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# COASTAL COMMAND REVIEW

October 1944

## Vol. III, No. 10

HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE

# COASTAL COMMAND REVIEW

## Vol. III, No. 10—October 1944

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

# The Month's Work—October

## Anti U-Boat

It is probable that the last of the trail of U-Boats making the passage round from Biscay ports arrived in Norwegian waters during October. The best of these boats have probably been taken in hand for refit and the worst paid off for scrap. Their trained crews will doubtless go straight into the new types of U-Boat.

2. Fairly continuous reports of disappearing Radar contacts, possible swirl marks, possible conning towers and other indications of the presence of U-Boats have been made during the month in widely divergent areas. This confirms that the Germans have begun to station U-Boats in the approaches to the English Channel, to the west and north of Ireland and round the north of Scotland.

3. Sightings and attacks of U-Boats this month amount to nine and three respectively, excluding a cannon attack by a Mosquito, off Norway. This is the lowest monthly total since January, 1942. It demonstrates on the one hand how skilful the U-Boats have become in the use of Schnörkel and Radar warning devices, and on the other hand to what an extent they have been forced to remain elusive and passive.

4. During the month no merchant ships have been sunk by U-Boats within Coastal Command's wide reach. This fact, together with the extreme paucity of sightings, is the measure of our success in driving the U-Boat underwater where she belongs and where her power to destroy shipping in convoy is comparatively limited.

5. If the offensive is re-opened against Atlantic shipping and is to be anything more serious than occasional sniping at convoys coming within reach of diving (and therefore immobilized) U-Boats, their tactics must change, for they will have on occasion to move on the surface in order to concentrate their attacks and to renew the action frequently. This must be true even of the latest types which are credited with very high speed underwater. Aircraft will then once more have the opportunity to repeat their successes against surfaced U-Boats, and together with surface forces they will be able to hunt these U-Boats to destruction if they are seen to dive.

6. There is no reason why we should be despondent over the continued drastic fall in sightings. On the contrary, taken in conjunction with the record low shipping losses, the fall in the number of sightings is a testimony to the influence of air power on the U-Boat war. For the moment therefore the ball has been passed to the surface craft, for the U-Boat is now an asdic target for 95 per cent. of her time at sea. We must, however, aim to make even " schnörkelling " a risky proceeding, and this will mean continued training and undiminished keenness in lookout.

## Anti-Shipping

The coasts of Holland and Germany have at last ceased to be happy hunting grounds by day. During October not a single merchant convoy was found in these waters, and our one daylight success was on the 15th, when Beaufighters set fire to three coasters and a lightship with R.P. and cannon.

8. Many night patrols have been flown to counter the continued threat of E- and R-Boat attacks on our cross-Channel convoys, as well as to harass the shipping which still slinks along the coast between the Elbe and the Ems. By moonlight on the 6th, off the Hook, three R.P. Beaufighters attacked a convoy of between 10 and 15 ships and scored hits on two " M " class minesweepers, one of which caught fire. On the 13th, No. 855 Fleet Air Arm Squadron ceased to operate under Coastal Command, but during their last six patrols they scored hits on an E-Boat, a minesweeper and an unidentified vessel.

9. As anticipated, the Norwegian coast is now the focal area of anti-shipping operations. In this area there were six Wing strikes during the month. The outstanding attack was made on the 9th, when 18 Beaufighters and 8 Mosquitos of the Banff Wing took off individually, crossed the North Sea in darkness, and formed up at first light round a Drem system of flares laid by the A.S.R. Warwick detailed as safety aircraft. The formation surprised a convoy of five merchant ships and six escorts about to enter Egersund anchorage. The attack was brilliantly executed and the final claims were : two merchantmen of 1,500 tons each sunk, one trawler-type auxiliary sunk, one merchantman 3,500 tons seriously damaged and one ex-Dutch gunboat seriously damaged. Six days later, a force from the Banff Wing, made up of half Mosquitos and half Beaufighters, with R.P. as the main weapon, penetrated deep into the Skagerrak. On the return journey they completely destroyed a laden oil tanker of 1,200 tons and her escort, a trawler-type auxiliary, off Kristiansand South. The beached hulk of the gutted tanker was seen by a reconnaissance aircraft two days later. On the 21st a small force of 11 Mosquitos, of which four were armed with 6-pounder cannon, together with six R.P. Beaufighters, attacked shipping in Haugesund harbour. Two merchant ships were claimed as seriously damaged. The Banff Mosquito Wing made three other attacks on small shipping targets, using formations of about 20 aircraft with 6-pounder cannon and 500-lb. M.C. bombs as the main weapons. Considering the weight of armament used, the results were good. Throughout the month, No. 333 Squadron's Mosquitos continued to provide invaluable reconnaissance for the Strike Wings.

10. In general, the anti-shipping campaign on the Norwegian coast produced excellent results during October, but as the month drew to a close it grew increasingly obvious that the enemy is becoming most reluctant to expose himself to air attack. The winter months will test the flexibility of our anti-shipping tactics to the utmost, and we have already taken steps to improve and intensify our night operations.

11. Nos. 502 and 58 Halifax Squadrons have carried the offensive deep into the Skagerrak by patrolling the shipping lanes between Oslo, Kristianand South and the Danish ports by night. They made 27 attacks, but as is usual in night attacks, it was not possible to see the results. There was one brilliant exception. On the 25th, Halifax P/58 set a merchant vessel and an escort on fire with one stick of bombs. The flames were still visible to the jubilant crew when the aircraft was 20 miles away.

12. The Norwegian Coastal route which passes on through the Skagerrak and Kattegat now carries Germany's only import traffic, which thus assumes an enhanced value. The essential trooping traffic to and from Oslo also passes through this area, thus emphasising the importance of these Halifax operations.

# I.—ANTI U-BOAT

## SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT

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

**OCTOBER, 1944**

| Duty and Base or Area. | Total Sorties. | Hours Flown | | U-Boats Sighted. | | U-Boats Attacked. | | Hours per Sighting. | | Number of Sorties. | | Sorties with U-Boat Flak. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Base to Base. | On Patrol. | Day. | Night. | Day. | Night. | Base to Base. | On Patrol. | When U-Boat Sighted. | When U-Boat Attacked. | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| *Convoy Cover.* | | | | | | | | | | | | |
| United Kingdom | 102 | 972 | 483 | — | — | — | — | — | — | — | — | — |
| Iceland | 15 | 151 | 88 | — | — | — | — | — | — | — | — | — |
| Gibraltar and Moroccan Sea Frontier | 67 | 534 | 328 | — | — | — | — | — | — | — | — | — |
| Azores | 11 | 123 | 37 | — | 1 | — | — | 123 | 37 | 1 | — | — |
| TOTAL CONVOY EFFORT | 195 | 1,780 | 936 | — | 1 | — | — | 1,780 | 936 | 1 | — | — |
| *A/U Patrols.* | | | | | | | | | | | | |
| *Northern Transit and North Sea* | | | | | | | | | | | | |
| United Kingdom | 1,003 | 9,436 | 5,866 | 6 | 3 | 2 | 1 | 1,048 | 652 | 11 | 5 | 4 |
| Iceland | 61 | 707 | 427 | — | — | — | — | — | — | — | — | — |
| *Northern Convoy* | | | | | | | | | | | | |
| United Kingdom | 677 | 5,172 | 3,199 | — | — | — | — | — | — | — | — | — |
| Iceland | 81 | 770 | 572 | — | — | — | — | — | — | — | — | — |
| Azores | 47 | 566 | 262 | — | — | — | — | — | — | — | — | — |
| *Bay of Biscay and Channel Approaches* | | | | | | | | | | | | |
| United Kingdom | 217 | 2,244 | 1,425 | — | — | — | — | — | — | — | — | — |
| *Central Convoy* | | | | | | | | | | | | |
| Gibraltar and Moroccan Sea Frontier | 374 | 2,115 | 1,427 | — | — | — | — | — | — | — | — | — |
| Azores | 24 | 286 | 153 | — | — | — | — | — | — | — | — | — |
| TOTAL OF A/U PATROLS | 2,484 | 21,296 | 13,331 | 6 | 3 | 2 | 1 | 2,366 | 1,481 | 11 | 5 | 4 |
| ADD CONVOY EFFORT | 195 | 1,780 | 936 | — | 1 | — | — | — | — | 1 | — | — |
| TOTAL A/U EFFORT | 2,679 | 23,076 | 14,267 | 6 | 4 | 2 | 1 | 2,308 | 1,427 | 12 | 5 | 4 |
| | | | | 10 U-Boats Sighted | | 3 U-Boats Attacked. | | | | | | |

*Note.*—In Addition to the above there were three chance sightings, one of them by a Coastal Aircraft.

### Assessments

(Received up to November 13th)

| Month. | Known Sunk. | Probably Sunk. | Damaged A. | Damaged B. | Slight Damage. | Insufficient Evidence of Damage. | No Damage. | Insufficient Evidence of U-Boat. | Unassessed. |
|---|---|---|---|---|---|---|---|---|---|
| August .. .. .. | 3* | 2* | 1 | 3 | 3 | 10 | 1 | 1 | 1 |
| September .. .. .. | 2 | 2* | 1 | 2 | — | 2 | 1 | — | — |
| October .. .. .. | — | — | — | — | — | — | — | — | 3 |

*Note.*—*In August two of the attacks assessed as Known Sunk and one assessed as Probably Sunk are shared with surface craft. Similarly the credit for one September assessment of Probably Sunk is shared.

### Analysis of U-Boats Sighted by A/U Aircraft during October

| Particulars of Incidents. | U-Boats. | | Sorties when Aircraft. | |
|---|---|---|---|---|
| | Sighted. | Attacked. | Sighted. | Attacked. |
| On 8 occasions 1 U-Boat was sighted by 1 aircraft—1 aircraft attacked. | 8 | 1 | 8 | 1 |
| On 2 occasions 1 U-Boat was sighted by 2 aircraft—All aircraft attacked. | 2 | 2 | 4 | 4 |
| TOTAL .. .. .. .. .. | 10 | 3 | 12 | 5 |

## Squadron Results—October

| | | | | *No. of Sorties when U-Boat Sighted.* | *No. of Sorties when U-Boat Attacked.* |
|---|---|---|---|---|---|
| 220 | Fortress | Lagens .. .. .. | | 1 | — |
| 59 | Liberator | Ballykelly .. .. .. | | 1 | — |
| 86 | Liberator | Tain .. .. .. | | 1 | — |
| 224 | Liberator L.L. | Milltown .. .. .. | | 1 | 1 |
| 311 (Czech) | Liberator | Tain .. .. .. | | 3 | 3 |
| 547 | Liberator L.L. | Leuchars .. .. .. | | 1 | — |
| 333 (Norwegian) | Mosquito | Banff .. .. .. | | 1 | —† |
| 330 (Norwegian) | Sunderland | Sullom Voe .. .. | | 1 | — |
| 407 (R.C.A.F.) | Wellington L.L. | Wick .. .. .. | | 2 | 1 |
| | | | | 12 | 5 |

† The sighting by 333 Squadron was made by an aircraft armed with cannon only. The aircraft fired on the U-Boat.

### Chance Sightings by Coastal Aircraft on Other Duties

| | | | *U-Boat Sighted.* | *U-Boat Attacked.* |
|---|---|---|---|---|
| 521 (Met.) | Hudson | Bircham Newton .. .. | 1 | (No weapons) |

# RECENT ATTACKS ON U-BOATS

## Very Good Homing

On September 18 **Liberator R/224** was flying at 900 feet in a cloudless sky when the Radar operator picked up a contact at 15 miles bearing Green 20°. The pilot held his course until the contact was bearing Green 45° at a range of 10½ miles. He then altered course to home and held the contact without difficulty. At 1 mile range the Leigh Light was switched on and it illuminated a surfaced U-Boat dead ahead on the rear edge of the light beam. All the members of the crew who saw the U-Boat were struck by her exceptional length. The whole of the deck forward of the conning tower was clear of the water and the width of the conning tower unit was seen to be about twice its height. It contained a single bandstand and was painted light grey. No guns were seen on deck. The U-Boat was in position 61° 41′ N., 02° 45′ E., steering 320° at 10–12 knots. The Liberator captain attacked from the enemy's starboard beam and from 200 feet released six depth charges spaced at 55 feet. All the depth charges fell to port of the target, the first one entering the water abreast of the conning tower. Estimates of the distance between the first point of entry and the target vary, but there seems no doubt that the stick overshot by a small margin. A flame float was thrown overboard when the depth charges were released, and it is thought to have hit the U-Boat as the Liberator's crew saw a momentary spurt of flame. The aircraft circled to port after the attack and the pilot turned in for a front gun attack. Unfortunately at 2 miles range the contact disappeared and although the captain maintained his course and switched on the Leigh Light, he saw no sign of the enemy. Contact was not regained, so the captain dropped a marine marker in the approximate position of the attack and continued to circle. Although there had been no cloud at the time of the attack, low stratus soon began to build up rapidly and when it had come down almost to sea level, the Liberator crew had great difficulty in keeping the marker in sight. About an hour and a quarter after the attack the Radar operator picked up another strong contact 12½ miles away fine on the starboard bow. This contact was 7 miles due north of the marker. The captain set course to home but at 4 miles the contact disappeared and was not regained. An hour later the crew finally lost sight of the marker and Control ordered the Liberator to resume patrol.

### Comments

*The crew took full advantage of the fact that there was no relative drift and the tracking was accurate. Now that the difficulty of tracking has been overcome after months of concentrated Radar training, it is most unfortunate that the depth charges overshot. It seems, however, that the nearest explosion was close enough to cause damage.*

### Admiralty Assessment

*This attack was assessed as "U-Boat probably seriously damaged had to return to base at once."*

## A Model Leigh Light Attack

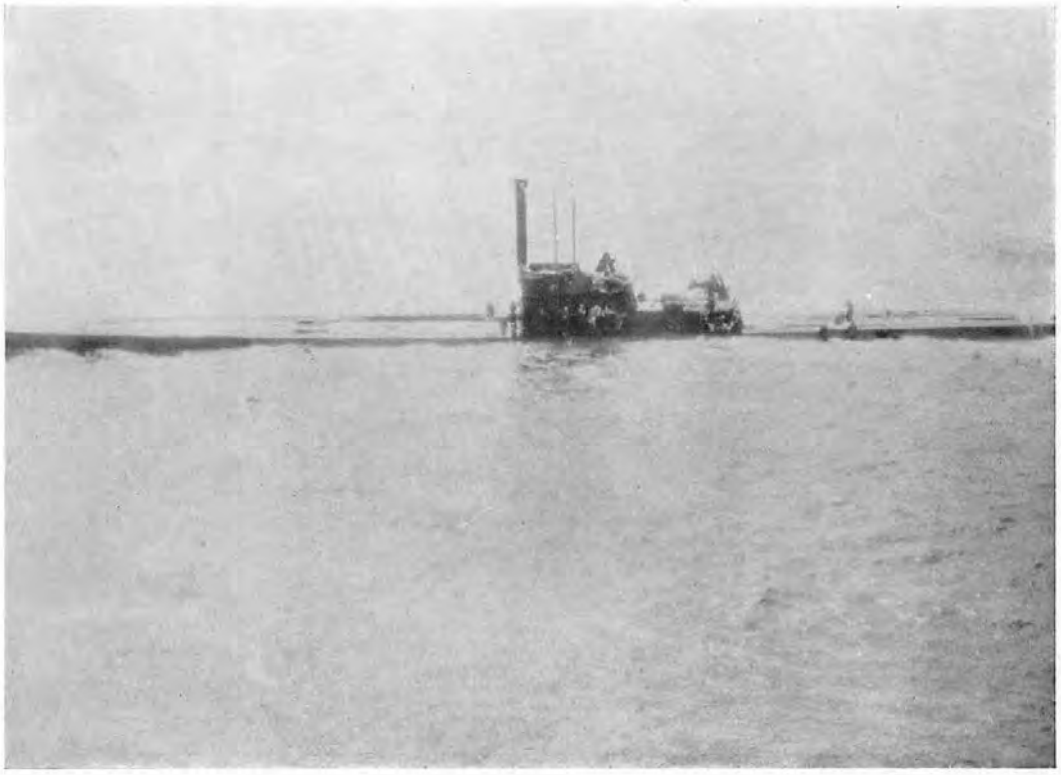
On September 24 **Liberator A/224** was on patrol south-west of Stadtlandet flying almost due north in good night visibility when the Radar operator picked up a contact 7 miles away on the port quarter. The captain turned on to 200° and homed on the contact until the range was down to 5 miles with the target dead ahead. He then realized that he was approaching from the direction of the Northern Lights, so he decided to circle and approach out of the dark sky. He therefore turned and flew on 110° until the target was on his starboard beam, altered course to 180° and then flew on south until the contact bore Green 135° at a range of 9 miles. He made a wide circle to starboard so that the target was dead ahead at 9 miles and so that the Liberator was attacking from the dark southern sky. The contact disappeared at 8 miles (the sea returns were only at 3 miles) reappeared at 6 miles, faded at 3½ miles and became clear again at a mile and a half. At 1 mile the Leigh Light was switched on but it illuminated the sea just beyond the target. When the beam was lowered it revealed a fully surfaced U-Boat dead ahead in position 61° 00′ N., 04° 07′ E. She was steering due east at 6 knots. The Liberator's crew saw that the U-Boat had a long, low conning tower with a step down aft and a single bandstand, but there was no sign of any guns either on the deck or on the conning tower. Catwalk railings were visible along the base of the conning tower which had a dark patch on the starboard side: the bows were well out of the water and the decks were clear. The Liberator attacked from the enemy's starboard beam and at 800 yards the front gunner put 20–30 rounds into the conning tower. The aircraft tracked over the U-Boat just abaft the conning tower and from 230 feet released six depth charges spaced at 55 feet. The low-level bombsight was used. The flight engineer saw only four of the depth charges enter the water, but he states that these straddled the U-Boat, two falling on either side. He estimates that No. 1 fell 40 yards to starboard of the U-Boat and another, probably No. 4, fell 10 yards to port. The stick exploded abaft the conning tower at right angles to the U-Boat's track, and the plumes covered the conning tower and stern, which were seen to be lifted out of the water. The Leigh Light was switched off after the attack and the U-Boat was not seen again. Radar contact was also lost immediately. The Liberator made three more runs over the spot with the Leigh Light and on the third run flash photographs were taken. One of these shows a dark

This U-Boat, which had been attacked and damaged by aircraft from H.M.S. *Implacable*, was finished off by the R.P. attacks of two Liberators from 311 (Czech) Squadron on October 29 in position 65° 24′ N, 12° 00′ E., off the northern tip of Fleina Island, Norway.

(C53936)

PLATE 2

This Type IXC (740-ton) U-Boat, *U 1229*, was sunk by aircraft from U.S.S. *Bogue* on August 20. After the first attack the U-Boat crash-dived and then raised her schnörkel in an attempt to proceed at schnörkel depth. When this was found to be impossible the boat surfaced with her schnörkel and periscope still extended. It is to be noted that in this class of U-Boat the schnörkel is on the starboard side, whereas the 500-ton boats have their schnörkels on the port side.



circular patch of water about 100 feet in diameter with a bubbling white centre and a fringe of white foam. (*See* plate 3.) This photograph was taken nine minutes after the attack. When dawn came other photographs were taken which showed a thin oil patch and an oil streak 70 yards long.

**Comments**

*This was an excellent performance. As in the attack by aircraft "R" of the same squadron on September 18 (see opposite) there was no relative drift and the tracking was accurate. This time the bombing appears to have been perfect and the attack has been assessed as "probably sunk."*

## Scanning with Binoculars leads to a Probable Kill

In the afternoon of September 26 **Fortress P/220** was on anti-U-Boat patrol when the wireless operator intercepted a sighting report from Fortress H/220. "P" altered course for the position and 20 minutes later received another sighting report of a schnorkel from "H." When "P" reached the position "H" and "F" were circling markers, and R/T communication was established between the aircraft. The weather was fine with a south-easterly wind of 5 knots and a moderate sea; the visibility was 15 miles. It was arranged that while "H" carried out search A, the other two aircraft would carry out search B. Soon afterwards "P" was ordered by base to return not later than 1800 hours and before leaving to drop a smoke float with a six-hour delay on the position of the sighting. A few minutes after receiving these signals, the second pilot, who was scanning with binoculars, sighted a periscope wake eight miles away broad on the starboard bow in position 43° 18′ N., 36° 28′ W. The periscope was moving west-south-west at 5 knots. The Fortress captain put his aircraft into a diving turn and attacked from the U-Boat's port bow. During the run in the U-Boat's conning tower broke surface and was hit by fire from the nose and mid-upper guns. From 40 feet the aircraft released three depth charges spaced at 90 feet while about one-third of the U-Boat's conning tower was visible. The fourth depth charge failed to release. Two explosions were seen to port of the U-Boat and one to starboard, the nearest explosion being about 30 feet from the hull. Before the explosion plumes began to form, the conning tower seemed to lift in the water and was then enveloped in spray. When the plumes had subsided the U-Boat could not be seen, but the aircraft's rear gunner saw a cylindrical object thrown into the air by the explosions. Immediately afterwards oil began to come to the surface and within 50 minutes the patch measured 1,600 yards by 700 yards. In the oil there were some black cylindrical objects about four feet long as well as what appeared to be a yellow log about ten feet of which was sticking out of the water at an angle of 45°. While the aircraft circled, more cylindrical wreckage kept rising to the surface for some time after the attack. Before leaving for base the Fortress dropped a marine marker with a six-hour delay.

**Comments**

*The crew of P/220 is congratulated on the excellent drill which made this attack possible. The well-organized look-out was responsible for the long-range sighting through binoculars and the drill after sighting was perfect. Photographs confirm the presence of oil and subsequent reports indicate that the oil was still coming up several days later. The attack has been assessed as "U-Boat probably seriously damaged, may have sunk."*

## Disappearing Contacts

**Report of the Crew of Aircraft "Z"**

Early in the afternoon of October 23 aircraft "Z" was flying on anti-U-Boat patrol in the area between latitudes 60° 30′ N. and 60° 54′ N., from the meridian of Greenwich to 01° 45′ E. After being on patrol for five hours "Z" had reached position 60° 30′ N., 01° 35′ E. and was steering 177°(T) at 1,000 feet. It was already dark and at 1925 hours the Radar operator obtained a contact bearing 170°(T) 4½ miles away. The aircraft investigated but the blip was lost at 2½ miles.

About an hour later "Z" was in position 60° 34′ N., 01° 36′ E. in the same corner of the patrol area and was flying at 1,000 feet on a course of 182° when at 2036 hours a contact came up bearing 197°(T) at a range of 5 miles. "Z" homed on the contact but it disappeared at 3½ miles. The aircraft flew on to the estimated position and dropped fifteen 1·7-inch flares. No target was seen. "Z's" crew saw by the light of the flares that the sea was very rough.

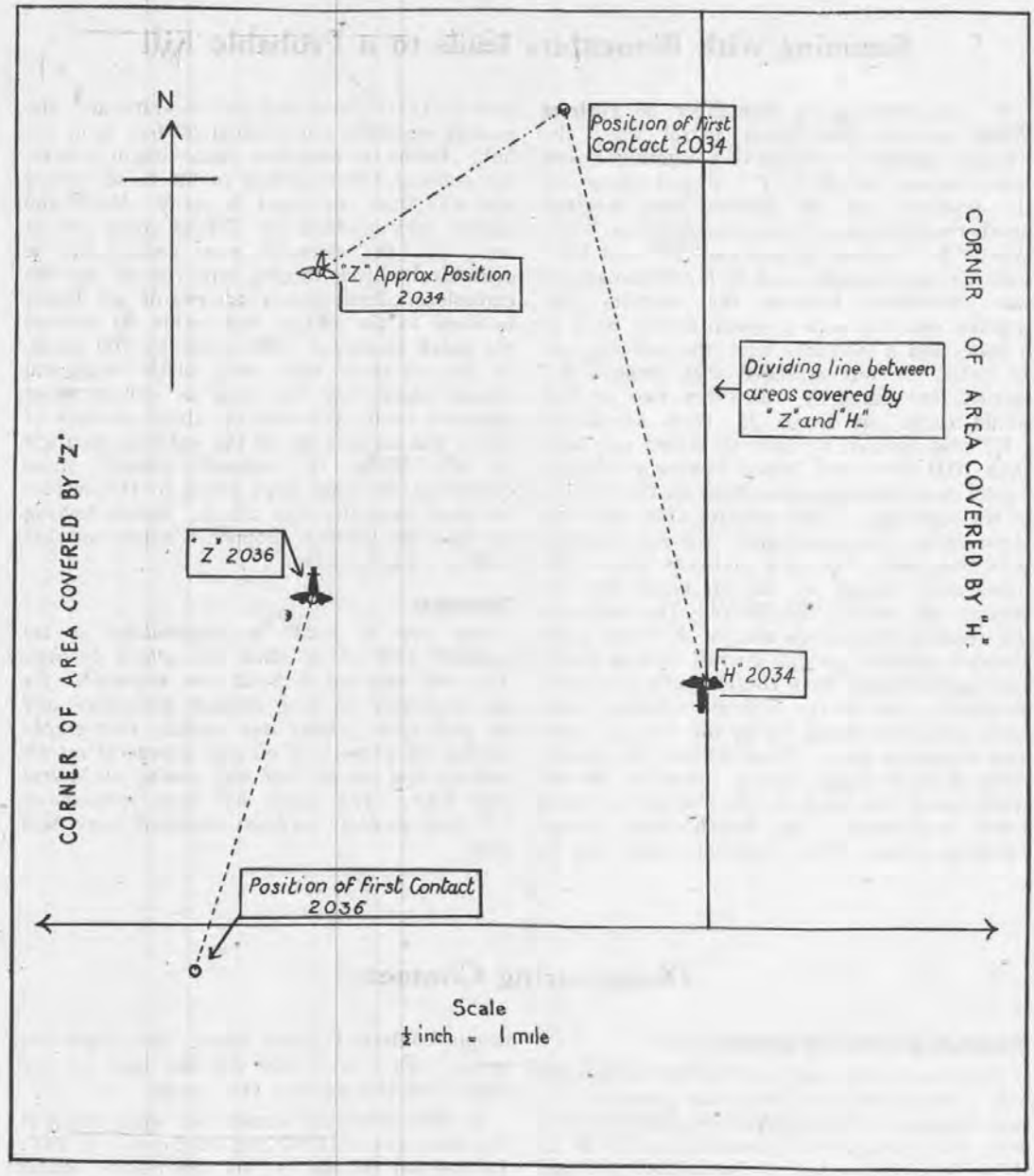
At 2045 hours the aircraft was again flying in the same area at 1,000 feet on a course of 181°. In position 60° 46′ N., 01° 36′ E. the Radar operator picked up another contact bearing 135°(T), range 5½ miles. "Z" investigated but the blip was lost at 2 miles. The aircraft resumed course for 15 minutes and returned to the position but did not regain contact.

Three and a half hours later "Z" was in position 60° 46′ N., 01° 00′ E. flying on a course of 088° at 500 feet when the Radar operator obtained a contact 6 miles away almost dead ahead. "Z" investigated again but lost contact at 4 miles. The blip then came up at 3 miles on the starboard beam. After the contact had been regained and lost several times, "Z's" crew came to the

conclusion that they were searching for an enemy aircraft which was operating with the possible U-Boat which they had already investigated.

**Report of the Crew of Aircraft "H"**

Aircraft "H" was covering the patrol area immediately to the east of "Z" and had been airborne about five hours when at 2034, in position 60° 33′ N., 01° 45′ E., a Radar contact was obtained on what was believed to be an enemy aircraft. "H" was flying at 500 feet on a course of 004° and the target bore 350°(T) at a range of 7 miles. The supposed enemy aircraft approached and from a height of about 800 feet dropped 15 orange flares about 2 miles away. The flares were dropped in sticks of three and burned for about three seconds.

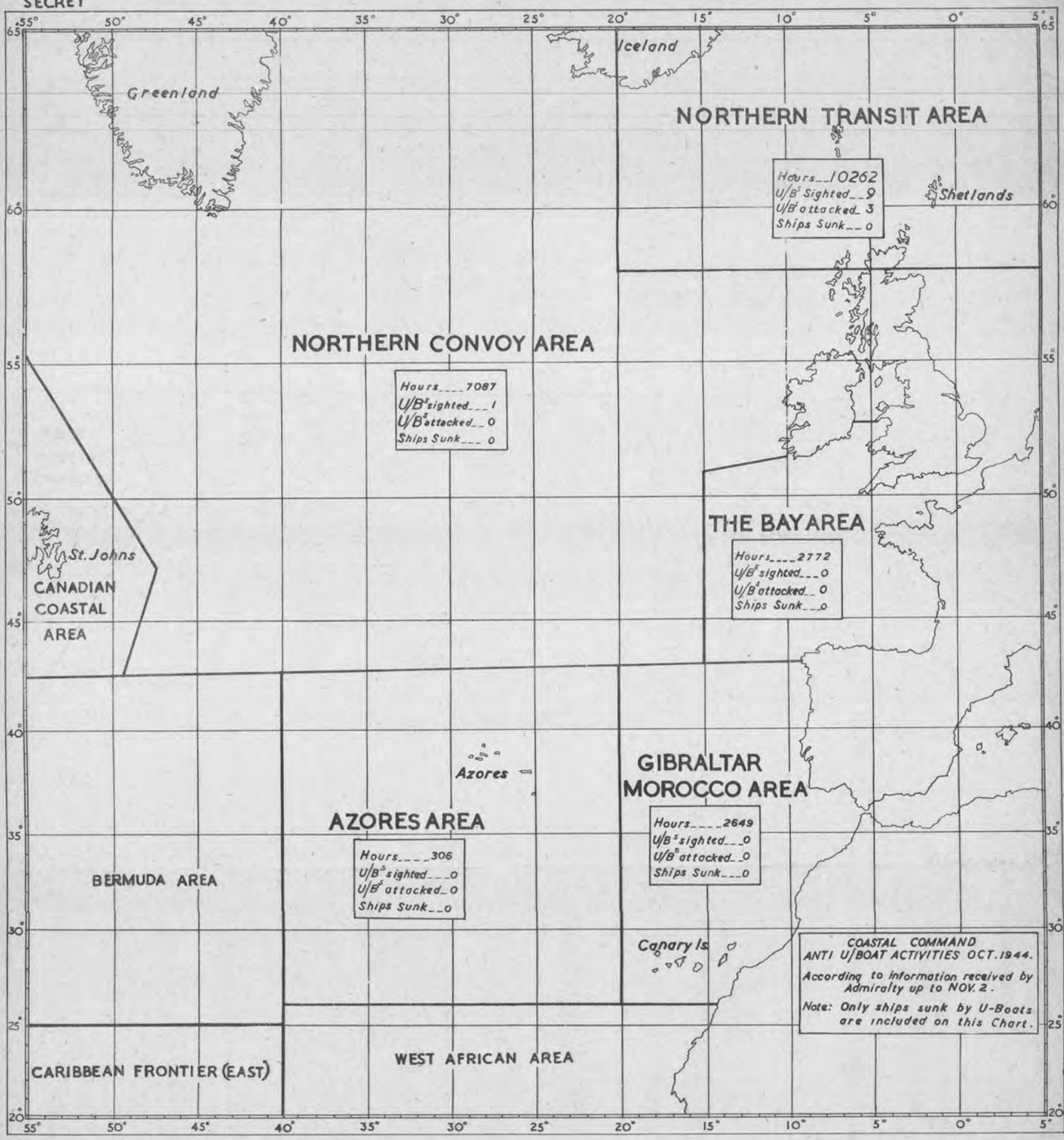



**Comments**

*Although the positions reported by the two aircraft do not correspond exactly, it appears likely from the report made by the crew of "H" that "H" was the target for the 15 flares dropped by "Z." This incident casts doubt on the conclusion reached by the crew of "Z" that there was probably a U-Boat in the area. It is already quite certain that a large number of disappearing contacts are caused by aircraft and it would seem that the reports by "H" and "Z" give an example of how some of these disappearing contacts occur. Although there is a school of thought which says that an aircraft contact will always be recognized by its rapid movement, this incident plus the long record of disappearing contacts shows that an aircraft contact will often be lost before it can be recognized for what it is.*

*To eliminate this type of difficulty it is essential that the ground speed of every contact be checked by accurate plotting of A.S.V. readings. The result of this will be that some contacts will be lost before they are intercepted, but this loss must be accepted for it will be balanced by the increased reliability of those contacts which are checked.*

SECRET


Greenland
Iceland
Shetlands
NORTHERN TRANSIT AREA
Hours 10262
U/B's Sighted 9
U/B's attacked 3
Ships Sunk 0
NORTHERN CONVOY AREA
Hours 7087
U/B's sighted 1
U/B's attacked 0
Ships Sunk 0
THE BAY AREA
Hours 2772
U/B's sighted 0
U/B's attacked 0
Ships Sunk 0
St. Johns
CANADIAN COASTAL AREA
Azores
AZORES AREA
Hours 306
U/B's sighted 0
U/B's attacked 0
Ships Sunk 0
GIBRALTAR MOROCCO AREA
Hours 2649
U/B's sighted 0
U/B's attacked 0
Ships Sunk 0
BERMUDA AREA
Canary Is.
CARIBBEAN FRONTIER (EAST)
WEST AFRICAN AREA
COASTAL COMMAND
ANTI U/BOAT ACTIVITIES OCT. 1944.
According to information received by Admiralty up to NOV. 2.
Note: Only ships sunk by U-Boats are included on this Chart.

*It is interesting that both crews in this instance concluded that the other aircraft was hostile. This is hard to understand in view of the fact that we have been flying patrols at fairly heavy density for some months. Also, 1·7-inch flares have been in use since D-Day and it is felt that after seeing such a large number of flares, each burning for only about three seconds, the crew of aircraft "H" should have realized that the other aircraft was friendly.*

# The Ones That Got Away

### 1. Off the Faeroes

In the early morning of October 18 one of our aircraft was on patrol to the south-east of the Faeroes. In position 61° 35′ N., 04° 30′ W., when the aircraft was flying on a course of 128°(T) at 1,000 feet, the Radar operator picked up a contact on the Mark III A.S.V. bearing Red 104° 8 miles away. It was just light and the aircraft turned to home but lost contact at 4 miles.

Just over an hour later, at 0826 hours, it was full daylight with 10/10ths cloud at 3,000 feet, and 3/10ths scattered cumulus at 1,200 feet; the sea was moderate and the visibility 8 to 10 miles. When flying at 1,200 feet on the same course as before, in position 61° 31′ N., 04° 37′ W., the aircraft picked up another Radar contact, this time bearing Red 126° 7 miles away. The aircraft began to home but lost contact at 5 miles. At 0830 hours contact had been lost for about half a minute and the aircraft, still at 1,200 feet, had started to turn back on to the original course when the flight engineer from the nose turret sighted a U-Boat on the surface 5 miles away and slightly to port. The enemy had obviously detected the approach of the aircraft for he was in the act of diving. The U-Boat was estimated to be a 500-tonner and was steering 220° at 8 knots. By the time the aircraft reached the spot there was no aiming mark and it was too late to make an attack. The U-Boat's position was given as 61° 38′ N., 04° 35′ W.

An escort group which was homed to the area arrived 1½ hours after the sighting and gained asdic contact on the U-Boat, but lost the contact again before an attack could be made.

#### Comments

*This was one of the few U-Boats sighted during October, and it is most unfortunate that an attack could not be made. The following points are raised as a basis for discussion on tactics in this latest stage of the anti U-Boat war :—*

(i) Check of Contacts.—*Further investigation shows that both the original contacts were obtained slightly forward of the beam and were held for a short while before the aircraft began homing. This enabled the crew to be sure that they did not start homing on another aircraft. It is desirable for this type of check to be reported fully so that any points of interest can be circulated among other crews.*

(ii) A.S.V. Manipulation.—*The Radar contact was lost while the U-Boat was still on the surface. As the Radar log has not yet come in, the only explanation which can be offered for this is that it happened because the aircraft homed at 1,200 feet. With a moderate sea it is possible for an experienced A.S.V. Mark III operator to hold contacts to ranges of less than one mile when the last part of the run is done below 400 feet. If the aircraft had reduced height during the approach, the sea returns would have been less, the Radar operator's task would have been much easier and the contact would probably have been held.*

(iii) Action when a Contact Disappears.—*The groundspeed of all contacts should be checked by plotting before the aircraft begins to home. If a contact is lost after the groundspeed check has proved that the target is not an aircraft, then it is probable either that the contact was caused by a U-Boat which dived, or that the difficulties in operating the A.S.V. were so great that the contact was lost in the sea returns. In either case, the aircraft should continue on course to the D.R. position of the contact and the crew should make a careful binocular and Radar search.*

(iv) Visual Search along Radar Bearing.—*The Form U-Sight suggests that the crew did not use binoculars during the approach. The visibility is given as 8 to 10 miles and if a careful visual search had been made, it should have been possible to sight the target before the contact disappeared. If binoculars had been used to search the area indicated by Radar, it is unlikely that the U-Boat could have been missed. It is essential that binoculars be used during the Radar approach whenever there is enough light to make visual sightings possible. If this is done, many contacts will be sighted and identified in good time to eliminate homing difficulties.*

(v) Enemy Detectors.—*The U-Boat appears to have detected the aircraft, to have waited for the aircraft to turn in, and then to have dived. The detection could have been made by the* Naxos *search receiver, by eye, or by Radar. Possible evasive action against these detectors is discussed below :—*

(a) Naxos.—*As no attenuator is fitted to A.S.V., Mark III, there is little scope for evasive action against* Naxos. *If, however, the visual sighting had been made with binoculars before the aircraft turned in, the approach could have been made with the A.S.V. off or with the scanner pointing away from the target. With other Marks of Radar where attenuators are fitted, power could have been reduced, thus retaining the assistance of A.S.V. during the approach. If there is no attenuator but adjustable tilt is fitted, the tilt could be used to give the* Naxos *operator a gradual fade out of signal before the scanner is pointed away from the target.*

(b) Radar and Visual.—*Although at present the enemy is not using Radar to any great extent, this question is considered here so that aircrews will be able gradually to introduce anti-Radar measures into their tactics. The aircraft was inside the expected enemy Radar cover for the whole period from the original contact at 0826 hours to the time the U-Boat was sighted. During daylight the approach of aircraft could be detected by Radar or by the U-Boat's visual look-out. In this case, if an early binocular sighting had been made by our aircraft, then the approach could have been designed to counter the enemy's visual look-out. Had the visibility been such that visual detection was impossible, then height should have been reduced so that, if the U-Boat had been using Radar, it would have been unlikely to obtain contact.*

**2. In the Atlantic**

Late at night on October 4, H.M.C.S. *Cherboque* was escorting Convoy ONS. 33 when she was hit and damaged by a torpedo. At about noon the next day **Fortress E/220** took off from Lagens to escort the convoy. About 3½ hours after take-off the Fortress was given the position of the damaged corvette and instructed to escort her. After flying for another two hours the aircraft reached the estimated position and began a search for the ship which was said to be steering east at 4 knots. There was 3/10ths cloud with base at 2,000 feet, the sea was calm and visibility was not more than 7 miles.

After searching for an hour E/220 was flying eastwards at 2,000 feet, using the Mark II A.S.V. At 2039Z hours it was nearly dark but the port beam lookout sighted a wake with a dark object at its apex in position 48° 38′ N., 25° 17′ W.

When first sighted, the dark shape at the head of the wake bore Red 60°, 6 miles away and it was thought to be the *Cherboque*. When the aircraft turned to approach, the vessel began to dive and it was realized that it was a U-Boat. By the time the aircraft reached the spot, the U-Boat, which had been steering 235° at 8 knots, had been down for two minutes and no attack could be made.

**Comments**

*This excellent visual sighting was the result of keeping an extremely good look-out, and it shows that this crew realize the value of a careful visual watch. The only comment that can be made is to suggest that binoculars should always be used to identify a target. If the target is a ship, the aircraft will not have to turn off its track, and if the target is a U-Boat the maximum time will be available to prepare for the attack.*

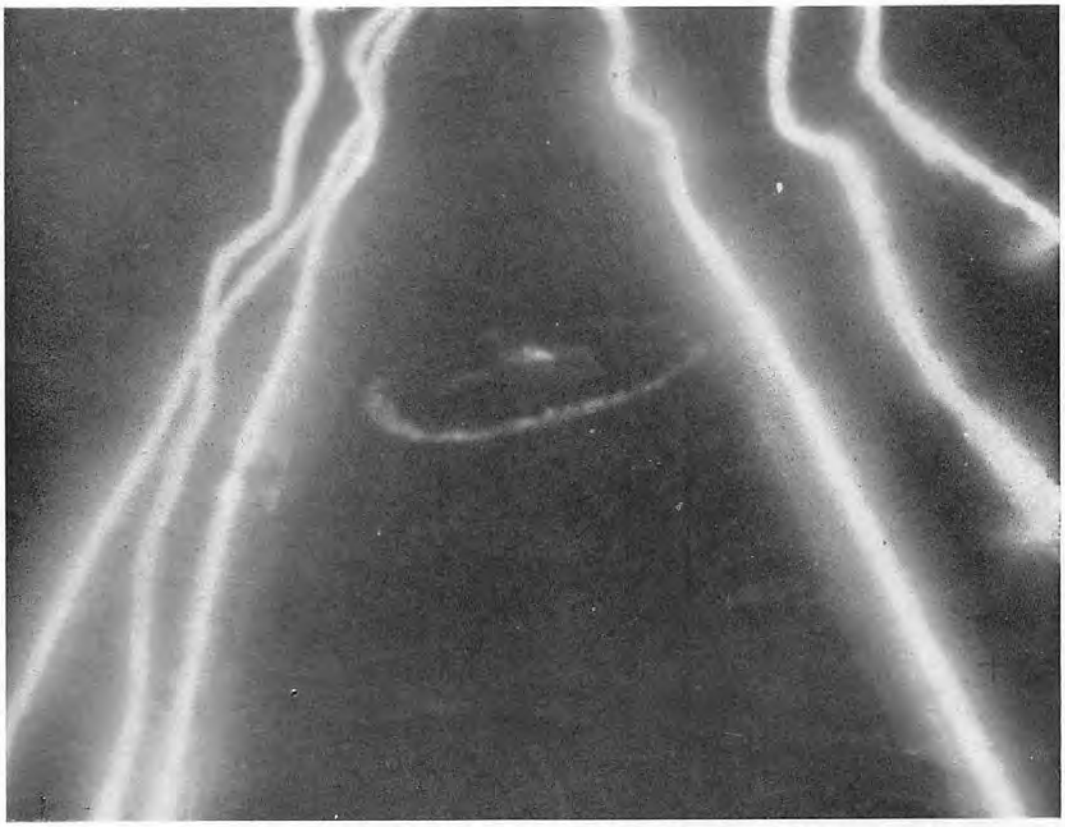
*The fact that A.S.V. was in use, indicates either that the visibility had been underestimated by the captain who must have felt that visual sightings were unlikely in that light, or that the A.S.V. was being used as a navigation aid. It is most important that the captain should be careful when making the decision to use A.S.V., Mark II in the probability areas. When this equipment is switched on, the aircraft becomes no more than a nuisance to the U-Boat, which is able to dive in perfect safety except on the rare occasions when the 1½-metre G.S.R. is out of order. It may well be that on this occasion the U-Boat received G.S.R. warning of the aircraft's presence, although it is also possible that the aircraft was silhouetted against the light sky in the west.*

## A U-Boat Destroyed off the Somali Coast

In May of this year aircraft of Aden Command made a successful attack on a German U-Boat off the coast of Somaliland. The following is an account of the action which caused the U-Boat to run ashore and blow herself up. The survivors were rescued by ships of the Royal Navy.

At 0105Z hours on May 2 **Wellington E/621** took off from Sousciuban to carry out a routine anti-U-Boat sweep along a shipping lane. Owing to weather conditions the captain decided to fly at 3,000 ft., and at 0420Z hours the front gunner from the second pilot's seat sighted a wake 8 miles away broad on the starboard bow. The aircraft turned to investigate and the crew identified the target as a U-Boat on the surface in position 10° 34′ N., 52° 20′ E.

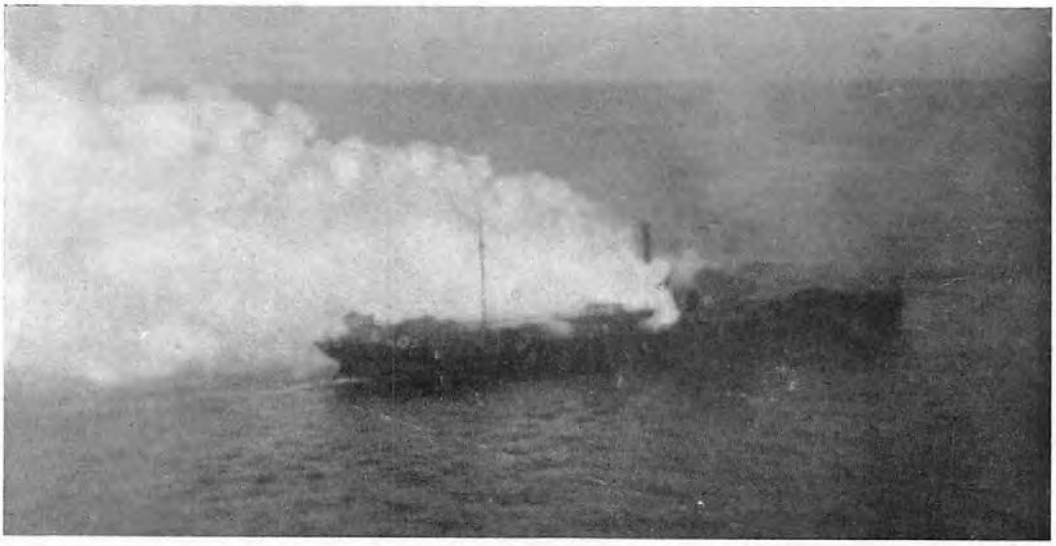
During the run in, the U-Boat began to dive, leaving a swirl but keeping a straight course. The front gunner opened fire and saw his tracer hitting the base of the conning tower. While the conning tower was still partly visible the captain released his depth charges, which were seen to fall in line with the swirl and to explode correctly. After the attack the captain made a climbing turn to port, hoping for an opportunity to photograph evidence of damage. Oil appeared immediately after the attack in the middle of the swirl, and three minutes afterwards the bows of the U-Boat broke surface at an angle of 50°. A photograph was taken before the bows submerged again, and shortly afterwards the U-Boat herself came to the surface and opened a heavy fire with light A.A. armament. The aircraft therefore turned up sun and made a second run, raking the U-Boat with machine gun fire from both front and rear guns. After this the U-Boat changed over to her main armament of a 4·1-in. gun forward and a 37-mm. A.A. gun aft. The shells fell into the sea around the aircraft at a distance of three miles. The Wellington then withdrew out of range and shadowed the damaged U-Boat from a safe distance. Every time the aircraft closed to within four miles the enemy opened fire, and puffs of black smoke were seen coming from the conning tower every 20 seconds. The captain, knowing that other Wellingtons were



This photograph was taken after a night attack off the Norwegian coast on September 24 by Liberator A/224. The U-Boat concerned was probably sunk.

The Germans, driven out of their Biscay U-Boat bases, will have to rely increasingly on Norwegian bases for carrying on the U-Boat war. Bergen is one of the bases they are developing, and in this picture the partially built shelter pens at Laksevaag can be seen. Three U-Boats are in floating docks in the shipbuilding basin. Bomber Command attacked the base a few days later and two of the U-Boats were severely damaged, if not totally destroyed.

PLATE 4



One of the most successful attacks in October was made by aircraft of the Banff Wing off Egersund, at dawn on October 9. Torpedoes, R.P. and cannon were used. It is known that the *L. Ollendorf*, 1,953 tons, and the *Sarp*, 1,116 tons, and a trawler-type auxiliary were sunk; a vessel of some 3,500 tons and another of 1,500 tons were damaged, and an ex-Dutch gunboat was seriously damaged. We suffered no casualties.

on their way, kept the U-Boat under observation and tried to head her towards the land. Her track was clearly defined by an oil streak.

Two hours and ten minutes later the first relief aircraft arrived and immediately went in to attack. Wellington E/621 then returned to base, where it landed with only 30 gallons of petrol left, all in the tank of one engine.

Other aircraft then joined in the hunt. In all, 18 sorties were flown and seven attacks made. From the time of the first attack the U-Boat headed south-east, then south, and finally west and along the coast. Her speed varied between 5 and 12 knots, and she was trailing an oil streak 20 miles long. At dawn on May 3 the U-Boat ran herself ashore and was blown up by the crew, somewhat to the dismay of the last Wellington crew who were about to render the *coup de grâce* with bombs.

Meanwhile, at 1006Z hours on May 2, H.M.S. *Falmouth* was ordered to assist in the hunt. She set course to intercept but did not sight her quarry till dawn the next day.

The motor boat was ready for lowering and an armed boarding party stood by as *Falmouth* closed the U-Boat. When she was still 2 miles away three violent explosions occurred in the U-Boat, followed by flames and columns of black smoke rising to a considerable height. *Falmouth* went in as close as possible and an armed party was at once landed to capture the U-Boat's crew. As the motor boat approached, a large area of oil was burning furiously on the water and continued to do so after the party had landed. Only when the smoke had cleared away could the remains of the U-Boat be seen.

In the meantime an officer, accompanied by a stoker and a seaman, had managed to get on board the U-Boat which was lying about 130 yards from the shore with a 40° list to port. Once on board the officer searched the lower conning tower, but was unable to get lower into the U-Boat because she was almost completely flooded. Moreover, he very soon detected gas and had to return on deck to put on his respirator. With this on he again went below and made a more thorough search, passing up gear and documents. For a time he felt quite all right, but he later found that his breathing was becoming more and more difficult, and realized almost too late that he was losing consciousness. He managed to stagger to the ladder and the stoker above, realizing that something was wrong, leaned through the conning tower hatch and pulled him up by the collar of his overalls.

Meanwhile it had been seen from the ship that a number of the U-Boat men were climbing the cliffs. The aircraft was informed and told to open fire if the Germans did not come down and surrender. The landing party then finished rounding up the rest of the survivors, transferring the wounded prisoners on board, and salvaging gear and documents.

In all 42 prisoners were taken, out of an original complement of 66. The U-Boat's Commanding Officer reported that he did not expect any aircraft in the area in which he was sighted. He crash dived when the aircraft came in to attack, but the depth charges straddled the U-Boat and broke a main inlet pipe. As water was flooding his boat rapidly he had no alternative but to surface. He found this very difficult and he was only able to do so by opening up all air bottles and driving the boat to the surface with the motors. She eventually surfaced at an angle of 45°. All the water had run aft, flooded the engine room and started a fierce fire. The Commanding Officer had hoped to be able to blank off the inlet pipe and escape to the south-east, but he later decided that repairs were not possible at that stage, so he altered course to close the coast.

## U-Boat out of Action for Two and a Half Months

During her first patrol in May, 1944, *U 736* had the misfortune to be detected by Liberator C/224. She was proceeding on the surface during the night of May 24/25 when she was illuminated by the Liberator's searchlight. At the same time the aircraft's guns opened fire to which the U-Boat replied until her quadruple 20 mm. guns failed after five rounds. The Liberator then attacked with eight depth charges which were seen to hit the water 50 yards astern of the target, but which did no visible damage. Soon afterwards the Liberator regained contact and once more illuminated the U-Boat. This time six depth charges were dropped, but again no results were seen.

However, inside *U 736* the results were only too apparent. Both the gyro and magnetic compasses were smashed, all the W/T equipment was put out of action and there was a rent 3 feet long in the pressure hull just below the bow torpedo tubes. By using all the bilge pumps the crew succeeded in reducing the level of the water and caulking the rent. When this had been done "U 736" was able to continue submerged at about 20 metres (65 feet). A short time before midnight the next night *U 736* was met by five minesweepers and escorted into Lorient,

The repairs in the Keroman dry dock at Lorient lasted nearly two and a half months. During this time the quadruple 20 mm. guns were exchanged for a 37 mm. and a schnorkel was fitted. One of the diesel cylinder leads had been cracked and two others, which were defective, also had to be replaced. Late in July she began tests in the harbour, but on the 26th she went aground 500 yards from the wet pens. At low tide she lay in about 3 feet of water with a list of 51°. This caused the acid to spill out of the main and torpedo batteries, and all the oil to run out of the bearings of the motors, which consequently seized up. She was eventually towed into the wet pens where her torpedoes were landed and new ones embarked. New batteries were also necessary, but before they could be supplied *U 736* had to leave in a hurry. The damaged batteries were therefore patched up and the U-Boat sailed on August 5. However, her ill-luck held and the following day she was sunk by H.M.S. *Loch Killin*.

# II. ANTI-SHIPPING

## SUMMARY OF ANTI-SHIPPING OPERATIONS BY COASTAL COMMAND AIRCRAFT OCTOBER, 1944

| Weapons Carried. | Number of Sorties. | | | Number of Aircraft to Attack. | | | Target. | |
|---|---|---|---|---|---|---|---|---|
| | On Reconnaissance. | On Strike. | Total. | On Reconnaissance. | On Strike. | Total. | M/V. | Naval. |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **DAY OPERATIONS** | | | | | | | | |
| Torpedo | 48 | 13 | 61 | 4 | — | 4 | 4 | — |
| R.P. | 242 | 67 | 309 | 28 | 12 | 40 | 14 | 26 |
| Bomb | 26 | — | 26 | 12 | — | 12 | 12 | — |
| Depth Charge | 25 | — | 25 | — | — | — | — | — |
| Tsetse | 21 (1) | — | 21 (1) | 16 (1) | — | 16 (1) | 15 | 1 (1) |
| Cannon and M.G. only | 388 (1) | 78 | 466 (1) | 80 (1) | 13 | 93 (1) | 56 | 37 (1) |
| TOTAL—DAY | 750 (2) | 158 | 908 (2) | 140 (2) | 25 | 165 (2) | 101 | 64 (2) |
| **NIGHT OPERATIONS** | | | | | | | | |
| Torpedo | 35 | — | 35 | 5 | — | 5 | 4 | 1 |
| R.P. | 23 | — | 23 | 5 | — | 5 | 2 | 3 |
| Bomb | 225 (3) | 3 | 228 (3) | 78 (3) | 2 | 80 (3) | 37 (3) | 43 |
| Depth Charge | 1 | — | 1 | — | — | — | — | — |
| Tsetse | — | — | — | — | — | — | — | — |
| Cannon and M.G. only | 20 (1) | — | 20 (1) | — (1) | — | — (1) | — | — (1) |
| TOTAL—NIGHT | 304 (4) | 3 | 307 (4) | 88 (4) | 2 | 90 (4) | 43 (3) | 47 (1) |
| **ALL OPERATIONS** | | | | | | | | |
| Torpedo | 83 | 13 | 96 | 9 | — | 9 | 8 | 1 |
| R.P. | 265 | 67 | 332 | 33 | 12 | 45 | 16 | 29 |
| Bomb | 251 (3) | 3 | 254 (3) | 90 (3) | 2 | 92 (3) | 49 (3) | 43 |
| Depth Charge | 26 | — | 26 | — | — | — | — | — |
| Tsetse | 21 (1) | — | 21 (1) | 16 (1) | — | 16 (1) | 15 | 1 (1) |
| Cannon and M.G. only | 408 (2) | 78 | 486 (2) | 80 (2) | 13 | 93 (2) | 56 | 37 (2) |
| GRAND TOTAL | 1,054 (6) | 161 | 1,215 (6) | 228 (6) | 27 | 255 (6) | 144 (3) | 111 (3) |

*Note.*—The figures in brackets, which are not included in the totals, represent attacks on shipping by aircraft on duties other than Anti-Shipping.

## FINAL ASSESSMENTS FOR SEPTEMBER 1944

*Day :—*

*Torpedo*

2 M/V.s (totalling 2,648 tons) sunk.
1 Trawler-type auxiliary sunk.
1 Lightship sunk.
1 M/V (3,323 tons) damaged.

*R.P. and Cannon*

2 M/V.s (totalling 4,447 tons) sunk.
3 "M" class Minesweepers sunk.
1 Incomplete destroyer sunk.
2 "M" class Minesweepers seriously damaged
2 Trawler-type auxiliaries seriously damaged.
1 M/V (1,000 tons) damaged.
1 Coaster damaged.
1 Minesweeper damaged.
7 Trawler-type auxiliaries damaged.
3 Tugs damaged.

*Cannon*

1 Minesweeper damaged.
2 Trawler-type auxiliaries damaged.
1 Coaster damaged.
1 Tug damaged.

*Tsetse*

1 Torpedo boat (*Kjell*) sunk.
1 Trawler-type auxiliary damaged.

*Night :—*

*Bombs*

1 Minesweeper seriously damaged.
1 Trawler-type auxiliary seriously damaged.
4 E/R-Boats seriously damaged.
1 T.L.C. seriously damaged.
1 M/V (1,000 tons) damaged.
2 Minesweepers damaged.
4 E/R-Boats damaged.

## RESULTS CLAIMED FOR OCTOBER

**(Subject to Assessment)**

*Day :—*

*Torpedo*

2 M/V.s (totalling 3,000 tons) sunk.

*R.P. and Cannon*

1 Tanker (1,200 tons) sunk.
2 Trawler-type auxiliaries sunk.
3 M/V.s (totalling 7,900 tons) seriously damaged.
1 Gunboat seriously damaged.
1 Coaster seriously damaged.
2 Coasters damaged.
1 Lightship damaged.

*Tsetse*

1 M/V (2,000 tons) damaged.
1 Torpedo boat (*Snogg* Class) damaged.
1 Ocean-going barge damaged.
1 Trawler-type auxiliary damaged.
1 Tug damaged.

*Cannon*

2 M/V.s (totalling 1,000 tons) damaged.
1 Trawler-type auxiliary damaged.
1 Patrol vessel damaged.
1 Tug damaged.

*Night :—*

*Bombs*

1 M/V (8,000 tons) seriously damaged.
1 E/V seriously damaged.
1 Minesweeper damaged.
1 E/R-Boat damaged.

*R.P. and Cannon*

1 Minesweeper damaged.

# Shipping Strikes in October

On the night of October 5/6 three **Beaufighters** of **455 Squadron,** armed with 25-lb. R.P., attacked a convoy of about 15 ships off the Hook of Holland. Four probable underwater hits were scored on an "M" class minesweeper, and great sheets of flame came from the vessel. Another "M" class minesweeper received two direct hits, which caused bright flashes. All the Beaufighters returned to base undamaged.

Another successful attack was made near Texel on the night of October 7, when **Avenger R/855** bombed four E- or R-Boats travelling in line ahead. From 900 feet the pilot dropped four bombs armed with the air burst pistol, and he saw the first bomb burst just over the rear vessel, causing a great shower of sparks. After this the boat stopped and was seen to be on fire, with the other three boats circling round her.

On October 9 the **Banff Wing,** consisting of 18 Beaufighters and 8 Mosquitos, made a dawn attack on a convoy off Egersund. All the aircraft took off in the dark and set course for a pre-arranged position 10 miles from the Norwegian coast. There they formed up by the aid of a Drem system laid on the water, and less than six minutes after leaving the rendezvous point they were on patrol off the coast. At 0710 hours the aircraft sighted a convoy of five merchant ships and six escort vessels just off Egersund, and attacked with torpedoes, R.P. and cannon. A merchantman of 3,500 tons and another of 1,500 tons were hit by torpedoes, which caused big explosions. As a result of R.P. and cannon attacks an armed trawler blew up, a 1,500-ton merchant ship caught fire and another trawler was seen to be out of control. A Mosquito which failed to rendezvous with the main force sighted the convoy 15 minutes after the attack and the crew counted only eight vessels, none of which was big. Subsequent information has established that two merchant ships and one armed trawler were sunk, and another merchant ship and an ex-Dutch gunboat seriously damaged. These results were achieved without loss to ourselves, and only three Beaufighters were damaged.

On October 15 the **Banff Wing** successfully attacked a small tanker and an armed trawler near Kristiansand. Twelve Beaufighters of 404 Squadron carried 25-lb. R.P., while 22 Beaufighters and Mosquitos from 144, 235 and 248 Squadrons provided the anti-flak force. As a result of concentrated hits with R.P. and cannon the tanker disappeared amidst intense flame and black smoke, leaving burning oil on the sea and survivors struggling in the water. Concentrated fire also caused a big explosion on the trawler, and she was last seen blazing from stem to stern with decks awash. Survivors from this vessel were seen in dinghies and on a raft. These two ships were destroyed without the loss of a single aircraft.

Off Wangeroog on October 15, twenty-six **Beaufighters** of **236** and **254 Squadrons, North Coates Wing,** attacked three coasters and a lightship with 25-lb. R.P. and cannon. One of the coasters blew up during the attack, and afterwards only a pall of smoke was seen on the water. The lightship was left blazing furiously, and the two other coasters were also set on fire. One Beaufighter is missing from this operation.

On October 17 four **Mosquitos** of **235** and **248 Squadrons** attacked an armed trawler off Gossen. One of the aircraft fired two rounds with 6-pounder cannon and scored a hit on the base of the funnel, but a stoppage occurred at that point and no more shots were fired. Many hits were scored with cannon and machine guns, and the ship was left on fire amidships and aft. The aircraft met a small amount of flak during the attack, but they all returned safely to base.

On October 19 the **Banff Wing** sent a force of 21 **Mosquitos** of **235** and **248 Squadrons** against enemy shipping north-west of Bergen. A big power-driven barge and a tug were hit with 6-pounder cannon shells, and two armed trawlers were repeatedly hit with 20-mm. cannon and machine guns. Bombs were also dropped, but no hits are claimed. It is probable that all four ships were damaged, and two of them were seen to be smoking when the Mosquitos left the area. F/235 was hit by flak and had to ditch ; one of the crew was seen in a dinghy.

On October 21 a mixed formation of 11 Mosquitos and 6 Beaufighters of the **Banff Wing** attacked enemy ships in Haugesund harbour. A 3,000-ton merchant ship was hit by no less than 22 R.P.s and another of 1,400 tons by eight R.P.s. These two ships were also hit with 6-pounder cannon, and both were set on fire. Concentrated hits with cannon and machine guns were scored on an armed trawler, which was also left on fire and smoking. One Mosquito failed to return from this operation.

On the night of October 22/23 **Halifax P/58** was on anti-shipping patrol in the Skagerrak when the crew sighted two merchant ships of 8,000 tons each and two escort vessels. The Halifax attacked from 5,500 feet in level flight, releasing six 500-lb. M.C. bombs. One merchantman and one escort were hit and set on fire, and the Halifax crew saw red distress signals being fired off after the attack. Fires on the bombed vessels were still visible when the aircraft was over 20 miles away.

On October 23, 21 **Mosquitos** of the **Banff Wing** attacked several small ships in Hjelte Fjord with bombs, 6-pounder shells and cannon fire. The crews claim no bomb hits, but they saw several 6-pounder hits as well as concentrated cannon and machine gun strikes. Photographs taken during the attack show several ships on fire and smoking heavily. A *Snogg* class torpedo boat, two tugs and two small merchant ships of 500 tons each, are claimed as damaged. All our aircraft returned safely to base and only two of them suffered minor damage.

## The Work of the Anti E-Boat Squadrons

Much has already been written about the anti U-Boat and anti-shipping work done by Coastal Command in support of the Allied invasion of the Continent. Little is known, however, of the concentrated and persistent operations which have been carried on to counter the very real threat of German E-Boat attacks against the Allied convoys, which have been carrying enormous quantities of men and material across the Channel.

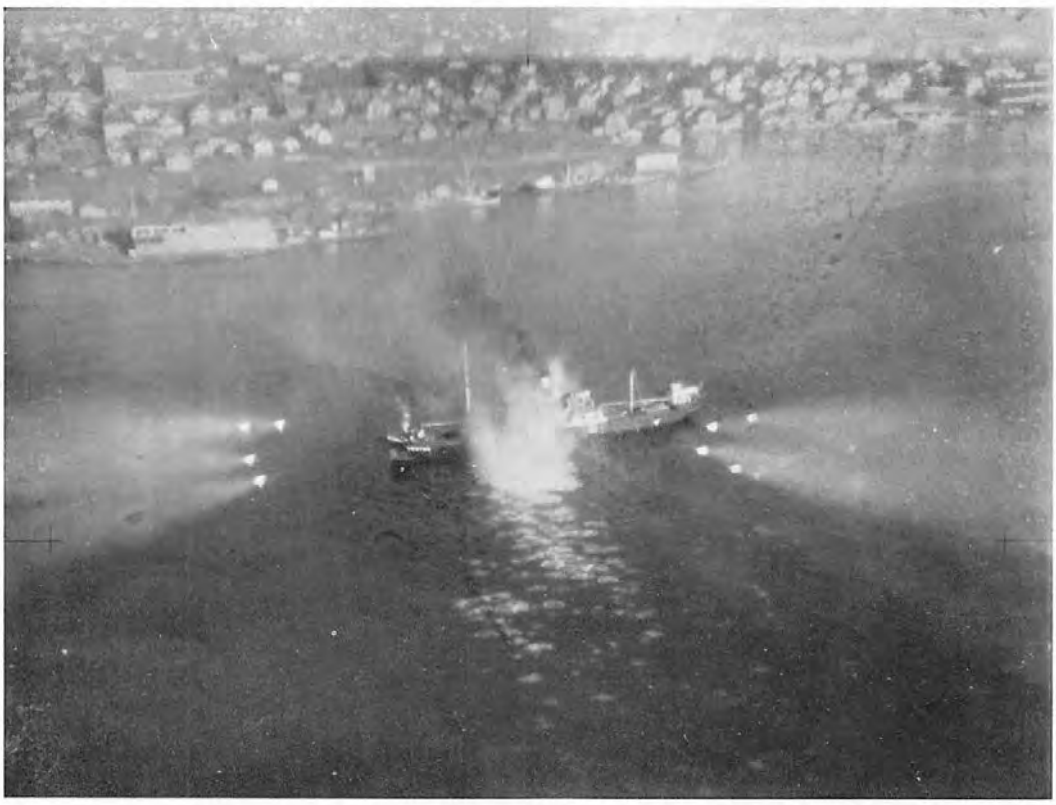
A conservative estimate of the number of E- and R-Boats available to the enemy for Channel marauding on D-Day was 120. They were dispersed in the various ports between Brest and Ijmuiden, the greatest concentrations being in Cherbourg and Le Havre. By virtue of their size and speed the E-Boats could not be considered easy targets in daylight, but under cover of darkness they presented a tactical problem as difficult as any with which the Command has been faced.

It was found that the 500 or 250-lb. M.C. bomb fused with an air burst pistol was the most effective weapon against this type of target. The difficulties of aiming at a vessel travelling at over 30 knots made it unlikely that many direct hits would be scored, but it was established that the blast and splinters from a medium-cased bomb bursting just above the water would damage an E-Boat within a hundred yards of it. Cannon, which at first had been considered the ideal weapon, was to be used in addition to bombs and R.P. when conditions were suitable.

Nos. 848, 854 and 855 Fleet Air Arm Squadrons equipped with Avengers, and No. 819 Fleet Air Arm Squadron with Swordfish, were brought in to help deal with the E-Boats and were placed under the operational control of Coastal Command. No. 524 Squadron equipped with Wellingtons, No. 415 Squadron, which had a flight of Albacores and a flight of Wellingtons, and No. 143 Squadron with Beaufighters, together with the naval squadrons, formed the anti E-Boat force. All these squadrons trained and became specialized in night operations. They were backed up by the three Beaufighter Wings, which had themselves completed a concentrated training programme and were competent to under-

PLATE 5 In the attack shown on Plates 5 and 6, Beaufighters of 404 Squadron and Mosquitos of 235 and 248 Squadrons attacked shipping in Haugesund harbour on October 21. The ship being hit by R.P. is one of the *Hansa* type emergency ships of some 3,000 tons, Germany's equivalent of Liberty ships.

The other ship to be hit in the attack on Haugesund was the *Vestra*, 1,422 tons, which was lying off shore. She was left in flames.



take night patrols against E-Boats when necessary. During training, shallow dive bombing attacks were practised against a radio controlled motor boat, which was manœuvred erratically at speed to simulate the evasive action of an E-Boat. Because of its antics, the target became known as the "Doodlebug," but it served its purpose by showing the crews how difficult their job would be.

There is no doubt that the cross-Channel convoys have been comparatively immune from E- and R-Boat attacks very largely because of the keenness and persistence with which the anti E-Boat squadrons have operated since before D-Day. In May the enemy's E-Boats were disposed on either side of the landing beaches, both at Cherbourg and in Le Havre. To counter this, anti E-Boat squadrons were based in both the 19 Group and 16 Group areas. However, the E-Boats based on Cherbourg were kept in port by continual patrols off the Peninsula and, although our aircraft had little apparent success in these patrols, the vessels were soon withdrawn eastwards as the American Army moved in on the port. With the fall of Cherbourg, it became evident that the air patrols had made it too hot for the E-Boats to pass down the Channel from Le Havre to Brest and the Channel Islands. The enemy therefore concentrated his forces in the east and all our anti E-Boat squadrons were moved from 19 Group to 16 Group.

During July the main E-Boat effort against our ships was directed from Le Havre and Dieppe. The enemy achieved some slight success but at a heavy cost. He needed constant reinforcements from bases further east and there is no doubt that the efforts of our aircraft to prevent further E-Boats from reaching the operational area met with considerable success.

During August and September the enemy became active from Le Havre and used his E- and R-Boats to mine the approaches to Arramanches on every suitable occasion. The distance from Havre to Arramanches is about 20 miles, and the problem of operating aircraft against E- and R-Boats was, therefore, a difficult one, because of the large amount of British shipping lying off the beachhead. In the ordinary course of events our own M.T.B.s would have been a most satisfactory answer to the enemy's mining operations, but owing to the excellent Radar cover and heavy coast defences at Le Havre it was impossible for the M.T.B.s to follow the E-Boats within 10 miles of their base. They could be engaged only by aircraft.

Because of the confined space, it was equally difficult to operate aircraft except under some form of ground control. Accordingly this was provided by No. 24 Sector of No. 85 Group T.A.F. and on several occasions Beaufighters, with Wellingtons to illuminate, operated right into the mouth of the River Seine. Although the Channel fog which was very persistent during the late summer, interfered with the operations, at least one successful attack was made and the mere threat of air attack did much to reduce the enemy's mining activity. As a result of this experience a ground control technique was developed, using mobile Radar units, which could be applied on the flank of the army at any point on the coast.

The one factor which places the anti E-Boat campaign in a class of its own is that the squadrons have always had to operate without the satisfaction of achieving spectacular results. Night fighters, flak, darkness and bad weather have added to the difficulties of these operations, and it is only now that evidence is coming in which proves that the several hundred attacks which have been made, with "unobserved results" have, in fact, been very damaging to the German E-Boat effort. In view of the difficulties of observation our claims of 7 sunk, 10 seriously damaged and 21 damaged are conservative.

But the threat to our convoys, although diminished, remains. Some of the squadrons are now engaged elsewhere, but others are continuing the campaign, along the coast of Holland. As before it is unspectacular, but it remains a vital part of the Command's operational effort.

# III.—OTHER OPERATIONAL FLYING

## Combats with Enemy Aircraft

In the early afternoon of October 24, **Mosquitos M** and **K/235, Banff Wing,** were patrolling off the Norwegian coast between Marsten Light and Stadtlandet. The aircraft were flying in echelon starboard at 2,000 feet, when the pilot of "M" sighted three aircraft in rough line astern fine on his port bow. The aircraft, which were immediately identified as Me. 110s, were heading towards the two Mosquitos. The Mosquito pilots turned hard to port and dived on the enemy, who replied by turning towards the attack, still keeping their formation. Aircraft "M" dropped slightly behind "K" during the turn and the pilot found himself in a favourable position to attack. He therefore closed the port quarter of the rearmost Messerschmidt and opened fire with cannon at about 450 yards. He closed to 150 yards and scored hits on the enemy's port engine and fuselage. Fire broke out amidships and the Messerschmidt crashed in flames into the sea.

Meanwhile "K's" pilot had fired a short burst at full deflection at the rearmost enemy aircraft, and then turned his attention to the No. 2 in the enemy formation. The Messerschmidt turned from port to starboard and fired from the rear upper gun position. "K" opened fire at 350 yards, closing to 150 yards, and the crew saw strikes on the enemy's starboard engine and around the cockpit. The Messerschmidt then dived steeply into the sea with smoke pouring from the starboard engine.

The pilot of "M" had also fired at this enemy aircraft and claims to have hit it in the port engine. After breaking off his attack and turning again, he saw the enemy crash as a result of "K's" fire. Both Mosquitos then chased the

remaining Messerschmidt, which was heading for the Norwegian coast at sea level. "K" began the pursuit about 1,500 yards behind the enemy, but when this distance had been reduced to 600 yards, the Messerschmidt turned south and flew parallel with the coast, taking evasive action and firing from the rear upper gun. "M" turned to head the enemy off, but "K" approached to 400 yards and opened fire in a quarter attack from the starboard side. After closing the range to 150 yards the pilot saw his cannon fire hit the Messerschmidt in the starboard engine and wing root. Both Mosquito crews then saw the enemy burst into flames and crash into the sea. Having disposed of the entire enemy formation without damage to themselves, our aircraft resumed their patrol. (*See* Plate 7.)

On October 30 **Mosquitos E** and **Y/235, Banff Wing,** were on offensive patrol off the Norwegian coast in formation with two other Mosquitos. While flying south-westwards they sighed a Ju.88 at 800 feet about 3 miles away on the starboard beam. The Mosquitos at once began a climbing turn to starboard towards the enemy aircraft, which began to weave. "E" attacked from the starboard quarter and then from the port quarter at ranges from 400 to 100 yards. The pilot saw his fire hitting the enemy's port engine, fuselage and starboard wing root. He then saw that the port side of the 88 was on fire, and that the aircraft was beginning to lose height and preparing to ditch. "Y" then attacked from dead astern and, closing to 100 yards, scored hits on the fuselage and wings. The Ju.88 was then enveloped in flames and 50 feet above the water it blew up. The position was 60° 55′ N., 04° 35′ E. No survivors were seen. During the combat the enemy's rear gunner fired tracer, but our aircraft suffered neither damage nor casualties. It is gratifying to record that in spite of their pre-occupation with enemy shipping the Mosquito Squadrons have lost none of their skill in air combat.

## Photographic Reconnaisance

The activities of No. 106 Group were severely hampered during October by bad weather, but vigorous efforts during the fine spells have enabled the Group to get through most of its programme.

Bomber Command's attacks still provide many first priority targets for the cameras. The breaches in the dykes, the extent of the flooding, and the damage done by continued bombing of gun positions on Walcheren Island, have been photographed every day weather has permitted (*see* Plate 10). Cover has also been obtained of pinpoint targets such as the *Tirpitz* at Tromsö, the U-Boat pens at Bergen (*see* Plate 3) and the dam at Kembs.

Other photographic reconnaissance has shown the existence and development of new landing strips in Germany, railway activity suggesting the movement of troops and supplies, and concentrations of shipping in Norway and Northern Germany which might indicate plans for withdrawals. No. 106 Group has also covered the enemy's ports and waterways, as well as many other varied and widely separated targets.

*The following reports were written by members of the air crews concerned:*

### 541 Squadron, Spitfire XIX

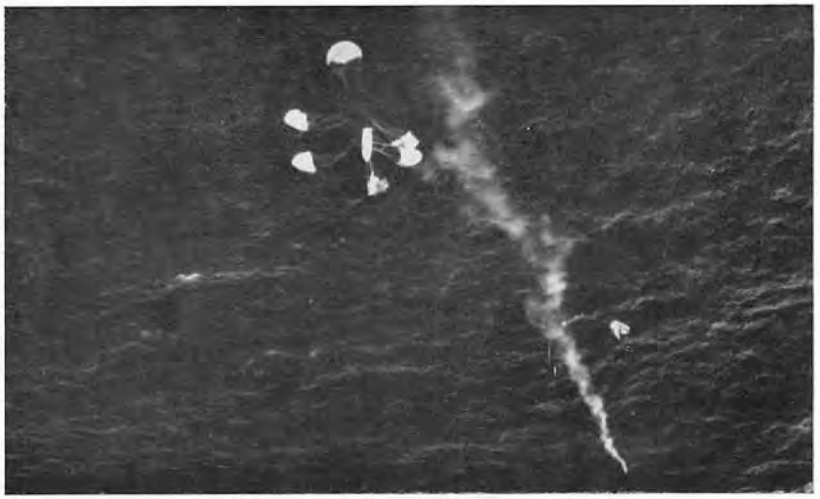
I took off from Benson at 1320 hours on October 6th in a Spitfire XIX to take oblique photographs in the Koblenz area from 6,000 feet. I approached the target from the north-west and finished the first run over Koblenz itself where there was a lot of flak all bursting about 2,000 feet above me. During the second run the flak was a little more accurate and included some light flak of the tracer type. As I turned away and began to climb I sighted two FW. 190's to the west and above me at about 9,000 feet. The leader immediately began to leave a trail as if he was using methonal injection and he closed very quickly to about 800 yards and opened fire. I broke left and proceeded to spiral down on to the deck turning as tightly as possible. The FW. came right up to me in a straight dive and kept firing erratically. When I was as near to the ground as I dared, I pulled up over four trees; my height was then about 150 feet. I looked behind just in time to see the leading 190 dive into the trees and blow up. I flew on as low and as fast as possible over the front line near Aachen but I did not see the second FW. again.

### 540 Squadron, Mosquito

On October 18 we were briefed to search for the battleship *Tirpitz* in the shipping leads and fjords in the Tromsö area. We took off from Dyce at 0745 hours and set course for Scatsca in the Shetland Isles, where we refuelled and took off again at 0935 hours. We set course for Tromsö and climbed to 25,000 feet through 10/10ths low, medium and high cloud. At 1010 hours we levelled out and flew above 10/10ths cirrus. During the first hour we had difficulty in making the 100-gallon drop tanks feed, but we cured the trouble by going down to 24,000 feet. Our first pinpoint was Bodo and there we began our search through 4/10ths medium cloud. We saw several merchantmen and photographed them on our way north. At 1220 hours we switched on the long-range fuel tank in the fuselage, but five or ten minutes later the red warning light showed that this tank was not working and the mains began to go down. We assumed that the fuel immersion pump had failed, and the question was whether there was sufficient fuel to get back to Scatsca. However, our final target was only five minutes further on, so we

On October 26, Mosquitos of 235 and 248 Squadrons attacked a merchant vessel of some 1,500 tons off the Natvigtangen Light east of Kristiansand South. She can be seen straddled by 20-mm. and 6-lb. cannon.

Mosquitos K and M of 235 Squadron sighted three Me.110's off Bergen on October 24. They immediately attacked and shot all three enemy aircraft into the sea. This photograph shows one Me.110 burning on the water.



The photographs on this page, which were all taken by aircraft of No. 280 Squadron, show incidents in Air/Sea Rescue operations between October 7 and 9 (*see* letterpress opposite). The two lower photographs show an airborne lifeboat dropped successfully and boarded by the survivors. The top left-hand picture shows another lifeboat just after release; the pilot parachute can be seen in the corner. The top right-hand photograph shows a lifeboat which landed upside down.

decided to investigate it. We dived to 15,000 feet below medium cloud and sighted the *Tirpitz* in position 260° Tromsö 4 miles. We made one run across the battleship from south-east to north-west at 290 m.p.h. I.A.S., meeting a small amount of accurate heavy flak from the ship and land batteries as well as intense light flak which burst 3,000 feet below the aircraft. We were not hit. After the run we turned to port and took some obliques and then set course for the Shetlands.

We had 400 gallons of petrol available for the return flight which was scheduled to take 3 hours 54 minutes; our estimated petrol consumption was 110 gallons per hour. We were very excited at having found the *Tirpitz*, but morale was rather low owing to the fuel shortage. We tried the long-range fuel tank again several times but it would not work. We flew at 15,000 feet at 1,950 r.p.m. and $-\frac{1}{4}$ lb. boost pressure; the I.A.S. was 250 m.p.h. We released the drop tanks and decided to fly for 2 hours obtaining W/T fixes so that we could test our new rate of petrol consumption. We then prepared a message in code stating "*Tirpitz* located in briefed position. Petrol failure." This was to be sent as a last resort. At the same time we realized that Warwicks with airborne lifeboats were ready at Wick and that we might arrange a rendezvous on track. The idea was for the observer to get the magazine from the starboard vertical front camera and for us to ditch while the Warwick with its airborne lifeboat was standing by. Having made our plans we got a fix at 1320 hours on the long range cathode ray system, but this gave us a position approximately 300 miles west of Ireland. We checked this and it was repeated, so we assumed that it was a rather futile attempt by the enemy to mislead us. We kept on as before. We found our petrol consumption was 100 gallons an hour, which made us feel a little better, and at 1423 hours we got a good bearing from Sumburgh. At 1435 hours a further petrol check gave us a consumption of 90 gallons per hour and at 1459 hours an M/F fix put us 300 miles north of Scatsca. We still had 180 gallons according to the gauges, with 79 minutes flying to reach Scatsca, and we realized that we should make the aerodrome. We landed at 1615 hours and after refuelling we flew back to Dyce, landing at 1800 hours after having been in the air for 8 hours 35 minutes. In all we had covered about 2,300 miles.

## Air/Sea Rescue

In October 75 men were saved by the Air/Sea Rescue Service. During the four days from October 7 to 10 inclusive, Air/Sea Rescue aircraft and surface craft were particularly active, and despite bad weather and the activities of enemy aircraft they succeeded in saving several lives. An account of this phase of the month's operations is given below.

On the morning of October 7, Warwicks A and E/280 with an escort of eight Mustangs sighted two "K" type dinghies with one survivor in each in position 53° 32′ N., 04° 38′ E. A/280 dropped an airborne lifeboat which landed within 100 yards of the dinghies but the survivors were apparently too exhausted to reach it. Then Warwick E/280 dropped a Lindholme dinghy within 25 yards of the survivors which they retrieved and boarded. The aircraft remained circling until P.L.E., when it dropped delayed action flame floats and returned to base. Warwick Z/280, which arrived on the scene next, sighted the flame floats and the dinghy and dropped a second airborne lifeboat. The aircraft then lost contact in the bad visibility.

Meanwhile A/280 had been diverted to three "K" type dinghies and two American rafts which had been sighted in position 54° 00′ N., 06° 34′ E. by Beaufighters of No. 143 Squadron which had dropped sea markers and reported the position to base. The Warwick dropped a Lindholme dinghy to the survivors and remained circling. On receiving this information Warwick L/280 took off from Langham with an airborne lifeboat. This aircraft was subsequently shot down after having dropped the lifeboat to the American survivors.

The following day a further search was made to cover these incidents. Warwicks A and G/280 were intercepted by enemy aircraft and G/280, which was last seen in position 53° 53′ N., 06° 30′ E., is presumed to have been shot down. The American crew sighted in position 54° 00′ N., 06° 34′ E. were not seen again, but are believed to have been rescued by the Germans.

In position 53° 42′ N., 05° 21′ E., F/280 sighted another dinghy with six occupants. An airborne lifeboat was dropped to them but it landed upside down. A/280 then arrived and dropped its lifeboat successfully; the survivors started the engines and were told by Aldis lamp to steer 255°. F/280 had to return to base because of an oil leak and E/280 which was also in this area remained circling but was forced to take cloud cover when three enemy aircraft appeared. After returning to the airborne lifeboat it was again driven off by enemy aircraft and had to return to base.

On October 9 a very extensive search was again made, for it was known that in the area there were two lots of survivors in dinghies as well as two missing Warwicks. Fighter escort was provided and at 0850 hours Warwick O/280 reported that it was over an airborne lifeboat with six occupants. They had sailed or motored about 80 nautical miles during the night. O/280 then homed a rescue launch to the airborne lifeboat. The survivors were found to be from Warwick L/280.

On the next day the original two survivors were also rescued. Two airborne lifeboats and a Lindholme dinghy had been dropped to them on October 7, but though they had boarded the dinghy, they had been too exhausted to retrieve either lifeboat. However, on October 10, a Mustang which had been escorting Hudsons of No. 279 Squadron, sighted the Lindholme dinghy in position 52° 45′ N., 03° 45′ E. H.S.L.s were homed to the position and the survivors were rescued. They proved to be the crew of Beaufighter E/489 which had been reported missing on October 2/3.

# IV. SPECIALIST AND GENERAL ARTICLES

## Coastal Command Operational Films

In the past six months members of No. 1 R.A.F. Film Production Unit have visited several Coastal Command stations. Boston aircraft bearing the crest of a motion picture camera surmounting the motto " We Shoot All," are now a familiar sight to many airfield controllers, and photographic sections have grown accustomed to handling 35-mm. film. The result of this activity has been a number of valuable and interesting films on the operations of the Command.

No. 1 R.A.F. Film Production Unit was formed early in the war. It is based at R.A.F. Station Iver Heath (known in peace-time as Pinewood Studios), which also houses the headquarters of the Army Film and Photographic Unit and the Crown Film Unit. The Operational Section of No. 1 F.P.U. was first started in 1941 with the object of filming attacks by Bomber Command for newsreels. In the last three years the Section has grown until it now covers with fixed cameras and aircrew cameramen the work of both heavy and medium day and night Bomber Squadrons, P.F.F., Fighter Command and the 2nd T.A.F. Other operational units have been formed to film the campaigns in North Africa, Italy and Burma. The results of their efforts may be seen any day of the week in cinemas all over the country, and, what is more important, they have proved of great value in assessing results.

No serious attempt at operational filming with Coastal Command was made before this year. This was chiefly owing to the chronic shortage of both cameras and trained cameramen. Coastal Command crews habitually take off with no knowledge of whether they will find a target and the majority of their attacks are extremely short. Half the attacks on U-Boats are made at night and shipping is usually attacked in the half light of dawn or dusk. Thus a very large number of cameras and cameramen would be needed to make sure of getting any useful results. For instance, during 1943 one cameraman flew for three months with No. 10 Squadron, Mount Batten, without seeing a U-Boat. Such a waste of man-hours and camera-hours discouraged any further attempt until this year when more cameramen and cameras were available.

It seemed probable that in the weeks immediately after the Allied landing on the Continent, both the anti-U-Boat and the anti-shipping squadrons would find more targets than ever before—and all within two comparatively small areas covering the flanks of the invasion convoys. The most promising area appeared to be 19 Group and a Film Unit detachment, consisting of three cameramen and a Boston aircraft, was therefore established at St. Eval. One of these cameramen flew in aircraft of No. 547 Squadron. The Boston, with two cameramen stood by at strike readiness in the hope of covering any U-Boats which might be damaged and forced to remain surfaced in daylight within range of St. Eval, or which might get loose among the convoys sailing round the coasts of Cornwall and Devon. Arrangements had meanwhile been made to instal fixed cameras in a number of Mosquitos and Beaufighters at Portreath and Davidstow Moor to cover shipping targets.

The plan for filming a U-Boat was unsuccessful. The great majority of the attacks in June and July in the 19 Group area were made at night, and of the U-Boats attacked in daylight not one remained surfaced long enough for the Boston to reach the scene. Several abortive sorties were made and morale began to drop. The cameramen flying with No. 547 Squadron had no luck either. It was therefore decided to approach the problem from a different angle. All the aircraft of one Liberator squadron were to be fitted to carry fixed cameras, one forward and one rear-facing. These cameras were to be easily interchangeable between aircraft. If the squadron averaged three sorties per day, it would be supplied with six cameras. This method is the same in principle as that governing the use of the F.24 camera on anti U-Boat squadrons, but it is an extravagant way of using ciné cameras, which are scarce and badly needed elsewhere. However, a film of a depth charge attack on a U-Boat has never yet been made and this seemed the best hope of getting one. Aircraft of No. 547 Squadron were the first to be fitted, but they have since been transferred to No. 59 Squadron at Ballykelly, one of the two daylight anti U-Boat landplane squadrons remaining in the Command. Ciné cameras have not so far been fitted to flying-boats because of the difficulty of designing suitable mountings.

Meanwhile a new use had been found for the Boston. The pilot had had experience of anti-shipping operations in 2 Group earlier in the war, and he volunteered to accompany Coastal Command Beaufighters on their strikes. The crew of the Boston I aircraft consisted of pilot, Wop/Ag and two cameramen. It was armed with only two Vickers G.O. guns, had no self-sealing petrol tanks, practically no navigation equipment, and an extreme endurance of less than four hours. On June 9 an attack on a beached German destroyer was filmed in the face of heavy flak. This attack took place near the Ile de Batz, off the north coast of Brittany. Towards the end of the month the Boston moved to Langham, and on July 6 another attack was filmed, this time on a convoy off the Frisian Islands. In August, after the American break-through at Avranches, the same crew returned to the 19 Group area with a Boston IIIA (with self-sealing tanks and an additional four front guns) to film attacks on enemy ships in the Biscay ports. In September the Boston was back at Langham and joined in two attacks on the anchorage at Den Helder, on September 23 and 25. The attack on the 23rd miscarried and the Beaufighters amused themselves by going for ground defences and other shore targets; the front guns of the Boston helped to blow up a gasometer (*see* Plate 9). Beaufighter pilots described the flak on the 25th as some of the heaviest they had experienced, but the Boston remained on the scene for half an hour after the Beaufighters had left, trying to film the results of the attack without being shot down. After this the pilot found it

*Above.* A still from a film taken from a Boston by a cameraman of the R.A.F. Film Unit during an attack on ground targets round the anchorage of Den Helder on September 23. (*See* letterpress opposite.)

*Below.* A still from a film taken by a fixed cine camera in an aircraft of No. 455 Squadron during an attack on a convoy off Heligoland on August 29. Note the Beaufighter silhouetted against the light of the explosion.

*Top*

WALCHEREN ISLAND—Flooding. Looking from Flushing (in foreground) northward along Flushing–Veere Canal. Middelburg seen in distance.

PLATE 10

*Bottom*

WALCHEREN ISLAND—Flooding.

impossible to re-cross the heavily defended anchorage of the islands to the north, and so he eventually cut south and came away across enemy-occupied Holland. The Boston had been given up for lost when it arrived back at Langham.

In addition to these films taken by the cameramen in the Boston, many excellent strike films have been taken with the fixed cameras mounted in Mosquitos and Beaufighters of Nos. 248, 236 and 455 Squadrons. These are Bell and Rowall " Eyemo " automatic aerial ciné cameras of the same type as those fitted in Coastal Command Liberators, as well as in Typhoons, Tempests and other aircraft. The " Eyemo " is very successful as a fixed aerial ciné camera, for it is extremely light, weighing only about 5 lb., and is virtually immune to vibration, even during the firing of cannon and R.P. It also turns the films at 48 frames per second—twice normal speed. This means that when a moving target is being filmed, each frame contains a much clearer picture than can be taken by the G.45 camera-gun, which runs at normal speed. It also means that when the film is projected at normal speed it appears on the screen in slow motion (half normal speed). Attacks on shipping happen so fast that if they are filmed at normal speed the film appears to the audience to be running much too fast. A slow-motion film not only appears to be running at a lifelike speed, but also shows up the details in these hectic action pictures. The " Eyemo " works off the aircraft's 24-volt system, is turned on by the pilot in Beaufighters or the navigator in Mosquitos, and takes 100 feet of film in thirty seconds, after which it turns itself off automatically. The exposure is set permanently at $f4 \cdot 5$ and the focus at infinity. Very high speed film can be used for dawn or dusk attacks. It has not, however, yet proved practicable to film night attacks on either shipping or U-Boats, since neither Leigh Lights nor flares give enough light for filming. The photoflash used with the F.24 only burns long enough for one or two frames of a moving film to be exposed.

By these methods enough topical material is being obtained to supply regular Coastal Command items to the newsreels, which are seen by twenty million people every week in this country and are also exported for showing in Allied and neutral countries all over the world. Moreover, these films constitute an historial record of many of the Command's activities since D-day, some of which will be included in the films being made to illustrate the campaigns of 1944. These are the principal purposes for which operational films are made. But they also possess considerable tactical interest to the squadrons concerned and on occasion they have provided the only proof that ships have been hit. Selected films have also been found useful for showing at O.T.U.s.

Some of Coastal Command's anti-shipping films have been among the most spectacular operational films ever made and they have been received enthusiastically by cinema audiences. The film record of an attack on a U-Boat, if one is secured, may be less spectacular, but should prove of even greater value tactically, as well as being one of the greatest " scoops " in the history of film-making.

## G.R. Operations in the Indian Ocean

The most impressive things about G.R. operations in the Indian Ocean over the past two years are the tremendous range and variety of tasks, and the almost classical development of operations from the shadowing of battle fleets to the hunting of U-Boats; in effect, from the classic G.R. syllabus of pre-war days to the modern Coastal Command technique.

In the early days, that is at the beginning of 1942, there were no U-Boats to hunt, but some very tough assignments were handed out to the pilots as a result of the fall of Singapore. For instance, one flying boat raced the Japanese to destroy fuel and other stores left on the Nicobar Islands, others searched for and found a Japanese Carrier Task Force, while another shadowed a battleship for nine hours. Even to-day pale and shaking veterans are to be found recounting in messes how they shadowed a Japanese aircraft carrier for 13½ seconds! Then there were anti-invasion patrols off the Andaman Islands which often led to encounters with enemy aircraft. Lastly there were the many reconnaissances which had to be flown in an attempt to find new bases for detachments. Crews would often have to anchor in some remote bay in Arabia or Africa and spend the night in sleeping bags on the mainplane. In the Indian Ocean captains of aircraft have to know everything there is to know about their aircraft, and about the uncomprehending natives who will surround it to indulge their curiosity on the slightest provocation. They must also know how to do repairs at remote island bases and how to fill up with thousands of gallons of fuel from four-gallon tins with the aid of a tired aircrew and a rope ladder.

The Japanese removed their Battle Fleet to the Pacific last year, and Axis submarines made their appearance instead. The present anti U-Boat war in the Indian Ocean is somewhat different from the operations in the Atlantic and Bay of Biscay, and as reinforcement G.R. aircrews are likely to be sent out East, it may be of interest to describe the conditions they will meet when they arrive.

Two things they will find most noticeable at first are the lack of U-Boats on the scale to which they have been accustomed in the Atlantic, and above all, the surfeit of square miles in which to look for them.

The Indian Ocean is quite large as oceans go; in fact it is 2½ times the size of the North Atlantic. It is studded with coral isles, sharks, and photogenic native sailing craft. The weather is simple, you can either see 40 miles or you can't see your wing tips. Into this modest area emerge at regular intervals small wavelets of about five U-Boats which immediately split up unsociably into individual units, and proceed to patrol the focal points of our shipping. And these focal points may be a very long way apart. One U-Boat may go to the mouth of the Red Sea, another to the Mozambique Channel 1,300 miles to the southward, and a third, most probably, will choose a patrol point south of the Maldive Islands, some 1,500 miles to the east-south-east.

These immense distances, coupled with the lack of sufficient land bases in the centre of the area, create gaps far greater than any which once existed in mid-Atlantic. The majority of these U-Boats are German U-Kreuzers and 740-tonners, some carrying out a patrol on their way from Europe to their Far Eastern base at Penang, and others coming out into the area from Penang on a routine sortie. There are also frequent sorties made by Japanese submarines into the area, but normally there are not more than two out any one time. Japanese submarines have unpleasant habits, as will be seen later.

The German and Japanese submarines vary considerably in their tactics and methods of operation. The Japanese use their submarines, which are large 2,000-ton " I " class boats, partly to harass shipping communications between Fremantle and Colombo and elsewhere, and partly to land not very cunning Indian agents on remote points on the coast of India. Before or after these excursions, the Japanese submarines usually cruise around looking for nice juicy independents to torpedo. They have only once attacked a convoy, and then the attacking submarine was depth-charged, rammed and sunk. They rarely ever use their W/T, which is a nuisance.

The German U-Boats are more venturesome than the Japanese, and sink or chase any independent that comes their way, but they are wary of convoys, and they are more cautious than in the Atlantic. Perhaps they are frightened of sharks.

We have now a picture of a large ocean area, which incidentally is bounded by South Africa, Somaliland, Arabia, Persia, Baluchistan, India, Ceylon, Sumatra and Western Australia, with perhaps two Japanese and five German U-Boats somewhere in it. What is to be done? First of all, provide yourselves with a " Brains Trust " and get it on speaking terms with the Navy so that you can borrow their intelligence information, and find out where they are going to send the ships. Then set up a Headquarters as near as possible to the centre of the area, and not more than two blocks from the Navy so that they can find out where you are going to send the aircraft. Next you ask for as many mobile flying boat squadrons, and not-so-mobile landplane squadrons, as can be spared, and arrange for them to be disposed around the area as close as possible to the U-Boats' favourite hunting grounds. You then arrange with the R.A.F. authorities in South Africa, East Africa, India and Ceylon, to place their squadrons under your central " Brains Trust " for Training, Tactics and General Operational Control and Planning. Everything is now set, except for the question of finding the U-Boats. Next, the ships have to be routed through lanes which avoid areas outside the range of shore-based aircraft you will be able to protect them with aircraft patrols. Finally, you must provide air escort for convoys, and retain a reserve of aircraft for offensive action and to hunt-to-exhaustion any U-Boat found.

All the above was, of course, done some considerable time ago, and was brought about by the united efforts of Air Ministry, Headquarters A.C.S.E.A., and Headquarters, No. 222 Group, with the excellent and effective co-operation of the South African Air Force authorities, A.H.Q. East Africa, H.Q. B. F. Aden, and H.Q., No. 225 Group in India. H.Q., A.C.S.E.A. has delegated the part of " Brains Trust," with certain reservations, to H.Q., No. 222 Group, and the latter H.Q. is situated alongside the C.-in-C., Eastern Fleet in Colombo. A separate section of H.Q. No. 222 Group, known as IOGROPS, specializes in Indian Ocean G.R. problems as they affect the whole area, as opposed to Ceylon only, and maintains close liaison with the staff of the C.-in-C., Eastern Fleet.

So much for the general organization. But how does it cope with the seven U-Boats we left " Somewhere in the Indian Ocean? " There is more to the problem than simply waiting for a D/F fix on a U-Boat, and then despatching the nearest aircraft to sink it. For one thing visibility in the Indian Ocean is normally so good that a U-Boat will see an aircraft before the aircraft sees the U-Boat.

Then we have the problem of night attacks. This is really a problem of disposing our few Leigh Light aircraft so that they will be the right side of the Indian Ocean when a U-Boat makes her appearance. It is obviously no good putting one Leigh Light aircraft in each place, because when a U-Boat pops up at night in the Mozambique Channel it is almost certain that this will happen when the local Leigh Light aircraft is having a " major." It is hoped to overcome this problem by specializing in flare attacks, as all aircraft will be able to make these without having to be specially modified.

Finally, we have the problem of communications. The use of M/F is unsatisfactory because of the prevalence of thunderstorms which, as everyone knows, invariably transmit on M/F. Also H/F is subject to even more skips and fading than is normal. This, of course, affects co-operation between aircraft, H.M. Ships and A.C.H.Q.

Communications over ocean spaces have to go through congested W/T channels and whenever fade-outs permit. Communications within Group areas in India and Ceylon, by telephone and teleprinter, are often at the mercy of wild life. Over distances of hundreds of miles, telephone and teleprinter cables are looped from tree to tree through the jungle. When conditions are at their best, speech is not easy; when they are at their worst it becomes impossible. Monkeys swing on cables, elephants tear them down, and enterprising villagers cut long stretches out of them for tethering goats. During the south-west and north-east monsoons a fairly severe storm is likely to put Group Headquarters in Colombo out of teleprinter and telephone communication with out-stations for the best part of a day. Gradually, however, the cables are being laid underground and the problem is being overcome.

Then we must consider the island bases, where lengthy detachments are often necessary. They are little demi-paradises of still, clear, blue water with graceful palm trees leaning out over white coral sand. Sleeping in the sun, with a coconut or piece of fish within reach when you are hungry. Scarlet birds, rats that gnaw your bed at night,

wonderfully coloured butterflies, huge land crabs that steal your shoes, ants in your food as well as your pants, and coal black natives who speak perfect French. Generally life in the islands is very conducive to a pleasant " Mañana " feeling. Unfortunately there is almost always hard work to be done too. And then, of course, the islands must be found in the first place, which is a matter well worth taking up with your navigator. The remoteness of these bases may be very pleasant to the inhabitants, but the general lack of facilities, and necessity for bringing in all supplies and equipment from outside, makes them operationally rather inconvenient.

Thus it will be seen that there are very real difficulties in the way of prosecuting successful U-Boat warfare in the Indian Ocean and by no means the least of these is the question of U-Boat and aircraft density. Enormous numbers of aircraft would be necessary to achieve saturation such as has been achieved in the Bay of Biscay and elsewhere.

In spite of all this, however, satisfactory results have been and are being achieved. It is no exaggeration to say that travelling by ship in the Indian Ocean is at present as safe as it is in the Atlantic.

# The Development of U-Boat Construction, 1940-44

The development and characteristics of German U-Boats have been very carefully watched all through the war, and from photographs taken between 1940 and the autumn of 1944 it is possible to survey the history of U-Boat construction. Many of the facts in this survey have already been published in the *Coastal Command Review*, but it will be useful to tell the whole story in one place.

## The U-Boat Building Programme

At the outbreak of war Germany was still developing her underwater fleet. When the shipyards were first photographed they were building 250-ton, 500-ton, 740-ton and 1,600-ton (minelayer) U-Boats. Towards the end of 1940 the last of the 250-tonners were fitted out and the first of the new 1,200-tonners was laid down. In the meantime the total number of boats under construction had been more than trebled : three-fifths of this total were 500-tonners. Early in 1941 the first of the 1,600-ton broad-beamed supply U-Boats was laid down. This class and the 1,200-tonners obviously foreshadowed operations in distant waters.

During 1941 U-Boat construction continued to increase, but in the autumn there was a decline. This was made good early in 1942 and by the end of that year about 245 boats were noted under construction. The increase was almost entirely in the 500-ton class and by December, 1942, these U-Boats accounted for three-quarters of the total number being built.

At the end of 1942 Admiral Doenitz became the Commander-in-Chief of the German Navy and during the first quarter of 1943 the construction of U-Boats was considerably stepped up. Ten more 500-tonners were seen on the slips, but this increase was partly offset by the fact that the broad-beamed U-Boat programme was almost completed. The total number of U-Boats under construction at this time exceeded 250 and the effort was maintained at that figure until September, 1943. Meanwhile in July a new series of 1,600-ton broad-beamed cargo U-Boats was begun, but none of these had been launched by the autumn of 1944.

During the last six months of 1943 photographic cover of the U-Boat yards was scanty, but it was seen that building activity was decreasing. In March, 1944, it was again possible to assess the position : in that month about 140 boats were under construction, 105 of which were 500-tonners, whereas on September 1, 1943, some 250 boats had been seen in various stages of completion, 195 of them being 500-tonners. The only class to show an increase was the 1,600-ton cargo-carrying class. This striking decline indicated that some major change of policy must have been made.

Between March and August, 1944, it became clear what the change of policy was, for two new classes of U-Boat were discovered. These are the 250 feet (Type XXI) and the 110 feet (Type XXIII) prefabricated U-Boats. These boats are quite different from any of their predecessors not only in lines and design, but also, as their title shows, in method of construction. During February and March, 1944, the first of these new boats were assembled, but it was not until June and July that they began to be assembled in numbers. Then for the first time in nine months the number of boats under construction increased.

The U-Boats of the old classes had taken between ten and twelve months to complete, so that the average yearly output has been roughly equal to the number of boats under construction at the beginning of the year. At the peak period, the summer of 1943, about five U-Boats were being completed each week, three-quarters of them being 500-tonners. According to photographic evidence over 240 U-Boats were completed during the year from September, 1942, to August, 1943. Naturally with 250 U-Boats still building in September, 1943, the output remained high until June, 1944, when it dropped suddenly. It will probably continue to drop but will rise again when the new programme gets under way. By the end of this year the output is likely once more to reach four boats a week. This quick recovery is due to the fact that the new prefabricated U-Boats take between six and ten weeks to assemble on the slips, whereas the old classes took some seven to ten months to build.

## Conning Tower Design

From the beginning of the war until early in 1943, the distinctive German design of the conning tower showed little change. It consisted

of the conning tower proper with a step or bandstand, which was a railed platform extending aft. A light A.A. gun was usually mounted on this platform. Early in 1943 the increasing effect of air attack forced the Germans to fit a much bigger anti-aircraft armament. This involved major changes to the conning tower. Moreover, some place had also to be found for the new detector devices which the enemy was beginning to use.

The changing of the conning tower was first seen in March, 1943, when vertical photographs of Stettin revealed a 740-ton U-Boat with the new type of conning tower. This had two successive bandstands instead of the original one, and it has now become the standard design. The conning towers of the 1,200-ton U-Boats show a slight variation in that the lower step is further aft than on the other classes, but it is solidly connected to the conning tower structure and is not a separate unit. One 1,600-tonner had an after step which was separate from the conning tower but connected to it by a raised catwalk.

Minor modifications have since been made to the standard two step design, the most obvious being the widening of the upper step so that two light A.A. guns could be mounted abreast. The height of the platform of this step has also been raised to allow the guns mounted on it to fire forwards over the top of the conning tower proper.

The new prefabricated classes have an entirely different conning tower. The 250-feet boats have a streamlined conning tower with tapering projections forward and aft of the central "core," and there are no bandstands. The conning towers of the 110-footers are more like the orthodox German design and resemble those of the old 250-ton class. However, there is again no bandstand and the after part of the conning tower slopes away at the point where the bandstand should be ; there is then a break in the line of the structure which gives way to a "tail" which runs well aft.

The complete change in the conning tower design of the prefabricated U-Boats indicates that the modifications to the earlier design failed to solve the problems which have confronted the U-Boats on their operational patrols. It should be added that none of the new boats has yet become operational.

### Conning Tower Fittings

The arrangements inside the conning tower are generally similar in all types, except that there is one important difference between the 500-tonners and the bigger types ; this is in the position of the periscope standards. In the 500-tonners one periscope is led through the forward part of the conning tower (where a round hole on the top of the front of the structure clearly shows where the periscope emerges) and the second is in the after part. In the bigger boats both periscopes are grouped together in the after part of the conning tower.

The conning tower is armoured but the plating is not usually visible, although an armoured door has been seen which runs across the middle of the conning tower to protect the men on the bridge. Visible fittings may include a box-like widening of the starboard side of the conning tower which is believed to provide stowage for the hydrogen bottles which are used to inflate the Radar decoy balloons. On one 1,200-ton U-Boat two cylindrical drums and a framework structure were seen abaft the guns on the upper step, which had been specially enlarged : these fittings were evidently connected with the helicopter kite which is used by long-distance U-Boats for observation. These kites are intended for use in unfrequented waters where shipping is not escorted but scattered and consequently difficult to find.

Another prominent fitting is the schnorkel which is mounted forward of the conning tower. This device is fully described in the *Coastal Command Review*, Vol. III, No. 5 (May, 1944). When not in use it is housed in a long slot cut in the deck. When being used, it is raised upright, being hinged at the conning tower end of the slot; and is held in position by a clip on the front of the conning tower. It extends about 27 feet above the deck, which corresponds to periscope depth, and may have some kind of aerial on the top.

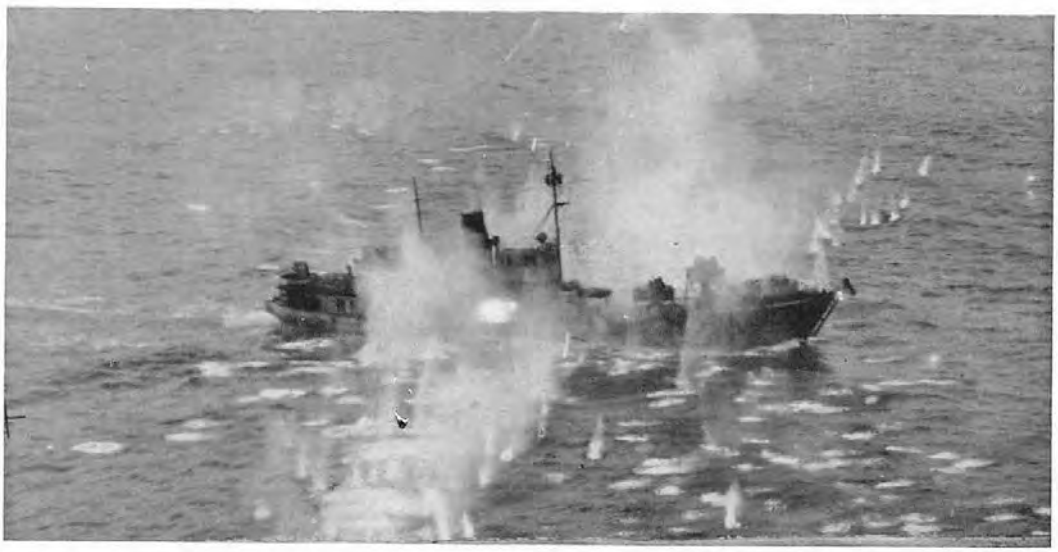
### Guns

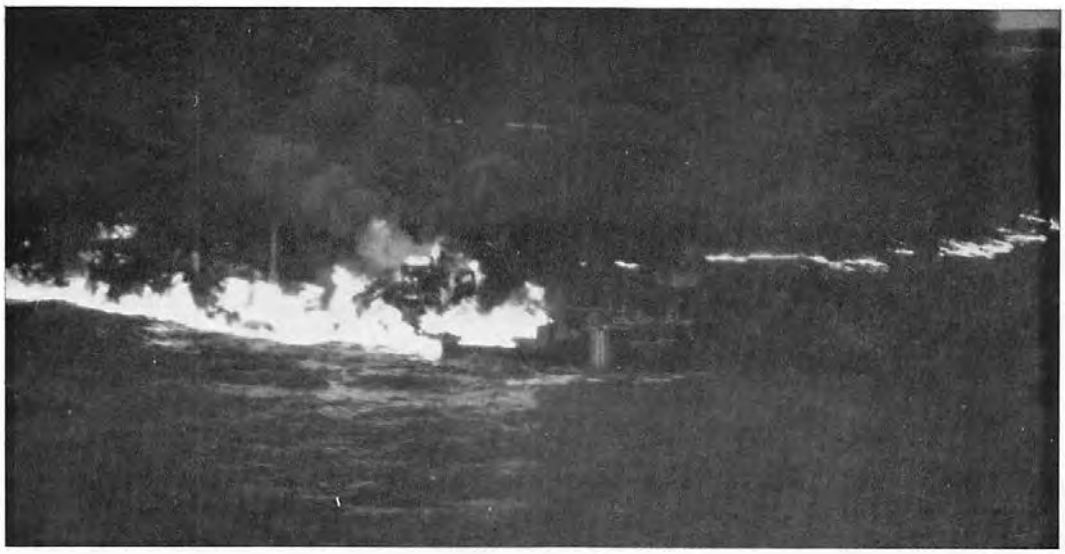
Until the spring of 1943 all sea-going and ocean-going U-Boats carried a more or less standard armament. The 500-tonners mounted one 88-mm. (3·5-inch) gun on the deck forward of the conning tower and one 20-mm. (·78-inch) gun on the single bandstand. U-Boats of 740 tons and above carried a 105-mm. (4·1-inch) gun forward, a 20-mm. gun on the bandstand and a 37-mm. (1·46-inch) gun on the deck abaft the conning tower. Changes in this armament were first seen in March, 1943, when the two step conning tower was introduced with a single 20-mm. gun on each step. Towards the end of April the first U-Boat with this armament was photographed at sea. Almost immediately the 37-mm. mounting on the deck was discarded and two 20-mm. guns were mounted on each bandstand. By that time the U-Boats had adopted the policy of remaining on the surface and shooting it out with the aircraft, and consequently the A.A. armament had to be increased again. By August, 1943, 500-tonners were operating with quadruple 20-mm. mountings on the lower step and double 20-mm. mountings on the upper step. During the summer the 500-tonners discarded their forward guns, though the bigger boats still carried theirs. By the late summer of 1943 the standard armament of 500-ton boats was therefore six 20-mm. guns. Apart from their forward guns the bigger boats were similarly armed, though some of the 1,600-tonners were seen with variations. One 1,600-ton minelayer and supply U-Boat mounted three twin 12·8-mm. guns, two on the upper step and one on the lower, and a 1,600-ton broad-beamed supply boat carried a 37-mm. gun forward, a single 20-mm. on the bandstand and another single 37-mm. gun on a raised platform aft of the conning tower and connected to it by a catwalk.

By the autumn the two single 20-mm. mountings on the upper bandstand had been adapted to carry two twin 20-mm. guns, and later in the year the quadruple mounting on the lower step was being replaced by a new 37-mm. gun. The new gun, which is described in the *Coastal Command Review*, Vol. III, No. 4 (April, 1944), is fully automatic and apparently specially designed for

The photographs on this plate and on Plate 12 show incidents in an attack by Beaufighters of 144 and 404 Squadrons and Mosquitos of 235 and 248 Squadrons. During this attack, which took place on October 15 off Kristiansand South, the tanker *Inger Johann*, 1,200 tons, and her escort were sunk. The enemy has been using a number of small tankers to remove surplus petrol and aviation spirit from dumps along the Norwegian coast to Germany, where it has recently assumed an enhanced value owing to our attacks on oil supplies.

PLATE 12





The top photograph shows the *Inger Johann's* escort under a hail of fire. In the middle picture the tanker herself can be seen burning out, and the bottom picture taken three days later by 235 Squadron shows the wrecked tanker still smouldering.

U-Boats. It has a large shield to protect the crew. This is now the standard anti-aircraft armament for U-Boats, and while the bigger boats still have a 105-mm. gun forward, the 500-tonners have discarded them entirely : even some of the 740-tonners have been seen without them. Most U-Boats also carry one or two light machine guns which can be mounted on the wings of the conning tower, but they are not often seen.

**Radar Fittings**

Radar was first fitted during the spring and early summer of 1943, when various forms of apparatus were seen on the forward part of the conning tower. These did not remain for long, probably because they could only be trained directly forward, and later in the summer a retractable Radar mat was being mounted. This apparatus is rotatable and is housed in a box-like structure on the port side of the conning tower.

Parts of the German Search Receiver (G.S.R.) are also visible, the most usual resembling a drum on top of a stick. This is most often seen on the port side of the conning tower just forward of the Radar mat housing It can be mounted elsewhere and various other designs exist, one of which may be in the form of a cross about one foot wide. The after periscope standard is another favourite place for mounting these aerials and more than one type may be carried. In addition a D/F loop is probably carried but it is rarely seen extended. It is housed on the starboard side of the conning tower and can be located by the slit in the top through which it is extended; the slit is rectangular with a round bulge in the middle.

Other information about U-Boat Radar and counter-Radar equipment, including details of performance, etc., will be found in the *Coastal Command Review*, Vol. III, Nos. 3 and 9 (March and September, 1944).

## Operational Training In Coastal Command

At the beginning of the war there was no operational training at all in Coastal Command. Pilots went from their Flying Training Schools in Training Command to the G.R. School at Thorney Island and thence either to their squadrons or else to the Seaplane Training Flight or the Torpedo Training School, if they were destined for boat squadrons or torpedo squadrons. They had to learn to fly their squadrons' aircraft and to be trained in operational procedure in the training flights of the squadrons. But as soon as war broke out squadrons were called upon to put out their maximum effort on operations, and they had no time to train. Bomber Command did not operate to the same extent for the first eight months of the war, and they were able to withdraw many of their squadrons and use them as training units. But in Coastal Command it was impossible to withdraw a single squadron from the line for the first 18 months of the war.

Behind this operational line there was a gap, and it took three or four years to fill that gap. The first step was taken in November, 1939, when the Coastal Command Landplane pilots pool was formed at Silloth. There pilots from Flying Training Schools learnt to fly operational aircraft. After training they were held in a pool to replace casualties in the squadrons. At the same time advanced training was given to air gunners and wireless operators. By present-day standards the unit was very small, its establishment being ten Ansons, six Hudsons, four Beauforts, and five Bothas; the Bothas were later replaced by Blenheims. Naturally, so small a pool could hardly affect the policy of doing most of the operational training in the squadrons, but the forming of this unit at Silloth was the first step along the road to providing squadrons with crews who were fully trained for operations. This fact was emphasised at the beginning of 1940, when the pool at Silloth was re-named the "Coastal Command Operational Training Unit."

The formation responsible for the Command's training units was No. 17 Group, which was then at Gosport. During the first six months of the war the number of units under the Group's control barely increased at all, but already they were becoming scattered. Whereas the three original units at Thorney Island, Gosport and Calshot had been close together, within six months the Torpedo Training Unit had moved to Abbotsinch, the Landplane Pilots Pool had formed at Silloth, both in the north, and the School of General Reconnaissance had moved to Guernsey for a stay which was destined to be short. No. 17 Group was thus preparing for the time when it would control an abundance of training units scattered all over the United Kingdom.

In 1940 there was a considerable expansion. The original School of General Reconnaissance went to South Africa, a second was formed and sent to Canada, and a third remained at Squires Gate. The Seaplane Training Flight became the Flying Boat Training Flight and moved from Calshot to Stranraer. There it became a Training Squadron and an embryo O.T.U. The Silloth O.T.U. found itself unable to cope with the demand for crews and a second O.T.U. was formed to train Blenheim crews. At the end of the year both a Beaufort and a Whitley/Wellington O.T.U. were also in the process of formation and Coastal Command possessed the beginnings of five O.T.U.s, besides the School of General Reconnaissance and the Torpedo Training Unit.

During the whole of 1941, every squadron in the Command was below strength. The reason was that the O.T.U.s were established to provide only 1·1 replacement crews per squadron per month. Flying-boat squadrons were to receive one crew every two months. These new crews were to replace casualties and crews posted away, but no provision had been made for forming new squadrons either at home or overseas. In particular, the increase of the G.R. force in the Middle East made frequent demands on the resources of Coastal Command. This inevitably resulted, in some cases, in squadrons being withdrawn from operations.

Obviously, the O.T.U.s would have to produce more pilots. But the shortage of aircraft made it impossible for them to do more flying. The problem was solved by economising in pilots. In 1939 and 1940, it had been accepted that all G.R.

aircraft should carry two pilots, but that meant that the O.T.U.s had to produce two pilots for every one crew. If one pilot and one observer were sufficient, the O.T.U.s could train twice as many crews as before. It was, therefore, decided that all medium-range G.R. aircraft should carry one pilot, who would do 72 hours' flying at his O.T.U. The Beaufort squadrons were the first to be affected, and they were quickly followed by the Hudsons. This decision was finally taken in July, 1941, and at the same time the Air Ministry agreed a considerable increase in the rate of replacement to squadrons.

The long-range G.R. squadrons did not then adopt the new policy. No. 4 (Flying-boat) O.T.U. continued to train both pilots of the crew to fly boats, and the Whitley and Wellington O.T.U. did the same. It was the common practice to break up these crews when they reached their squadrons, and for both pilots to become second pilots in other crews. Thus the R.A.F. had a large hidden reserve of flying-boat pilots, which was most useful when the outbreak of war in the Far East caused a great increase in the number of flying-boats needed.

Early in 1942, the expansion of the flying-boat force overseas, together with the shortage of both aircraft and accommodation at the Flying-boat and the Whitley/Wellington O.T.U.s forced upon the Command a most drastic change of policy. It was called temporary, but it has persisted to this day. In February, 1942, it was decided that second pilots in long-range G.R. aircraft and flying-boats should no longer be qualified on the aircraft in which their squadrons were operating. This policy was the logical development of the earlier economy in pilots which had caused second pilots in Hudsons to be replaced by navigators. Even that had caused opposition and complaint, but the new change was the most unpalatable of all the changes that have been made during the first five years of war. In fact, Squadron Commanders no longer felt that they could operate in safety. But the step was justified. Pilots who had been second pilots of flying-boats, but who had been trained to fly the aircraft, became available for the big flying-boat expansion programme. During 1942, the expansion was carried through with these ex-second pilots forming the backbone of the new crews.

The same reserve was available to the long-range G.R. squadrons, who were thus able to expand to their full established number of crews.

During the year several new O.T.U.s were formed, ferrying and photographic reconnaissance training were reorganized, or organized for the first time, and existing O.T.U.s had to give courses on new aircraft, if possible without interrupting the flow of trained crews. On top of all this, training was seriously handicapped by shortage of ground crews and aircraft.

The Command's concern with ferry training grew out of the increase in the number of crews required for overseas. In 1941, the regular overseas commitment was some 16 crews a month, but by the end of 1942 the figure was 120 crews a month. Most of these crews had to fly reinforcement aircraft overseas, and consequently they needed ferry training. In 1941, this was given partly in No. 44 Group, which was a Ferry Command Group, and partly in units of Bomber Command. This system prevailed during most of 1942, but it had many disadvantages, most of which were caused by having to move crews from training in one Command to training in another. It was, therefore, decided to form Ferry Training Units in Coastal Command. By the end of the year two such units, one for flying-boats and one for Wellingtons, had been formed.

The need for more Wellington and Beaufighter crews, and the change from Blenheims to Beaufighters caused three more landplane O.T.U.s to be formed in 1942, excluding No. 8, which was formed to reorganize the rather haphazard P.R. training. Another flying-boat O.T.U. also came into being.

The target figures in 1942, although not entirely achieved, give some idea of the expansion of the Command's training organization in the first years of the war. In December, 1940, the Command undertook to train 50 crews a month; in December, 1941, the figure was 133 crews a month, and at the end of 1942 it had risen to 261. At that time the Command had 11 O.T.U.s, two Ferry Training Units, two Blind Approach courses, and a School of General Reconnaissance.

The year 1943 was notable for three reasons. It was the year in which the torpedo policy of the R.A.F. demanded first a big and sudden expansion and then an equally sudden and big contraction. It was a year in which shortages of operational aircraft at home and unannounced re-equipment overseas caused large surpluses of trained crews, and, most important of all, it was the year in which Planned Flying and Planned Maintenance was first tried.

The decision to expand the torpedo force naturally called for more training, and as a result facilities were provided for 3,000 practice drops a year. The expansion was carried through quickly and successfully, but just as the O.T.U.s were reaching their target figures, information came from overseas that only four Beaufort crews were required each month. At about the same time the number of Wellington crews required was greatly reduced when torpedo training in the Middle East was expanded. As a result, Coastal Command were left with a large number of crews who were fully trained, but for whom there was no employment either at home or overseas. They therefore had to be re-trained for other work. The Wellington crews were eventually absorbed in the new Warwick A.S.R. squadrons.

The summer of 1943 produced a third surplus, this time of Catalina crews. This was caused by a breakdown in the supply of Catalinas from the United States, and for five months the Command had a surplus of Catalina crews as big as that of Wellington and Beaufort crews. However, these crews were absorbed by the end of the year.

Despite these most embarrassing surpluses in some crews, other O.T.U.s suffered from equally embarrassing arrears. The changes in the war situation, particularly in the Mediterranean, caused wide fluctuations in the demand for crews overseas. In spite of the length of the O.T.U. and F.T.U. courses, the Air Ministry often found it necessary to make sudden demands at short notice for crews to be sent abroad. These demands

coupled with shortages of training aircraft and men, made it impossible for the O.T.U.s to meet their commitments (though when they did meet them the crews were sometimes not needed). The causes, lack of aircraft and men, could not be removed by the Command. They were frequently and forcibly represented to the Air Ministry, and by the early summer much had been done to put the various training units on a sound footing. By July, 1943, the overseas landplane targets were being reached and the F.T.U.s were running efficiently.

The greater efficiency in training in 1943 was undoubtedly due in part to Planned Flying and Planned Maintenance. This scheme, which is now well known in the Command, was put into operation during the year with the result that in spite of all difficulties the output and training of crews was much more according to plan than it had been in any previous year.

The efficiency of training in 1943 is reflected in the comparative ease with which the four-engined squadrons were established. Liberators, Halifaxes and Fortresses, were all provided for without upsetting the training organization. Similarly, the training of 48 crews for the new Halifax Met. Squadrons was achieved by using one Squadron (No. 518) as an O.T.U. In 1943, the Command also undertook to train 60 Warwick crews for Air/Sea Rescue, and in spite of difficulties, this was successfully done.

1943 was the peak year for training in Coastal Command, and in the summer, No. 17 Group was probably one of the largest Groups in the whole of the Royal Air Force. At one time it had 1,007 aircraft on its charge and during the year it posted away 2,348 trained crews, totalling about 9,000 men. The highest monthly output was reached in August, when 238 crews were produced. There was a small reduction when some of the F.T.U.s were transferred to Transport Command, and when certain types of training ceased, but at the end of the year the Command still controlled 10 O.T.U.s, two F.T.U.s, a Halifax Met. training squadron, a School of General Reconnaissance a Torpedo Training Unit, an Air/Sea Rescue Training Unit, a Heavy Conversion Unit and two Blind Approach flights.

The beginning of 1944 brought an apparent reversal of policy. Much intensive training had to be done in the squadrons in the same way as had been done in 1939. This was due to the importance of having every squadron at the highest possible pitch of efficiency for the Invasion. All squadrons equipped with Leigh Lights and similar nocturnal devices spent about 10 weeks in intensive training, in order to ensure accurate night homing. In this work each Liberator crew did about 50 hours' training. Although this was a heavy commitment which had to be undertaken without too much interruption of normal operational flying, the results abundantly justified what was in effect a radical and retrograde change of policy.

In June, 1944, the number of O.T.U.s in the Command had fallen to seven, one of which was combined with the Torpedo Training Unit. The other training units hardly changed from those which existed at the end of 1943. The number of units was smaller, but the number of different kinds of work for which crews had to be trained was larger. In 1943, No. 17 Group trained 26 different kinds of crews, each crew requiring a separate syllabus of training. By July, 1944, the number had risen to 38.

In 1943 and 1944, the proper balance of training and operational flying was being achieved in Coastal Command. Crews were being posted to squadrons so highly trained that only a short time in the squadron was enough to make them fully operational. This short period in the squadron was necessary, firstly to enable the new crews to become familiar with local conditions, and secondly to teach them to use new equipment, which nearly always reaches a squadron before O.T.U.s.

There is no doubt that the policy of removing as much training as possible from the operational squadrons is the right one. In Coastal Command, the difficulty was that not only were the squadrons operating at full intensity from the beginning of the war, but that there was no training organization behind them to carry on the work which they were unable to do. In March, 1940, the Command flew a total of 14,000 hours, of which only 3,000 were devoted to training. In the same month Bomber Command operated for 3,000 hours and trained for 9,000. Although Bomber Command's total of flying hours soon passed Coastal's, it was not until 1941 that Bomber Command did more operational flying than Coastal, and not until 1943 that the difference was substantial. In 1944, out of 40,000 hours flying, Coastal Command was able to devote half to training, but even this proportion fell far short of the Bomber Command figure, which was one-third operating and two-thirds training. Nevertheless, Coastal's proportion was becoming satisfactory, and if, as is probably true, the squadrons of Coastal Command in 1944 were more efficient than at any other time in the war, this was undoubtedly due to the greater emphasis on operational training.

The work involved in producing this satisfactory result is perhaps not generally realized. In the past two and a quarter years, aircraft of No. 17 Group have flown a distance equivalent to four times round the world every day. This does not include the distance flown by aircraft of No. 8 O.T.U., which is now administered by No. 106 (P.R.) Group. The average output of trained men from No. 17 Group has been 46 a day, and at one time the Group's strength was 27,411 men and women. Although the Group has grown smaller recently, its work has become decidedly more complex, for whereas a year ago one airfield catered for one type of training, most are now doing three or more. In spite of this enormous amount of flying, the accident rate has fallen steadily from 3·3 per 1,000 hours in 1942 to 3·0 in 1943; so far, in 1944, it stands at 2·5.

One of the great difficulties in training is to maintain the standard; both instructors and pupils at individual stations may easily become bored or unskilful and so fall below the standard maintained in the Group as a whole. This is counteracted by circulating agreed instructions both for training and administration, and by ensuring that every training exericise shall simulate the standard operational procedure. Thus briefing and interrogation are made to conform with the practice of operational groups and this standard

is in force throughout the Group. For instructors two schools are run which develop flying, technical and even lecturing ability.

An added stimulus to training is given by the fact that there is provision in the organization for O.T.U. crews to take part in operations when the need arises. In June, 1942, 17 Group took part in the first of the "thousand bomber" raids, and since then the Group has participated in operations, through one unit or another, practically continuously. Anti U-Boat patrols (at least two of which were highly successful) Met. flights and Air/Sea Rescue sorties are among the operational work performed by the O.T.U.s.

The task of 17 Group has been and will continue to be unique. It has surmounted the difficulties of a vast and rapid expansion and it has coped with many fluctuations in requirements. Not only are its units scattered all over the British Isles, but they have frequently had to move from one station to another. It trains crews for almost every kind of operational flying and its syllabuses constantly have to be changed or brought up to date. Despite all these difficulties, crews trained by 17 Group have operated with ever growing success in every part of the world; this must be the justification of Coastal Command training.

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