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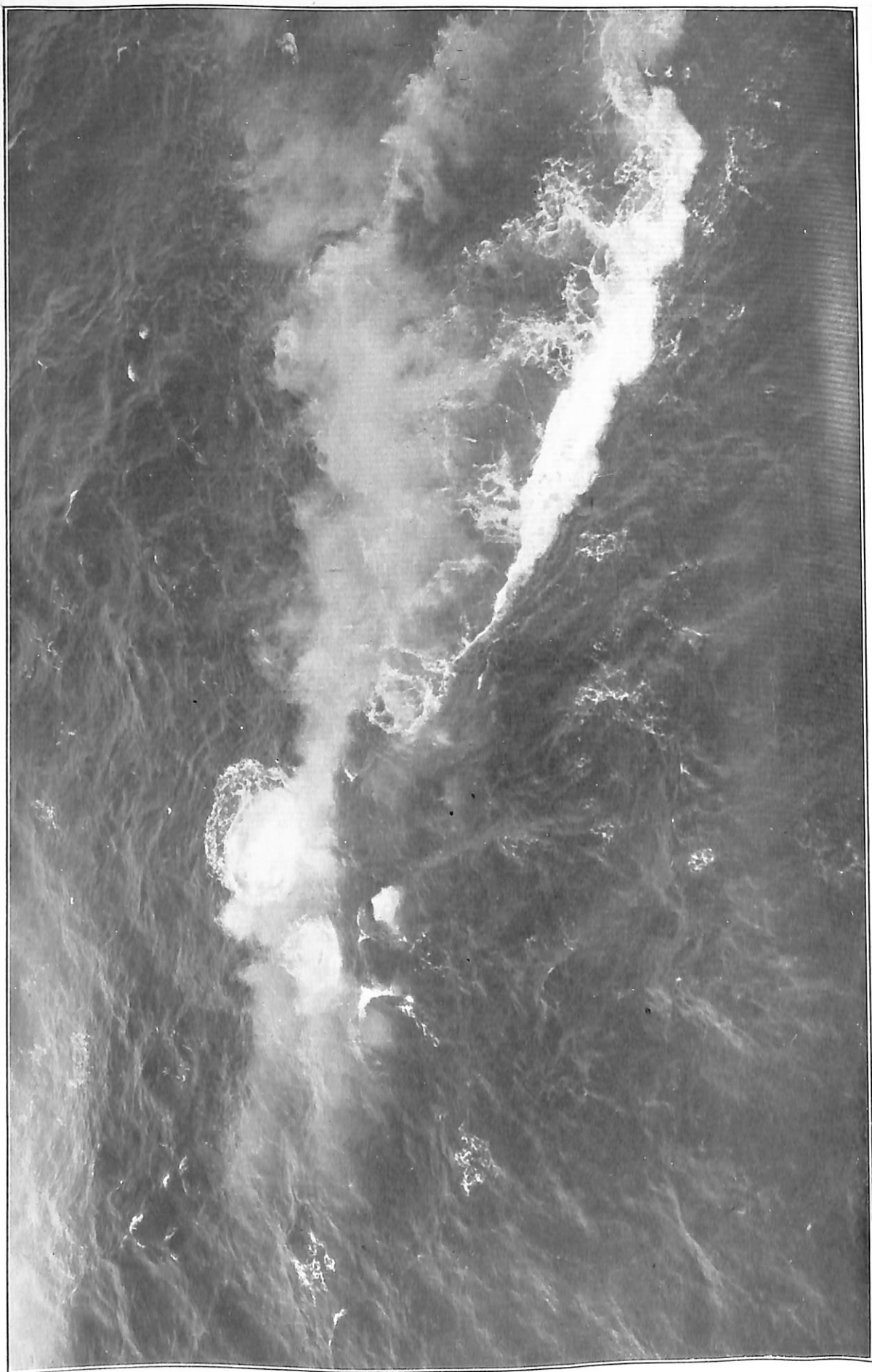
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COASTAL COMMAND REVIEW

February, 1943

No. 10

HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE



SWIRL OF DIVING U-BOAT. No. 2 U.S.A. A/S SQUADRON. See letterpress, page 10.

COASTAL COMMAND

Editorial—February, 1943

The high-lights of the month have been the recrudescence of a relatively large number of U-Boat sightings, 77 having been reported as against 33 for January, and the successful co-operation between Air and Naval Forces which resulted in the sinking by the latter, on the 26th, of an inward-bound tanker, which was trying to run the blockade. Photographic reconnaissance has established that the Heavy Cruiser "Hipper," last seen on 23rd January, has left Norwegian waters and is now in Wilhelmshaven, but she was not sighted in transit.

2. The unsettled and stormy weather of January continued during the first half of February, with correspondingly poor operational and photographic reconnaissance conditions except at Gibraltar, and at first in Iceland. In the third week a large anti-cyclone developed from the Azores to central Europe, whereupon, in the south, operational and photographic reconnaissance weather improved, though the latter was interfered with at times by fog on the Continent. Stormy conditions persisted north of latitude 55° N., for the remainder of the month, with a series of depressions, accompanied by much low cloud and precipitation moving north-east from South Greenland across Iceland. Temperatures remained much above average for the entire area throughout the period.

3. While the number of sorties for the month is slightly lower than in January (3,151 as against 3,262) the total operational flying times have fallen but little (19,440 as against 19,525 hours) due to an increase in the number of long-range aircraft, which has brought the average duration of sorties up to 6 hours and 10 minutes. In looking at these figures, it must be remembered too that February is three days short of a full month, and the average number of sorties per day, 112.5, as compared with 105.2 for January, would in a 31-day month have given some 3,400 sorties and a flying time of the order of 21,000 hours.

4. Adopting the breakdown system into types of task which was introduced in Issue No. 9, we get the following figures:—

	February.	January.
Anti-Submarine Patrols	1,226	1,430
Anti-Shipping Patrols.. .. .	370	447
Interceptor Patrols	130	119
Convoy Escort	477	401
Photographic Reconnaissance	245	180
Meteorological	300	265
Air/Sea Rescue	403	420

From the above, it will be seen that, on the basis of a 31-day month:—

- The rate of effort on Anti-Submarine Patrols has remained almost constant, but the ratio of sightings to flying hours has increased generally.
- The reduction in the number of Anti-Ship sorties is small.
- The number of Interceptor Patrols has increased considerably. The analysis given later in this issue shows a considerable measure of success.
- The rate of expenditure of effort on Convoy Escort has risen by nearly 25 per cent.
- The number of Photographic Reconnaissance sorties shows a marked rise: on a 31-day basis this is about 50 per cent.
- The effort on Air/Sea Rescue remains approximately constant, but shows improved results, 86 lives having been saved.

Valuable help has again been afforded by units of Bomber Command, and the U.S.A.A.F. These units have contributed some 13 per cent. of the total effort. The impending withdrawal of No. 405 Squadron (B.C.) and the two Anti-Submarine Liberator Squadrons (U.S.A.A.F.) is noted with real regret. A further loss to the Command, which is to take place during March, is No. 320 (Dutch) Squadron which has in the past done so much excellent work in the effort against enemy shipping.

5. The following organization changes have occurred during February:—

- 1st R.A.F. Station, Lough Erne, re-named Castle Archdale.
- 6th No. 59 Squadron from Thorney Island to Chivenor.
- 10th R.A.F. Station, Invergordon, re-named Alness.
- 11th No. 8 O.T.U. from Fraserburgh to Dyce.
- 14th Nos. 120 and 220 Squadrons from Ballykelly to Aldergrove.
- 14th No. 140 Squadron from Mount Farm to Odiham.
- 15th No. 407 Squadron from Bircham Newton to Wick.
- 17th No. 53 Squadron from Davidstow Moor to Docking.
- 17th No. 190 Squadron to commence forming from No. 210 Squadron at Sullom Voe.
- 20th R.A.F. Station, Tain, transferred to Coastal Command.
- No. 1 O.T.U. is to move from Sillloth to Thornaby.
- No. 6 O.T.U. is to move from Thornaby to Sillloth.

I.—ANTI-SUBMARINE SECTION

Anti-Submarine Operations February, 1943

During the month of February there were in all 77 sightings of U-Boats, leading to 43 attacks, by operational aircraft of Coastal Command. Fifty sightings and 26 attacks came from aircraft based in the United Kingdom and Iceland. Twenty-six sightings and 16 attacks were from aircraft based on Gibraltar. One sighting, followed by attack, was from an aircraft from Greenland.

The number of ships sunk in the Northern Atlantic has risen from the very low figure of January—three ships only—to 27. All but seven of these were lost from the two convoys S.C.118 and O.N.166. The first attack on S.C.118 was in the afternoon of 5th February, when a straggler was torpedoed. This ship, however, reached port. On the 6th air escort was provided by four Liberators of 120 Squadron from 1000 to 1700 hours and from 1830 to 2030. Eight U-Boats were sighted and four attacked with depth-charges. On the same day another large pack of U-Boats (10?) were sighted near this convoy by transatlantic ferry aircraft. The convoy was then about 550 miles south of Iceland (c). In spite of these four attacks, the large pack of U-Boats involved made an attack in the early morning of the 7th, in which seven ships were sunk.

On the 8th five U.S.N. Catalinas and two Liberators were sent to escort. All the Catalinas returned, because of bad weather, before finding the convoy. One of the Liberators also failed to meet it. The other remained with the convoy for two hours in the evening. Six Fortresses of 220 and 206 Squadrons flew protective sweeps round the convoy's track, and one Fortress sighted and attacked a U-Boat. One further ship was sunk on the night of the 7th-8th. On the 8th a heavy air protection of seven Fortresses, two Liberators, and a Sunderland, were on escort to, or sweeps round the convoy, from 0920 to 2030. One of the Liberators sighted and attacked a U-Boat. No further ships were lost. Another attack was delivered by a Fortress on a sweep astern of the convoy on the 9th.

The second of these big attacks was on the outward-bound convoy O.N.166. Escort was provided to this convoy on the 21st by three Liberators, one of which failed to find it. The others were with the convoy from 1000 to 1300 and from 1800 to 2130. At 2015 the air

escort sighted two U-Boats close together, one of which was attacked. The convoy was then in about 48° N., 300° W.—nearly 1,000 miles from the aircraft's base. One ship was sunk between the two periods of air cover, and two more during the night of the 21st-22nd. An attempt was made by a Liberator to escort this convoy on the 22nd, but the aircraft could not find it at such extreme range in the short time available. The U-Boats remained in contact for the next three days and sank 10 more ships in all.

In the Bay of Biscay area, escort was again given to the North African convoys—in all just over 60 sorties were involved. None of these aircraft made any sightings of U-Boats. The almost complete immunity of these convoys, crossing a regular passage area for large numbers of U-Boats, can be ascribed only to the continual risk of air cover preventing the U-Boat's operations. The Bay A/S patrols resulted in 32 sightings and 15 attacks—a large increase over the 10 and seven, respectively, of the month before. About half these sightings were in the far west approaches to the Bay. One sighting (attacked) resulted from the air offensive in the northern passage area north of Scotland.

Shipping Protection

The following table shows the amount of shipping passing through the Coastal Command area and the air protection given to it:—

Type of shipping.	Number of sailings.	Number protected.
Convoys and Naval Forces ..	55	50
Independents	72	1

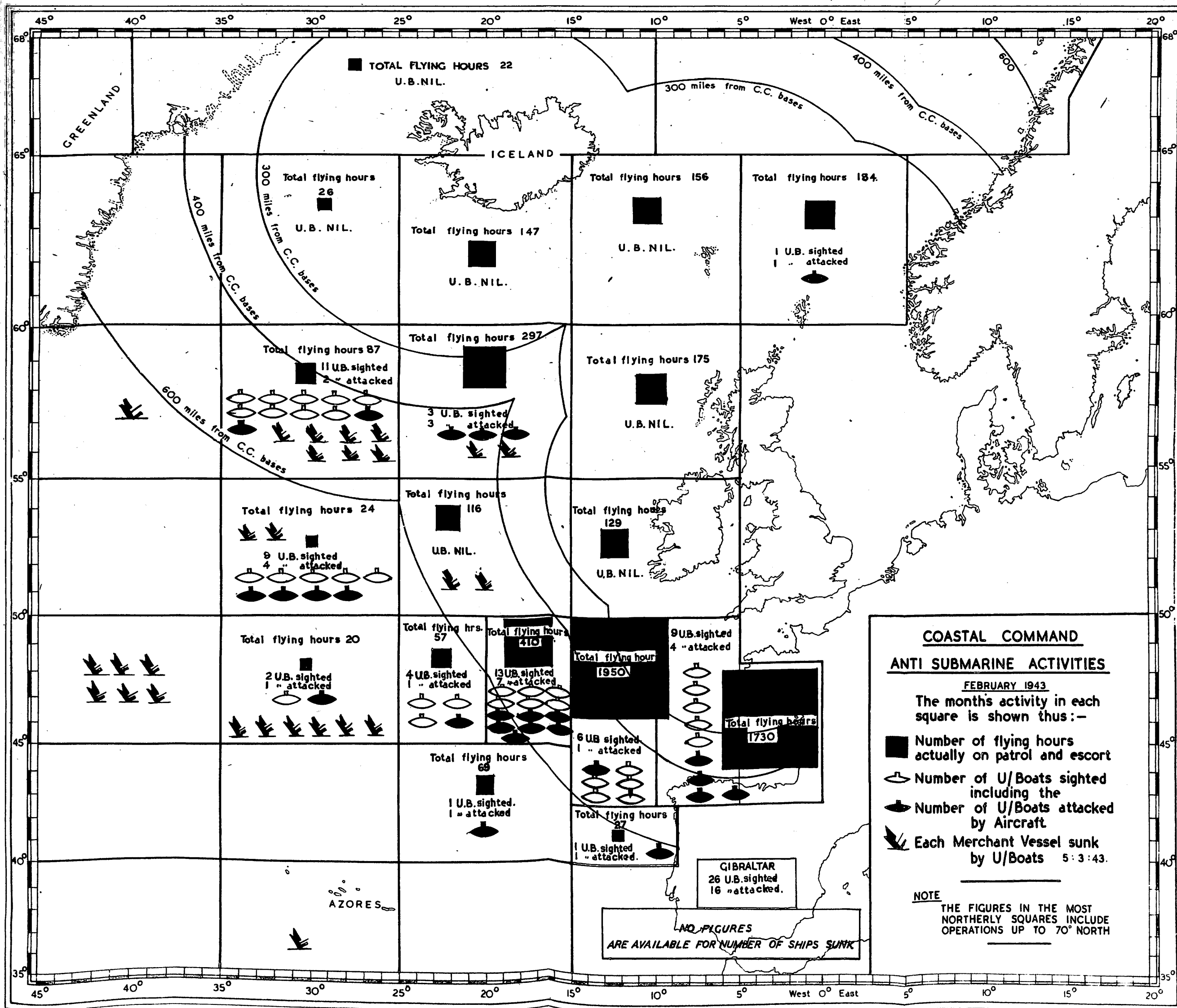
This protection was given by 262 sorties divided as follows:—

Type of shipping.	Met.	Escorts. Failed to meet.	Sweeps round convoy tracks.
Naval Forces and convoys	139	24	98
Independents	1	0	

Analysis of Operations

This table analyses U-Boat sightings in terms of the different types of duty engaged in by aircraft (excluding aircraft based in Gibraltar), and the average duration of the sorties in the area of operations:—

	All Anti-Submarine Escorts.	OFFENSIVE OPERATIONS			Chance.	Coastal Command Total on Anti-Submarine Work.
		Around Convoy Tracks.	Bay of Biscay.	Elsewhere.		
U-Boats sighted	10	4	32	3	11	49
U-Boats attacked	5	4	15	2	0	26
Sorties	164	98	645	108	—	1,015
Average No. sorties per sighting	16	25	20	36	—	21
Hours actually on patrol ..	408	439	4,050	605	—	5,502
Average duration of sorties actually on patrol	2½ hrs.	4½ hrs.	6¼ hrs.	6 hrs.	—	5½ hrs.



Sightings and Attacks by Squadrons

U.K. and Iceland.

		Sightings.	Attacks.
(i) Aircraft on A/S Work.			
172	Searchlight Wellingtons (Chivenor).	4	2
	No. 1 U.S.A. Liberators (St. Eval) ..	5	3
	No. 2 U.S.A. Liberators (St. Eval) ..	10	2
10	O.T.U. Whitleys (St. Eval) ..	5	2
59	Liberators and Fortresses (Chivenor).	1	1
10	R.A.A.F. Sunderlands (Mount Batten).	1	1
461	Sunderlands (Hamworthy) ..	1	1
224	Liberators (Beaulieu) ..	2	2
405	Halifaxes (Beaulieu) ..	3	1
120	Liberators (Iceland and Ballykelly).	13	7
220	Fortresses (Aldergrove) ..	2	2
206	Fortresses (Benbecula) ..	1	1
612	Whitleys (Wick) ..	1	1
		49	26

		Sightings.	Attacks.
(ii) Aircraft not on A/S Work.			
248	Beaufighters (Predannack) ..	1	0
	Aircraft of Ferry Command ..	10	0
		11	0
(iii) From Gibraltar.			
179	Searchlight Wellingtons ..	1	1
202	Sunderlands and Catalinas ..	9	6
210	Catalinas ..	2	0
48	Hudsons ..	6	5
233	Hudsons ..	7	3
1404	Met. aircraft ..	1	1
		26	16
(iv) From Greenland ..			
		1	1
		87	43

Recent Attacks on Submarines

Escorting Convoy S.C.118

[The full analysis of air escort to this convoy appears on pages 8, 9 and 10.]

At 1157 hours on 6th February, W/120 Liberator I, camouflaged white underneath, was escorting S.C.118 which was met at 1000 hours. Homing procedure B was tried but was unsuccessful. At 1012 hours, the S.N.O. escorts signalled by V/S, "U-Boat bearing 271°." The aircraft flew on a course of 271° for ten miles but, seeing nothing, returned to convoy. The aircraft flew on track 255° for 30 miles and, at 1156 hours, when still on track 255°, at 1,500 feet, in weather 7/10 cloud, base 1,500 feet, sea calm, visibility 7 miles, sighted a wake which was identified a little later as a U-Boat on the surface bearing 240°, distant 1½ miles, in position 53° 50' N., 30° 35' W., course 060°, 15 knots. This position was 31 miles 250° from the convoy. The U-Boat was not clearly seen. It was probably of small size, painted dark brown or grey. No other details were possible.

The aircraft dived to attack on opposite course to the U-Boat, directly down track. The U-Boat had started to dive and at the last minute the aircraft hauled out slightly from the down track approach and ran in from the U-Boat's starboard bow, at about 10° to track, releasing, from 100 feet, 6 Mark XI Torpex depth-charges, set to shallow depth, spaced to 36 feet, while 20 feet of the U-Boat's stern was still visible.

Evidence states that No. 1 depth-charge entered the water, level with the front of the visible stern portion of the U-Boat, 40-50 feet to starboard. The rest of the stick was slightly across the swirl. After the explosions a marine marker was dropped, but there were no signs of damage or any after effects. The aircraft remained in the area for 5 minutes and then set course to rejoin the convoy, informing the escort on R/T of the details of the attack.

Result

The location of this U-Boat shows the importance of close co-operation with the surface escorts who can give D/F bearings to the aircraft supporting the convoy. It is not understood why the aircraft

hauled out of the down track approach. It seems that it was going out of its way to make things more difficult for itself. As it was, the stick appears to have been a close miss astern. The lack of after results seems to confirm this opinion. There is no doubt, however, that it was close enough to the U-Boat to inflict a severe shake-up. At any rate it would cause it to lose touch with the convoy temporarily.

At 1208 hours, as the aircraft was flying on track 060°, at 100 feet, to re-join the convoy, a U-Boat was sighted on the surface by the captain of the aircraft. It was bearing Green 20° at distance 1 mile, in position 53° 50' N., 30° 20' W., course 060°, 15 knots. This position was 26 miles, 238° from the convoy. The U-Boat was German, 517-ton type, black in colour. No distinguishing marks or guns could be seen. The aircraft altered course immediately and increased speed to 200 m.p.h. (The U-Boat was stated to have altered course approximately 20° to port while diving.) The aircraft attacked from the U-Boat's port quarter at 40° to track, releasing, from 50 feet, the remaining two Mark XI Torpex depth-charges, set to shallow depth, spaced 36 feet apart. Twenty feet of the stern of the U-Boat was still visible at an angle of 25°. Evidence states that the depth-charges were seen to enter the water one on either side of the stern, which was still visible. Both depth-charges were seen to explode. When the explosion plumes had subsided, a square patch of oil, 60 feet by 40 feet, appeared just ahead of the explosion mark. No other after effects were observed.

The aircraft continued to circle and dropped a marine marker. R/T was used to report the details of the attack to the S.N.O., Escorts. Two corvettes proceeded to the position of the attack. One arrived at 1230 hours and the other at 1330 hours. The aircraft left the scene at 1410 hours, by which time the two corvettes had begun their search. At 1437 hours the aircraft sighted another Liberator and at 1457 hours rejoined the convoy.

Later, the aircraft again searched and re-joined the convoy at 1530 hours, and resumed coverage. At 1600 hours, it sighted a U-Boat in position 54° 10' N., 29° 42' W., course 060°, 18 knots. This position was approximately 20 miles astern of the convoy. Having no depth-charges left, the aircraft attacked with cannon. The U-Boat dived. At 1630 hours, the aircraft re-joined the convoy and continued coverage. At 1650 hours, the S.N.O. asked the aircraft to direct a destroyer to the position but, as the message took half an hour to decipher and since the aircraft had already remained with the convoy 39' over P.L.E., no action could be taken. At 1704 hours, the aircraft left in position 54° 16' N., 28° 49' W., on the same course and speed.

N.B.—These three U-Boats were all sighted 20–30 miles directly astern of the convoy.

Result

This seems to have been a well placed attack with the last two depth-charges that remained. The small amount of oil indicates that explosions were close to the U-Boat, but it is impossible to assess any damage.

Attack with Amatol Depth-Charges

At 1505 hours on the same day, another aircraft, **X/120 Liberator III (V.L.S.)**, camouflaged white underneath, was also on escort to SC.118. It carried out homing procedure "B" for an hour and twenty minutes, but with no response. It then began C.L.A. search for the convoy, finally locating a sloop in the position 54° 40' N., 30° 32' W., and communicated by V/S.

The sloop asked, "Where is convoy?" and the aircraft replied, "Not yet met." The sloop then signalled, "Believe they are 35 miles south from here."

The aircraft continued the search and at 1143 hours, sighted a U-Boat in position 54° 57' N., 29° 58' W. Attack was impossible. At 1154 hours, the convoy was sighted in position 54° 12' N., 29° 35' W., course 056°, 7 knots. The convoy was informed by R/T of the U-Boat sighting.

At 1230 hours the S.N.O. signalled by visual, "What are your signal letters?" and the aircraft replied, "BRMW." At 1240 hours a V/S came from the S.N.O. to carry out patrol which the aircraft proceeded to do. At 1335 hours, the aircraft re-joined the convoy and began standard patrol. At 1357 hours, patrol was recommenced and at 1504 hours, flying at 3,000 ft., in weather 3/10 cloud, base 2,500 feet, sea moderate, visibility 5–10 miles, a U-Boat was sighted on the surface, bearing Red 50°, distant 5 miles, in position 54° 33' N., 29° 27' W., course 110°, 6 knots.

The U-Boat was dirty white in colour, similar to the 517-ton German U-Boats. One periscope was visible, and one gun forward of the conning-tower. There appeared to be a porthole in the side of the conning-tower. This position was 355°, 18 miles from the convoy.

The aircraft remained in cloud until approximately abeam of the U-Boat when it turned in to attack from the U-Boat's port beam. Immediately prior to the release, a large column of water was seen coming from the stern of the U-Boat. From 40 feet, there were released six 250-lb. amatol depth-charges, while the U-Boat

was still visible, with decks awash. The stick straddled the U-Boat and No. 3 depth-charge was a direct hit. It was seen and heard to explode on impact.

Immediately after the spray had settled down, large bubbles and under-water disturbances were seen. One and a half minutes later, a large black object, probably the bows of the U-Boat, just surfaced and immediately disappeared below again. A piece of timber about 20 feet long was also seen. A patch of diesel oil appeared and a number of sea gulls gathered around. As P.L.E. was reached, a marine marker was dropped on the scene of the attack and the aircraft set course for base 20 minutes after the attack.

N.B.—At 1515 hours, a W/T report of sighting and attack was made to the convoy. No reply was received so, at 1525 hours, the sighting report was passed via Iceland. At 1535 hours the attack report was made. At 1538 hours, in position 54° 35' N., 29° 02' W., a two-funnel destroyer of an old type was sighted on course 094°, speed 12 knots. This may well have been the ship reported by the Ferry Command Liberator at 1544 hours. The aircraft signalled by visual to this destroyer, "I go." S/E was used for the last two hours for navigational purposes.

Result

An exceedingly good attack after an excellent approach. At this stage of the war it is surprising to find aircraft taking out Amatol depth-charges. But in this case the direct hit seems to have done the trick and the after evidence gives every hope that the U-Boat was seriously damaged if not destroyed.

An Excellent Attack

R/120 Liberator III (L.R.), camouflaged white underneath, was also escorting SC.118, flying on track 203° at 3,000 ft., in weather 8/10 cloud, base 3,800 ft., sea slight, visibility 8–15 miles, when the tail gunner reported that a U-Boat's periscope and wake were immediately below the aircraft and on the same course, in position 54° 30' N., 28° 48' W., course 200°, 3 knots. The aircraft turned at once to starboard, through nearly 360°, losing height from 3,000 ft. to 70 ft. While the aircraft was turning, the U-Boat fully surfaced, apparently not having seen the aircraft. This position was 47 miles, 330° from the convoy. The U-Boat was German, with one gun forward of the conning-tower and a stanchion, or possibly a lighter A.A. gun, aft of the conning tower. There were two machine guns in the bandstand. The U-Boat was coloured dark grey.

The attack was delivered from the U-Boat's starboard quarter, at 30° to track, releasing from 70 ft., four Mark XI Torpex depth-charges, set to shallow depth, spaced to 45 ft., while the U-Boat was still visible, with the bows under water. Three depth-charges were seen to enter the water on the U-Boat's port bow, the nearest being 10 ft. from the U-Boat's side.

Another depth charge, perhaps No. 1, was seen to ricochet and spin in the air, falling well away from the stick. It was not seen to detonate.

The aircraft tracked right over the conning-tower and one member of the U-Boat's crew was

seen looking up through the open hatch. Explosions blotted the U-Boat from view but, as the spray settled, her bows were seen rising up out of the water. The U-Boat then rocked forward and the stern broke surface. After this, it sank bodily on a more or less even keel. The depth-charge scum and explosion eddies faded away slowly, giving place to a large patch of bubbles and under-water disturbances which persisted, gradually increasing in intensity.

The patch was still boiling when the aircraft left the spot 40 minutes later. Close by were seen two light brown cylinders, 16 ft. by 2 ft., one white plank-like object 15 ft. by 8 ft., and a black box-like object, floating on the surface. Numerous white sea birds were seen to be diving on the centre of the disturbance as the aircraft left. This was at 1657 hours.

Course was set for the supposed position of the convoy. At 1735 hours, a C.L.A. search was instituted down track of the convoy and homing procedure "B" was attempted, but without result. At 1815 hours, M.T.B. "Not met." At 1918 hours, S/E contact with the convoy was obtained and at 1923 hours, the aircraft met SC.118 in position 54° 08' N., 29° 12' W., course 064°, 7½ knots. The aircraft was unable to raise the S.N.O. on the R/T, and so reported by V/S. The S.N.O. then signalled instructions by Visual. The aircraft set course accordingly and, at 1935 hours, sighted a white wake, identified later as that of a U-Boat, in position 53° 53' N., 29° 02' W. But the U-Boat submerged before any attack could be made. Markers were dropped and after 10 minutes in the area, the aircraft returned to the convoy.

N.B.—Subsequently, at 1920 hours, 0/120 sighted a very large patch of oil in position 54° 35' N., 28° 23' W., at a distance of 15 miles from the position. This discrepancy could be accounted for by navigational error.

Result

The after evidence of the boiling patch persisting for 40 minutes and the wreckage indicate an excellent attack and probably a kill. The visual evidence by the flight engineer that the depth-charges entered the water in the position stated, with the nearest point of entry 10 ft. from the port side of the U-Boat, must be inaccurate because the under-water travel of approximately 36 ft., before detonation, would have taken even the nearest one out of lethal range. If No. 1 depth-charge was the one seen to ricochet, it is possible that it actually hit the U-Boat and

ricocheted off the upper deck, finally exploding under the U-Boat just after the other three detonated. This would account for it not being seen to detonate.

Kill by a Fortress "Indicated"

A further aircraft, J/220 **Fortress II**, was engaged on a sweep when it sighted the same convoy at 1740 hours. While flying at 1,700 ft., in weather 10/10 cloud, base 3,500 ft., and broken low cloud, sea moderate and visibility 1 mile in frequent showers, 20 miles in clear weather, a U-Boat was sighted on the surface. It was bearing 250°, distant 8-10 miles, in position 55° 42' N., 26° 17' W., course 010°, 6 knots. The U-Boat was painted a greenish colour, with a gun forward of the conning tower. The flare at the top of the conning-tower appeared to be wider than usual. The position of the sighting was 058°, 55 miles from the convoy.

The aircraft climbed into cloud and approached, finally breaking cloud three-quarters of a mile from the U-Boat, which was re-sighted on the starboard bow. The attack was made, through rain, and the U-Boat was surprised from its starboard beam. Seven Mark XI Torpex depth-charges were released from 50 ft., set to shallow depth, spaced to 36 ft., while the conning-tower was half out of the water. The bomb aimer in the nose and the rear gunner in the turret both saw the conning-tower pass directly beneath them.

The stick straddled the U-Boat. Nos. 4 and 5 depth-charges entered the water on either side of the hull. After the explosion plumes had subsided, a rounded object 12 ft. long rose out of the water to about 5 ft. Black oil welled up in the centre of the explosion mark. More oil, which was lighter, was finally seen on the surface, part in and partly out of the explosion area, at the leading edge. Pieces of yellowish-coloured wood, together with lighter-coloured wood, not more than 2 ft. long, were seen in the explosion area. A marine marker was dropped and at 1828 hours the aircraft contacted one destroyer and one corvette, 215° 6 miles from the scene of the attack. V/S was made from the aircraft to the corvette giving details of the attack. This was acknowledged and at 1831 hours the Fortress set course for the convoy and then for base.

Result

A very good approach followed by an excellent and accurate attack. The after evidence, particularly of the pieces of wood, seems to indicate a kill.

Other Attacks

On February 10th, **Liberator II**, T/2, **U.S.A.A.F.**, camouflaged drab olive, was on A/S patrol, flying on track 270° at 400 ft., in weather 10/10 cloud, base varying from 200 ft. up to 3,000 ft. The sea was moderate. Visibility 1-4 miles, with intermittent rain and haze. The aircraft got an S/E contact Green 90°, range 3-4 miles, at 0910 hours. The aircraft homed on it and at 0911 hours, when flying at 200-300 ft., on track 360°, the port waist gunner sighted a U-Boat on the surface, almost immediately beneath the aircraft. This was in position 47° 05' N., 17° 45' W., course 090°, 8-10 knots. The U-Boat was of medium size and grey in colour, with white marks on the conning-tower and one gun forward.

(C48069)

Two or three members of the U-Boat crew were seen on the bridge. The aircraft circled to get into position to attack, but meanwhile, the U-Boat submerged and the conning-tower had disappeared for more than a minute by the time that the aircraft reached position. Consequently no attack was made, although the top gunner and tail gunner each fired 100 rounds at the U-Boat.

At 0928 hours, the aircraft had resumed track 270° and was at 300 ft. in base of 10/10 cloud, with visibility less than 1 mile, when the bombardier sighted visually (simultaneously S/E contact was obtained) a U-Boat on the surface, bearing Red 10°, distant 4 miles, in a slightly clearer patch. It was in position 47° 05' N., 18° 34' W., course 090°, speed unknown.

B*

The U-Boat was dark in colour and of medium size. One gun was observed forward of the conning-tower, which appeared to be wider than that of the one sighted previously.

The aircraft approached, losing height gradually and reaching the position about two minutes later to find the stern of the U-Boat completely exposed and between 30 and 40 ft. of the deck and 10-12 ft. of the keel visible. The conning-tower was not visible: there was no churning from the propellers and apparently no forward motion.

The aircraft attacked from the U-Boat's port bow at 20° to track, releasing from 200 ft. six Mark XI Torpex depth-charges, set to shallow depth, spaced to 19 ft., while the stern half of the U-Boat was still above water. The tail gunner observed that the explosion of No. 1 depth-charge was about 30 ft. astern of the U-Boat. While passing over the U-Boat he fired 75 rounds at it. The U-Boat appeared to lift slightly and then level out so that the conning-tower broke surface and both ends of the deck became awash.

The aircraft circled to port and, about two minutes later, attacked a second time from the same angle, releasing from 200 ft., three Mark XI, Torpex depth-charges, with the same settings.

Evidence states that the first explosion was ahead of the U-Boat and one was astern. The third explosion was not observed. The U-Boat again appeared to lift slightly in the water as the tail gunner once more fired 75 rounds into it. A third run was then made after circling to port and on the run in, the navigator thought that the U-Boat had a list to starboard. Although still motionless, there was some churning water astern of her, showing that she had just started up the motors. Ten seconds before release, the U-Boat had disappeared on a practically level keel, without leaving any swirl.

From the same height as before, three more Mark XI Torpex depth-charges were released. But they were not seen to fall. It is not known how close they fell to the position of the U-Boat as, before the tail gunner was in a position to see, all traces of the U-Boat had disappeared.

Two of the depth-charges were seen to explode, but without a plume and making what is described as a dome-shaped bubble, with ragged outside edges. The third depth-charge was not seen to explode. Sea markers had been dropped on each run. One of these was still burning and the aircraft circled it. Two minutes after this third attack, the aircraft found a round patch of brown fluid, slightly greater in diameter than that of a U-Boat's length. Search was continued for 30 minutes, but nothing further was seen.

Two attacks by Liberator II

At 1115 hours on 26th February, **Liberator II, Z/224**, camouflaged white underneath, was on A/S patrol, flying on track 090° at 2,000 ft., in weather 3/10 cloud, base 3,000 ft. The sea was calm and visibility 12-15 miles. The aircraft got a contact on Mark V S/E at 1101 hours, bearing Red 40°, range 30 miles. The aircraft homed and when at 2,000 ft., sighted a U-Boat on the surface, almost 6 miles ahead, in position 41° 33' N., 21° 49' W., course 122°, 10 knots.

As the aircraft approached to attack, the U-Boat dived and the final run in was made from the U-Boat's starboard beam, releasing from 50 ft. four Mark XI Torpex depth-charges, shallow setting, spaced 36 ft., 25 seconds (timed) after the U-Boat had disappeared. Evidence states that the stick exploded across the line of advance and 200 ft. ahead of the apex of the swirl. No results were observed so the aircraft continued on A/S search at 1130 hours.

Analysis

Time interval of 25 seconds, plus 2 seconds, time of flight, plus 3 seconds to reach depth = 30 seconds. During this time the conning-tower advanced 300 ft. ahead of the apex of the swirl.

Result

On the evidence available, it appears that the stick would have been right on or just astern of the tail of the U-Boat. Although it gave the crew a good shaking up, it probably inflicted no damage.

At 1200 hours a merchant ship was sighted by the same aircraft. It shadowed the ship until 1408 hours when P.L.E. was reached. The aircraft then set course for Bishop's Rock. At 1623 hours, when flying on track 050° at 7,000 ft., the aircraft simultaneously got a contact on Mark V S/E and visually sighted a U-Boat on the surface, bearing Green 90°, distant 15 miles, in position 44° 21' N., 15° 48' W. The course was 140°, 10 knots.

The U-Boat was a large-type German with two guns, one forward and one aft of the conning-tower. The aircraft immediately altered course and dived to attack, reaching a speed of 300 m.p.h.

The U-Boat was completely taken by surprise and the attack was made up track, releasing from 50 ft. four Mark XI Torpex depth-charges, set to shallow depth, spaced 32-33 ft., actually while the conning-tower and after deck were still above water.

Evidence states that the stick exploded alongside the U-Boat and slightly to starboard, with one depth-charge ahead and two or three level with the fore part of the U-Boat, just forward of the conning-tower. The pilot continued to fly straight and level in order to obtain mirror-camera photographs. He then circled to port and returned to the position of the attack.

About 4 minutes after the attack, the bow of the U-Boat re-appeared and hung stationary for about 2 minutes. Then the whole U-Boat broke surface, rolling heavily.

The top turret gunner fired 200 rounds and one minute later, at 1633 hours, the U-Boat sank below the surface without any forward movement. A patch of bright blue water with a foamy edge was immediately observed where the U-Boat had disappeared. This spread rapidly and continued to seethe for several minutes, ultimately covering an area approximately 200 ft. long, with ragged edges and streaked with patches of darkish oil.

The churning in this patch continued while the aircraft circled and, at 1650 hours, the bows of the U-Boat re-appeared suddenly at a very steep angle. This was estimated by a member of the crew as 30-40°, observed from the beam.

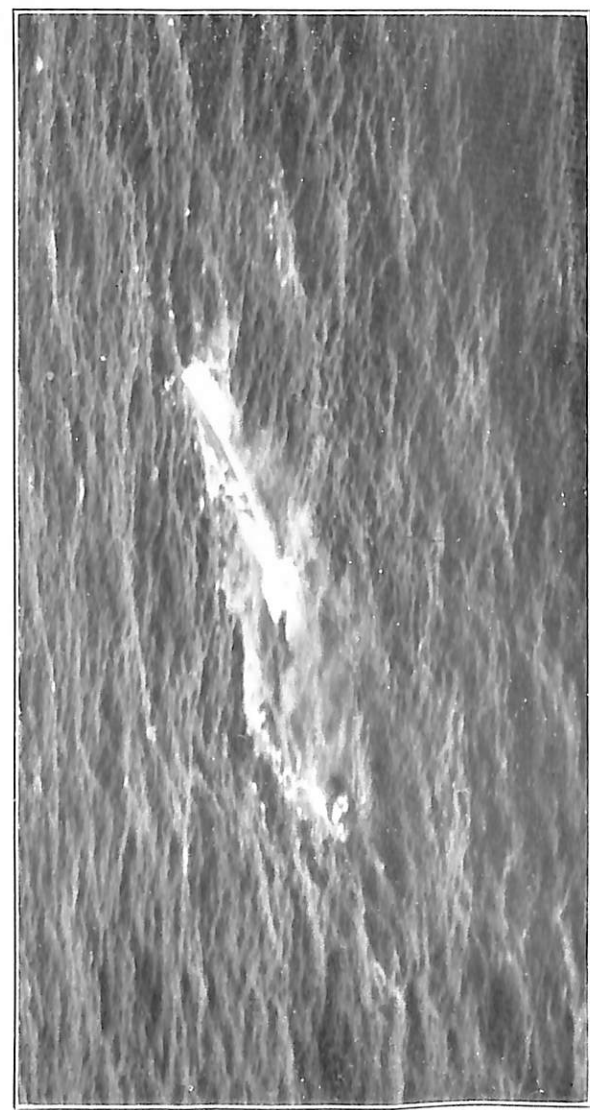
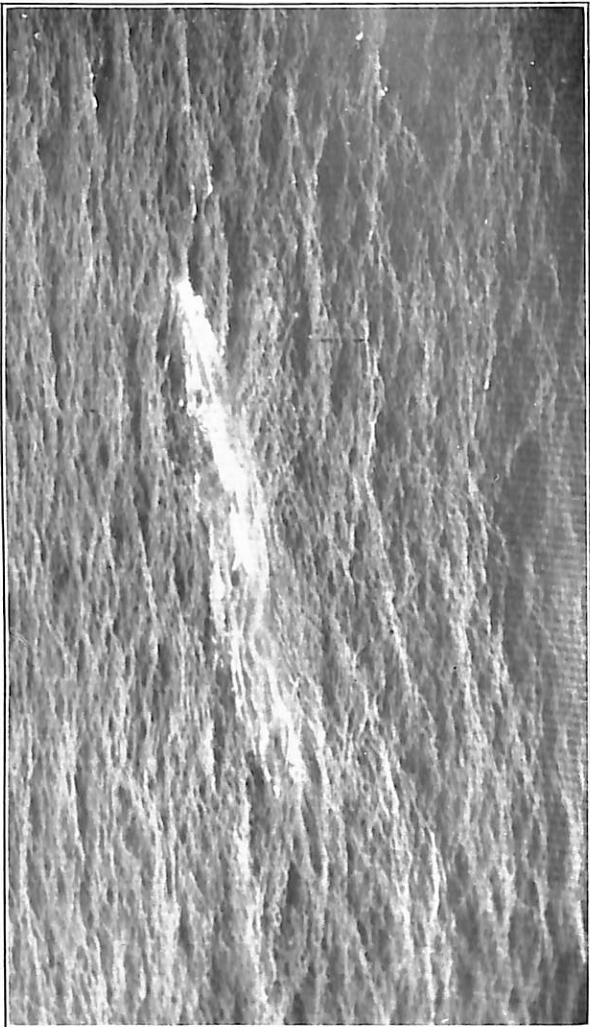
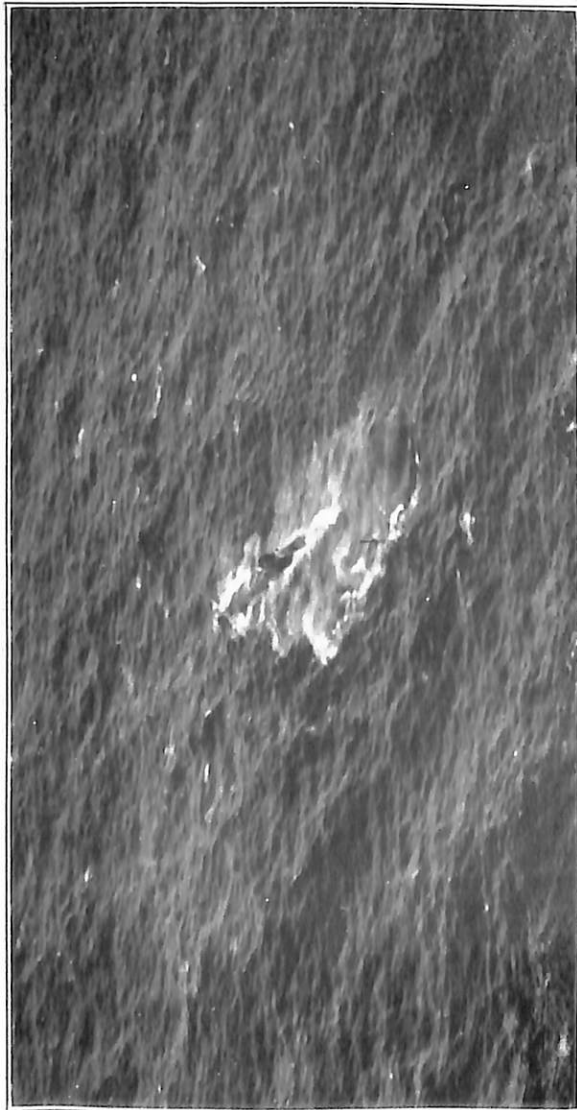
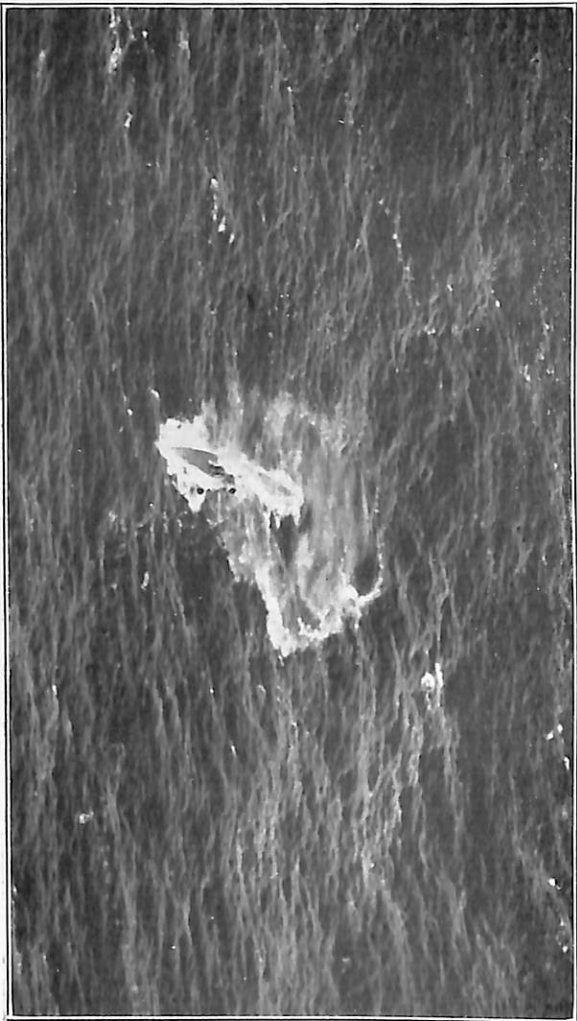


S.120 brings back the ideal photograph after an attack, showing the points of entry of depth-charges relative to the U-Boat.

U.S. Navy - 1945



T.120. This photograph shows the first depth charges of the stick entering the water alongside the U-Boat. The attack was made down track.



Photograph of U-Boat brought to the surface in a crippled condition after a very good attack by Z/224.

The U-Boat then surfaced fully and moved ahead under motors. The top and rear gunners opened fire as the aircraft circled, sometimes closing range to 300-400 yards.

At approximately 1652 hours, activity was seen on the bridge of the U-Boat and light A/A fire was opened. This lasted for only a short time, probably being silenced by the top turret gunner's fire.

At 1655 hours the aircraft flew over the U-Boat for the last time, as P.L.E. had been exceeded, and as the U-Boat appeared to be making unsuccessful attempts to dive again, with bows partly submerged. It was then on course 050° and had

been steering an erratic course at a speed estimated at 6-8 knots. The forward and after deck guns were visible, with barrels trained askew as if bent by explosion.

Result

A good approach and an excellent attack. The U-Boat was obviously damaged and the two attempts to dive and the two subsequent re-appearances on the surface indicate that, as well as secondary damage inside the U-Boat, the pressure hull itself was probably split. It is impossible to say what happened to the U-Boat after the aircraft was forced to leave.

Trade Protection

A Record

The effectiveness of air cover to convoys has been demonstrated again and again, in the way in which even packs of U-Boats have been dispersed by the arrival of air escort. This has made it worth while to lay on aircraft on convoy escort over remote waters of the Atlantic, even at such distances that escort is available for only short periods. For the same reason, it is highly important that aircraft should meet the convoys they are to escort. Various devices, such as homing procedure and Type 251 apparatus, have been introduced to help aircrews to do this. Success in meeting convoys depends ultimately on the members of the crew themselves, on the efficiency of the look-out, the care with which S/E is watched, the concentration of the pilots, and the continuous checking of winds and accurate plotting of positions by the navigator.

These points are illustrated in the remarkable flight made by B/120 on 23rd to 24th February on convoy escort to O.N.S.167. It is hoped to print the log of this flight and comments on it in next month's "Coastal Command Review."

The Form "Green" ordered three Liberators to escort the convoy until dusk. The first aircraft was to be on patrol at 1215 hours, and Homing Procedure was to be used to assist the aircraft. The convoy was over 1,000 miles distant from base. The first two aircraft did not meet. The third was to escort from 1825 until dusk (2105 hours).

The flight by the crew of B/120 began inauspiciously. At 1043 hours they were airborne, 2 minutes before E.T.D., in aircraft T. But the retracting gear would not operate, and, after trying unsuccessfully for some 20 minutes to get the wheels up, it was decided to land. The Captain arranged by R/T from the air to have aircraft B ready. At 1115 hours, aircraft T landed and taxied to dispersal. The crew were transferred to aircraft B. B was taxied out and by 1139 hours, was airborne again on its long flight. The estimated time for escort was reduced to 1½ hours. An hour and a quarter later the last landfall in the outward flight was made, Eagle Island being sighted at 1254 hours. For 6¼ hours the aircraft was flown to maintain the same track on the way to a point on the convoy route, 35 miles astern of the convoy's estimated position. The track was roughly parallel to a cold front which passed through 48° N. 35° W., 50° N. 22° W., and 55° N. 12° W. Cloud was 8/10 to 10/10 with rain and drizzle. The base was

1,500 ft., lowering to 500 ft. at times. Visibility was about 5 miles, falling to 1 mile in rain. For 65 miles of the flight the aircraft was in the front itself, with cloud base down to 500 ft. The winds were adverse and greater in strength than the 25 to 35 m.p.h., which had been forecast. They were generally from 40 to 45 m.p.h. There was an improvement in the convoy area, north of the front swept upwards. But for the 6¼ hours, the utmost effort was required of the navigator. He was constantly taking drifts and three-course winds and he was fortunate enough on one occasion to get a sun shot.

The aircraft had been plotted in the Operations Room to be on patrol at 1920 hours, but it was delayed by the stronger head winds. It was not until 1909 hours that it was thought proper to start Homing Transmissions. However, no reply was received from the convoy and the Captain had to rely on his S/E and his Navigator. They did not fail him. Almost an hour after the On-Patrol time stated in the Form "Mauve," the aircraft arrived at the D.R. position on the convoy's track. This was at 2011 hours in position 47° 41' N., 29° 55' W. From this point a creeping line ahead search down the convoy's track was carried out, to a distance of 15 miles either side of the convoy's track, with distances between tracks twice the visibility of 8 miles. S/E was on continuously. At 2045 an S/E contact was obtained on the Beam aerials at a range of 25 miles on a bearing slightly to port. At 2052 the light was beginning to fade and, visibility being 6 miles, the convoy was sighted. At 2055 the aircraft was with the convoy in position 46° 53' N., 30° 58' W., 1,060 miles from base. The aircraft had, of course, flown a greater distance. Even assuming that the convoy was actually in the position given by the Form "White," the D.R. error at the end of the flight was less than 2 per cent.

On reaching the convoy, communication was established with the S.N.O. who asked for a patrol to be carried out round the convoy at distance 15 miles. Dusk was at 2105, the time for the aircraft to set course for base, but the Captain was determined to carry out a patrol to prevent U-Boats closing in to attack. Not until 2157 hours was the message "I go" passed to the S.N.O. At 2202, the Captain took the last look at his flock and set course for base. The return journey was uneventful although, as completely

overcast skies prevented any astro, it was once again necessary to take drifts and three-course winds continuously. At 0121 hours, when the aircraft had already covered some 500 miles on its way back to base, a message was received diverting to St. Eval. A new course was set, and by 0158 hours the E.T.A. for St. Eval had been transmitted to Control. The time given was 0430 hours and at 0433 hours the aircraft was over St. Eval. These two times suffice to demonstrate that the same high degree of efficiency was maintained to the end of this seventeen-hour flight.

S.C. 118

Convoy S.C.118 sailed from New York homeward bound to U.K. on 25th January, 1943. It consisted of 63 ships in 14 columns, with a maximum of five ships in any one column. The speed of the convoy was 7 to 7½ knots.

The convoy escort on 31st January consisted of three destroyers and four corvettes which by 4th February was reinforced to a total of five destroyers, five corvettes, one cutter and one sloop.

The voyage up to 4th February was uneventful, the convoy receiving aircraft escort from West Atlantic bases up to 31st January.

First Sighting

Before dawn on 4th February, there is evidence that a starshell was inadvertently fired by a vessel in the convoy. This starshell was sighted by a U-Boat which was on her maiden voyage and was about to take up position as the wing U-Boat of a patrolling pack. The U-Boat closed the convoy and probably reported its position at about 1000 hours. The convoy was then in the proximity of 50° 00' N., 35° 30' W., on a course of 015°. Later in the forenoon, as this U-Boat was the first to make contact with the convoy, it automatically became "The Shadower" and commenced homing other U-Boats.

There had already been indications during the afternoon that this U-Boat had taken up position right ahead of the port column of the convoy. Later, escort vessels made contact with her and in the words (more or less) of the Commander of the *Vimy*: "I gave her a couple of depth-charges to get her where I wanted her, followed by two pattern attacks. 100 ft. of the stern of the U-Boat appeared and I knocked the end of that off with the 4-in. gun. The U-Boat went down and the survivors came up!"

Thirty-four of the U-Boat crew were rescued, mostly by *Vimy*, but as a gesture, a few were left for *Beverley* who had been participating in the attack.

During the night a number of contacts were made with U-Boats which were beginning to collect and three attacks were made on them by surface vessels. Although several U-Boats were within visual range of the convoy, no attack developed.

5th February

During 5th February, the convoy altered course to 052° but was still some 800 miles from Iceland and rather more from North Ireland. At 1300 hours *West Portal*, a straggler from the convoy, was torpedoed, while *Beverley* during the day made two attacks on U-Boats.

The Form "Orange" was completed at 0600 hours on 24th February, 21 hours after the crew had arrived for briefing on the previous day. Not till then had the crew completed their routine task—in which a convoy escort had been carried out at a record distance from base.

This remarkable performance reflects the greatest credit on all concerned, and affords an excellent example of the achievements possible with good navigation and team-work between the various members of a well-trained and efficient air crew.

From dusk onwards, there was every indication of a growing strength of U-Boats in the vicinity of the convoy. The new "Shadower" probably lying somewhere between 270° and 325° relative to the convoy, the wind being S.W.W., and convoy course 052°. No attack was made on the convoy during the night.

6th February—First Aircraft

In the light of the information received it was appreciated that it was essential that aircraft should reach the convoy and give it maximum escort throughout the day of 6th February. Four Liberators of 120 Squadron were detailed, two to take off from Ireland and two from Iceland. W/120 was the first aircraft to make contact with the convoy at 1000 hours, in position approximately 53° 40' N., 30° 40' W., and escorted it until 1704. During this time the aircraft attacked three U-Boats, two with depth-charges, and the third with cannon fire.

In the first attack the sighting was due to being laid on by the S.O. Escort, and is a good example of efficient co-operation between sea and air. The aircraft was instructed to search along a relative bearing of 255°. The position of attack was 31 miles, 250° from the centre of the convoy. The second attack was made as the aircraft was returning to the convoy after the first attack. In spite of the aircraft being only at 100 ft., with visibility 7 miles, sufficient surprise was effected to enable an attack to be made when 20 ft. of the stern of the U-Boat was still visible.

After the third attack the aircraft was instructed to home a destroyer to the scene of the attack. The message was sent in cypher and by the time it had been decoded, the aircraft was already 40 minutes over prudent limit of endurance. The order could therefore not be carried out. This order could therefore not be carried out. This order emphasizes the importance of captains of aircraft on arrival letting S.O. Escort know the aircraft's P.L.E., and the undesirability of coded messages between escort and aircraft other than in exceptional circumstances.

As all three U-Boats were still surfaced at the time of attack, the efficiency of lookout by the crew and the speed of attack by the pilot of the aircraft are to be commended.

Second Aircraft

X/120 was the second aircraft to contact the convoy, reporting at 1154, having previously sighted a U-Boat 5 miles astern of the convoy, but too late to make an attack. The aircraft maintained patrol until 1504, when, flying at 3,000 ft., 400 ft. above 3/10ths cloud, a U-Boat

was sighted on a bearing 355° 18 miles from the convoy. Complete surprise was achieved and surface evidence after the attack points, at the least, to considerable damage being done to the U-Boat.

Third Aircraft

Both aircraft W and X had endeavoured to home on to the convoy by W/T, but without success. Aircraft O, however, commenced homing, using Procedure B, at 1700, and after receiving three bearings found the convoy at 1829 and remained with it until 2009, but without obtaining any U-Boat sightings.

Fourth Aircraft

The last aircraft of the day, R/120, when searching during the afternoon for the convoy, sighted a U-Boat in a position subsequently estimated to be 47 miles 350° from the convoy. The U-Boat was still visible at the time of the attack and a member of the U-Boat's crew was looking up through the hatch as the aircraft tracked over the conning-tower. Pieces of wreckage and a boiling patch of sea, persisting for 40 minutes, point to the possibility of a kill.

After failing to home on the convoy, aircraft R finally made contact at 1923. Two minutes afterwards the wake of a U-Boat was sighted but no attack could be made.

The climax to the day's work was the sighting by a Liberator, which was on transit flight from Newfoundland to U.K., of six U-Boats some 50 miles ahead of the convoy. All of these were fully surfaced and were seen within the space of half an hour during the early afternoon.

Appreciation of the Day's Work

All four aircraft found the convoy, all but one contact being by D.R. navigation from bases 700-800 miles away. Eight sightings and five attacks were made by these aircraft. During the period of escort, seven searches along a line of bearing were laid on by the S.O. Escort, at least one of which led to an immediate attack by the aircraft concerned.

During 6th February, the convoy received air escort for six hours with an additional period of three and a half hours between 1500 and 1830, when aircraft were searching in its vicinity. During the day there were probably 15 or more U-Boats in contact with the convoy.

Night, 6th/7th February

The weather deteriorated during the night, the wind being S.S.W., force 4/5, with high sea. The sky was overcast, with visibility one mile. At 0248 an attack on the convoy commenced and by 0600, seven ships had been torpedoed. Six of these ships were in stern positions of the convoy columns and the attacks were estimated mostly to have come from the quarter. One ship was not sunk immediately but was attacked a second time at 1350/7 and finally sunk when well astern. A further ship was lost through collision.

7th February

Thirteen aircraft were laid on to cover the convoy, seven on escort and six on protective sweeps. The weather in Iceland was very bad

(C48069)

and resulted in five Catalinas being recalled to base before they were able to reach the convoy. Of the remaining two aircraft detailed to escort, C/120 carried out a search from 1222 to 1800, and although the convoy R/T was heard on three occasions, the convoy was not sighted. S/120 made contact, having been successfully homed by W/T, escorting the convoy from 1735 to 1950. No aircraft U-Boat sightings were made, in part no doubt due to the ship which had been mainly instrumental in obtaining U-Boat bearings the previous day having been sunk during the night.

All six aircraft on sweeps carried out their tasks, but Fortress J/220 was the only aircraft to obtain a sighting. This was a fully surfaced U-Boat 55 miles from the convoy bearing 234°. Very intelligent use of a rainstorm was made, enabling the aircraft to approach from a distance of 8-10 miles to three-quarters of a mile without being sighted. The U-Boat's conning-tower was half out of the water when the attack was made and the quantity and character of oil, together with wreckage seen subsequently, points to a possible kill. Three attacks were also made by escort vessels.

Night, 7th/8th February

Although there was every evidence of a strong force of U-Boats being in the vicinity, only one attack was made at 0043, when a further ship was sunk.

8th February

By the morning of 8th February, the convoy had reached a position 56° 30' N., 22° 30' W., and was some 500 miles from both Iceland and North Ireland. Practically continuous escort was given from 1131 to 2029 by five aircraft while another five carried out protective sweeps.

Only one sighting of a U-Boat was made, this being by K/120 on its way to the convoy and some 19 miles therefrom. This occurred on emerging from cloud, and with the very poor visibility the crew did well to obtain a sighting immediately below the nose of the aircraft. An attack was made 7 seconds after the U-Boat had disappeared, but no results were observed. The convoy was not attacked during the night.

9th February

Further cover was given to the convoy on 9th February, in the course of which, at 1030, L/206 sighted *Vimy* towing *Lobelia* in position 56° 15' N., 19° 58' W. *Vimy* asked aircraft to escort throughout the day, subsequently requesting A/S search within a radius of 30 miles. At 1242, the aircraft sighted a fully surfaced U-Boat five to six miles away and 19 miles 263° from *Vimy*.

By the time the aircraft tracked over the U-Boat, the decks were awash, but four or five men were still visible in the conning-tower. The U-Boat was straddled and when the spray subsided the men were no longer visible. All forward way was lost and the U-Boat gradually settled and sank on an even keel two to three minutes after the explosion.

No further attacks developed against the convoy which reached home waters on 11th February.

Conclusions

The findings of the Admiralty Assessment Committee have not been completed and cannot be anticipated. On the Naval side one U-Boat was sunk and three other attacks were reported to be promising. On the air side, three attacks seem promising, and others probably inflicted damage to a major or minor degree. The moral effect on all U-Boat crews in the pack must have been considerable and the cumulative effect of successful offensive action around a convoy must deter many U-Boats from taking up attack positions. It is of particular interest to note that after the offensive action on 6th February, with the exception of the attack on that night which was probably confined to two to three U-Boats, although a dozen more were in contact, the convoy only suffered one other attack and that by a single U-Boat.

When U-Boats in these numbers collect round a convoy, it would appear that it is very desirable that aircraft after an attack on a U-Boat should not remain longer in the vicinity of the attack

than is necessary to check on results and inform the S.O. Escort. This naturally does not apply if the aircraft is instructed to home surface vessels to the scene of the attack. Steps have also been taken to ensure that aircraft spend the minimum of time over the convoy and the maximum of time in the areas relative to the convoy where U-Boats are most likely to be sighted.

The close co-operation between the S.O. Escort and the aircraft was a feature of this operation, and in the words of the former's official report (referring to operations on the 6th): "One point I should like to mention is how extraordinarily useful the aircraft were and how successful R.T. communications proved to be."

Once the convoy has been reported by the enemy there now seems to be general agreement that the presence of aircraft is essential and justifies fully the breaking of W/T and R.T. silence by the S.O. Escort to ensure that the aircraft arrive as soon as possible and engage in the maximum of offensive operation against the U-Boat pack.

[A number of combat reports of aircraft engaged in the escort of S.C. 118 are printed on pages 3, 4 and 5.]

U-Boat Warfare ; The Tactical Approach

Wakes and Swirls

A knowledge of swirls, their size, cause and persistence is important because in 53 per cent. of all attacks on U-Boats since July, 1942, they were the only visible aiming mark for the pilot.

It is essential to differentiate between the term "swirl" and "wake." The *wake* is made by a U-Boat while it is surfaced and on its Diesel engines. It consists of the usual bow waves and the stern wash, which in calm water forms a long track astern. Photos 1, 2, 3, 4 and 5 show the wake of various U-Boats from different angles.

When a U-Boat wishes to dive, ballast tanks are flooded, the Diesels are unclutched and the main electric motors are put to full speed ahead. As the bows go under the conning-tower starts to make the swirl; this is clearly shown in Photo 6. This swirl continues to be formed by the conning tower as in Photo 7 until finally it dips under as in Photo 8. After this the swirl does not advance because the conning-tower which formed it has now gone below the surface. Very soon after this the stern disappears but before it reaches the apex of the swirl. Thus a white swirl mark is left stationary on the surface as in Photo 9, with the fading wake stretching astern of it. This was taken 25 seconds after conning-tower had dipped. Photo 10 shows one taken 7 seconds after conning-tower had dipped, with the marks of where a stick of depth-charges have entered the water. No. 6 depth-charge (nearest the camera) has just detonated.

As the crash-dive speed of a U-Boat is always about the same (viz., full speed on the motors)

the shape and size of a swirl is fairly constant, whether in calm or rough weather. It will, of course, fade out or get broken up quickly in a rough sea, but for 30 seconds it will always provide a good yardstick of distance. The white creamy swirlmark is about 100 ft. long and 80 ft. broad. If it is used in reporting the distance ahead at which the centre of a stick fell it should be clearly stated as to whether it is so many swirl's lengths or so many swirl's breadths ahead of the apex of the swirl. The *apex* of the swirl is the last marked position of the conning tower and it is from this point that, knowing the interval since disappearance, the position of the invisible conning tower can be calculated, at release of the depth-charges.

There are two occasions when the swirl mark will not be a regular shape. The first is when the U-Boat dives under helm. In this case the mark will be lopsided, with most of the white water to the side opposite to which the U-Boat is turning. Photo 11 shows this clearly. The wake can be seen in the background and the U-Boat has dived under starboard wheel or turning to its right.

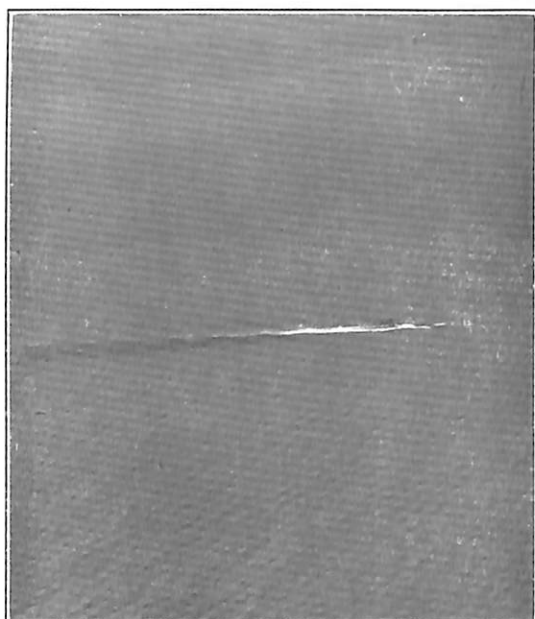
The second is when, through damage or other reason, a U-Boat submerges with little or no forward way on the boat. There will be none of the usual white water. Only a small disturbed patch will remain where at the last moment the sea lopped in and filled up the bridge casing, with some bubbles rising in or near it. This is shown in the photograph reproduced as a frontispiece. (T/2 U.S.A.)



1



2



3

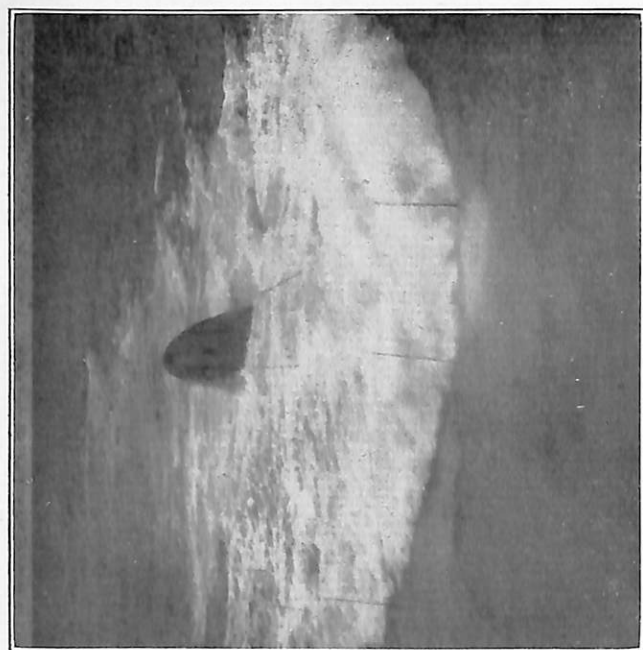


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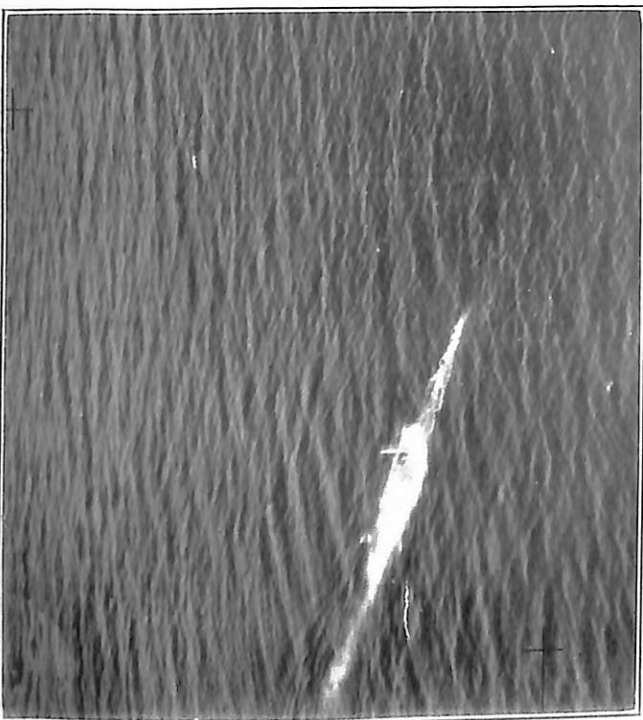
WAKES OF VARIOUS U-BOATS FROM DIFFERENT ANGLES
See letterpress, page 10 (opposite)



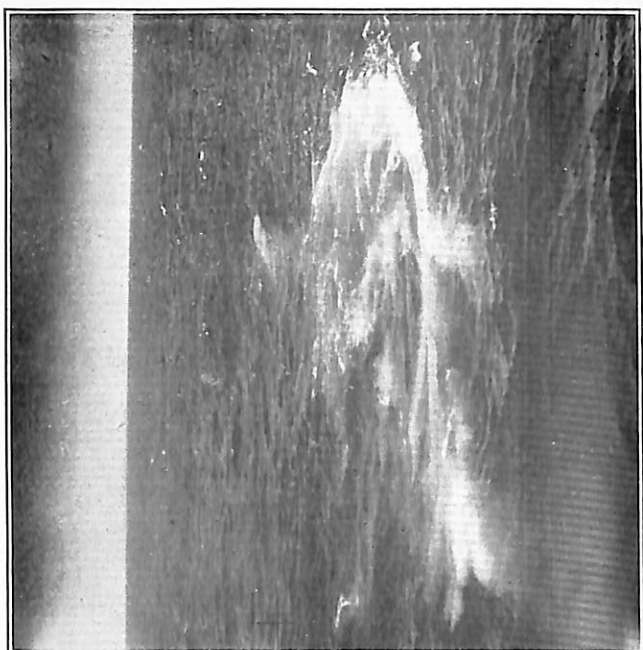
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7



6



11



10



9

SWIRLS OF VARIOUS U-BOATS FROM DIFFERENT ANGLES. See letterpress, page 10

II—OTHER OPERATIONAL FLYING

Enemy Shipping, December to February

Biscay Area

The various types of traffic in this area have remained unchanged, but there has been some decline in activity, which has not been entirely due to seasonal causes.

In the iron ore trade, for instance, shipments by the numerous small vessels engaged between Bilbao and Bayonne, have been much restricted throughout the period, and over the major part have probably not averaged more than 1/2 sailings per day, as compared with 5/7 when traffic is normal. There seems little doubt that mining in the Bayonne area has been the primary cause of this decline, and it is virtually certain that there was some obstruction in the mouth of the Adour river for a time.

Of the larger ore carriers, which sail between Bilbao and Bordeaux, the Spanish *Kaudi*, 3,157 tons, and the German *Scharlachberger*, 2,844 tons, have continued to operate, also at a reduced scale. The intention of the Germans to ship a greater volume of ore is indicated by the addition of three newcomers to the traffic, namely, the *Baldur*, approximately 4,500 tons, the *Nordfels*, 1,214 tons, and the *Livadia*, 3,094 tons—all German ships. There is reason for believing that one of them suffered some damage during January.

The loss of iron ore from French North Africa, to the tune of 25,000 tons each month, and the decline that took place in shipments from Sweden throughout 1942 (referred to later), will have made the enemy more anxious than ever to maintain his shipments of Spanish ore to French ports. The interference in the Bilbao traffic must therefore be viewed with satisfaction.

The contraband trade in general goods, carried on between Portuguese and Spanish ports and Bayonne, continued without any important change.

Following the considerable activity in Far Eastern blockade running in November (see Review No. 7), there has been some diminution in the scale of effort in this direction during December–February. There was only one attempt at evasion from a French port and only two incomers from the Far East have tried to reach Bordeaux. All these attempts failed. The attempt to break out was made by the tanker *Germania*, 9,851 tons. She evaded our Bay patrols in a patch of bad weather, but on 12th December, she was intercepted by surface forces some 300 miles west of Finisterre and scuttled herself. She was undoubtedly on her way to pick up vegetable oil in the East. She was probably carrying nothing of consequence on her outward voyage.

Of the two incoming ships, the first was the *Rhakotis*, 6,754 tons, whose interception and sinking on New Year's Day, after air and sea co-operation, are referred to at length on pages 20–22 of this number of the Review. Similar excellent co-operation, by air and surface forces, led to further success on 26th February, when the inward bound, ex-Norwegian tanker *Herborg*, 7,892 tons, was engaged and sunk some 500 miles

west of Finisterre. The *Herborg* was completing a voyage similar to that for which the *Germania* had been intended, and was carrying vegetable oil from the East Indies, as a contribution to Germany's margarine ration. If she was loaded to capacity, her destruction has denied the enemy oil sufficient for the manufacture of a month's ration for the entire civilian population of Germany. The incident is referred to on page 13, and photographs of the final stages of the operation will be found opposite page 12.

Other movements in the Bay area have been comparatively few. The two most interesting were the return in December of the 10,000-ton tanker *Antarktis*, from Vigo to Nantes, and that of the 9,000-ton tanker *Spichern*, which it will be remembered, was damaged by a Wellington of 172 Squadron in November, and forced to take refuge in Ferrol. She left that port early in January, in an unrepaid state and was located in dry dock at Brest a little later. Other movements were the arrival of the ex-British tanker *Canadolite*, 11,310 tons, at Donges, and the *Monsum* (ex-Norwegian tanker *Sandefjord*), 8,040 tons, at Nantes. At the time of their moves, both of these latter ships and the *Antarktis* may have been intended for dispatch to the east to bring vegetable oil. Their inactivity since their arrival in these ports suggests that there has been a change of programme.

Channel Area

The last of the larger ore carriers to be withdrawn from the Biscay trade, the *Leesee*, 2,654 tons, passed up the Channel by stages in December and reached the North Sea. Her passage seems to have completed the programme of transfers for the time being.

The most interesting movement in the area was the arrival in Boulogne early in February of a 5,000-ton *Togo* type vessel. From observation of her refit in Stettin, and of her general appearance, she was evidently intended to function as a raider. Her importance was clearly indicated by the movements that took place before her arrival, which resulted in one of the heaviest escort forces seen for months, concentrating in the various ports she should have visited on her way through the Channel. There was also a strengthening of the ground defences in the area with additional rail-borne flak. An attack carried out by Whirlwind bombers of Fighter Command just after she and her escort passed Boulogne at night, forced her to turn back. After a few days in Boulogne, and some more spent in Dunkirk, during which she was heavily but unsuccessfully bombed, she once more returned eastwards.

Hook-Elbe Area

This is the area most affected by seasonal causes, since 90 per cent. of the westbound cargoes normally carried consist of Swedish iron ore. The major part of this comes from ports in the Gulf of Bothnia, which freeze annually from the end of December to May. Although this

winter has been milder, by far, than the preceding three, cargoes of Swedish ore have ceased for the time being, except for those coming from the Norwegian port of Narvik and South Swedish ports.

In consequence, there has recently been a marked decline in the volume and frequency of the convoys operating in this area. Abnormally rough weather throughout part of the time has been a further limiting factor. Rotterdam has on the whole remained comparatively active, but Emden, the next most important North Sea port, has relapsed into almost complete inactivity. This is unlikely to change for the next month at least.

The year 1942 ended with German imports of Swedish iron ore (of which more than half is moved through Rotterdam and Emden), showing a decline of a million tons, compared with 1941. This decline, brought about by a shortage of suitable tonnage, cannot be pleasing to the enemy. The shortage has been caused by attack by air and surface forces and minelaying, proving the value of such operations against shipping in these waters.

The *Togo* type raider, referred to earlier, was also sighted in this area when she was on her way both to and from the Channel. The former occasion was on 8th February, when she was accompanied by a large sperrbrecher, four "M" class minesweepers, and three auxiliaries, proceeding at an estimated speed of 12 knots. On 28th February, when she was again sighted, but this time eastbound, she was in the mouth of the Elbe, escorted by seven "M" class minesweepers. She has since reached Kiel.

There has been little change in the behaviour of the shipping using the Hook-Elbe route. The eastbound convoys still favour the forenoon, around 1000 hours, for leaving the Hook, and most of those westbound seem to have aimed at reaching the Hook before nightfall, although bad weather may have delayed a few.

Reference has been made in this and earlier numbers of the Review to individual attacks made in this area during these three months. It is now

known that one carried out by aircraft of 320 Squadron on 18th January, off Terschelling, resulted in the sinking of a 1,600-ton ship.

Norwegian Area

There has been no freezing of the approaches to the Baltic this year, so that traffic to and from Norway has not been forced to use the alternative route, down the west coast of Denmark, as in early 1942. It has continued to use the Kattegat, Belts, and Kiel Canal throughout.

But the winter may have had some effect on shipping in the Norwegian area because there were big concentrations of shipping at Kristiansand S. and Stavanger by the end of February. Part of this may have been southbound traffic, delayed by the mining of the approaches to the Baltic and along the Dutch coast. Part was probably shipping that would normally have gone to Swedish and Finnish ports that are now icebound.

Traffic in the area appears to have been greater than a year ago. Indeed, it was expected to be, since the decline in iron ore imports from Swedish ports and the loss of those from North Africa, forced the Germans to ship more from Narvik. This they seem to have been trying to do.

A seasonal traffic is now in full swing (and will continue until the end of March) in connection with the transport of iced herring from Norwegian to Danish and German ports. Ships normally engaged in other traffic are taken over for this work, the majority being between 800 to 1,500 tons, with an occasional larger one. Since these cargoes are highly perishable, the vessels load day and night and rarely wait for convoys, but proceed alone as soon as they are ready. The 3,500-ton ship sunk by Hampdens of 455 and 489 Squadrons off Egero on 29th January, was probably refrigerated, and she may have been on her way to carry one of these cargoes. If this is so the enemy has not only lost a valuable ship, but the German civilian populace have been deprived of an appetising cargo. It is consoling to conclude that as there was no other means of transporting the herrings to Germany, they may have reverted to the Norwegians, for whom God intended them.

Torpedo Attack

Hampden O/415 was dispatched to carry out a torpedo strike by night on a convoy previously reported off the Dutch coast. At 2200 hours, flares and flak were sighted and a number of vessels were seen through the haze. The Hampden manoeuvred for position to attack and at 2207 hours, approached two M.V.s, one of about 4,000 tons, with a second of unknown tonnage, echeloned behind her. The approach was made from the port side just before the beam, and the 4,000-ton ship was selected as the target.

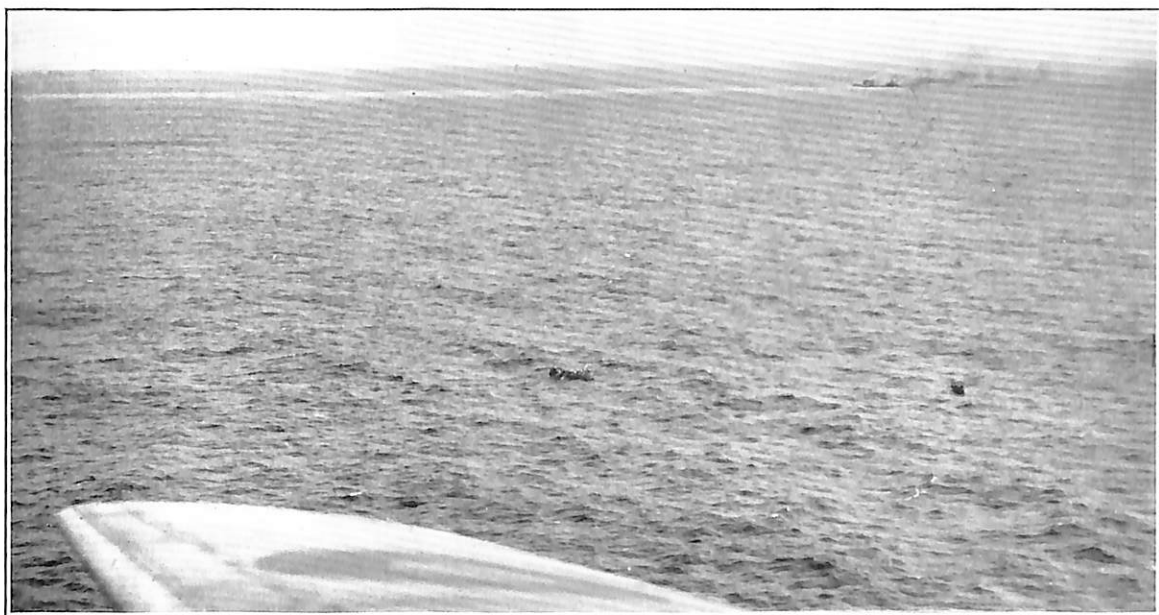
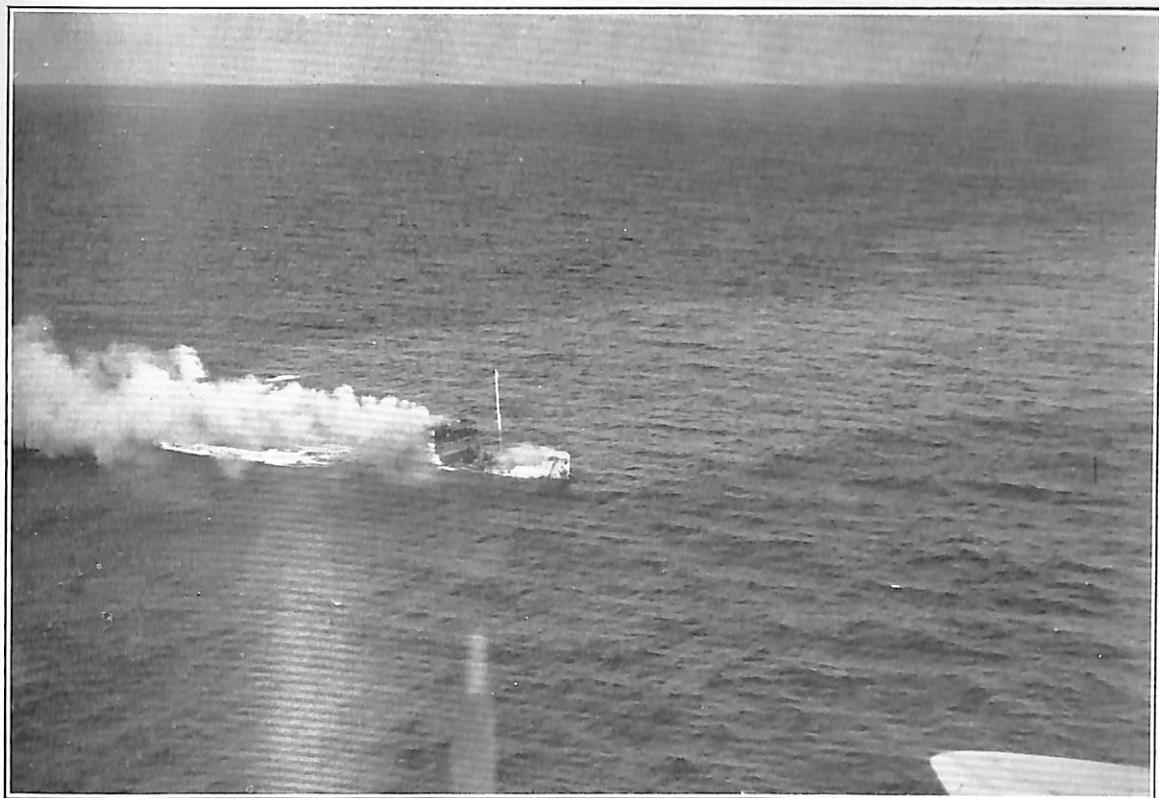
During the approach the convoy opened up with accurate and concentrated light flak, with tracer of all colours. O/415 was hit immediately, but carried on with her attack, dropping her torpedo from 700 yards.

Violent evasive action was taken shorewards and the aircraft then turned westwards and passed over a number of other ships, which put up a concentrated barrage. One, believed to be a Sperrbrecher, put up a tremendous barrage from

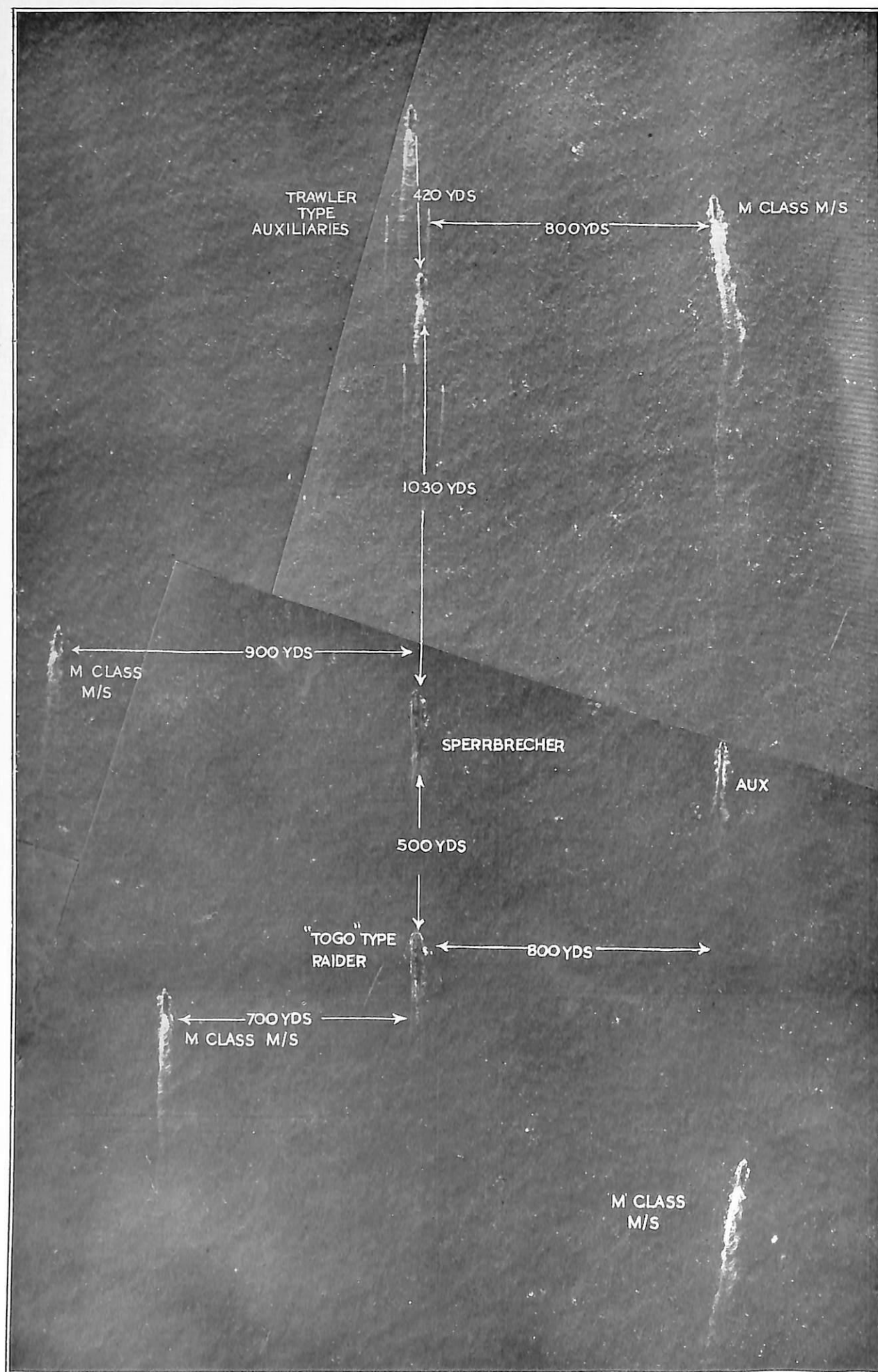
numerous multiple pom-poms and the Hampden was hit in many places by her fire.

The two gunners looked back and saw a vessel of 4,000 tons on fire in the bows, which indicated a possible torpedo hit as no fire had previously been seen.

O/415 had rudders, fins and elevators partly shot away, wing tips damaged or shot away, and numerous holes in the fuselage and perspex. The aircraft set course for base. The compass and W/T receiver were damaged and u/s and the port engine caught fire intermittently and eventually stopped. The starboard engine was running erratically. The Hampden was ditched on the return journey and sank, the crew taking to the dinghy. Searches were carried out by Beaufighters, Hudsons and Ansons on the following day, but they were unsuccessful. Next day the crew were seen by a Beaufighter on A/S.R. duties and were later picked up by a Walrus. They were unhurt.



As referred to in the Shipping Notes on p. 11 and again on p. 13, Fortress C-59 was present at the destruction of a blockade-running tanker. The top photograph shows the burning tanker. In the middle one some of the survivors may be seen leaving the doomed ship. The lower photograph shows the last stage.



The convoy in which the "Togo" type raider was escorted, seen on 8th February off Bergen Aan Zee (P.R.U.). Heading the convoy are two trawler-type auxiliaries with sweeps out, followed by a Sperrbrecher, which immediately precedes the "Togo." It will be noted that the "M" class minesweepers are being used as escort vessels and not as sweepers.

Assessment of Attacks on Enemy Shipping, November—January

Results of attacks on enemy shipping, as assessed by the Air Ministry and Admiralty Committees, are now available to the end of January, 1943. They are as follows:—

					Sunk or Total Loss.	Seriously Damaged.	Damaged.			
					Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1942—										
November	..	..	..	..	—	—	2	5,000	4	19,523
December	..	..	..	..	—	—	3	9,500	1	2,000
1943—										
January	..	..	..	..	3	6,119	1	2,000	4	10,000
Totals since 1st March, 1941					58	164,017	61	154,849	156½	543,898

Sinking of an Enemy Tanker

At 0947 on 26th February, some 450 sea miles west of Finisterre, aircraft "G" of No. 1 U.S.A. Anti-Submarine Squadron, sighted an enemy tanker 12 miles ahead proceeding, when sighted, on a south-easterly course. The ship took violent evasive action and made numerous alterations in course, continuing generally in an easterly direction.

The aircraft started homing procedure and, while sending reports back to base from time to time, continued to shadow the tanker until mid-day. P.L.E. being reached, it was forced to leave the ship, which was then sailing almost due east.

The cruiser *Sussex*, on patrol in the Atlantic, was diverted to intercept and investigate, and she sighted the tanker with a F.W.200 overhead. At 1600 hours she engaged her with gunfire and set her alight. The tanker sank at 1810.

While searching for the tanker, Fortress C/59 sighted and engaged a F.W.200 at 1655. Having broken off the combat and resumed patrol, the Fortress sighted the tanker at 1745, well afire and sinking. Four lifeboats were seen with about 50–80 survivors, 2 miles north of the burning tanker. The Fortress took photographs and signalled "Tanker sunk" at 1810.

Liberator Z/224, though taking no actual part in the tanker action itself, nevertheless had an eventful and successful patrol. At 1115, it attacked a U-boat a few miles from the position of the tanker and on the way home, at 1626, sighted and attacked another some 300 miles to the north-east.

Photographs establish that the tanker was the Norwegian *Herborg*, referred to in the shipping notes on page 11.

Combats with Aircraft

Aircraft Z of No. 143 Beaufighter Squadron while on patrol in conditions of poor visibility on the Dutch coast sighted what was at first thought to be a small boat. When at a distance of 700 yards the object proved to be an aircraft flying at 300 ft. on a reciprocal course. Aircraft Z kept closing and at 400 yards identified the aircraft as a Ju.52. Z immediately carried out a head-on attack at 20 degrees on the enemy's port bow, opening fire with a one-second burst of machine-gun fire. This was followed up by a two- to three-seconds burst of cannon and machine-gun fire, closing to 100 yards. Aircraft Z then broke away below and behind the enemy aircraft.

During the engagement strikes were observed on the port side of the aircraft in the pilot's cockpit. The enemy aircraft did not attempt evasive action. The observer of aircraft Z saw the enemy aircraft climb slightly and then go into a shallow dive until the port wing hit the sea. The aircraft burst into flames and disappeared.

Aircraft B of No. 235 Beaufighter Squadron was flying at sea level on a reconnaissance off the

Norwegian coast when it sighted a F.W.190 at 1,000 ft., apparently in pursuit. Aircraft B turned to starboard and was climbing to evade when a second F.W.190 was seen, attacking at quarter stern. Beaufighter B took violent evasive action out to sea. Several attacks were delivered by both the enemy aircraft from port and starboard between full beam to stern, so that there was no opportunity for the Beaufighter B to reply. One F.W.190 opened fire from 600 yards to 150 yards and expended all his ammunition without damaging B. The other enemy aircraft fired short, accurate bursts from 300 yards to 100 yards, maintaining these attacks for 28 minutes.

Beaufighter B's evasive tactics were to turn in to beam attacks and climb and corkscrew during stern attacks, which proved successful in evading the enemy's stern diving attacks. During one attack, both enemy aircraft attacked simultaneously from quarter port and starboard. The navigator of aircraft B flashed an Aldis lamp which dissuaded them from opening fire. This was successful only once. The last two attacks delivered by one F.W.190 were without firing. It then flew alongside aircraft B, gave the pilot a

"V" sign and broke away and flew off on an easterly course.

This pilot considers that his success in evasion was due solely to the evasive tactics as taught and practised with the Coastal Command Spit-fire Circus.

Aircraft M of No. 235 Beaufighter Squadron on a shipping reconnaissance on the coast of Norway was approaching a group of islands at a height of 50 ft. to recon. ships anchored in Hjelt Fjord, when an enemy aircraft, identified as a Blohm and Voss 138, was seen one mile away flying at 500 ft. At this moment shore batteries opened fire with light flak and aircraft M began weaving and climbing to avoid the fire. At the same time M turned to port to come out of the sun on to the tail of the enemy aircraft. When at 300 yards dead astern aircraft M opened fire with cannon and, closing to point-blank range, delivered a second burst. The enemy aircraft went into a gradual dive with smoke issuing from the centre engine, which burst into flames. It then made a steep dive, apparently out of control, and plunged into the fjord.

Some of the crew were seen falling into the sea before the aircraft hit the water. When about to attack, aircraft M received a hit on the starboard wing from a 20 mm. shell from the shore batteries. This necessitated putting on full port aileron trim.

Aircraft G, F and H of No. 248 Beaufighter Squadron on patrol in the Bay of Biscay sighted four Ju.88s four miles away on the port quarter, up sun. On sighting the enemy aircraft coming out of the sun on the port quarter, the leader, in aircraft G, led the formation into a climbing turn to port with the object of getting above the enemy aircraft. The Ju.88s immediately formed a wide defensive circle beneath. Aircraft G dived to attack one from 1,500 ft., but had to turn to meet the beam attack of another. In doing this he found himself in a position to make a quarter attack on another enemy aircraft. Aircraft G opened fire at 200 yards, closing to 50 yards dead astern in a steep turn. The enemy aircraft turned over the vertical. Aircraft G was unable to follow and overshot the enemy aircraft's tail whilst doing a steep turn. On completion of the turn aircraft G saw the enemy aircraft spiral into the sea and disappear immediately. At the same time he saw another aircraft burning on the water, on the port side.

Aircraft F followed aircraft G in the climbing turn and also followed down in its attack. Seeing another Ju.88 in a position liable to attack him he opened fire from point blank range estimated closing from 100-50 yards. The Ju.88's port inner tank exploded in flames and aircraft F just managed to avoid a collision and watched the Ju.88 dive into the sea. Aircraft F then climbed again into the sun, preparatory to a further attack, but could see only Beaufighters.

Aircraft H followed aircraft G and F in the turn to port. When at a height of 800 ft., and a good way below aircraft G and F, he observed a Ju.88 behind, at the same height. It was firing from a range of about 800 yards. Aircraft H steepened his turn and on the second turn round, saw a Ju.88 in front and slightly below. He dived and delivered

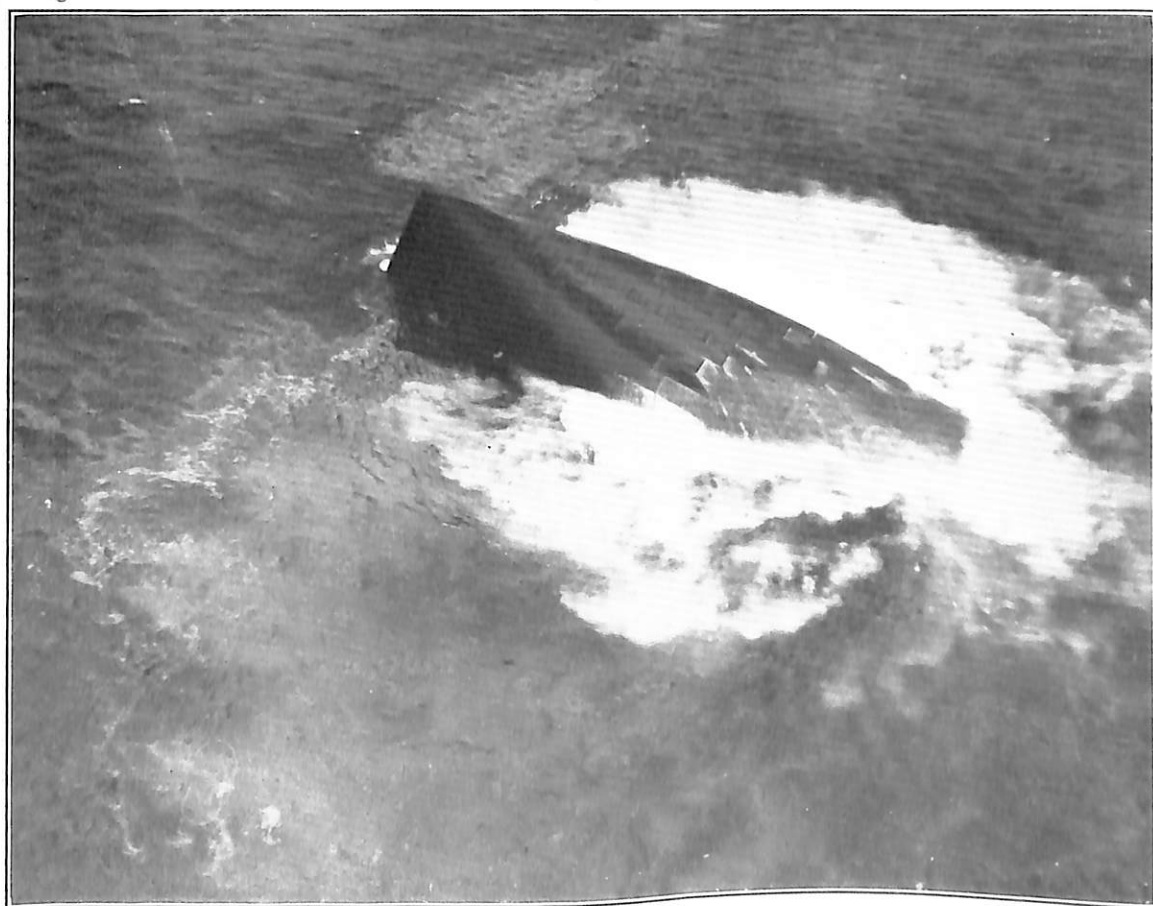
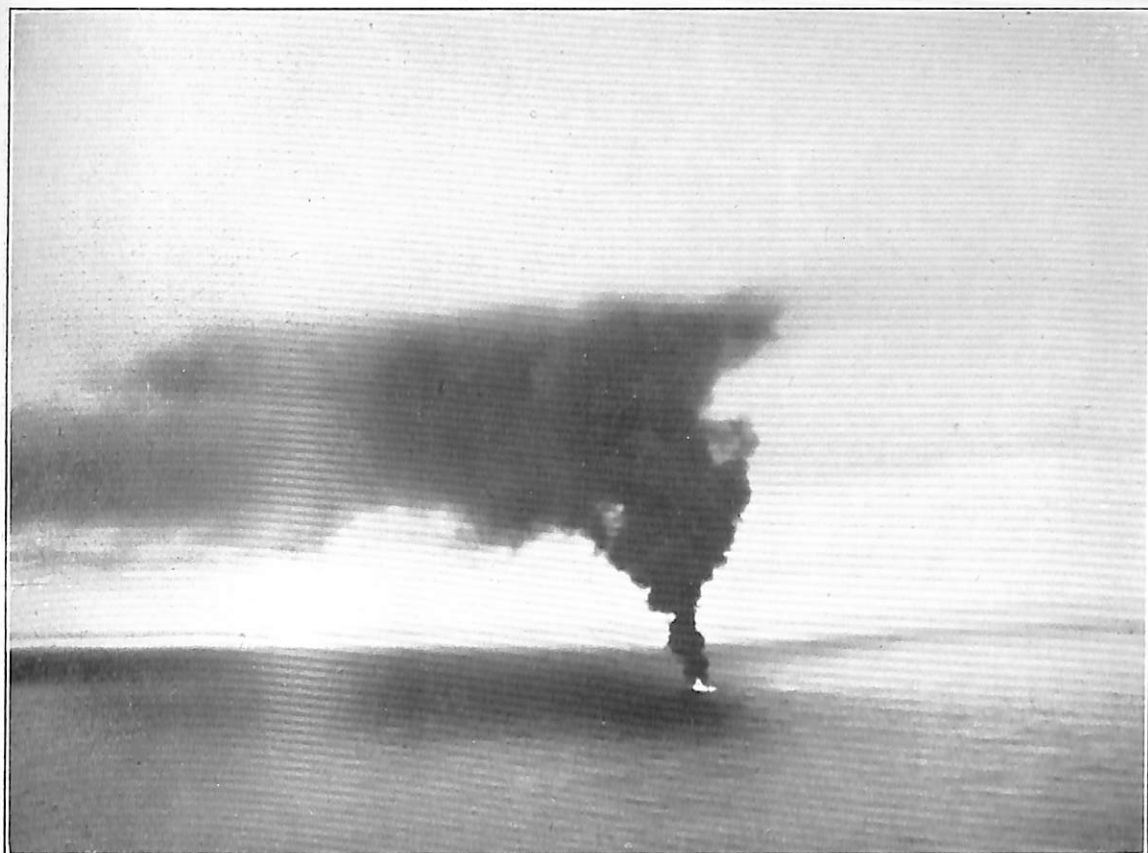
a machine-gun attack from port quarter above, at about 350 yards range. The enemy aircraft returned fire from the dorsal top gun. Continuing his turn, aircraft H made another steep turn to port and saw two Ju.88s approaching head on, at a distance of half a mile. One turned to starboard and the other continued to climb, firing as it came. Aircraft H opened fire with cannon and machine-gun at 450 yards, allowing one ring deflection, and closing. When at about 200 yards range the Ju.88's port engine exploded and broke away from the aircraft, the engine going above the starboard wing of aircraft H and the aircraft below. On completion of the turn to port aircraft H saw the enemy aircraft glide down and hit the water. The enemy aircraft remained afloat for a short time.

The combat report given to the intelligence officer by this pilot from Texas, who was on his first operational sortie, was as follows:—

"I was a-commin', he was a-commin'—he was a-shootin', I was a-shootin'—and he got it!"

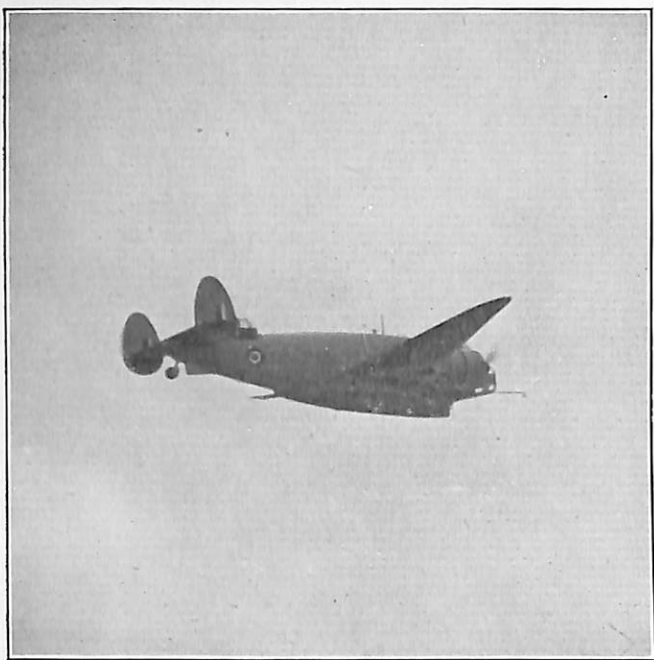
Sunderland aircraft N of 461 Royal Australian Air Force Squadron was on anti-submarine patrol when it observed two Ju.88s and two F.W.190s attacking from the port and starboard quarter. Aircraft N used corkscrewing tactics at heights varying from 2,000 to 4,000 ft., with violent similar changes of height and speed of 140 to 200 knots. The Ju.88s attacked together in a shallow dive, down sun, on both quarters, while the F.W.190s made one simultaneous attack, one from port quarter and the other from cloud on the starboard bow. One F.W.190 then made two beam attacks, followed by an attack on the starboard bow. During their first attack the Ju.88s opened fire at 1,000 ft. with cannon and machine-guns, closing to 400 ft., crippling the hydraulics of the rear turret which afterwards had to be operated manually. The rear gunner of aircraft N opened fire at the starboard Ju.88 at 600 ft. range. The Ju.88 attacking on the port was not replied to and it scored some hits with cannon and machine-guns on the control surfaces and hull of aircraft N. Aircraft N then dived into 4/10 strato-cumulus cloud and did steep turns in the cloud. On emerging, it was immediately attacked by the two F.W.190s which opened fire at 1,000 ft., closing to point-blank range. Aircraft N dived towards and past the F.W.190 on the starboard bow into another cloud, and the F.W.190 fired in a climbing turn, obtaining hits on aircraft N. The midship gunner of aircraft N fired 200 rounds at this aircraft and claimed hits. Meanwhile, the other F.W.190 attacked from the port quarter in a shallow dive, opening fire and closing to point-blank range. The tail gunner returned the enemy fire. The rear gunner, who fired 400 rounds at this enemy aircraft, claimed many hits and damage to the enemy aircraft. It went into a steep dive and, half inverted, disappeared into cloud and was not seen again.

During the three attacks by the remaining F.W.190, aircraft N combined violent corkscrewing with the tactical use of the available cloud cover and thus rendered two of the attacks ineffectual. Forty minutes elapsed between the first attack by the Ju.88s and the last attack by the remaining F.W.190.

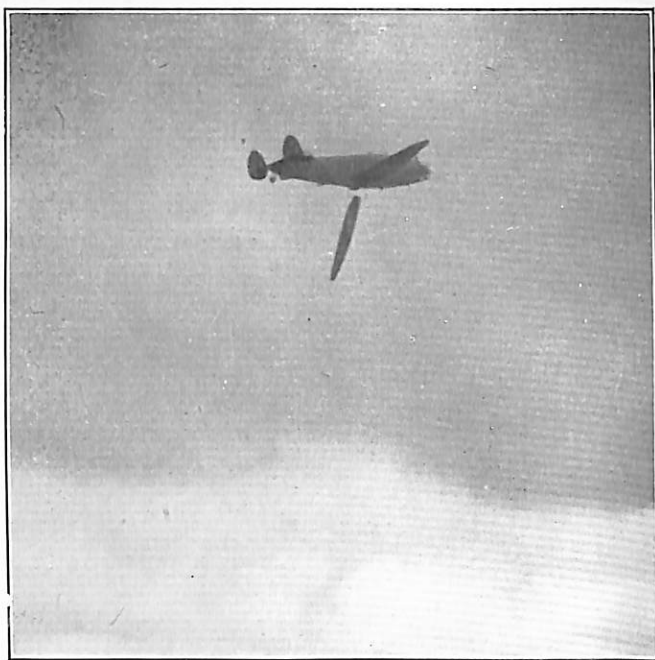


WHAT THE ROYAL NAVY AND COASTAL COMMAND ARE WORKING TO PREVENT.

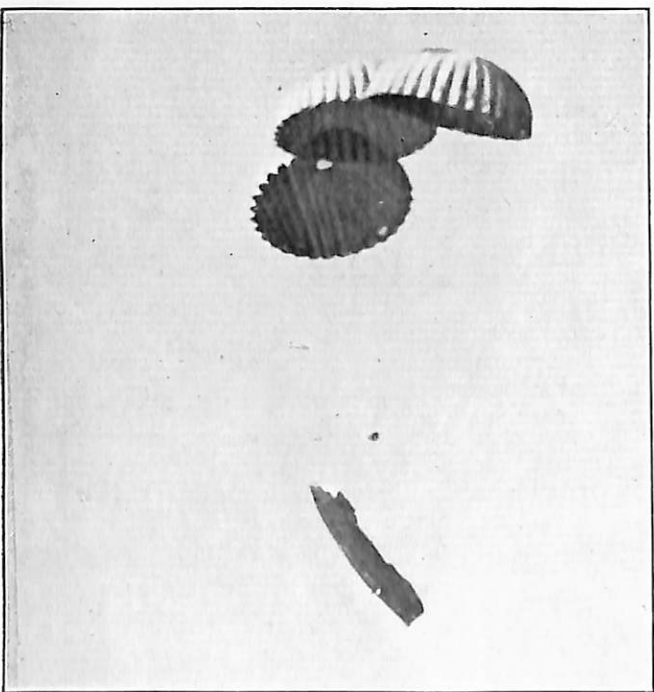
The top photograph shows a burning ship after attack by a U-Boat.
The lower photograph is of another torpedoed Allied ship that capsized before sinking.



1



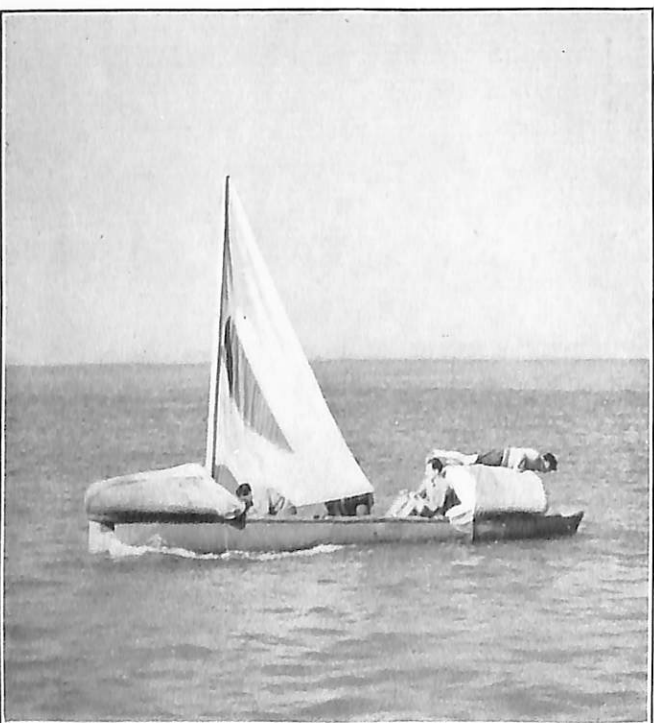
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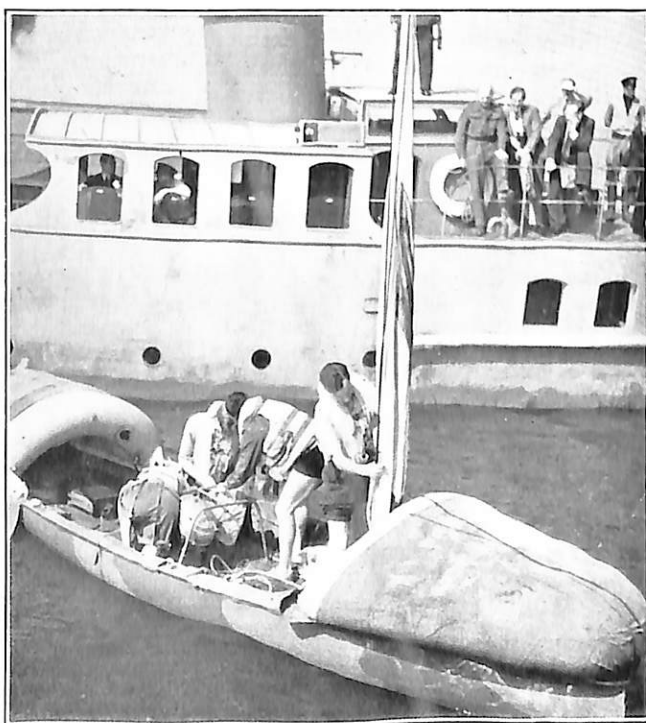
3



4



5



6

Photographs 1, 2 and 3 show an air-borne life-boat being released from a Hudson aircraft. Photographs 4, 5 and 6 show the life-boat with sails set and in operation.

III. SPECIALIST AND GENERAL ARTICLES

Air/Sea Rescue

Air/Sea Rescue, which came into being some time after war was declared, is now doing a most important duty in the war.

But the Air/Sea Rescue Service cannot help to the full unless members of aircrews are aware of their own duty in time of trouble. The following article traces the history of Air/Sea Rescue and sets out to help all concerned to appreciate what is being done to lessen risk and danger in the event of a forced-landing in the sea.

Before the present war began, aircraft which forced-landed upon the sea were mainly dependent for help and rescue upon the same services as ships in distress. These services were the Royal Naval Lifeboat Institute, salvage tugs and vessels at sea. In addition, the R.A.F. had a few high-speed launches for going to the assistance of forced-landed aircraft, and some light craft at the bombing and gunnery ranges, used as range safety boats. They were not intended to go to sea although they did so occasionally. All the R.A.F. craft were under the jurisdiction of the local station commander. If an aircraft distress message was received in peace-time, the station operating the boats would order them to sea, if circumstances permitted, and if the scene of the forced-landing was within range. The parent station of the aircraft was responsible for informing the Naval Commander-in-Chief in whose area the forced-landing had taken place, and for having W/T broadcasts sent out by the G.P.O. stations responsible for working with merchant shipping.

These arrangements were sufficient in peace-time because land 'planes, especially single-engined aircraft, seldom flew over the sea and when they did so, they did not fly far from the coast. Forced-landings were primarily caused by engine failures and as the mechanical reliability of engines increased, and as flying in very adverse weather was seldom necessary, there were few forced-landings at sea. If an aircraft was in need of help, all the international services were available. In home waters, where there was a great deal of merchant traffic, help was usually at hand.

The Beginning of the War

On the outbreak of hostilities, most of these facilities were greatly reduced. Aircraft of all types were obliged to fly a great deal over the sea and the possible causes of forced landings were increased by enemy action and adverse weather. Aircraft known or suspected of having landed in the sea were searched for by aircraft of their parent station, or aircraft from the same area. If they were located, naval craft or R.A.F. craft were relied upon to carry out the rescue.

During the Battle of Britain a rescue organisation was formed at Dover, utilising the services of a few R.A.F. high-speed launches and light operational naval craft, loaned for the purpose. Lysander aircraft were borrowed from Army Co-operation Command. The success achieved in rescuing airmen from the sea during the Battle of Britain was encouraging.

In February, 1941, the Air Ministry decided to form an Air/Sea Rescue Service which would be responsible for organising and co-ordinating all means of rescuing. This directorate was originally located at Coastal Command headquarters, but in August of 1941 it was moved to the Air Ministry. In September, 1941, the Directorate-General of

Aircraft Safety was formed and the Directorate of Air/Sea Rescue Services became a branch of the D.G.A.S. It is now known as the Deputy Directorate of Air/Sea Rescue.

Division of Responsibility

Responsibility for operating the Air/Sea Rescue Services was divided between Fighter Command, Coastal Command and the naval commanders-in-chief. Fighter Command were made responsible for close search around the coast, Coastal Command for deep search beyond the fighter zone, and the naval commanders-in-chief for the operation of all surface craft, including those manned by the R.A.F.

Fighter Command search aircraft were organised on a squadron basis and stationed at coastal aerodromes. These were Lysanders and they carried dinghies on their bomb racks, which would be dropped to airmen in the sea. Their main function was to locate the forced-landed aircrew and to guide surface rescue craft to the scene. In addition to the search aircraft, Fighter Command were also provided with amphibian aircraft for alighting on the sea and picking up crews. Naturally they could not be used for this purpose unless the sea was reasonably smooth.

Coastal Command were obliged to make use of their operational aircraft for the deep search and to supplement these by calling upon Bomber Command aircraft for help. Special deep search squadrons are now attached to Coastal Command. Their sole duty is search and rescue operations. They are equipped with every necessary device and their crews are specially trained. Although these special Air/Sea Rescue units are ready to take off at the first hint of distress, they are at times used to the limit of their capacity and it is still necessary sometimes to call upon operational units to play a part. The surface craft for Air/Sea Rescue consist of R.A.F. high-speed launches, pinnaces, seaplane tenders and rescue motor launches. There are also naval air rescue boats, motor gun-boats, motor anti-submarine boats, motor launches, in fact, in an emergency, any sea-going craft that happens to be available. These rescue boats are stationed both at home and abroad, wherever Allied aircraft fly over the sea. On many occasions, destroyers have steamed hundreds of miles into the Bay of Biscay, out into the Atlantic or into the Mediterranean, to effect rescues.

The Ministry of Aircraft Production

At the same time that the Air/Sea Rescue organization was being built up, technicians in the Ministry of Aircraft Production tried to improve the life-saving equipment carried in aircraft. Pneumatic dinghies had long been in use in flying boats and Fleet Air Arm aircraft, but it was only just before the war that thought was given to their

development for all types of land planes. At first these dinghies were carried loose in the fuselages of the larger types. Subsequently, proper storage was provided and automatic operation for inflating the dinghy, when the aircraft landed in the sea, was developed.

Later still, the problem of providing the single-seater pilot with some means of remaining afloat, in addition to the life-saving waistcoat, was solved. It is probably true to say that this invention, known as the "K" type dinghy, has been responsible for saving more lives than any other device since the introduction of the parachute.

Improvements

Other improvements are constantly being introduced into the service, such as the W/T transmitter, carried in the dinghies of the larger aircraft, and the telescopic mast and rocket kite for supporting the W/T aerial and for helping surface craft to locate dinghies. Two other questions which have been solved are the carrying of food and water in aircraft, for use in dinghies, and the introduction of a set dinghy drill. Food must be sustaining, with the maximum food value in the smallest possible bulk. It must be easily digested and must not promote thirst. It must be equally suitable in either hot or cold weather conditions. The storage of drinking water has always been a difficulty, because of the quantity required and the fact that its bulk cannot be reduced. Its taste is readily affected by the type of container and the length of time it has been stored. This problem has now been solved in two ways, *i.e.*, by canning water in sealed tins, and by making salt water drinkable.

Two more aids to crews who have ditched have now come into the service. One is the "Q" type pneumatic dinghy. This can be stowed in the place of the round-shaped "J" type. It is shaped on the lines of a whaleboat and has mast, mainsail and foresail. The mast plugs through a hole in the bottom and forms the leading edge of a canvas keel. It is practically foolproof and sailing instructions are incorporated in the stowage, together with compass and charts.

The other is the Air-borne Lifeboat (*see illustrations, Plate 9*). This is carried underneath the bomb bay of Air/Sea Rescue aircraft, and is dropped to ditched crews to enable them to escape if their ditching has taken place near enemy shores. It is dropped by three parachutes and on boarding it, the crew find mast, sail, and two petrol oil engines capable of carrying them over 100 miles, at approximately five knots. In its waterproof lockers are a compass, charts, warm clothing, heating bags, dinghy radio and sustenance to last a crew of seven for at least a week. The dinghies are made of mahogany, and no matter in what position they enter the sea, their buoyancy chambers immediately turns them on to an even keel.

Dinghy Drill

The importance of carrying out correct W/T ditching procedure at the first sign of trouble cannot be too strongly stressed.

Immediately there is doubt as to whether base may be reached, the Wireless Operator should be instructed to call up on the operational frequency

giving estimated D/R position, and then change to the appropriate M.F./D.F. frequency, sending out frequent S O S's to enable the ground station to obtain a series of fixes. When about to ditch, the "X" signal, "Am reeling in aerial to land," should be transmitted and, before taking up his ditching station, the Wireless Operator should screw down his key. The first part of the ditching has now been carried out correctly. The position of ditching is known, and the Air/Sea Rescue machinery is in motion. The next and most difficult job is to get the aircraft on the water as gently as possible. Each member of the crew must be in his correct ditching station, with his allotted dinghy equipment to hand, or better still, attached to his person. All should be braced, the pilot's Sutton harness secured, and no one should relax until the aircraft has come to rest. Do not relax at the first impact. It is the second and final one that is most severe and most likely to cause injuries. After the second impact and the aircraft has come to rest, each member of the crew should leave the aircraft in the correct order, with his allotted dinghy equipment, *i.e.*, emergency pack, dinghy radio and pyrotechnics. It is essential that a Very pistol and cartridges should be taken aboard the dinghy. A dinghy pistol and cartridges in waterproof tins are now provided in emergency packs but, if time permits, it is obvious that the more pyrotechnics available the better are the chances of being found. Aircraft of the Air/Sea Service search both night and day, and continuous watches are kept at the four area Combined Headquarters and Headquarters, Coastal Command.

Co-operation of Crews

The growing success of Air/Sea Rescue naturally influences the morale of members of the Command who now realise the extent of the efforts made to help them. But, as we have pointed out in the introductory note to this article, chances of rescue are increased with the co-operation of crews who are in distress. In that hour, their drill will stand them in good stead. It is remarkable, in studying the files of reports, to see how discipline and drill have contributed to the saving of life.

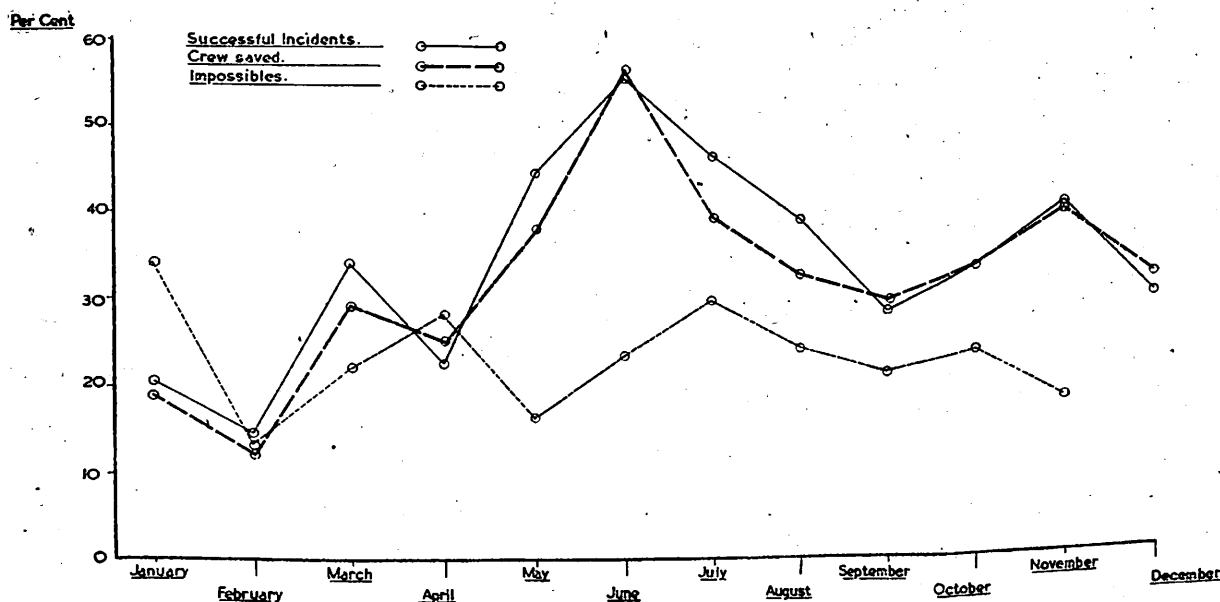
The landing of an aircraft at sea, even under ideal conditions, is more difficult than the layman supposes. Bad visibility, darkness and a rough sea, add to the difficulties. Obviously it will be impossible to rescue any crews unless they are afloat. The first essential, therefore, is a successful landing.

Secondly, when the aircraft has alighted successfully it must be made to float at least long enough to allow the crew to get into their dinghy.

Thirdly, the dinghy must be located. Finally, a surface or amphibian craft must be able to reach it to effect the rescue.

It is remarkable that there have been so many successful landings in the sea; but it is reasonable to assume that there are a certain number which are not successful, because the aircraft struck the water too violently, because it sank before the crew could make use of the dinghy, or because the dinghy drill was not efficient enough for the crew to abandon the aircraft in the time available. Practice landings on the sea in land-planes are not feasible and, judging by the number of successful landings, sometimes in spite of difficult conditions, it does not seem to be necessary. The lessons that

Chart showing percentage of Air Sea Rescues carried out during 1942.



have been learned indicate that some types of aircraft float longer than others. The crews of these aircraft naturally have more chance of being saved than those in types that sink immediately.

It is obviously impossible to ensure that every aircraft can be made to float indefinitely, so the emergency dinghy will always be necessary. The necessity of ensuring that this gear is efficient and that crews are trained in its use will therefore remain.

Dinghy Drift

The operation of saving lives of the crew does not end when they have succeeded in getting into the dinghy, for this will change its position under the influence of wind and tide. Dinghy drift is a complex subject and it forms the subject of a special article in the next issue of the *Coastal Command Review*.

Dinghies are small, whether viewed from the air or from the sea level, and therefore difficult to locate. Aircraft must fly low to find them and the range of vision is consequently limited. A surface craft is even more handicapped in its search because of the limited vertical surface of the dinghy above water.

W/T Transmitters

The difficulty of locating dinghies is being overcome by providing a W/T transmitter so that rescue craft may home on it, a telescopic mast with a flag that may be used to attract attention, a kite which can be seen by day and which carries up the W/T aerial, and pyrotechnic signals, which are being waterproofed.

Communications play a very important part in Air/Sea Rescue. The information regarding channels of communication and procedure is published from time to time in Confidential Orders.

Speed is vitally important if a rescue is to be effected. Failure to understand the organisation of the services provided for rescue may result in unnecessary loss of life.

A special frequency, 385 kc/s, has been instituted for the use of searching aircraft. Surface craft also use this frequency, changing over to their port wavelength 5 minutes before the hour and half hour. With the introduction of the dinghy radio, searching aircraft will also listen out for stated periods on 500 kc/s.

A number of experiments have been carried out with A.S.V. in the hope that aircraft searching during bad visibility may pick up a dinghy on their screen. These have now reached an advanced stage.

Directly an S O S is received, it is passed by land lines, if they are in order; failing this, by W/T to the appropriate A.C.H.Q. who immediately organise a search with Air/Sea Rescue aircraft belonging to their Group, aided, if necessary, by aircraft from their nearest Bomber Group. Surface craft are warned to stand by. H.Q.C.C. are informed and they assist when necessary. D.D.A./S.R. has all the information passed to him at various times during the day. The fighter M.L.O.s are consulted, also the Observer Corps, in case they have information which may tie up with the incident.

The Pigeon Service

The R.A.F. has a first-class pigeon service at its disposal. It can be of great help in saving lives, if it is used correctly, in conjunction with other methods of communication, or alone if they have failed. If possible, a crew about to ditch in daylight should release the pigeon whilst they are still airborne. If in darkness, the pigeon container should be taken on board the dinghy and the message should be prefixed with the letter "D," meaning, *Released from dinghy*. Each pigeon issued to aircraft already carries a pigeon S O S message (Form 1326) with aircraft number, date and crew of station (C.C.O.52/1940). If released in the air, the message should contain the following information: *A/position/time of origin*. If released from the dinghy it should read, *D/time of ditching/time of release*. If the crew in the dinghy still have a pigeon available, and if

searching aircraft are visible but have failed to locate them, this pigeon should be released with the following message, *D/SV 270 deg./3/1315*, meaning, *From dinghy/search is visible 270 deg. three miles have not seen us/time of origin/1315*. Of all the pigeons known to have been released, over 90 per cent. have reached their base. But it must be stressed that the pigeon is a very poor night flier and that it will park down on the first available object until dawn.

It is interesting to recall the outstanding instance of a pigeon being definitely responsible for locating a ditched crew. On 23rd February, 1943, Beaufort M/42 ditched approximately 120 miles east of the Firth of Forth. One engine had cut at 200 ft., thus giving the Wireless Operator time only to send one S O S. The impact with the water was so violent that the pigeon container broke open. One pigeon escaped and reached land. On working out the pigeon's speed, plus a wind of 30 miles per hour, which had been blowing behind it, it was realised that the search, which had already been made 170 miles out, was at least 50 miles too far from land. Another search was laid on and, within an hour, the dinghy was located.

The first Air/Sea Rescue attributed to the use of the dinghy radio occurred on 4th March, 1943.

A Fortress of No. 1 Wing Bombardment Squadron, U.S.A.A.F., ditched approximately 25 miles north-east of Cromer. The first intimation was an automatic S O S, on 500 kc/s, reported first by Humber radio and immediately tied up with Cullercoats and North Foreland Radio stations. A search was organised and the search aircraft located the dinghies, containing seven live members of air crew, in the position of the fix obtained from the dinghy radio. Trawlers in the vicinity were quickly guided to the dinghies by the search aircraft and the distressed air crew were soon aboard and comfortable.

In Conclusion

The chart reproduced with this article sums up the success of Air/Sea Rescue during 1942. Since the Rescue Service began, one-third of the crews suspected or known to have gone into the sea have been saved. In arriving at this figure, any aircraft that fails to return whilst flying over the sea, whether sea-mining, or on shipping strikes, or any aircraft seen to hit the water with such force that no trace of either aircraft or crew is left, is counted against Air/Sea Rescue. Up to the end of 1942, out of a possible total of 4,821, 1,606 lives were saved by Air/Sea Rescue in home waters alone.

Leaves from a Navigator's Log Book—III

We navigators are in a pretty strong position when it comes to a show-down. At least, the job we do is so vital, and it seems to grow more complicated every day, so we are inclined to feel more or less "fireproof." Every occasion must be judged on its own merits and who knows better than we what really happened on a sortie? As long as we have brought our Captain back home without too much panic, we have been able to forestall criticism with a wide choice of excuses. Perhaps this immunity from criticism has been a bad thing—it usually is, you know.

Whether or not we have got away with the odd spot of slackness in the golden past, we can't count on doing so for very much longer, not the way things are trending at present. One or two "narks" have been putting their heads together, and it looks as if the navigator is in danger of being exposed as the rogue he may sometimes be. It fairly makes us grey to think how lucky we have been to have so far escaped this inquisition. What the wretched aircrew have to put up with to-day is nobody's business. If we could not rely on the navigator's fundamental intelligence, this latest quiz would surely be the straw that broke the camel's back.

Aircraft are not sent, as some may imagine, indiscriminately into the ocean wastes or routed to some foreign shore on a mere impulse. All operations are planned, and the final execution of the plan is of the greatest concern to all, even though it is in the hands of the lowly Navigator. It matters tremendously that each aircraft should proceed precisely as ordered. The utmost value is attached to reports of position, for upon them

depend the future actions of other aircraft and of naval craft as well. The humble Navigator can have no idea of the trouble he may cause by being slack, or presumably he would mend his ways. Yet how can we be sure the Navigator is doing his stuff, when it seems to be so hard to assess navigational performance on Coastal Command sorties?

It isn't as though the final landfall gives any indication of the merit of the navigation. True, if a crew consistently makes a landfall, say, 50 miles out, it would be reasonable to regard the Navigator with suspicion. But this doesn't often happen in practice. Last month we explained how systematic errors cancel out on most sorties, so that we should expect satisfactory landfalls as a normal occurrence, even though the navigation was bad. Besides, there is always the H.F. D/F station only too eager to give you a "Q.D.M.," even if the S.E. beacon doesn't come to your rescue long before that. Indeed, the gentle art of navigating all the way to base is as dead as doornails—killed by "homing"—and it's no good blinking at facts. Homing to base by radio or by eye is so much more convenient than carrying on with your last course until you reach E.T.A., that it has come to stay. There was a Navigator in our experience who deliberately did a square search for the S.E. beacon when he was 50 miles away from it by D.R. This eccentricity at least gave a navigational flavour to a procedure which so many of us now accept as a god-sent preserver of "face." Would we know what to do without it? Nevertheless, one form of homing or another has made the error in landfall at the end of a

sortie of no navigational consequence whatsoever, and of no value as an indication of performance.

What a pity calculation error, too, can't be taken as an index of performance! This one aspect of the Navigator's work, comprising all his faults in plotting and in manipulating various instruments, as well as his clerical and arithmetical mistakes, seems at first sight to be the best check on his skill and to hold out the most promise as a possible source of improvement therein. But alas, it is useless. The man who sticks to his flight plan throughout the sortie, and thereby makes fewest calculations, stands to come off better than the energetic type who spends all his time calculating, and so produces a larger total of error. Besides, the Navigator has only to wait until he is fairly sure of his real position by means of an S.E. beacon, if not actually by peering ahead to get a distant view of the land on a clear day (it has been done!). Then, by a judicious stroke of the pencil, he can reduce his calculation error to practically nothing at all and simply calculates a final course and E.T.A. Even then, how often does he persuade his Captain to steer a course rather than to home in a curving track to base?

Bad Navigators in Bomber Command cannot escape detection so easily as they do in Coastal Command. If the photographs they bring back do not show their targets, but disclose some distant part of Europe, the magnitude of their error is laid bare. Apart from our P.R. Squadrons, we have few chances of securing such evidence of navigational performance. (P.R. sorties are highly specialised and have to rely largely on pinpointing in the target area for their results, after very thorough flight planning. The opportunities in Spitfires and Mosquitos for air navigation, properly so-called, are necessarily extremely limited. It follows that the utmost has to be made of those few "breaks" which are available.) The fact remains that the sort of photos brought back by our Beaufighters, Wellingtons, Sunderlands and so on are no good for assessing navigational errors, though they may show a "mouldy" running into a ship or perhaps a stick of D.C.s straddling a U-Boat.

Convoys have a habit of not being met! A good deal of thought has therefore been given to finding out why, but without very definite results.

We know that convoys are often out of position; but they are commonly on track, if not actually at the expected position. Their own navigational errors can, therefore, be largely discounted. Thus the "not met" convoy is primarily, though not necessarily, a reflection on air navigation. It may, of course, reflect on the Captain's handling of the tactical situation when he fails to find the convoy at its rendezvous. However, while a general increase in the number of "not mets" would point to a decline in performance on the part of our Navigators, a study of "not mets" does not give us a continuous or detailed enough picture of what is going on in Coastal Command as a whole.

Rather similar objections hold good with regard to shipping strikes. A squadron that consistently fails to find the objective deserves criticism of its navigational ability. But the objective may sometimes be incorrectly reported by reconnaissance aircraft, and hence individual strikes that fail are not necessarily laid at the door of the striking force. We are, in fact, still left guessing at navigational merit if we use the success of a strike as a navigational index. On the other hand, we are reminded of an outstanding example of navigation that might equally have applied to a strike, only it came from a Whitley in the spring of 1942. The aircraft had left Land's End on a westerly track and, when about an hour out, was ordered by Group to attack a U-Boat which had been sighted several hours earlier by a transit aircraft from Gibraltar. The U-Boat was 200 miles or so to the south-west and its course and speed had also been reported. By the time the message had been decoded in the Whitley, the aircraft had got even further out; but, nothing daunted, the Navigator set course for the reported position of the U-Boat, intending to follow along its track. As luck would have it, the sun was shining almost dead ahead, and he was able to get a couple of good runs with a Mark IX sextant at an interval of 45 minutes. From these sights he worked out a ground speed and corrected his distance still to run. Accordingly, at the estimated time, he turned and flew along the U-Boat's track. You can imagine his satisfaction when, after half an hour, he saw the still-surfaced U-Boat ploughing along, dead ahead! Six D.C.s brought a happy event and this article to a close. Next time we may be able to explain how you can judge your worth as a Navigator.

God and the Big Battalions

Letter to the Editor

"In the article entitled 'Luftwaffe at Bay' in *Review*, No. 9, I notice that Marshal de la Ferté is alleged to have coined the well-known remark about the 'big battalions.' If, in fact, he did claim to have done so, I agree with you that it was an 'exquisite cynicism' on the Marshal's part as he must have extracted this quotation almost verbatim from a letter written by Voltaire many years before."

This misunderstanding has arisen owing to the contributor wrongly describing Marshal de la Ferté as one of Napoleon's generals. Nevertheless, the Marshal died 67 years before Voltaire made the remark.

He certainly did not have the idea first. Tacitus, quite a long time earlier, said, "Deos fortioribus adesse," and one Roger, Comte de Bussy-Rabutin, said, or wrote in 1677: "God is generally for the big squadrons against the little ones."

Then came de la Ferté's remark, which was quoted by Madame de Sévigné some 40 years later. On 6th February, 1770, Voltaire, who does not seem to have tried to give the impressions that it was an original idea, said: "It is said that God is always on the side of the big battalions."

Interception of the "Rhakotis"

Some reference to the *Rhakotis* operation was made in *Coastal Command Review No. 9*. Since then there has been an opportunity to study the reports of the responsible Naval and Air Staffs and thus to see if there are lessons to be learned by Coastal Command from the operation.

Since, through the combined efforts of the Navy and Air Force, the *Rhakotis* was in fact sunk, it might seem somewhat ungenerous to criticise the participants. On the other hand, luck did for once run our way. Had the wheel turned against us, this successful operation might well have been a failure.

The Tactical Position

The tactical situation on December 31, 1942, was as follows:—

From certain observed activities of enemy surface and air forces, there was reason to anticipate that a blockade runner, which might have been any one of several ships expected, might be making for one of the Bay of Biscay ports. On the 31st it was estimated that she might be approaching the entrance to the Bay by the evening of 1st January, on an easterly course. Assuming her speed to be in the neighbourhood of 10 knots, unless previously intercepted, her position by dawn on the 2nd would have been so far into the Bay as to make interception by surface vessels impossible, and by strike aircraft uncertain, unless it had been possible to maintain unbroken shadowing through the night. In view of the weather forecast, which was as bad as it could be for an operation of this type, with cloud base 400–800 ft. and very limited visibility, the situation was appreciated that unless the blockade runner was located on the night of the 31st, or early on 1st January, there would be little chance of interception.

The British Naval surface vessels available or within reach consisted of:—

- (a) H.M.S. *Scylla*, who, by a fortunate coincidence, was homing from Gibraltar to the United Kingdom and was expected to be in the approximate position of 43° 00' N. 16° 00' W. at dawn on the 1st January.
- (b) At about the same time an escorted convoy from Gibraltar was expected to be in the approximate position of 46° 00' N. 14° 42' W., co. N. at 6½ knots.

First Air Search

In the light of this information, it was decided to lay on a wide search throughout the night of 31st December. Nine aircraft were detailed for this task, consisting of four Wellingtons of No. 172 Squadron, fitted with Leigh searchlights, and five Whitleys of No. 502 Squadron. All aircraft were fitted with A.S.V.

The datum for these aircraft were positions at 10-mile intervals between 45° 00' N., and 46° 20' W., on the longitude of 11° 00' W. The track of all aircraft was to be 270°, the search westwards to be carried to the prudent limit of

endurance. This parallel track sweep could be expected to meet all contingencies, such as one or more aircraft returning early, as in fact one did, or the enemy unit making variations in course, either towards the South Coast of Brittany or the North-Westerly ports of Spain.

The aircraft took off at 15-minute intervals, commencing at 2330/31.

First Sighting

The aircraft found the Met. forecast for the area only too accurate. There was 10/10 cloud with tops at 3,000 ft. and base 400 ft. It followed that the search had to be carried out above cloud, making all possible use of A.S.V.

It is, therefore, to the everlasting credit of the crews of J and M of No. 502 Squadron, who were on adjoining tracks, that they each obtained an A.S.V. contact at 0440 and 0441 from 3,500 ft. and 3,000 ft., at distances respectively of 20 miles and 16 miles.

Both aircraft homed on to the contact, and, after breaking cloud, J sighted the wake of a ship and dropped a flare by the light of which both J and M sighted the blockade runner. Between 0500 and 0530, sighting and amplifying reports were sent to base. But there was a divergence of opinion as to position, J reporting it as 46° 05' N. 14° 32' W., while M estimated it to be 45° 37' N. 14° 15' W. In the meantime N/172 intercepted J's sighting report, set course to intercept and was successful in so doing. His report to base at 0546 gave the position as 46° 03' N. 13° 51' W., All aircraft agreed to the blockade runner's course as 090°, but estimates of speed varied between 10 and 15 knots.

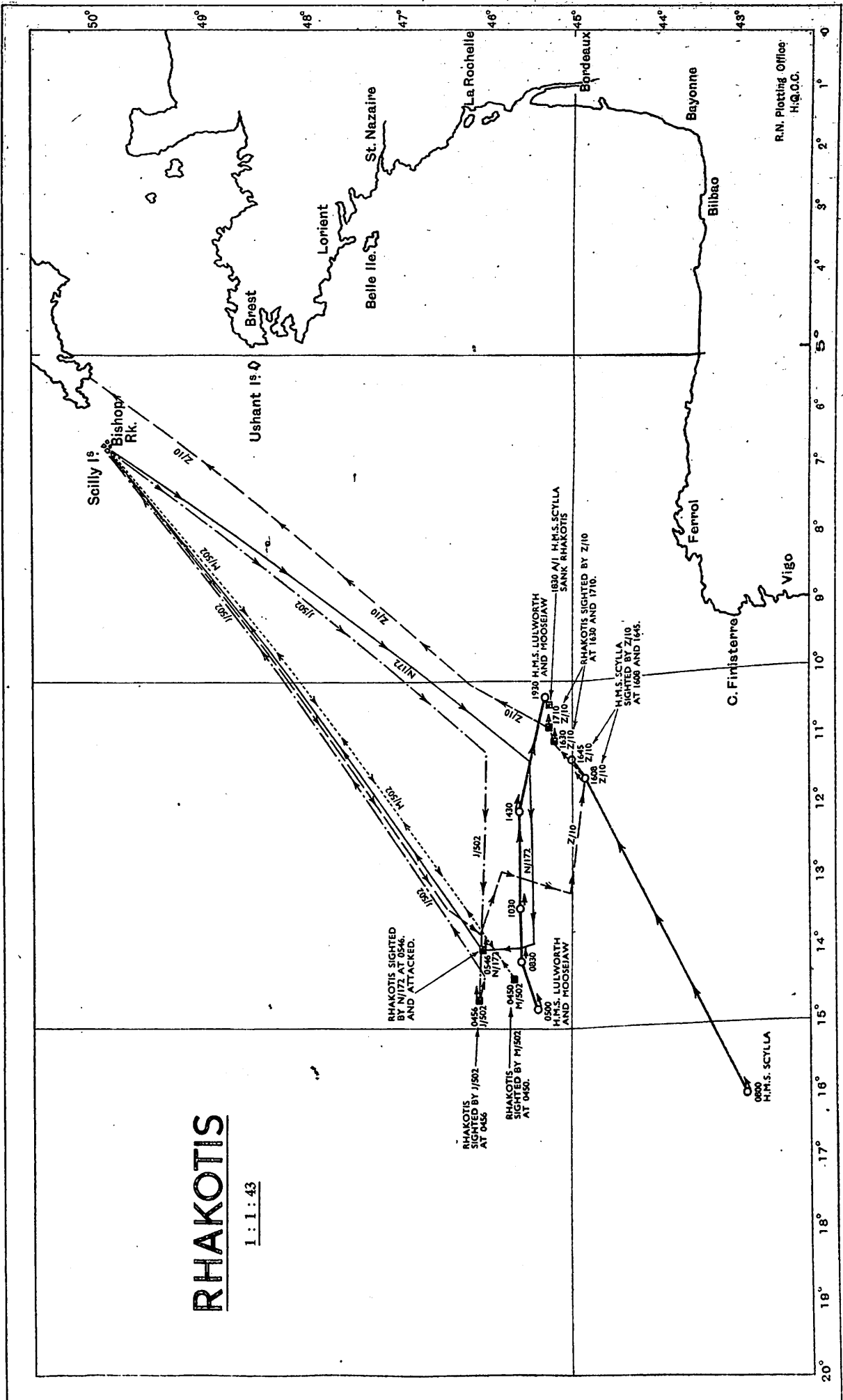
It is of importance to appreciate here that the original plan had been modified to permit a direct attack by aircraft. N/172 did, in fact attack, but without success. M/502, when investigating, inadvertently flew over the ship and was badly shot up, but managed to make base, making a crash landing at St. Eval, where the cloud base was only 80 ft. J/502 attempted to attack from 200 ft., but visibility was too bad to make a release.

Further Aircraft

Two Sunderlands of No. 10 Squadron had been ordered into the air at 0100 respectively to positions 46° 30' N., 11° 00' W. and 45° 50' N., 11° 00' W., thence to sweep on course 270° to prudent limit of endurance. These aircraft were diverted following the original sightings, and at 0730, one of them sighted a convoy approximately in position to which he had been diverted. He reported these vessels as friendly. Neither aircraft sighted the enemy and they returned to base.

Appreciation of the Position at 0900 hours

At 0900 hours a general appreciation of the position shows that from the air aspect, contact with the blockade runner had been lost. Two Sunderlands were still airborne, but were returning to base, while a third Sunderland, Z/10, was airborne at 0815, followed by a Liberator, P/224.



Of the Naval surface vessels, H.M.S. *Scylla*, acting on her own initiative, had set a course of 048° from position 41° 52' N., 15° 58' W., at 0705, in an endeavour to intercept.

H.M.S. *Lulworth*, in company with H.M.S. *Moosejaw*, escort vessels detached from the convoy, had set course 090° at 15 knots from position 45° 37' N., 14° 00' W., at 0830 and was chasing the enemy.

H.M.S. *Lulworth* had in fact been in close proximity to the blockade runner, as at 0500 she had sighted the flares dropped by the aircraft, on a bearing of 074° from position 45° 23' N., 14° 42' W., which made the positions given by both aircraft of No. 502 Squadron about 45 miles too far north.

The variation in positions given by the aircraft, unavoidable in the circumstances of operation, combined with a negative report from the Sunderland, made the position of the blockade runner very uncertain and, in fact, suggested the possibility of there being two ships.

Furthermore, the report of H.M.S. *Lulworth* as having sighted the flares was held up and did not reach C.-in-C. Plymouth until the early afternoon.

Afternoon

In the meantime, after receiving signals despatched by our Naval units, the C.-in-C. Plymouth made a fresh appreciation of the position and estimated that the blockade runner would be within 16 miles of 45° 04' N., 10° 53' W., at 1800, steaming between 090° and 100°, speed 10-12 knots, and a signal was accordingly made.

The Sunderland and Liberator aircraft were searching early in the afternoon in the vicinity of 46° 30' N., 13° 10' W. and 46° 10' N. and 12° 20' W. At 1435 the Sunderland was diverted to 45° 00' N., 13° 00' W., thence to sweep east, while the Liberator was directed to 45° 40' N., 11° 00' W. to sweep west.

The Liberator's search westwards was unproductive, but at 1608 the Sunderland, Z/10, when in the approximate position 44° 40' N., 11° 45' W., obtained an A.S.V. contact and subsequently closed with the *Scylla* with whom she exchanged V/S signals. Z/10 then proceeded on her search and at 1630 obtained a further contact which brought her to the blockade runner to the north-east of the *Scylla*.

There followed an unorthodox but none the less effective, homing of the *Scylla* by closing her and exchanging V/S signals followed by the laying of flame floats along the course to be steered. Unfortunately the Sunderland had to leave when the two ships were still 12 miles apart and was therefore unable to be present at the kill, which was accomplished at 1800, just before darkness set in.

Z/10 had cut things so fine that had the Navigator been a few minutes adrift in his navigation, she would not have made base. As it was she landed at Mount Batten at 2121, with tanks all but dry, having been airborne 13 hours 6 minutes.

It is interesting to record, *vis-a-vis* the C.-in-C. Plymouth's estimation of the probable position at 1800, that *Scylla* gave the position of interception at 1735 as 45° 01' N., 10° 50' W.

Conclusions

From the first aircraft being airborne in search of the blockade runner until she was sunk, 18½ hours elapsed. During this time the blockade runner was successfully located by three of the first sweep and subsequently by the Sunderland, leading to a kill.

A number of lessons can be learned from this operation, the first of which is that we must remember that when aircraft are despatched to locate and shadow an enemy, and home a striking force, whether it be naval vessels or, as may happen on other occasions, an airborne strike, they cannot be used offensively and that the orders as to their duties must be clear and concise. The difficulty in maintaining contact, the necessity of running no risks of being shot down, and the tactical skill required in appreciating the enemy's movements and seeing that all essential information is passed quickly and accurately, and operating the homing procedure correctly, are sufficient tasks in themselves, without attempting to attack.

The second conclusion is that when there is a reasonable chance of locating an enemy surface vessel, we must so plan the operation that even if it is impossible to maintain unbroken shadowing, aircraft are detailed in advance to be at a state of readiness that will give the maximum chance of retaining or regaining contact with the enemy.

Thirdly, Captains of aircraft cannot pay too much attention to reporting the enemy's position, course and speed accurately, and by the method laid down for the operation. Admittedly in this case, errors in estimating position at the first sightings were possibly unavoidable, but the unorthodox homing by the Sunderland, although effective, might well fail on other occasions, and should be used only when W/T or R/T intercommunication cannot be established.

When it is appreciated that the average speed of a British naval surface vessel is six to eight times less than an aircraft, the problem of effecting an exact interception at sea is one of great difficulty which can be solved only by receiving information of a hundred per cent. reliability.

The operation as a whole, considering in particular that the aircraft were operating 400 miles from base, and that the *Scylla* had little reliable information upon which to act until well on in the afternoon, was outstandingly successful and reflected the greatest credit upon those participating at sea and in the air.

The cargo carried by the *Rhakotis* from the Far East was typical. It consisted of 4,000 tons of rubber, as well as a quantity of vegetable oil, fats, quinine bark, tin, tea, rice and ore (probably wolfram). A consignment of cultured pearls valued at 50,000 yen was consigned to the Japanese Embassy at Berlin, and would probably have been utilised to obtain foreign currency of a neutral country for payment of purchases outside Axis countries. The cargo was said to have been the most valuable yet carried by a German ship.

It is worth remembering that 4,000 tons of rubber, would suffice to equip four armoured divisions with all their needs for a year, while the quinine position is so serious in Germany that its use has practically been banned. It is easy to appreciate what the loss of such a cargo means to a hard-pressed enemy.



A large U-Boat, sighted and attacked by I/461.



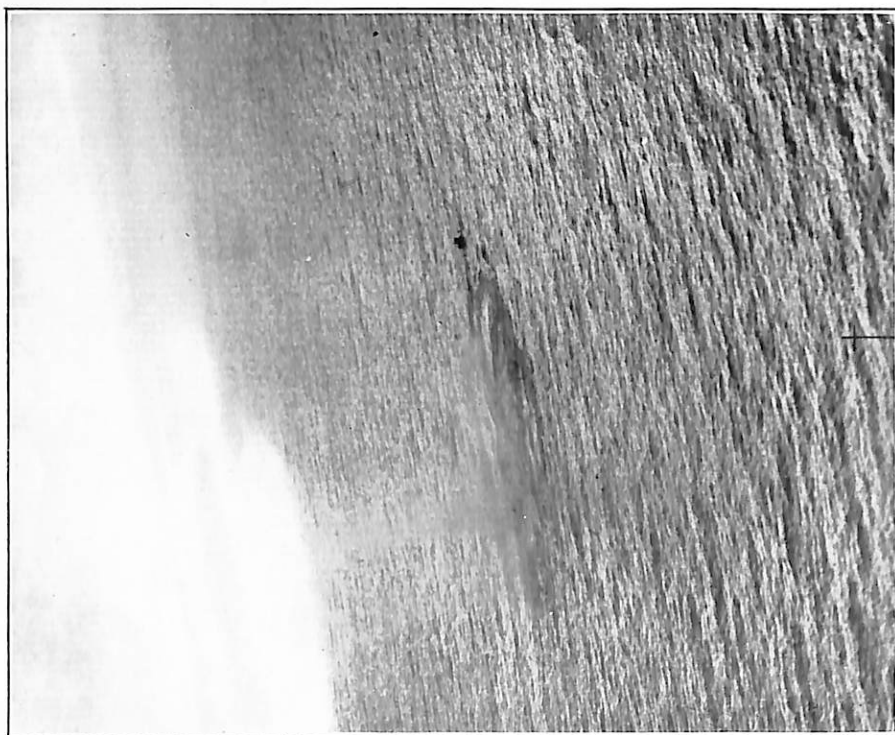
BLACK ROCK LIGHTHOUSE

Two of the best known landfalls off the Irish coast are Black Rock and Tuskar Rock, the former off the west coast and the latter off the south. It is well to remember the courage of the men who tend these lighthouses, while suffering many hardships. On 17th February it was announced that two of the three lighthouse keepers on Black Rock had been rescued after one of them had spent the record term of 115 days on the island. His colleague had been there for 86 days. The third keeper volunteered to remain for another fortnight.

Tuskar Rock was also in the news a few weeks before when, after 76 days isolation off the South Wexford coast, keeper Edward Hickey was brought ashore with Peter Roddy, the other keeper, who had been there 64 days.

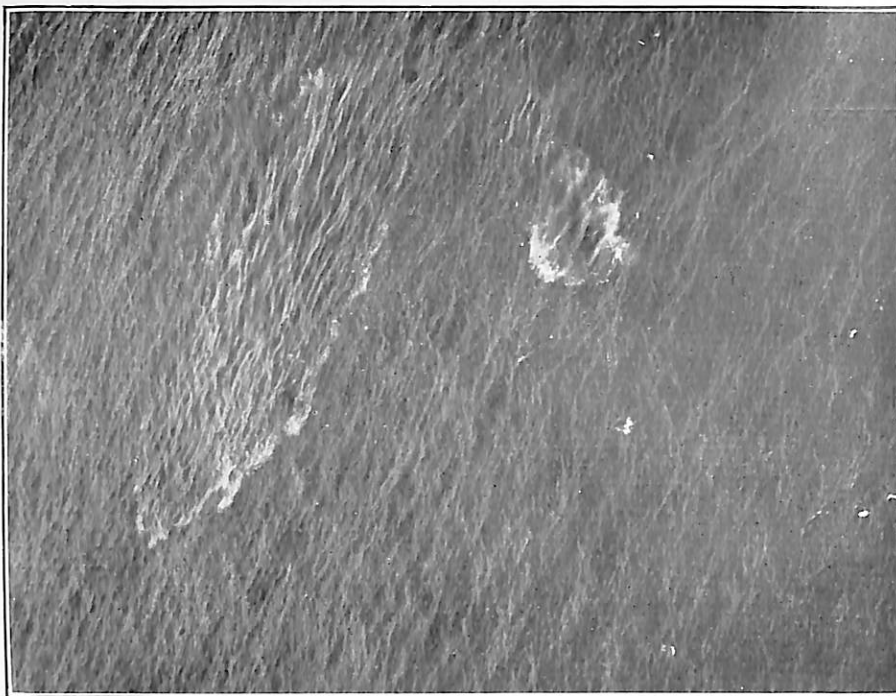


Depth-charges exploding.



Five seconds after explosion. U-Boat beginning to submerge.

[An example of a bad over-shoot, at least one hundred feet away from this U-Boat.]



Approximately 35 seconds after attack. U-Boat's swirl in relation to depth-charges.

Radio Aids to Navigation in Coastal Command

Radio aids to navigation in Coastal Command have been designed and installed to provide long distance checks on D.R. navigation, channels for the local control of aircraft movements, and landing and homing facilities in bad weather.

The following aids are, or shortly will be, available :—

- (1) Long-range cathode ray H.F./D.F. stations.
- (2) M.F./D.F. sections.
- (3) M.F. beacons.
- (4) H.F./D.F. homers.
- (5) S.E. beacons.
- (6) Standard beam approach.
- (7) Beam approach beacon system.
- (8) Coastal and Bomber emergency R/T organisations.

It is outside the scope of this article to deal with certain other aids which are not yet available to aircraft of this Command though the policy has been established of more general adoption at a later date.

1. Long Range Cathode Ray H.F./D.F. Fixing Services

This service, which shortly will be re-introduced in a modified form, provides fixes and bearings at distances between 300 and 1,500 miles, and consists of a number of Groups of H.F./D.F. stations located at strategical points in the British Isles and in Iceland. These Groups have been arranged geographically to provide suitable base-lines for fixes in all areas in which Coastal Command aircraft operate, *i.e.*, one Group will cover the North Atlantic Approaches, another the Norwegian Coast area, and a third the Bay of Biscay. A central control station is to be established at St. Helens, in Lancashire, and will be staffed by experienced Flying Control Officers, Navigators, and Signals Officers. Subsidiary stations in the section will pass bearings taken on aircraft transmissions to St. Helens by landline (with the exception of the Group in Iceland that will perforce use W/T). At St. Helens, these bearings will be considered in the light of prevailing ionospheric conditions, and an area of probability determined by mathematical analysis. The resultant fix is then transmitted to the aircraft. No other radio aid can at present replace this system.

2. M.F./D.F. Organisation

The M.F./D.F. organisation consists of a number of medium frequency D/F stations, grouped into sections to give suitable base-lines for fixes all round the coast of the British Isles, at distances up to 400 miles. The sections normally consist of three or four stations linked to a Central Control by either landline or W/T. Bearings are taken by all stations in a particular section, on aircraft transmissions and passed to the Control Centre, where a plot is made and passed back to the aircraft. Control stations are linked to the A.C.H.Q. by landline. Once a particular aircraft has been identified, information as to its position or bearing is passed via the M.L.O. to the operations staff.

3. M.F./D.F. Beacons

Five groups of three beacons have been sited along the east and south coasts of this country, and one group in the north of Scotland, primarily to provide navigational help to aircraft of Bomber Command returning from sorties on the continent. But their position is such that certain groups can provide similar assistance for aircraft of this Command. The principle of operation is as follows. The six groups, A, B, C, D, F and J, each operate with three fixed transmitters, located at mast sites approximately in the form of an equilateral triangle with 60 mile sides. The nine frequencies and six call signs which are available are interchanged between the groups and masts at frequent but irregular intervals, according to a pre-arranged schedule. Transmissions are made from only one mast site at any one time.

In this manner it becomes difficult for any operator not in possession of the operating schedule to determine which particular mast site is in use at any specified moment. While this arrangement gives a certain measure of security, in that it renders the use of these beacons difficult to the enemy, it is still possible for him to mutilate each of the nine frequencies in such a way that any bearings taken on the transmission may be unreliable. Since this service is intended only as a check on a position which has been already fixed by D.R., any bearing that diverges by more than five degrees or so from that expected, should be regarded with suspicion. Similarly, ambiguous minima may indicate unauthorised mutilation. The range of these beacons is approximately 400 miles, although reliable reception has frequently been possible over far greater distances. The height at which an aircraft is flying is not an important factor in M.F. transmission.

Beacon Group G in Northern Ireland operates on a fixed frequency from one of three mast sites at any one time. Reference to the Schedule of Operation contained in C.D. 0223 (20) will indicate which particular mast site is in use, and D/F bearings may be taken, or the aircraft homed to the mast.

4. H.F./D.F. Homers

H.F./D.F. homers have been established at every operational station in this Command, to give homing bearings (Q.D.M.) to aircraft within 100 miles of base by day, and 50 miles at night. The distance at which reliable bearings are obtainable depends greatly upon the height at which the aircraft is flying, and at extreme range, the most reliable indications are given when the height is not below 6,000 ft. While the primary purpose of these base H.F./D.F. stations is to home the aircraft to the aerodrome, it is possible by operating three or more such stations on the same frequency, to provide a short range H.F. fixing service. Bearings taken by the D.F. stations are passed on to the A.C.H.Q. where a plot of the position of the aircraft is made.

At Type I Flying Control Stations, a H.F./D.F. station has been provided for the use of the Flying Control organisation. Once again, by using a combination of three or more such stations, a reasonably accurate fix at short range may be

passed to an aircraft, but their primary function is to provide a channel of communication by means of which controlled "descent through cloud," or homing may be given (QGH procedure).

5. S/E Beacons

S/E beacons may be used, as their name implies, as a beacon, so enabling aircraft to home on to them, or, if the aircraft is within range of more than one beacon, they may be used as an instantaneous cross check on a position previously determined by dead reckoning. These beacons are, or will be, established all round the coast of the British Isles (and in other friendly areas in which Coastal Command aircraft operate) in such a way that an aircraft crossing the coast will be within range of at least one of them. The range achieved with the latest type of S/E beacon is approximately 80 miles at 3,000 ft. If the aircraft is not fitted with S/E a small device may be installed in the aircraft to operate the beacon and give similar indications. In order that an aircraft may identify a particular beacon, coding has been incorporated in the ground transmitter by the super-imposition of two morse symbols.

6. Standard Beam Approach

It is not the policy of this Command to instal S.B.A. primarily for the use of our own land planes. Since S.E. is an operational requirement in most types of aircraft in Coastal Command, B.A.B.S. will be employed for bad weather approaches. S.B.A. ground installations have been made at certain Coastal Command aerodromes to which aircraft of other Commands may be diverted. The beam from the main S.B.A. beacon is aligned on the most suitable runway, for bad weather landing, and by means of marker beacons, giving coded vertical transmissions, an aural indication can be given to the pilot of an aircraft approaching an aerodrome, when he is within a mile or so of the end of the runway, and in line with it, and when he has crossed the aerodrome boundary. A reliable altimeter, together with these aural indications, will enable the pilot to lose height at a specified rate, bringing him down to within a few feet of the ground, over the end of the runway.

Existing installations have a range of approximately 70 miles at 3,000 ft., but in many cases they are operated at reduced power, since the frequencies employed are similar to those used by the G.A.F. and would provide navigational assistance to enemy aircraft at considerable range.

7. Beam Approach Beacon System

The fundamental operation of S.E. beam approach is very similar to that of standard beam approach, except that indications are visual and not aural. An important additional facility provided by B.A.B.S. is that range indications are available, thus eliminating the necessity for marker beacons to indicate aerodrome boundaries, etc. The transmission from the beacon is designed to give a number of zones on either side of an equi-signal area aligned on the best runway in prevailing bad weather winds. By observing the behaviour of the indicator under the influence of the coded symbols being transmitted, it is possible to calculate the direction from which the approach is being made. Having located the equi-signal zone, the pilot flies a straight course, losing height at a pre-determined rate, until the indicator shows arrival over the runway. A normal landing may then be made. An article on the aids described in this and the preceding paragraph appear in No. 8 of the *Review*.

8. Emergency R/T Organisation—Code Name "Darky"

This organisation is intended to supplement the facilities already existing in the D/F and Flying Control organisations, and provide a rough check on the position of an aircraft. The fact that a pilot is in communication with one of the ground stations in this organisation will indicate that he is within the limited range of the low power R/T transmitter on the ground, i.e., normally within 10 miles.

All Type I Flying Control stations, all stations in Coastal Command, and certain aerial lighthouse sites and Royal Observer Corps posts have been, or are being equipped, with these low power R/T transmitters. Not only may the location of the transmitter be passed to the aircraft over this channel, but weather information, requests for landing lights, etc., may also be handled. In Coastal Command, this emergency R/T organisation has been modified for the use of Flying Control. It provides a communication channel for the control of all local aircraft movements. With the introduction of more modern equipment, the congestion at present experienced on the frequency used will be considerably lightened, since separate frequencies will be used for local aircraft control and for "Darky" facilities proper.

Bibliography:—

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- H.F./D.F.*—C.C.O.1/1941, Section I.
- S.E. Beacons*—Coastal Command Atlas of Radio Aids to Navigation.
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- B.A.B.S.*—Coastal Command Atlas of Radio Aids to Navigation.
- "Darky"—Coastal Command Signals Staff Instruction No. 33.