a wide arc. It is recommended that he should scan from dead on the beam forward as far as he can up to 45° . He must scan forward of the beams, for U-Boats or Schnorkel will tend to dive before they pass the beam of the aircraft.

When scanning, the lookout should always scan forwards, whether sweeping with the naked eye or with binoculars. By scanning against the passing scene the lookout will cover a much wider area of sea in a single sweep than if he scans from ahead back to the beam.

The beam lookout should use binoculars and a holder, scanning his sector in sweeps of one minute duration.

The aircrew manning the beam lookout positions may also be taking turns to watch the Radar or W/T set but a change is nearly as good as a rest. It should be remembered that with the appearance of the Schnorkel, the work of the Beam Lookouts has become of vital importance.