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COASTAL COMMAND REVIEW

May 1945

Vol. IV, No. 5

**HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE**

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

COASTAL COMMAND REVIEW

Vol. IV, No. 5—May 1945

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The Month's Work—May 1945

The Anti U-Boat Effort

During the first eight days of May there was a remarkable resurrection of the type of battle (like the famous battles in the Bay of Biscay and off the Norwegian coast during 1943 and 1944) in which aircraft fought against surfaced U-Boats.

2. The closing days of the war, up to the unconditional surrender on May 9, saw a mad rush of U-Boats of all types seeking to escape from North German ports to Norway. The three wings from Banff, Dallachy and North Coates and aircraft of Nos. 224, 547, 206, 311 (Czech), 86 and 210 Squadrons made altogether nineteen attacks on these U-Boats. Official assessments have not yet been completed, but provisionally nine U-Boats are considered sunk or probably sunk.

3. In addition to the attacks mentioned above, the following noteworthy attack was made in the month of May. X/210 made an excellent depth charge attack on May 7 on a schnörkelling U-Boat north-east of the Shetlands, releasing depth charges ten seconds after the schnörkel dipped. Much oil was seen afterwards and it has since been established that the U-Boat concerned (*U.320*) sustained such serious damage that it foundered two days later while attempting to return to Norway.

4. Since the surrender and up to the end of the month full air escort has been given to ocean convoys. In addition, almost continuous anti U-Boat patrols have been maintained in focal areas and over the northern transit area. The object of these patrols has been not only to locate, report and shadow surrendered U-Boats, but also to try and intercept such U-Boats as refused to surrender and either continued hostile or if not hostile tried to schnörkel home to Germany in order to evade the surrender order. In fact a number of U-Boats, known from the German records to have been at sea on May 9, have not appeared yet, and it is thought that the most likely explanation for their non-appearance is such an attempt at evasion of the surrender order. Certain of them have been earmarked as possible victims of recent convincing attack reports, but there are still a number completely unaccounted for. No hostile acts have been committed, and the fact that two of these U-Boats have since been reported off the German coast in the Heligoland Bight strengthens this theory of evasion.

5. This final burst of activity brings to a close the war work of Coastal Command against the U-Boat fleet.

6. The total score of successes is not yet worked out, but the following facts speak for themselves:—

- (a) Over 1,250 ocean convoys have been air escorted.
- (b) 120,300 anti U-Boat sorties have been flown involving upwards of 850,000 hours' and over 100,000,000 miles' flying.
- (c) 2,557 U-Boats have been sighted of which 1,664 have been attacked.
- (d) Final results are expected to total at least 180 U-Boats sunk or probably sunk plus 21 more shared with naval forces, and 280 U-Boats damaged plus 6 more shared with naval forces.

7. The absorbing story of this struggle will be the subject of many unofficial and official reports and histories, but one fact will be outstanding, namely that shore-based air power played a part second to none in the decisive phases of the battles of the Atlantic and of the Bay of Biscay, which spelt the doom of the U-Boat menace.

Anti-Shipping

8. The order to discontinue attacks against enemy shipping was given on May 7. The anti-shipping effort was, however, maintained until the last moment. 453 anti-shipping sorties were flown during the first seven days of May. 142 Coastal Command aircraft attacked, with the result that eight ships were definitely sunk, nine seriously damaged and 23 ships damaged.

9. Early on the morning of May 3, twelve Beaufighters of the North Coates Wing attacked a number of small vessels off Cuxhaven. They obtained cannon and R.P. hits, sinking one coaster and leaving two other vessels burning furiously. Later in the day, twenty-nine Beaufighters took off from North Coates and attacked a large concentration of shipping in the Great Belt and landed at a forward base on the Continent. During this attack they sank a tanker and a merchant vessel of 1,200 tons and damaged fifteen other vessels, one of them being the liner *Der Deutsche*, 11,400 tons. The wing was airborne from their forward base the next morning and patrolled through the Belts to the Kattgat where they attacked a large merchant vessel, a destroyer and an auxiliary south-east of Aarhus. They landed again at the forward base and, after refuelling, returned to North Coates.

10. Thus in the closing stages of Coastal Command's anti-shipping campaign the mobility of the Strike Wings was exploited to the full and the confused remnants of enemy shipping fleeing from the advancing armies were given a final battering in an area hitherto considered safe.



On May 2, 1945, the Banff Mosquito Wing attacked a convoy of two U-Boats of the 110-foot prefabricated type escorted by an "M" class minesweeper. The upper photograph, taken by A/235, shows one of the U-Boats under attack. (See letterpress, p. 7.)



On May 5, 1945, G/86 made two attacks on a 1,200-ton type U-Boat, one of a convoy of three U-Boats. Three minutes after the second attack approximately 40 survivors were seen in dinghies and in the water.



On April 26, 1945, Beaufighters of the Dallachy Strike Wing attacked a convoy lying in Fedefjord. This was the last wing strike in a Norwegian fjord and it was one of the most difficult ever made. The merchant vessel *Palmyra*, 3,600 tons, was seriously damaged.



11. The Wellington squadrons of 16 Group flew their normal night anti-shipping patrols off the Dutch and German coasts during the month and carried out fourteen attacks on enemy shipping.

12. In the 18 Group area Mosquitos of the Banff Wing started the month by seriously damaging an "M" class minesweeper in the Kattegat. On May 3, fourteen Beaufighters from Dallachy attacked shipping in the Great Belt. Using torpedoes and R.P., they sank an "M" class minesweeper and seriously damaged the tanker *Taijun*, 6,405 tons. Banff Wing Mosquitos on May 4 attacked groups of ships near Aarhus in the Kattegat. They sank the merchant vessel *Wolfgang*, 3,000 tons, and three escorts, besides damaging a merchant vessel of 3,540 tons and two other vessels.

13. The Halifaxes continued their usual good work in the Skagerrak and the Kattegat and made six attacks against enemy shipping.

14. The work of the anti-shipping squadrons during this final week of the war is consistent with their previous fine record, and all concerned, both on the ground and in the air, may feel that they have contributed in no small measure to the successful conclusion of the European war.

I.—ANTI U-BOAT

SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT

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

PERIOD 1st to 8th MAY, 1945

The following table carries the usual monthly Summary down to the date of cessation of hostilities.

Duty and Base or Area.	Total Sorties.	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per "A" and "B" Sighting.		Number of Sorties.		
		Base to Base. (2)	On Patrol. (3)	Day. (4)	Night. (5)	Day. (6)	Night. (7)	Base to Base. (8)	On Patrol. (9)	When U-Boat Sighted. (10)	When U-Boat Attacked. (11)	
<i>Convoy Cover</i>												
United Kingdom	72	826	563	1	—	1	—	826	563	1	1	
Iceland	6	72	50	—	—	—	—	—	—	—	—	
Gibraltar and Moroccan Sea Frontier	19	135	88	—	—	—	—	—	—	—	—	
TOTAL CONVOY COVER	97	1,033	701	1	—	1	—	1,033	701	1	1	
<i>A/U Patrols</i>												
<i>North Sea-Baltic</i>												
United Kingdom	98	827	197	22	2	14	2	34	8	57	38	
<i>Northern Transit</i>												
United Kingdom	111	1,208	830	1 (1)	—	1 (1)	—	604	415	1 (1)	1 (1)	
Iceland	43	445	258	—	—	—	—	—	—	—	—	
<i>Northern Convoy (including Irish Sea)</i>												
United Kingdom	185	1,957	1,565	1 (1)	—	1	—	978	782	1 (1)	1	
Iceland	4	50	47	—	—	—	—	—	—	—	—	
Azores	4	50	13	—	—	—	—	—	—	—	—	
<i>Bay-Channel</i>												
United Kingdom	182	1,705	1,292	— (1)	—	—	—	1,705	1,292	— (1)	—	
<i>Central Convoy</i>												
Gibraltar and Moroccan Sea Frontier	21	128	80	—	—	—	—	—	—	—	—	
Azores	1	7	6	—	—	—	—	—	—	—	—	
TOTAL A/U PATROLS	649	6,377	4,288	24 (3)	2	16 (1)	2	219	147	59 (3)	40 (1)	
ADD CONVOY COVER	97	1,033	701	1	—	1	—	—	—	1	1	
TOTAL A/U EFFORT	746	7,410	4,989	25 (3)	2	17 (1)	2	247	166	60 (3)	41 (1)	
				27 + (3) U-Boats Sighted.		19 + (1) U-Boats Attacked.						

Notes.—(1) In addition to the above there were 30 Chance Sightings (28 Grade "A" and 2 Grade "B"). One of these (Grade "B") was in the Northern Convoy Area and the remainder were all in the Great Belt by aircraft which were unarmed on reconnaissance or which had already expended their ammunition on shipping targets. Also excluded is one attack on a contact located in the position of a previous attack on a Grade "A" target.

(2) During the period five U-Boats have been attacked by three Strike Wings in the Great Belt. In these engagements a total of 27 aircraft carried out attacks on the U-Boats, hence the large number of aircraft listed under columns (10) and (11).

(3) Details of Grade "B" targets (i.e. a swirl, wake, or smoke believed caused by a U-Boat) are shown separately in brackets and are not included in the main totals.

Squadron Results—1st to 8th May, 1945

A/U Sightings and Attacks

					<i>No. of Sorties when U-Boat Sighted.</i>	<i>No. of Sorties when U-Boat Attacked.</i>	
236	Beaufighter	North Coates	..	..	17	12	2 Wing Strikes
202	Catalina L.L.	Castle Archdale	..	..	1	1	
210	Catalina L.L.	Sullom Voe	..	..	2	2	
86	Liberator L.L.	Tain	..	..	5	4	
206	Liberator	Leuchars	..	..	2	1	
224	Liberator L.L.	Milltown	..	..	3 (1)	2 (1)	
311 (Czech)	Liberator	Tain	..	..	1	1	
547	Liberator L.L.	Leuchars	..	..	2	2	
143	Mosquito	Banff	..	..	8	7	} 1 Wing Strike
235	Mosquito	Banff	..	..	9	2	
248	Mosquito	Banff	..	..	9	6	
201	Sunderland	Castle Archdale	..	..	1	1	
228	Sunderland	Pembroke Dock	..	..	— (1)	—	
423 (R.C.A.F.)	Sunderland	Castle Archdale	..	..	— (1)	—	
					<u>60 (3)</u>	<u>41 (1)</u>	

Note.—In addition to the above, 59 Squadron attacked a contact in position of a previously reported Grade "A" Sighting.

Attacks by Strike Aircraft with Cannon only on U-Boats included above .

					<i>No. of Sorties when U-Boat Sighted.</i>	<i>No. of Sorties when U-Boat Attacked.</i>
236	Beaufighter	North Coates	..	..	(See above)	3
254	Beaufighter	North Coates	..	..	16	16
333 (Norwegian)	Mosquito	Banff	..	..	3	2

Chance Sightings

						<i>Number of U-Boats Sighted.</i>
144	} Dallachy Beaufighter Wing (after attacking shipping) ..					16
455 (R.A.A.F.)						
489 (R.N.Z.A.F.)						
1674 H.C.U.	Halifax	Aldergrove	..	..	..	— (1)
333 (Norwegian)	Mosquito	Banff	..	..	..	5
248	} Part of Banff Mosquito Wing					— (1)
404 (R.C.A.F.)						
544	P.R. Mosquito	Benson	..	..	..	7
						<u>28 (2)</u>

Note.—Grade "B" targets are shown separately above in brackets.

Assessments

*One of the April "Known Sunk" is shared with Naval Forces in the following circumstances. The U-Boat was first sighted by a Coastal Aircraft. The aircraft homed an escort group to the position which sunk the U-Boat. The Admiralty Assessment Committee have awarded part of the credit for this success to the aircraft which first found the enemy.

(Received up to 18th June, 1945.)

Month.	Known Sunk.	Probably Sunk.	Damaged. "A."	Damaged. "B."	Slight Damage.	Insufficient evidence of Damage.	No Damage.	Unassessed
March	1	2	—	1	—	17	10	7
April	4*	4	—	2	1	8	—	6
May	3	6	1	—	—	1	—	8

RECENT ATTACKS ON U-BOATS

Attacks on U-Boats in the Kattegat

During the afternoon of April 19 **Mosquitos** of **235 Squadron**, including the leader, four of **143 Squadron**, five of **248 Squadron**, two of **235 Squadron** and two of **333 (Norwegian) Squadron** were on Rover patrol flying at 3,000 feet in fine weather when the strike leader sighted first an escort vessel, then four fully surfaced U-Boats in line astern formation, bearing Green 20°, distant 10 miles in position 56° 37' N., 11° 51' E. The first U-Boat of the four sighted had crash-dived before the strike wing reached the attack area. An immediate attack was made, across sun, from Red 90° to the U-Boat's course, firing R.P.s in a 10° to 8° dive. The second U-Boat of the formation was attacked from 500 feet down to 250 feet, 24 R.P.s being fired at ranges of 600 to 500 yards. Two dry hits were obtained on this U-Boat and 14 wet hits. A strike was then made on the third U-Boat, which was attacked from 600 feet down to 500 feet, 16 R.P.s being fired at ranges of 700 yards to 500 yards. Four wet hits were obtained. Eleven dry hits and between 13 and 19 wet hits were scored on the last U-Boat, which was attacked from 500 feet down to 200 feet. Slight smoke was seen coming from amidships of the second U-Boat. This U-Boat made no attempt to submerge during two attacks, but did take some evasive action. Eight to ten yellow inflated dinghies were seen close to the hull. The third U-Boat was stationary after the attack; no attempt was made to submerge and unidentified light coloured objects were seen forward of the conning tower on the hull. The fourth U-Boat

was also stationary for a while after attack with black smoke coming from it and the conning tower was seen to be damaged. This U-Boat later sank without way, leaving a discoloured patch on the water. During the attack light flak came from some of the U-Boats—this was not accurate. One Mosquito of 235 Squadron landed safely in a neutral country, having reported that one engine was unserviceable; damage was presumably caused by flak. Another aircraft of 235 Squadron was damaged by ground flak and crash-landed in Denmark. One of the 248 Squadron aircraft had a 3-foot square hole in main plane and rear main spar was broken. The remaining aircraft reached base safely.

Comment

All crews concerned are congratulated on an excellent performance. The evidence shows that one U-Boat was probably destroyed and the other damaged.

Admiralty Assessment

This was a determined and skilful attack on three U-Boats escorted by an "M" class minesweeper.

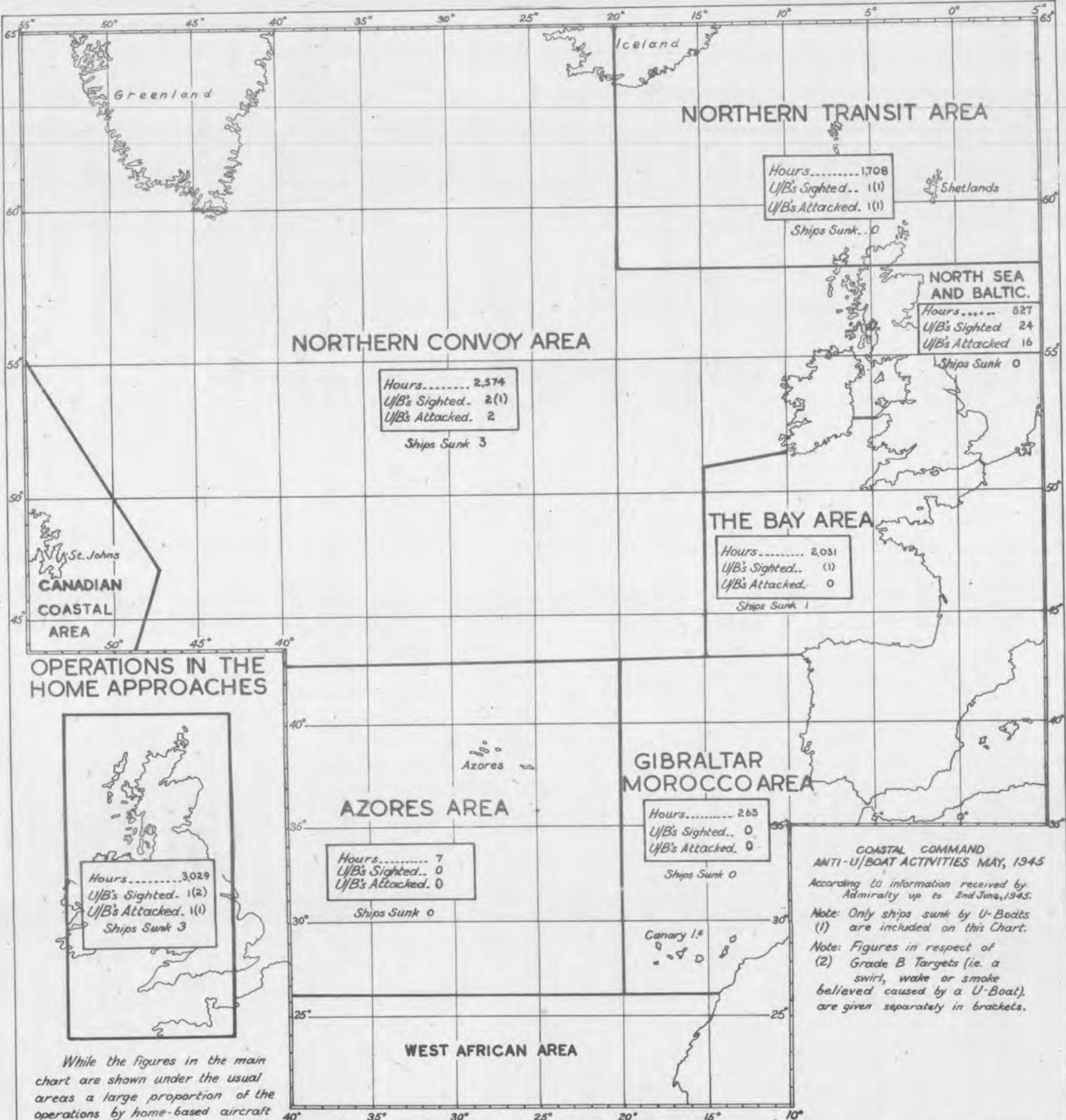
From visual and photographic evidence, the centre U-Boat, a 500-tonner, is considered to have sunk. The leading boat, a Type XXI, and the rear boat, a Type XXIII, are considered to have been seriously damaged.

The action is accordingly assessed "One 500-ton U-Boat known sunk, one Type XXI and one Type XXIII probably damaged B."

An Excellent Attack

In the evening of April 30 **Catalina R/63** was on M.A.D. anti U-Boat Rover patrol on course 104° at 2,000 feet when a prominent arching white spray, possibly caused by a schnörkel, was sighted bearing 270°, distant approximately 2 miles. The sky was clear and the sea moderate. The pilot immediately altered course, diving down to attack the position. Shortly after the dive began a black object could be seen at the base of the spray. When the aircraft was approximately three-quarters of a mile from the target a definite schnörkel was seen projecting about 3 feet out of the water in position 48° 00' N., 06° 30' W., and travelling on course 004° at a speed of 6 knots. The schnörkel was bearing 090° distant 60 miles from the 1st Escort Group. The attack approach was made from stern to bow at 100 feet tracking directly over the U-Boat. At the time of passing over the U-Boat the schnörkel, periscope and supporting guy wire for the schnörkel were clearly visible extending approximately 6 feet out of the water. A strong M.A.D. signal was obtained over the schnörkel, and 24 retro-bombs were dropped on the M.A.D. signal, 14-6 lateral spacing with three sticks of

eight bombs each. The aircraft was on course 004° at the time of release and at 100 feet. Crew members in the waist compartment reported a violent explosion 10 to 15 feet aft of the schnörkel in the centre of the wake one second after the bombs entered the water. A sharp turn was made to run back over the target to begin cloverleaf tracking, and during the turn a large circle of disturbed water could be seen marking the spot of the explosion. No further M.A.D. indications were obtained and on the second cloverleaf pass a purple Sono buoy was dropped with negative results. At 1813 hours a boiling motion of the water accompanied by large air bubbles was seen in the centre of the explosion slick. On the next cloverleaf pass over this spot an oil slick was beginning to form and small pieces of bright coloured wood and one piece of black tubing approximately 6 to 8 feet were seen in the middle of the slick. Cloverleaf tracking continued until 1820 hours without results, and a trapping circle was then begun, but results were negative. At 1,500 yards a Sono buoy pattern was laid during the trapping circle with negative results. An



OPERATIONS IN THE HOME APPROACHES



While the figures in the main chart are shown under the usual areas a large proportion of the operations by home-based aircraft were over inshore waters. To illustrate these separate (but not additional) figures are given in the inset.

**COASTAL COMMAND
ANTI-U/BOAT ACTIVITIES MAY, 1945**
According to information received by Admiralty up to 2nd June, 1945.
Note: Only ships sunk by U-Boats (1) are included on this Chart.
Note: Figures in respect of (2) Grade B Targets (i.e. a swirl, wake or smoke believed caused by a U-Boat), are given separately in brackets.

attempt was made to contact the 1st Escort Group known to be in the area but without success. It was discovered later that the voice antenna had been burned off by the rocket motor explosion. The radio equipment was found to be unserviceable for homing purposes and therefore at 1845 hours trapping circle was abandoned and altitude gained so as to increase R/T range and to contact the Escort Group. At 1905 hours contact was established with the Escort Group, and they were requested to proceed to the attack position at full speed. Half an hour later the aircraft was contacted by the relief aircraft, Sunderland D/228, and as P.L.E. had been reached R/63 left the area. The Escort Group arrived at 2300 hours and found the oil slick. A bottomed asdic contact was

obtained at the head of the slick and 19 Group were told that an attempt to bomb for evidence would be made at daylight. No further evidence was obtained by the Escort Group; asdic contact remained stationary and oil samples were collected for assessment.

Comment

A most excellent attack on a schnörkelling U-Boat. The sighting, attack and after results indicate the very high operating efficiency of both crew and equipment.

Admiralty Assessment

The attack is assessed "U-Boat probably sunk."

Survivors in the Water

Early in May there was yet another attack on U-Boats in the Kattegat. This was made during the morning of May 2 by **nine Mosquitos of 143 Squadron** including the leader, **nine of 235 Squadron**, **nine of 248 Squadron**, **four of 404 Squadron** and **four of 333 (Norwegian) Squadron**. The aircraft were flying in hazy weather at 2,000 feet on course 166° when the Wing leader sighted two fully surfaced U-Boats, bearing Red 20°, distant 3 miles, in position 57° 29' N., 11° 24' E., course 360°, 10 knots. The U-Boats were in line astern about half a mile apart. The leading U-Boat was thought to be a Type XXIII and the second U-Boat was possibly a 250-ton type. The U-Boats were up sun and the leader immediately ordered all sections to attack, the port section to attack the leading U-Boat and the starboard sections to attack the rear U-Boat. As the leader ordered the attack on a heading of 100°, "L" and "F" of 333 Squadron, flying as fighter cover on the forward port side of the formation, were the first aircraft to attack. All attacks were made from Red 80° to the U-Boats' course. F/333 attacked the leading U-Boat and L/333 attacked the rear U-Boat. No. 143 Squadron aircraft split and attacked both U-Boats followed by 235 Squadron aircraft and 248 Squadron aircraft. Some of the aircraft were unable to attack before the U-Boats disappeared and none of the 248 Squadron aircraft attacked the leading U-Boat. This leading U-Boat was attacked with R.P.s, at ranges of 800 down to 200 yards, heights 800 to 100 feet. Ten wet hits were observed entering the water between 4 to 30 yards from the conning tower; there were two possible wet hits on the stern and two dry hits on the base of the conning tower. Further results were unobserved owing to the spray. 1,900 rounds of cannon and 200 rounds of machine gun were fired at this U-Boat. Strikes were seen on the conning tower and on the hull forward and aft of the conning tower, tracer was used. Inaccurate light flak came from this U-Boat during the attack. Immediately after the attack by the

first aircraft this U-Boat began to submerge at an angle of 35°. Air bubbles were seen together with discoloration and possible oil round the swirl. The U-Boat was not seen again. The rear U-Boat was attacked with R.P.s at ranges of 550 to 300 yards, heights 400 to 300 feet; two wet hits were observed 20 yards from the conning tower, eight wet hits 15 to 20 yards from the conning tower and four possible wet hits 30 yards from the conning tower; there were also eight possible wet hits around the conning tower and two probable dry hits on the base of the conning tower. (See Plate 1.) Further results were unobserved owing to spray. 3,240 rounds of cannon and 900 rounds of machine gun were fired, strikes being seen along the whole length of the hull and on and around the conning tower. At the beginning of the attack inaccurate light flak came from this U-Boat, but the flak was silenced early by L/333. During this attack the U-Boat turned to port. An explosion was seen and debris was thrown up, several aircraft suffering damage from the debris. The U-Boat stopped and was seen pitching with bow and stern alternately out of the water. The U-Boat was later seen to sink stern first in a large patch of oil and wreckage. Four dinghies were inflated and the survivors climbed into them—other survivors were seen in the water. When the aircraft left the area no U-Boats were visible, there was one patch of discoloration and possible oil, and the circular patch of oil, debris and wreckage with dinghies and survivors. Two aircraft of 248 Squadron were damaged by the debris thrown up by the rear U-Boat, and one aircraft of 143 Squadron was also damaged by this debris. Another aircraft of 143 Squadron had its starboard nacelle holed by ricochet. G/235 did not return and was last reported heading for neutral territory.

Comment

This is another of the many fine attacks made by strike aircraft on surfaced U-Boats. An excellent performance.

A Mortal Blow

During the early hours of May 7 **Catalina X/210** was patrolling on a south-easterly course when a Radar contact was obtained bearing Green 65°, range 2 miles. At that time the weather was good with visibility 8 miles. The aircraft homed and continued on the same course. Soon afterwards a wake was sighted, and then a schnörkel and periscope in position 61° 32' N., 01° 53' E., course 315° and speed 7 to 8 knots. The aircraft was too near to make an attack on the initial sighting; so it circled and attacked from the starboard quarter, releasing from 50 feet four depth charges, set to shallow depth, spaced at 100 feet. The bombsight was not used as there was insufficient time to make an accurate homing run for the bomb aimer. The attack was made when the swirl was visible and 10 seconds after the schnörkel and periscope had disappeared. The first depth charge was seen to enter the water approximately 50 feet ahead of the last visible point of the wake. The depth charge explosions blotted out the swirl from view. When the schnörkel was visible 25 rounds of tracer were fired, but no hits were seen. Oil began to rise approximately 4 minutes after the attack and the area in which it appeared increased in size to 200 yards by 30 yards, followed by oil streaks 120 yards by 10 yards—all near the position of the attack. Basic Sono buoy pattern

was laid, followed by Extension "A" in a direction of 180°. Positive contacts were obtained which indicated that the U-Boat was stationary; these were followed by interrupted movements. Sono buoy was still positive when the aircraft left the area, intermittent engine and hydroplane noises being heard. The movement of the U-Boat was negligible; this was confirmed by the relieving aircraft. From final indications the course of the U-Boat seemed to be 060° as compared with the original heading of 315° at the time of the attack.

Comment

A good attack after a Radar contact on a schnörkel, confirmed by a visual sighting. The Sono buoy evidence, together with the appearance of oil after the attack, indicated that the U-Boat had received severe damage. Later evidence of the foundering of the U-Boat showed this to be true.

Admiralty Assessment

From information received from the Germans, "U.320" was attacked and sunk by aircraft on this date.

It is considered that Catalina X/210 is responsible for this attack, which is assessed "U.320" known sunk."



On May 2, 1945, the Banff Mosquito Wing seriously damaged an "M" class minesweeper in the Kattegat.
(See letterpress, p. 10.)



The "M" class minesweeper sunk by the Dallachy Beaufighter Wing in the Langelands Belt on May 3, 1945.
(See letterpress, p. 10.)



PLATE 4

SURRENDERED U-BOATS.—I, 1,200-ton quick-diving type photographed by K/461 (R.A.A.F.) on May 11, 1945.
II, 1,200-ton quick-diving type photographed by B/105 (U.S.N.) on May 10, 1945.



II.—ANTI-SHIPPING

SUMMARY OF ANTI-SHIPPING OPERATIONS BY COASTAL COMMAND AIRCRAFT

PERIOD 1st to 7th MAY, 1945

Note.—On 7th May, orders were received to cease attacks on shipping forthwith.

Weapons Carried. (1)	Number of Sorties.			Number of Aircraft to Attack.			Target.	
	On Reconnaissance. (2)	On Strike. (3)	Total. (4)	On Reconnaissance. (5)	On Strike. (6)	Total. (7)	M/V. (8)	Naval. (9)
DAY OPERATIONS								
Torpedo	—	18	18	—	7	7	7	—
R.P.	6 (6)	144	150 (6)	6 (6)	50	56 (6)	39	23
Bomb	1	1	2	1	—	1	—	1
Depth charge	152	—	152	—	—	—	—	—
Tsetse	6	2	8	3	2	5	2	3
Cannon and machine gun only	14 (3)	45	59 (3)	7 (3)	37	44 (3)	32	15
TOTAL—DAY	179 (9)	210	389 (9)	17 (9)	96	113 (9)	80	42
NIGHT OPERATIONS								
Torpedo	—	—	—	—	—	—	—	—
R.P.	—	—	—	—	—	—	—	—
Bomb	52	—	52	18	—	18	6	12
Depth charge	9 (1)	—	9 (1)	1 (1)	—	1 (1)	—	2
Tsetse	—	—	—	—	—	—	—	—
Cannon and machine gun only	3	—	3	—	—	—	—	—
TOTAL—NIGHT	64 (1)	—	64 (1)	19 (1)	—	19 (1)	6	14
ALL OPERATIONS								
Torpedo	—	18	18	—	7	7	7	—
R.P.	6 (6)	144	150 (6)	6 (6)	50	56 (6)	39	23
Bomb	53	1	54	19	—	19	6	13
Depth Charge	161 (1)	—	161 (1)	1 (1)	—	1 (1)	—	2
Tsetse	6	2	8	3	2	5	2	3
Cannon and machine gun only	17 (3)	45	62 (3)	7 (3)	37	44 (3)	32	15
GRAND TOTAL	243 (10)	210	453 (10)	36 (10)	96	132 (10)	86	56

Notes.—(1) The figures in brackets represent attacks on shipping by aircraft on duties other than anti-shipping.

(2) Included in the above figures are 155 sorties directed against small battle units and comprising:—

3 sorties with bombs.
152 sorties with depth charges.
6 midget U-Boats were attacked.

FINAL ASSESSMENTS FOR APRIL, 1945

Day :—

R.P. and Cannon

- 6 M/V.s (totalling 20,849 tons) sunk.
- 1 " M " class Minesweeper sunk.
- 3 Trawlers sunk.
- 1 Tug sunk.
- 2 M/V.s (totalling 3,542 tons) seriously damaged.
- 1 Tanker (6,031 tons) seriously damaged.
- 7 M/V.s (totalling 25,870 tons) damaged.
- 1 E-Boat Depot Ship (3,615 tons) damaged.
- 1 " M " class Minesweeper damaged.

Cannon

- 2 Coasters (totalling 378 tons) sunk.
- 1 Lighter (300 tons) damaged.
- 1 T.T.A. damaged.

Night :—

Bombs

- 5 M/V.s (totalling 14,451 tons) sunk.
- 1 Escort Vessel sunk.
- 4 M/V.s (totalling 15,000 tons) seriously damaged.
- 1 Tanker (10,243 tons) seriously damaged.
- 2 M/V.s (totalling 6,500 tons) damaged.
- 1 Destroyer damaged.
- 1 Escort Vessel (2,000 tons) damaged.
- 1 " M " class Minesweeper damaged.
- 1 Escort Vessel damaged.

Cannon

- 1 Coaster (400 tons) damaged.
- In addition 13 Midget U-Boats are provisionally assessed as sunk.

FINAL ASSESSMENTS FOR PERIOD
1st-7th MAY, 1945

Day :—

R.P. and Cannon

- 2 M/V.s (totalling 4,163 tons) sunk.
- 1 Tanker (750 tons) sunk.
- 2 " M " class Minesweepers sunk.
- 1 Ex-Dutch Gunboat sunk.
- 1 Swinemunde Drifter sunk.
- 1 Small Coaster sunk.
- Liner " Der Deutsche " (11,453 tons) seriously damaged.
- 4 M/V.s (totalling 13,881 tons) seriously damaged.
- 1 Tanker (6,405 tons) seriously damaged.
- 1 " M " class Minesweeper seriously damaged.
- 1 Tug seriously damaged.
- 3 M/V.s (totalling 18,989 tons) damaged.
- 5 Coasters damaged.
- 1 Ex-Dutch Gunboat damaged.
- 1 Escort Vessel damaged.
- 1 Large Barge damaged.

Cannon and Tsetse

- 1 Auxiliary (50 tons) seriously damaged.
- 1 M/V (2,500 tons) damaged.
- 2 Small Coasters damaged.
- 1 " M " class Minesweeper damaged.
- 1 Barge (500 tons) damaged.
- 2 Tugs damaged.
- 1 Motor Barge damaged.
- 1 R-Boat damaged.
- 1 T.L.C. damaged.
- 1 Auxiliary damaged.
- 1 Steam Cutter damaged.

Shipping Strikes in May

On May 2 six **Mosquitos** of the **Banff Wing**, after attacking two U-Boats in the Kattegat, sighted an " M " class minesweeper. They attacked with R.P. and cannon and scored many hits. The minesweeper stopped and was last seen listing to starboard and burning furiously along its whole length. (See Plate 3.)

On May 3 fourteen of the **Dallachy Wing Beaufighters**, on patrol in force, sighted a group of ships in the Great Belt. They attacked them with torpedoes, R.P. and cannon. No torpedo hits were seen, but numerous strikes were obtained with R.P. and cannon, resulting in the complete destruction of an " M " class minesweeper and serious damage to the tanker *Taijun*, 6,405 tons. All our aircraft returned safely from this operation. (See Plate 3.)

Early on the morning of May 3 twelve **Beaufighters** of the **North Coates Wing**, while on a reconnaissance in force, sighted several small groups of ships in and near the Heligoland Bight. They attacked one group of eight small vessels off Cuxhaven with R.P. and cannon. A coaster was sunk, survivors from it being seen in a small boat. Two other vessels were set on fire and left burning fiercely.

Later on May 3, during the afternoon, twenty-nine **Beaufighters** set out from **North Coates** for the Great Belt, where they encountered a great concentration of enemy ships. R.P. and cannon attacks were made on many of these vessels and at least two of them, a tanker and a 1,200-ton merchant vessel, were sunk. No less than fifteen other vessels, one of them being the liner *Der Deutsche*, 11,400 tons, were damaged, five of them seriously. The **Beaufighters** landed at a forward base on the Continent and were refuelled and rearmed.

The next day the **North Coates Wing** were airborne from their temporary base, and flew into the Kattegat in search of further targets. They sighted a destroyer, a 5,600-ton merchant vessel, and an auxiliary south-east of Aarhus. These ships were attacked and the **Wing** landed once more on the Continent. After refuelling they returned to North Coates.

On May 4 **Mosquitos** of the **Banff Wing** were also busy in the Kattegat. They attacked several groups of ships near Aarhus with R.P. and cannon. The merchant ship *Wolfgang*, 3,000 tons, and three escorts, were sunk, while a merchant vessel of 3,540 tons and two other vessels were damaged.

III.—OTHER OPERATIONAL FLYING

Air/Sea Rescue

During the month of May, 61 members of Aircrew were rescued by the Air/Sea Rescue Service.

It was hoped that with the end of the war in Europe an immediate easing of the pressure of Air/Sea Rescue operations would be felt and that considerable reductions in the number of air and surface craft disposed around the coast of the United Kingdom might be made.

This has not proved to be the case, and the figure of survivors for last month is high when compared with those for the other four months of this year (45, 62, 84, 50).

Air/Sea Rescue Squadrons have continued to be fully employed and, to cover the great numbers of aircraft making the return flight across the Atlantic, detachments of Warwicks have been sent from the east coast of the British Isles to Tiree and Iceland.

The first rescue of the month took place on May 2. It concerned the crew of a Wellington from Lossiemouth, which came to grief on a non-operational flight over the Moray Firth. The ditching was seen by an Anson and a Hurricane and the whole crew were soon picked up by a fishing vessel.

On the following day a model rescue operation was accomplished. The pilot of Mustang H/65 Squadron, on his way from an escort flight to the Norwegian coast, called on R/T that the amount of fuel remaining to him was 10 gallons. A plot was kept on the aircraft, a Warwick scrambled from Thornaby and two H.S.L.s sailed from Blythe. At 1915 hours, when thirty miles off Newcastle, the pilot called that he was about to bale out. After a short search the Warwick found the airman in the water and homed one of the H.S.L.s who completed the rescue by 2030 hours.

In all thirteen aircrew were picked up between the beginning of the month and V.E. day, bringing

the total saved in Home Waters, from the formation of the Air/Sea Rescue Service in February, 1941, until the end of the European war, to 5,804.

From V.E. Day until the end of the month, ample evidence became available to prove that Air/Sea Rescue must be a permanent institution until the safety of flying is much improved. For in those twenty-two days, with the dangers of enemy action removed, transit and training aircraft provided forty incidents from which forty-eight people were saved.

On May 10, a Halifax of No. 102 Squadron signalled that an accompanying aircraft, also a Halifax, had ditched thirty miles off Whitby. This aircraft was detailed to stay circling the dinghy and to home **Warwick V/279** while at the time a H.S.L. was sent out. The Warwick found the dinghy quite easily and homed the H.S.L. which picked up the whole crew of eight who were uninjured.

The next major incident which took place on 26 May was a very similar one, only in this case the aircraft concerned were B.17s of No. 336 Squadron (U.S.A.A.F.). This ditching took place forty-five miles off Southwold and an airborne lifeboat was dropped to the survivors who were in two dinghies. They were also uninjured, and when eventually rescued by H.S.L. 2733, had got the lifeboat under way and were making four knots.

Three days later one of A.T.A.'s gallant members of the so-called weaker sex ditched a Barracuda while on a transit flight from Prestwick to Dunino. A Hurricane and two launches were sent out, but before either of the official rescue craft could arrive, she had been rescued by a civilian fishing boat.

Photographic Reconnaissance

Up to V.E. day photographic reconnaissance was for the most part confined to north-west Germany, Denmark and Norway. Its object was to watch the final attempts by the enemy to withdraw his remaining sea and air forces to the above area in order to render them less vulnerable to immediate attack by Allied land forces.

Photographs of Kiel and the Canal showed the departure of about forty-five active U-Boats, while the main units, *Admiral Hipper* and *Emden*, both appeared to be in a damaged condition and unlikely to set sail. The U-Boats were

subsequently located in Flensburg, in the Sound and in southern Norwegian ports.

Apart from an unusual concentration of tankers in Kiel Fjord, the remaining shipping was mostly inactive.

The greatest concentration of German shipping was seen at Copenhagen and included the heavy cruiser *Prinz Eugen*, the light cruiser *Nürnberg*, seven destroyers, nineteen lesser naval units and seven sperrbrechers, in addition to the laid-up Danish naval units and a considerable total of liners and merchant vessels.

Photographs of airfields in the Schleswig area and in Denmark showed high totals of enemy aircraft, many of them of jet-propelled types. Some of these airfields attacked by T.A.F. Squadrons constituted the few damage assessment targets for the month.

Routine cover of the Channel Islands and west French ports was continued. The final cover of Swinemünde proved beyond doubt that the pocket battleship *Lutzow* had originally been damaged; the top of the rear turret had been dismantled to lessen the weight aft.

Photographic reconnaissance activities since V.E. day have included non-operational sorties over targets on the Continent for use by all war departments and over towns and other targets in the United Kingdom for planning and research purposes. For the benefit of the Naval Commanders-in-Chief newly appointed to north German, Danish and Norwegian coastal areas, sorties were despatched to determine the disposition and condition of their newly acquired naval and merchant fleets.

Photographic Reconnaissance

The first of the photographic reconnaissance sorties on the Continent since V.E. day was made on 12th June. This was a routine cover of the Channel Islands and west French ports. The sortie was flown by a formation of four Spitfires, two of which were equipped with cameras. The formation was led by a pilot from the 1st Tactical Reconnaissance Wing, who was also the observer. The sortie was successful in that it provided a clear view of the Channel Islands and west French ports. The formation was seen by the enemy, but no action was taken. The sortie was a success in that it provided a clear view of the Channel Islands and west French ports.

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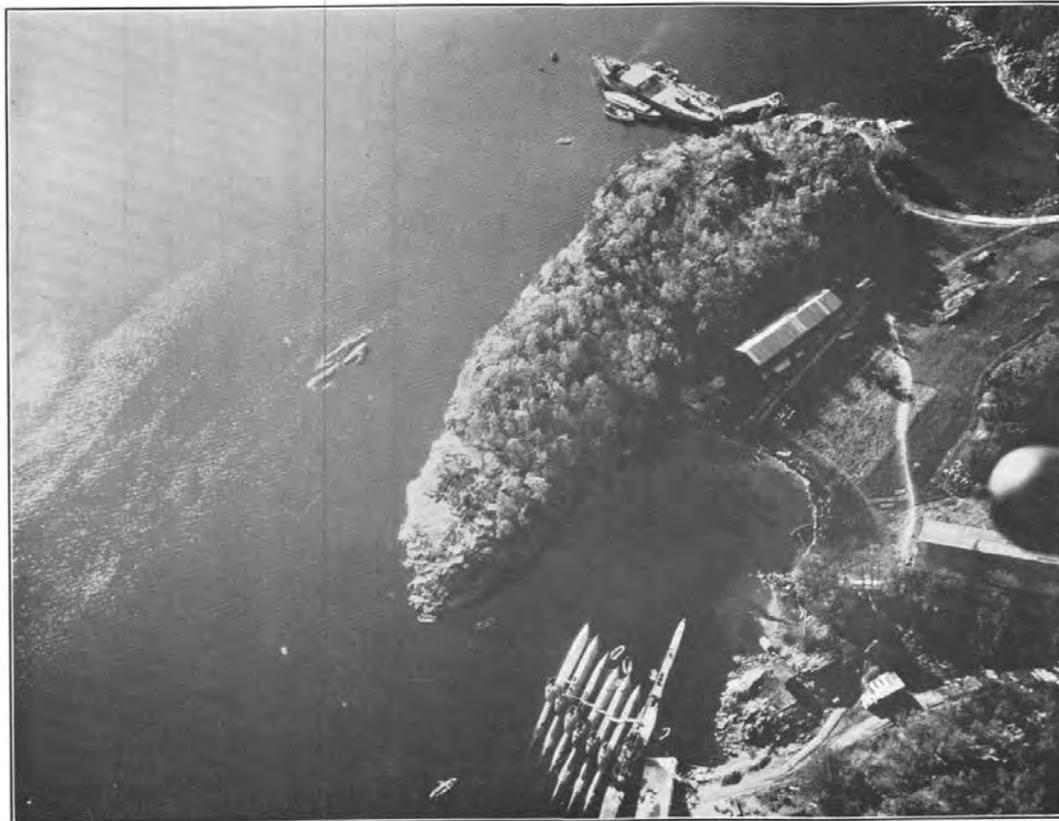
SURRENDERED U-BOATS.—III. 1,200-ton quick-diving type photographed by N/461 (R.A.A.F.) on May 10, 1945.
IV. 500-ton type photographed by Z/36 on May 13, 1945.

PLATE 5





A convoy of surrendered U-Boats photographed by M/59 on May 14, 1945.



U-Boats at Kristiansand South photographed on May 19 by H/502.

IV.—SPECIALIST AND GENERAL ARTICLES

Synthetic Sono Buoy Training

An excellent synthetic Sono buoy training device has been designed at Pembroke Dock to operate in conjunction with the Link Trainer. It simulates the laying of the basic Sono buoy pattern and the subsequent tracking procedure which would follow a contact on a submerged submarine.

Briefly the equipment consists of a Link Trainer table with a glass shelf the same size as the table but raised some 6 inches above the table top. On this glass shelf the ordinary Link crab operates. A special crab has been made, which runs on the table beneath the raised glass shelf and records the submarine track on the underside of the glass shelf. The motor of this crab produces noises similar to those of a submarine and is the medium for providing the cavitation swish or propeller beat. To this crab is attached a Sono buoy hydrophone which is connected to a control panel at the side of the Link Trainer desk.

The control panel is made of five carbon rheostats, to each of which the output from the hydrophone is fed. These rheostats control the noise level of the feed to the buoys. The output from the rheostats is fed to the hydrophone connections of the Sono buoys, which are mounted in a suitable position in the Link Trainer room. The receiver is installed in the cubicle in which the wireless operator sits.

A rotary switch is mounted on the back of the main tuning condenser of the receiver, the wiper arm of the switch being integral with the centre spindle. The fixed contacts of the switch are so positioned that the wiper arm makes contact with a fixed segment at each position when the condenser is correctly tuned to the appropriate buoy frequency. The power supply to the buoys is from an outside source, the H.T. negative lead being fed via the rotary switch. The power supply is thus only fed to the buoy selected by the wireless operator. Each member of the crew has his own position, the pilot in the Link Trainer, the navigator at a separate table, the wireless operator in a special cabin. All positions are connected on an intercommunication system so that each member can talk to the other and listen to the Sono buoy indications.

The Link Trainer instructor controls the output of the buoys in relation to the distance between the submarine crab and the plotted positions of the buoys as dropped by the crew. He keeps the aircraft crab within range of all the buoys and brings the captain over the proper buoy on each occasion during the laying of the basic pattern. When the crew has decided that it has correctly plotted the submarine, and when the navigator has indicated the pattern to be laid as follow-up procedure, the instructor stops the exercise and the crew then compare their plot with the movements of the submarine on the Link table.

The following three accounts of U-Boat attacks give excellent examples of the use of the Sono buoy.

Liberator Y/120 was on anti U-Boat patrol on February 20, when at 1251 hours a signal was received from Control diverting the aircraft to position 55° 43' N., 06° 53' W. to investigate schnörkel smoke reported by Y/201 at 1110 hours. The signal instructed Y/120 to use Sono buoys. The aircraft set course for the position, making landfall *en route* at Rhins of Islay for position check. At 1353 hours the position of Y/201's report was reached and a Sunderland aircraft was sighted patrolling in the area. The weather in the area was very good, 1/10 to 2/10 cloud, base 3,000 feet, sea—Beaufort scale 3, visibility 30 miles plus wind 250°, 22 knots. No markers or shipping were visible. R/T contact was attempted with the Sunderland without success, so two Mark II Marine Markers were released over the D.R. position and the aircraft began laying basic Sono buoy pattern. The blue buoy was found to be unserviceable after release, so the green buoy was released in its position. At 1430 hours a harsh

grinding noise and intermittent beats were heard on the purple buoy. No results were heard on the orange or the yellow buoys. At 1440 hours a medium rhythmic swish was heard on the purple, red and green buoys—this appeared to be louder on the green. Rhythm was timed by stop watch as 180 beats per minute. These sounds were quite distinct from water noises. Based on these results the captain concluded that the U-Boat was in the area of the centre point of the triangle formed by the purple, green and red buoys, and since the sound was slightly louder on the green buoy, that the U-Boat's course was approximately 135°. As there was little wind the captain decided that an up-track attack was of more value than an into-wind attack. At 1452 hours the aircraft tracked over the centre point of the triangle and an attack was made. A loud reverberating tearing noise was heard on the purple buoy, lasting several seconds. A few minutes later noises described as similar to a motor cycle were heard continually on the purple

and green buoys and faintly on the red. This sound continued until 1600 hours and the crew thought it might have been caused by the U-Boat circling. At 1615 hours a croaking sound was heard intermittently on the purple buoy, but a quarter of an hour later nothing was heard on any of the buoys. Instructions were received from Control at 1657 hours to begin homing transmissions, and markers on the centre of the basic pattern were replenished. Liberator Q/120 arrived at 1800 hours and a few minutes later Y/120 set course for base.

Comment.

The captain and crew displayed that they were well versed in Sono buoy tactics and the substitution of the green buoy for the blue in the basic pattern was correct.

Liberator M/120 was ordered to proceed from base to the position of a sighting and an attack which had been made at 1000 hours on March 22 by Wellington R/172. The weather was fair, 6/10 to 8/10 cloud, descending to 2,000 feet in parts, sea—Beaufort scale 2, visibility 7 miles, wind 210° 25 knots. At 1240 hours the position was reached—no markers were visible, but several escort vessels were seen 3½ to 4 miles north of the position. A basic Sono buoy pattern was then laid, but no definite sounds were picked up and it was thought that the escort vessels might be interfering. R/T contact was made with the escort vessels and the aircraft asked them to retire. The escort vessels complied and remained hove to about 5 miles east of the position. At 1320 hours submarine noises were heard on the blue buoy—these were increasing, suggesting that the U-Boat was approaching the pattern from the east. By 1400 hours the sounds had developed into definite beats of 125 per minute—this was still heard on the blue buoy. An extended pattern "A" was then laid with blue as apex, red to south, yellow to north. Beats were also picked up on red extension, then faded slightly on red and increased further on the blue. These sounds are described by the crew as being, if anything, clearer than they had heard on the Sono buoy training records, there being no doubt that they were caused by a U-Boat approaching the blue buoy from the east. The position of the blue buoy was 55° 23' N., 06° 40' W. and the course of the U-Boat estimated as westerly at 6 knots. At 1422 hours, when the aircraft was on course 100°, an attack was made. The aircraft flew over the markers of the purple buoy to the flame float marking the blue buoy and the attack was made on the blue buoy, using Mark III bomb-sight. This direction of attack was chosen as the marine markers by the purple buoy were much more definite than the flame float by the blue buoy. As the attack was being made the beats on the blue buoy developed into a high whining hum which stopped and re-started almost immediately. This whining hum continued fairly strong on blue and appeared to become even stronger on purple. Two bangs were then heard on blue buoy—these were loud but as though muffled by distance, fairly sharp but each tailed into a "wooshing" sound. The bangs were three seconds apart. The "wooshing" part of the second bang tailed into a screeching sound. This screech was coarse and had the effect of surging—the crew describe the coarseness of the screech as a grinding, gurgling, shrieking quality all mingling to give the screeching note. After twenty seconds

this tailed away into a low whining and humming sound. This low whine and hum continued on the blue, was also picked up on the purple, then on the orange, then on the blue and the yellow—the Sono buoy operator described these sounds as conflicting, and he could not say that any definite U-Boat sounds were audible. These sounds were gradually overcome by the escort vessels which were asked to close the scene to investigate. The escort vessels were asked to close position at 1505 hours and they arrived at 1523 hours. At 1545 hours a circular patch of oil, approximately 100 feet in diameter, was seen—this was 50 yards west of the marker marking the point of attack. No oil had been visible in the area before the attack. The aircraft reported the presence of the escort vessels to Control, also that no Sono buoys were left. The aircraft set course for base at 1613 hours.

Comment.

This is an intelligent application of the Sono buoy tactics by an efficient crew. The laying of the basic pattern, followed by the correct extension of it led to a good estimation of the U-Boat's position and subsequently a good attack. It is to be noted that the escort group was asked to retire in order to prevent their interference with the monitoring of the pattern. The Sono buoy evidence and the appearance of the patch of oil after the attack would indicate that damage was inflicted.

The Admiralty Assessment Board have now assessed this attack as Category "B," probably sunk.

At 1142 hours on April 4 **Liberator K/86** was on anti U-Boat patrol in position 59° 03' N., 04° 55' W., flying on course 292° at 1,500 feet, when Liberator A/224 was sighted on the port bow, distant 5 miles, circling a Sono buoy pattern. K/86, listening in, heard rhythmic propeller beats, and 2 minutes later a very loud deep sound of explosion which continued for 2 minutes, decreasing gradually in volume. The aircraft continued on course and at 1240 hours received instructions from Control to hunt a U-Boat in position 59° 03' N., 04° 51' W. The aircraft set course and arrived at the position at 1335 hours. The weather was good, with slight haze, cloud 3/10, base 3,000 feet, sea force 2, visibility 15 miles, wind 119° 10 knots. The other aircraft was still circling the Sono buoy pattern, but nothing was heard by "K" except a very faint mechanical noise from the yellow buoy. Five streaks of dark reddish brown oil were seen bearing 040° 3 miles from A/224's Sono buoy pattern running from east to west. Selecting the largest of these, which narrowed towards its western end, the aircraft dropped green Sono buoy at about one-third of its length from the western end. Whirring engine noises were heard and 10 minutes later, at 1400 hours, propeller beats at 200 r.p.m. were clearly heard. When flying on course 270° at 300 feet the captain decided to attack the green buoy.

A loud rumbling explosion was heard which lasted 45 seconds and air bubbles were seen for 1 minute, bearing Green 225°, distant 1 mile. The propeller sounds, which had been timed on the blue buoy at 188 r.p.m. immediately before the explosion, increased within 2 minutes to 340 r.p.m. During the next 10 minutes propeller revs. gradually decreased and were accompanied by loud clanking noises. At 1444 hours a fluorescent patch and wreckage were seen



The departure of members of the Allied Control Commission for Norway from Woodhaven, and (below) their arrival at Oslo/Fornebu.





University Square, Oslo, photographed on V.E. day by G/330 (Norwegian).



Another photograph of Oslo taken on V.E. day.

bearing Green 255°, distant 1½ miles, very close to the air bubbles previously seen. The wreckage consisted of one large piece of wood about 8 feet in length, numerous small objects, yellow and white in colours, and several other small objects like corned beef tins. Two or three fresh oil streaks also appeared. From 1502 to 1535 hours three more Sono buoys were dropped, red, orange and purple, in positions respectively, Green 150° 1 mile, Green 030° 1 mile and Green 090° 1 mile. Sono buoy contact was maintained in all for 3 hours and 55 minutes, during which time the propeller beats, noises like an express train, clanking noises, clattering noises and regular knockings were heard, sometimes louder on one buoy and sometimes on another. The conclusion was drawn that the U-Boat was not on a set course, and was either circling or out of control. At 1647 hours three minor explosions were heard on the green buoy. By 1715 hours all sound was very faint.

The yellow buoy was dropped at 1727 hours at Green 090° 2 miles, but nothing was heard. Nothing more was heard from any of the buoys and aircraft carried out search "A." At 1803 hours two pieces of yellow debris were seen close to the yellow buoy. At 1930 hours, on instructions from Control, the aircraft set course for base, having remained in the area for 5 hours and 22 minutes after attack.

Comment

This is an example of an excellent Sono buoy hunt. The conditions of wind and sea were most suitable and the Sono buoy tactics modified to meet the situation were well applied. The transmissions were recorded in detail on the Sono buoys log submitted. The Sono buoy evidence, supported by the oil and debris brought up, point to some measure of success.

Philante Trial

A series of trials were made by the Joint anti U-Boat School, R.N.A.S., Maydown, together with a Liberator aircraft of No. 120 Squadron, to ascertain the practicability of tracking a deep submerged submarine with Sono buoys with sufficient accuracy to enable escort vessels to be homed within asdic range.

The equipment used was the expendable radio Sono buoy and the normal aircraft receiver. The trial was done in three stages during the months of October, November and December.

At the beginning of the trial the submarine was at a prearranged rendezvous, and H.M.S. *Philante* was in a position 090°, 10 miles from the rendezvous. As soon as the aircraft gave the signal to begin the trial, the submarine dived to a depth of 260 feet. The aircraft then proceeded to lay the five-buoy pattern, and when the pattern had been laid fading contacts were picked up on the purple buoy, and contact on the red buoy. Throughout the trial contacts were never very strong, but the operators were able to count the revolutions. The contacts continued on the red buoy and the submarine's course was estimated to be 166° True and making a good speed of 2½ knots. The actual course and speed of the submarine at this time was 160° True, 2½ knots. After an hour a second pattern was laid, as in Figure 3 in Article 18 C.C.M.A.U.W., a purple buoy being dropped to the starboard of the submarine and a green buoy to the port. A yellow buoy was dropped to check estimated course of the sub-

marine, but, unfortunately, in this case the parachute did not open and the buoy failed to operate. Further contacts were picked up on both the purple and green buoys, the green being slightly louder than the purple. The aircraft now estimated the submarine's course to be 160° True, and the course to steer to intercept the submarine was passed to the escort. While closing the escort was requested to reduce for a period of three minutes. This was found to be quite sufficient for the operator in the aircraft to distinguish the noises made by the escort. The escort closed position and a smoke float was dropped by the aircraft giving the "on top" position. This marked position was 1.8 miles south of the submarine's actual position.

It will be seen that it is possible for an aircraft using Sono buoy equipment to track a submarine at a speed of 3 knots and at a depth of 260 feet (80 metres) under favourable conditions (sea state less than 4) with sufficient accuracy to home escort vessels to within asdic range provided the escort vessels are within:

- (a) 1 and 1½ hour's steaming—aircraft equipped with and using eight Sono buoys.
- (b) Three hours' steaming where the aircraft is using 12 Sono buoys. The "on top" position was considered by the escort Commander to be accurate enough to enable escort vessels to pick up the submarine on asdic while doing an "observant" patrol.

Results

Date.	Time.	Submarine.	Actual Co. and Sp.	Estimated Co. and Sp.	Time Submerged.	Depth.	Sea State.
11/10/44	1300 hours.	H. Nor. M. s/m. "Utsira."	160° T. 2-3 knots.	166° T. corrected to 160° T. on second pattern 2½ knots.	1300-1600 3 hours.	260 ft.	1-2

Sono Buoy Training and the Coastal Command Anti U-Boat Devices School

The Sono buoy and its tactical application are fully described elsewhere in this number of the *Coastal Command Review*. It is the intention of this article to give a brief picture of the facilities available for training aircrews in its operational use. To ensure consistently good results, this training must be concentrated and there must be plenty of it; moreover, aircrews which have reached a satisfactory standard will still need continual revisional training to help them to maintain it. The large amount of information which aircrews are already expected to absorb, and the limited amount of equipment available, render the provision of this training no easy task.

The first supplies of training equipment received from the United States consisted of a few gramophone records and films. These were in two sets. One, consisting of records and strip films, provided a pictorial description of the equipment and its use; the other, consisting of records only, gave a course in underwater listening. Great difficulty was experienced in obtaining a gramophone capable of playing the records with sufficient fidelity and of providing the required play-back speeds. The only one which was immediately available was the Synchrophone. All the records had to be re-recorded on different material, some of them at different speed, so that they could be played on this instrument.

When the equipment had been distributed, training was instituted in squadrons, the signals leader in each squadron being made responsible. To provide a basis for this training, a manual, entitled *The Coastal Command Manual of Sono Buoy Training*, was compiled and issued to all squadrons concerned. Included in this manual was information intended to give stations guidance in the construction of synthetic trainers. The use of these locally constructed trainers was to be an interim measure pending the arrival of a more comprehensive instrument. Eventually gramophones arrived from America. These were better than the Synchrophone, but were still not very suitable for the job; moreover they required modification before they could be used on the British mains supply. A British substitute of high quality is now being distributed.

The squadrons were very keen and did a large amount of training, but it was felt that this training was not obtaining quite the desired standard. This was due to a variety of reasons, of which perhaps the most important were lack of certain training equipment and the fact that the training was of necessity disjointed. It was therefore considered that some form of centralised course was desirable, during which a continuous period of time

could be given over completely to Sono buoy training. Accordingly it was decided to form the Coastal Command Anti U-Boat Devices School.

The object of this School was to provide a course of instruction on the Sono buoy and its operational use, both alone and in conjunction with special armament. Some of the personnel and all the aircraft belonging to the old Loran Training Unit were used in its formation, together with instructional personnel selected from the operational and training groups. These latter were selected both for their instructional ability and for their experience with the equipment; for ground instructors instructional ability was taken as the governing factor.

Each of the School's ten Wellington XIII aircraft has been fitted with two receivers, so that, although only one crew is carried, both Sono buoy operators can operate a receiver simultaneously. A demonstration room has been fitted out with a number of receivers and a synthetic trainer specially constructed at Headquarters, Coastal Command. Each receiver is wired into an aircraft intercom. system—both British and American are provided—and each position has a plotting table. The trainer enables comprehensive tracking exercises to be performed, either in the demonstration room or in aircraft, the transmitting aerials being mounted outside for that purpose. A description of the trainer will be published in an early issue of the *Coastal Command Signals Review*.

It is hoped to provide more synthetic trainers in the near future. One of these is being made in this country and is now almost complete, while two more are expected from America. The latter are briefly described in the January, 1945 issue of the *U.S. Atlantic Fleet Confidential Aviation Bulletin*.

A nine-day course is run at the School, with an intake of five crews every six days, each crew consisting of first pilot, navigator and the two Sono buoy operators. The syllabus includes a detailed description of the equipment and its use, together with instruction on the sounds likely to be heard through the Sono buoy. Four air exercises and a number of ground synthetic exercises are also included. Some of the air exercises will use the synthetic trainer, while others will use a pattern of buoys laid in the sea off the coast of Ireland.

The School is situated at Limavady and instruction has already begun, the date of the first intake having been May 14. It is hoped that all concerned will co-operate with a view to ensuring its complete success.



A hospital on the outskirts of Stavanger photographed by G/330 (Norwegian) on May 9, 1945.



The airfield and seaplane base at Stavanger/Sola photographed by G/330 (Norwegian).



Quisling's house near Oslo.



A part of the docks at Oslo.

Some Effects of Visual Lookout Training

During the last three years visual lookout training has been carried out at O.T.U.s and a number of instructors have toured the Command lecturing to aircrew on the problems of visual search. There are very few yardsticks that can be used to judge the general improvement of lookouts, but a few facts which will give some indication of their efficiency are discussed below.

Early analysis of sightings proved, what in fact was fairly obvious—that by the nature of the direction in which lookouts face and the way in which they scan, the lookout kept directly ahead of the aircraft was much more efficient than that kept on the beam. Now to achieve high search efficiency the lookouts must sweep out as wide a path as possible, so that any increase in beam sightings would improve the general search

efficiency. Table I shows that some measure of improvement in spreading sightings more evenly over the sectors covered by forward lookouts has been achieved.

Table II shows the percentage of sightings made from different lookout positions for three periods over the past two years. It will be seen that the contribution of the lookouts outside the cockpit has remained very constant except that for the last period the proportion of sightings from the beam lookout position has increased.

In spite of much propaganda, binoculars have not been used to any great extent for scanning for U-Boats, owing, to a large extent, to the design of cockpits and other lookout positions. Table III gives the total number of visual

Table I
Spreading of Sightings towards the Beams

Period.	Total No. Sightings.	Percentage of Sightings made between Dead Ahead and 40° or Starboard.
March, 1942–December, 1942.. .. .	143	41 per cent.
January, 1943–May, 1943	362	37 per cent.
June, 1943–August, 1943	109	35 per cent.
September, 1943–July, 1944	148	21 per cent.
August, 1944–April, 1945	105	23 per cent.

Table II
Proportion of Sightings made from Different Look-out Positions

Position in Aircraft.	June, 1943–May, 1943.	September, 1943–July, 1944.	August, 1944–April, 1945.
Nose	58 (21 per cent.)	19 (13 per cent.)	16 (14 per cent.)
Port pilot	126 (44 per cent.)	66 (46 per cent.)	48 (43 per cent.)
Starboard pilot	51 (18 per cent.)	32 (22 per cent.)	26 (23 per cent.)
Between pilots	13 (4.5 per cent.)	3 (2 per cent.)	1 (1 per cent.)
Astrodome + Mid upper	9 (3.0 per cent.)	7 (5 per cent.)	6 (5 per cent.)
Beam guns	11 (3.8 per cent.)	2 (1 per cent.)	11 (10 per cent.)
Rear gun	18 (6.0 per cent.)	3 (4 per cent.)	5 (4 per cent.)

Table III
Use of Binoculars

Period.	Total Sightings.	Binocular Sightings.	Binocular Recognition.	Percentage of Sightings when Binoculars used.
January, 1943–May, 1943	494	10	7	3.4 per cent.
June, 1943–September, 1943	211	17	28	21 per cent.
October, 1943–July, 1944	195	4	42	23 per cent.
August, 1944–December, 1944	60	6	16	37 per cent.
January, 1945–April, 1945	100	1	21	22 per cent.

Table IV
Use of Binoculars for Investigating Radar Contacts

Period.	Number of Disappearing Contacts.	Number of occasions when Binoculars were used in attempt to make Visual Contact.
November-January, 1944-5	22	5 (23 per cent.)
February-April, 1945	42	28 (67 per cent.)

sightings over the last two years and the number of U-Boats first detected by lookouts with binoculars and the number of occasions when binoculars are known to have been used for purposes of recognition.

It is probable that binoculars have been used for recognition purposes as often as is practicable.

Table IV shows that lately they were being used to a considerable extent for investigating Radar contacts.

Furthermore, during the round-up of surrendering U-Boats an analysis of some 113 sightings shows that binoculars were used for purposes of recognition on 60 per cent. of the occasions.

Is Your Accident Really Necessary? (2)

"What goes up must come down." Of course you are tired of hearing it said, but turn your thoughts for a minute to the business of coming down, the right way to do it and the right place in which to do it. Think of all the accidents involving flying into high ground of which you have heard—and you must have heard of one at least from the twenty-six aircraft that crashed in nine months of 1944, killing 153 aircrew and injuring 24. Then ask yourself what causes this unnecessary waste of men and material. Partly it is caused by inefficiency on the part of the aircrew themselves and partly by insufficient confidence and co-ordination between the men in the aircraft and those on the ground.

Disobedience, combined with a degree of carelessness, is the essential feature of these accidents. Every imaginable precaution has been passed on to aircrew to help them in bad weather and to enable them to avoid flying into hills, cliffs, church spires, trees and the like, all of which seem to have a magnetic attraction for Pruneish pilots. The instructions imparted during briefing should be quite clear and concise, giving tracks to follow and safe heights at which to fly. These allow a fair margin for navigational errors. Don't be worried just because you can't make visual contact with the ground; your wireless and Radar are the eyes of the aircraft, and the people on the ground have a much better idea of what the weather looks like down there than you would have by coming down to have a look, even if you should live to see it. Stay up above the cloud, or at any rate at a safe height, until you are told to come down. It is safer that way.

There is really nothing very difficult about a controlled descent through cloud; and it is worth while keeping in practice. Confidence in the ground control will be increased and if a pilot desires to live to a ripe old age he must observe instructions given by the ground control a lot more rigidly than he does at present. What pilot at some stage of his career has not been heard to say: "We know where we are, so let's go down and have a look around." How many more have said this and haven't been heard because they crashed?

Crew discipline also plays a large part in flying safety. Where only one or two persons man an aircraft they must understand the facilities at their disposal and be able to use them effectively. In the case of the aircraft carrying a larger crew there exists an additional necessity for close crew co-ordination, as well as for co-operation with ground control. Each member has his own job and it is up to the captain to ensure effective co-ordination. It is for the navigator to advise the position of the aircraft and the height of the ground ahead, and to ensure that the pilot flies above this height. The wireless operator must be ready to obey the captain's order immediately in obtaining positions, courses to steer and weather information. The Radar operator assists by observing the area ahead and the remaining crew members by maintaining an adequate look-out.

When in doubt, ask Control; they are often better acquainted with your position than you are yourself. Do not let false pride interfere with safety. Remember, Flying Control exists to control aircraft, not to offer a little gentle spiritual guidance. When a captain is given diversion instructions, he must obey them implicitly. A diversion will not be given unless it is really necessary. If you have cause to doubt the information received, then by all means question it, but do not disobey until your views have been confirmed. When necessary, give the ground control a full picture of your circumstances, petrol remaining, endurance, flying conditions, etc. This information may help them to get you down safely.

The captain of a Catalina, not knowing exactly where he was, but knowing that he was in the vicinity of high ground, descended to a low altitude with complete and utter disregard for the safety of the aircraft and crew and against the advice of the navigator and second pilot. The aircraft crashed, killing three and injuring the others. It was later found that the crew was very dissatisfied with the captain and had no confidence in him. Had this been reported earlier an unnecessary accident would have been avoided.

Some months ago a Wellington pilot carelessly allowed his aircraft to hit a hill and came back to



Gossen airfield photographed by N/248 on May 21, 1945.



Shipping at anchor in Flensburg Fjord photographed by P/58 on May 21, 1945.



An excellent photograph of the Longships Lighthouse taken by J/10 (R.A.A.F.) Squadron.

tell his story. One morning this crew took off in rather cloudy conditions, well aware that there was high ground to be crossed before reaching the coast. The navigator made a mistake of 30° in giving the first course to the captain and the captain, who had not studied the flight plan, was incapable of correcting this error. The captain was flying along happily at 800 feet just under the cloud base when he decided to ask the height of the surrounding hills which were between 1,400 to 1,800 feet. Realizing at last that it would be necessary to gain height he started climbing when, through a break in the cloud, high ground was seen ahead. Climbing as steeply as possible the aircraft almost cleared the high ground, the aft section being damaged. It was only by the mercy of providence that six men were not killed.

A Sea Otter pilot, who was anxious to keep a dinner appointment, took off without the permission of the Detachment Commander and well aware that the weather *en route* would be bad. Finding that the cloud was right down and having no wireless aids, the pilot attempted to coast crawl, following the line of cliffs and finally hitting one. The pilot and both passengers were killed.

Accidents involving flying into high ground are very closely allied with flying discipline. Observe flying discipline and you should avoid flying into high ground; it is worth trying. Just because a pilot succeeds in finding his way home nine times by contact flying under a cloud base of 100 feet or so, there is no guarantee that he will not follow the wrong railway on the tenth trip and meet that friendly hill which is always waiting to greet him with open arms.

Editor's Note.—The June, 1945, publication will be the final issue of the *Coastal Command Review*.