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COASTAL COMMAND REVIEW

Vol. III, No. 2—February 1944

CONTENTS

| | Page |
|--|-------------|
| Summary of the Month's Work—February | 1 |
| A Speech by the Parliamentary Secretary to the Ministry of Economic Warfare .. | 2 |
| I.—ANTI U-BOAT | |
| Scores from August, 1943–January, 1944 | 3 |
| Notes on Table | 3 |
| Summary of Anti U-Boat Operations, February | 4 |
| Assessments: Analysis of U-Boats sighted during February | 5 |
| Squadron Results, February | 5 |
| Recent Attacks on U-Boats | 6 |
| II.—ANTI-SHIPPING | |
| Hidden Profits | 12 |
| Shipping Strikes in February | 12 |
| III.—OTHER OPERATIONAL FLYING | |
| Combats with Enemy Aircraft | 14 |
| Photographic Reconnaissance | 15 |
| Air/Sea Rescue | 17 |
| IV.—SPECIALIST AND GENERAL ARTICLES | |
| Quislings in an Invasion Exercise | 19 |
| H.M. Submarine <i>Stubborn</i> | 21 |
| Is Your Aircraft Really Serviceable? | 23 |
| R.A.A.F. Squadrons in Coastal Command | 24 |
| Operation Against the <i>Tirpitz</i> | 26 |
| PLATES | |
| Plate 1. U-Boat attacked by Catalina M/210 off the Lofoten Islands | opp. page 2 |
| 2. U-Boat attacked by No. 162 Squadron (R.C.A.F.) | 3 |
| 3. Probable U-Boat Kill by Liberator E/103 (U.S.N.) | 8 |
| 4. Gibraltar Bay. Photographed by 202 Squadron | 9 |
| 5. { Enemy Merchant Ship beached at Ervik | 14 |
| { He. 115 shot down off Bremanger by 333 Squadron | 14 |
| 6. Königsberg. Photographed by 540 Squadron | 15 |
| 7. { The Bachman, von Blumenthal Factory near Nurnberg | 18 |
| { Liberator survivors rescued off Land's End | 18 |
| 8. Kindley Field, Bermuda | 19 |
| 9. { The German Battleship <i>Tirpitz</i> in Kaa Fjord | 22 |
| { The French Battleship <i>Richelieu</i> | 22 |
| 10. Mt. Pico, the highest point in the Azores | 23 |
| 11. No. 10 Squadron (R.A.A.F.) in action against a U-Boat | 24 |
| 12. { Sunderlands of No. 461 Squadron (R.A.A.F.) | 25 |
| { A Hampden of No. 455 Squadron (R.A.A.F.) | 25 |
| CHARTS | |
| Anti U-Boat Activities—February | opp. page 6 |
| Ratio of U-Boats sunk by Aircraft to Total Sinkings | 10 |

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

Summary of the Month's Work—February, 1944

The February Anti U-Boat Effort

1. As foreshadowed in the Summary for January, the excellent opportunities for attacking the U-Boat patrols off our western seaboard have been taken by both surface and air craft. During February 15 attacks were made by aircraft in this area, of which six look very promising. As the later attacks were further and further west, it appears that the combined weight of surface plus air attacks have forced the enemy to retire once more out into the Atlantic. As a result of this switch in our offensive, the number of aircraft available for the Bay of Biscay has been much lower than in January and only eight attacks have been made in that area. Gibraltar aircraft have made three attacks on U-Boats attempting to get into the Mediterranean. One of these resulted in a kill and was a perfect example of co-operation of forces. The U-Boat was located and attacked by U.S.N. Catalinas, depth charged by destroyers, attacked on the surface by U.S.N. Venturas and finally straddled by an R.A.F. Catalina. Another good kill was secured by an 18 Group Catalina when coming away from a convoy in the Arctic some 700 miles from base.

2. As in January, the majority of locations and attacks were at night. Out of 35 U-Boats located, 26 were at night, and of the 27 U-Boats attacked 22 were at night. In all but a few of the night attacks evidence of success was lacking owing to the inherent difficulty of obtaining illumination strong enough to distinguish such signs. It is still rare for the points of entry of depth charges to be observed, and the vague outline of the explosion plumes at night are not much help to accurate analysis. While waiting for the coming of night photography, the only source of information is the rear gunner, and it is a nice point to decide whether he is to concentrate on his legitimate job of gunnery or to keep a special lookout for these points of entry relative to the U-Boat.

3. In four night attacks there was evidence of after results suggesting that serious damage had been inflicted, but in the remaining cases there is only the Radar evidence of the blip disappearing, which is not conclusive of any damage.

4. While this number of night locations means good Radar lookout, there are still many subsequent attacks which miss due to inaccurate final stage homing.

5. Of the five day attacks, two were kills as mentioned above and two others show evidence of damage having been inflicted.

6. The continued preponderance of night locations and attacks indicates that the U-Boats are still using maximum diving tactics and rarely appear on the surface in daylight. There is no reason to doubt that this will continue during March, and it underlines the necessity for a high standard of Radar and attack performance.

Anti-Shipping Operations

7. During February 445 anti-shipping sorties were flown, which included a major strike by the North Coates Wing on a convoy composed of one 2,000-ton M/V, three "M" class minesweepers and six R-Boats at the entrance to Den Helder. In addition, three aircraft on anti U-Boat patrol carried out attacks against surface vessels. As a result, four M/Vs, totalling 13,500 tons, are claimed as seriously damaged, one R-Boat sunk and an E-Boat, a minesweeper and three R-Boats damaged. We lost six aircraft.

8. Night torpedo attacks, in conjunction with flare-dropping Wellingtons, were introduced for the first time in this theatre by Beaufighter aircraft of No. 16 Group, when on February 13 two aircraft of the North Coates Wing attacked a 4,000-ton M/V off Ijmuiden. One torpedo hit was claimed.

9. The 25-lb. R.P. head has been used continuously, but there is still a lack of conclusive evidence on the relative merits of the 25-lb. and 60-lb. heads, although opinion favours the former. The 20-mm. cannon continues to prove a most effective weapon against flak and light surface craft.

10. Albacores of No. 415 R.C.A.F. Squadron made three night attacks during the month on enemy light surface craft. 250-lb. bombs were used and one possible hit was claimed.

Photographic Reconnaissance

11. The outstanding event of the month proved to be two complete photographic covers of Berlin after nearly two months of disappointment. Photographs were also obtained of the majority of targets attacked by Bomber Command, and, in addition, P.R. aircraft have frequently followed behind the heavy bombers of the United States Strategic Air Force to confirm the effects of their offensive.

12. This month's routine reconnaissance of ports and airfields penetrated far into the Baltic, when photographs were taken of Königsberg and Pillau which disclose a decline in the number of U-Boats being built in German yards.

13. The output of photographs has been 33½ per cent. greater than the previous highest figure, and the record day was 9,832 negatives and 31,063 prints.

Meteorological Flights

14. As the result of re-arming the Meteorological Squadrons and Flights with Halifaxes and Venturas, long-range meteorological sorties have been flown with improved regularity. Once again the U.S.A.A.F. Fortresses from Bovingdon have carried out those sorties from Land's End to the west, but are shortly to hand over this task to one of our own squadrons.

Air/Sea Rescue and Flying Control

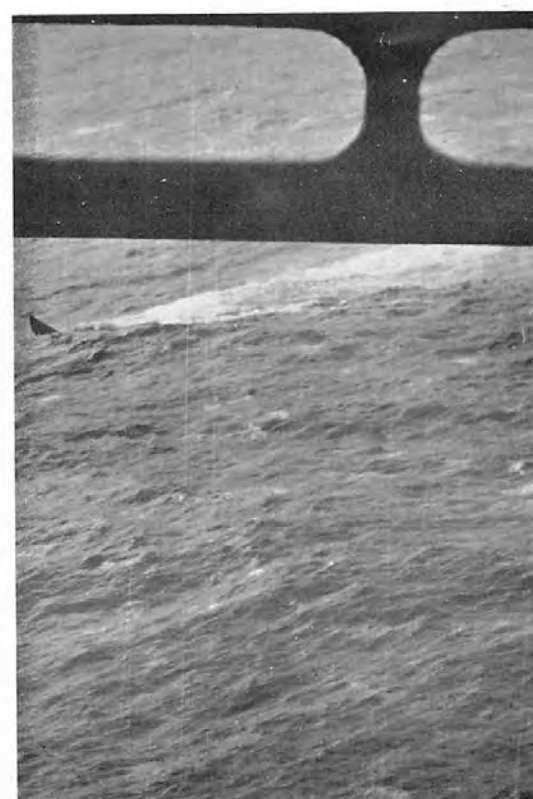
15. Eighty aircrews were saved during 72 incidents calling on the resources of the A.S.R. service. One ditching reflects credit upon the captain and crew of a Liberator, a notoriously difficult aircraft to ditch, as a result of which eight out of the crew of 11 were rescued. This, like all other successful ditchings, is directly attributable to hours of crew ditching drill and careful study of all items of life saving equipment.

16. There were 192 diversions effected by Flying Control, of which 125 were in the No. 19 Group area. One of these, a Liberator, which landed at St. Eval, is of interest and shows commendable initiative on the part of the Duty Flying Control Officer. The aircraft was running out of fuel, and indeed had insufficient to carry out a normal Q.G.H. descent. Accordingly the Duty Flying Control Officer remained in touch with the D/F operator, and when the aircraft was overhead directed it to descend and land off a turn, albeit on a runway not in use. Two engines cut some distance from the airfield perimeter, the flaps had to be raised to stretch the approach and, after landing at 150 m.p.h., the aircraft came to rest intact, with dead engines and dry tanks.

Extract from a Speech by Mr. Dingle Foot, M.P., Parliamentary Secretary to the Ministry of Economic Warfare, to the Leeds Luncheon Club, Monday, March 6, 1944.

I do not think that the public always appreciates the importance of the destruction of Axis shipping around the coasts of Europe. As you know, this is the combined achievement of Coastal Command, the Royal Navy and aircraft of Bomber Command engaged in mine-laying. We all watch with admiration the raids by Bomber Command, and it is easy to understand the damage which they inflict upon the enemy. I am not sure that full justice has been done to the less spectacular but extremely valuable contribution of Coastal Command. It is important to realize how dependent the Germans are upon their sea communications in the Baltic, the North Sea and around the coast of Norway. The iron ore from Sweden and the nickel ore from Finland must come by sea. The sinking of Axis ships achieves a twofold purpose. In the first place the enemy loses valuable, and possibly irreplaceable cargoes. Secondly, it may well happen that a greater strain is placed upon his overland transport.

This attack upon enemy shipping has been going on for over four years. It took a long time for the results to become apparent. At the beginning of the war Germany possessed a considerable reserve of ships which could no longer sail the high seas, and which were therefore available for coastal traffic and the Baltic. Moreover, she obtained considerable windfalls in the various countries which she occupied. It was therefore bound to take time before the problem of replacement could become acute, and for over three years the Germans took practically no steps to replace their losses by new construction. Last year, however, we received most significant news. It was to the effect that the Germans were resuming merchant ship building in their shipyards. When we take into account the present shortage of manpower and materials in Germany and the competing claims of other forms of production, it is clear that this step could only have been taken from sheer necessity. There could have been no clearer evidence of the success of Coastal Command, the Royal Navy and Bomber Command in their long campaign against the enemy's mercantile marine.



An attack by Catalina M/210 off the Lofoten Islands on February 25, 1944.



This 740 ton U-Boat was attacked on February 22 by a Catalina of No. 162 (R.C.A.F.) Squadron operating from Iceland. The oil shown in the bottom photograph indicates that the U-Boat was probably damaged, though it is unlikely that the damage was serious. The top photograph shows the now standard armament of two twin 20 mm. mountings on the upper bandstand, and one 37 mm. on the lower. This lower bandstand seems to have been lengthened, but the reason is not apparent.

I.—ANTI U-BOAT

(See notes below.)

ANTI U-BOAT SCORES FROM AUGUST, 1943, TO JANUARY, 1944.

PERCENTAGE FIGURES OF MERIT
IN BIG NUMERALS

| 10 Sq. | 48 Sq. | 53 Sq. | 58 Sq. | 59 Sq. | 86 Sq. | 120 Sq. | 172 Sq. | 179 Sq. |
|-----------------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------|
| $\frac{20}{20} = 100$ | $\frac{10}{10} = 100$ | $\frac{19}{70} = 27$ | $\frac{49}{70} = 70$ | $\frac{50}{120} = 42$ | $\frac{56}{70} = 80$ | $\frac{105}{300} = 35$ | $\frac{65}{130} = 50$ | $\frac{148}{230} = 64$ |
| 422 Sq. | 201 Sq. | 202 Sq. | 206 Sq. | 210 Sq. | 224 Sq. | 228 Sq. | 233 Sq. | 269 Sq. |
| $\frac{20}{20} = 100$ | $\frac{0}{0} = 0$ | $\frac{0}{0} = 0$ | $\frac{3}{20} = 15$ | $\frac{0}{0} = 0$ | $\frac{16}{70} = 23$ | $\frac{20}{30} = 67$ | $\frac{10}{10} = 100$ | $\frac{33}{90} = 37$ |
| 304 Sq. | 311 Sq. | 330 Sq. | 333 Sq. | 407 Sq. | 423 Sq. | 461 Sq. | 502 Sq. | 547 Sq. |
| $\frac{6}{30} = 20$ | $\frac{13}{30} = 43$ | $\frac{0}{0} = 0$ | | $\frac{32}{60} = 53$ | $\frac{20}{20} = 100$ | $\frac{20}{30} = 67$ | $\frac{12}{60} = 20$ | $\frac{0}{10} = 0$ |
| 612 Sq. | 248 Sq. | 103 Sq. U.S.N. | 105 Sq. U.S.N. | 110 Sq. U.S.N. | 162 Sq. | 220 Sq. | | |
| $\frac{25}{70} = 36$ | $\frac{10}{10} = 100$ | $\frac{20}{30} = 67$ | $\frac{0}{20} = 0$ | $\frac{10}{20} = 50$ | $\frac{0}{0} = 0$ | $\frac{10}{10} = 100$ | | |

Attacks on U-Boats

Note on Table above, showing Squadron Scores for the Six Months, August, 1943, to January, 1944.

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

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

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

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

120 Squadron have the highest number of actual attacks to their credit during the period under review, while of those Squadrons who have recorded 5 or more attacks, 86, 58 and 179 Squadrons have obtained the highest marks, with 80%, 70% and 64% respectively.

Nos. 10, 59 and 612 Squadrons, and 103 U.S.N. Squadron all obtained 100% for the attacks carried out during January, 1944.

SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT
(Including Iceland, Azores, Gibraltar and U.S. Moroccan Sea Frontier)
FEBRUARY, 1944.

| Duty and Base or Area. | Total Sorties. | Hours Flown. | | U-Boats Sighted. | | U-Boats Attacked. | | Hours per Sighting. | | No. of Sorties. | | Col. 10 Sorties with 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) | |
| <i>Convoy Cover</i> | | | | | | | | | | | | |
| United Kingdom | 84 | 1,080 | 419 | 1 | 6 | 1 | 5 | 154 | 60 | 4 | 4 | 4 |
| Iceland | 11 | 103 | 40 | — | — | — | — | — | — | — | — | — |
| Gibraltar and Moroccan Sea Frontier | 76 | 655 | 352 | — | — | — | — | — | — | — | — | — |
| Azores | 17 | 189 | 84 | — | — | — | — | — | — | — | — | — |
| TOTAL CONVOY EFFORT | 188 | 2,027 | 895 | 1 | 6 | 1 | 5 | 289 | 128 | 4 | 4 | 4 |
| <i>A/U Patrols—Northern Transit</i> | | | | | | | | | | | | |
| United Kingdom | 98 | 818 | 396 | 1 | 3 | — | 3 | 204 | 99 | 4 | 3 | 2 |
| Iceland | 20 | 222 | 107 | — | 1 | — | — | 222 | 107 | 1 | — | 1 |
| <i>Northern Convoy</i> | | | | | | | | | | | | |
| United Kingdom | 305 | 3,424 | 1,156 | 1 | 5 | 1 | 5 | 570 | 192 | 6 | 6 | 5 |
| Iceland | 27 | 348 | 191 | 1 | — | 1 | — | 348 | 191 | 1 | 1 | 1 |
| Azores | 55 | 638 | 300 | — | — | — | — | — | — | — | — | — |
| <i>Bay of Biscay (Inc. adjacent patrols)</i> | | | | | | | | | | | | |
| United Kingdom | 703 | 7,389 | 4,054 | 1 | 10 | — | 8 | 672 | 368 | 9 | 8 | 4 |
| Gibraltar and Moroccan Sea Frontier | 18 | 195 | 68 | — | — | — | — | — | — | — | — | — |
| <i>Central Convoy</i> | | | | | | | | | | | | |
| Gibraltar and Moroccan Sea Frontier | 691 | 5,641 | 4,335 | 5 | 2 | 3 | 2 | 806 | 619 | 10 | 8 | 3 |
| Azores | 104 | 814 | 463 | — | — | — | — | — | — | — | — | — |
| TOTAL A/U PATROLS | 2,021 | 19,489 | 11,070 | 9 | 21 | 5 | 18 | 650 | 369 | 31 | 26 | 16 |
| ADD CONVOY EFFORT | 188 | 2,027 | 895 | 1 | 6 | 1 | 5 | — | — | 4 | 4 | 4 |
| TOTAL EFFORT | 2,209 | 21,516 | 11,965 | 10 | 27 | 6 | 23 | 581 | 323 | 35 | 30 | 20 |
| | | | | 37 U-Boats sighted: | | 29 U-Boats attacked: | | | | | | |

Note.—In addition to the above there were 5 chance sightings, 4 by Transit aircraft and 1 by a Met. Flight aircraft.

Summary—continued.

Assessments

| Month. | Known Sunk. | Probably Sunk. | Damaged A | Damaged B | Slight Damage. | I.E.D. | No Damage. | Unassessed. |
|----------------|-------------|----------------|-----------|-----------|----------------|--------|------------|-------------|
| December .. | — | 1 | — | — | 3 | 5 | 1 | — |
| January | 3 | 2 | — | 3 | 3 | 12 | 8 | 5 |
| February | 1 | 2 | — | — | 1 | 4 | 4 | 17 |

Analysis of U-Boats sighted during February

| Particulars of Incidents. | U-Boats. | | Sorties when Aircraft | |
|--|----------|-----------|-----------------------|-----------|
| | Sighted. | Attacked. | Sighted. | Attacked. |
| On 27 occasions 1 U-Boat was sighted by 1 aircraft—22 aircraft attacked | 27 | 22 | 27 | 22 |
| On 3 occasions 2 U-Boats were sighted by 1 aircraft—3 aircraft attacked 4 of the U-Boats | 6 | 4 | 3 | 3 |
| On 1 occasion 3 U-Boats were sighted by 1 aircraft—2 U-Boats were attacked | 3 | 2 | 1 | 1 |
| On 1 occasion 1 U-Boat was sighted by 4 aircraft—all aircraft attacked | 1 | 1 | 4 | 4 |
| TOTALS | 37 | 29 | 35 | 30 |

Squadron Results—February

| | | | | Sorties when U-Boat Sighted. | Sorties when U-Boat Attacked. |
|-------------------|---------------|--------------------|--|------------------------------|-------------------------------|
| 1. United Kingdom | | | | | |
| 210 | Catalina | Sullom Voe | | 1 | 1 |
| 58 | Halifax | St. Davids | | 2 | 2 |
| 53 | Liberator LL | St. Eval | | 5 | 5 |
| 224 | Liberator LL | St. Eval | | 2 | 2 |
| 103 (U.S.N.) | Liberator | Dunkeswell | | 1 | 1 |
| 201 | Sunderland | Castle Archdale .. | | 1 | 1 |
| 330 (Norweg.) | Sunderland | Sullom Voe | | 1 | — |
| 461 (R.A.A.F.) | Sunderland | Pembroke Dock .. | | 1 | — |
| 172 | Wellington LL | Chivenor | | 1 | 1 |
| 304 (Polish) | Wellington LL | Predannack | | 2 | 2 |
| 407 (R.C.A.F.) | Wellington LL | Limavady | | 4 | 4 |
| 612 | Wellington LL | Limavady | | 2 | 2 |
| 2. Iceland | | | | | |
| 162 (R.C.A.F.) | Catalina | Reykjavik | | 1 | 1 |
| 120 | Liberator LL | Reykjavik | | 1 | — |
| *1407 | Hudson | Reykjavik | | 1 | — |
| 3. Gibraltar | | | | | |
| 202 | Catalina | New Camp | | 1 | 1 |
| 63 (U.S.N.) | Catalina | Port Lyautey | | 2 | 2 |
| 48 | Hudson | North Front | | 2 | — |
| 111 (U.S.N.) | Liberator | Agadir | | 1 | 1 |
| 179 | Wellington LL | North Front | | 2 | 2 |
| 127 (U.S.N.) | Ventura | Agadir | | 1 | 1 |
| 132 (U.S.N.) | Ventura | Agadir | | 1 | 1 |
| | | | | 36 | 30 |

Notes.—1. The score of 612 Squadron includes 1 sighting and attack by a crew of 612 Squadron in a 407 Squadron aircraft.

2. * Chance sighting by Met. Flight aircraft.

Recent Attacks on U-Boats

A Copybook Night Attack

Soon after midnight on December 28 **Wellington H/172** flying from the Azores got a Radar contact 7 miles on the starboard beam from 1,500 feet. The Captain homed and when the Leigh Light was switched on from 150 feet at a range of $\frac{3}{4}$ of a mile, a U-Boat was illuminated fine on the port bow. The U-Boat was in position 43° 57' N., 24° 04' W., and was steering 310°. She looked broad in the beam compared with her length, and had a single-step conning tower with bandstand. She had no visible armament forward, but the Wellington's navigator has a vague impression that she carried a gun on deck abaft the conning tower. While the enemy was fully surfaced the aircraft attacked from the starboard bow and dropped six depth charges spaced at 60 feet. During the run in the navigator opened fire with the front gun. The rear gunner saw one explosion to starboard and two to port forward of the conning tower, the first two of these explosions being very close to the U-Boat. Two flame floats were dropped with the depth charges and one of them worked. The Captain therefore climbed to 500 feet, turned to port and flew back to the marker, but no Radar contact was made. The flame float went out before the aircraft reached it, but the Mark II marine marker was dropped in the estimated position. The Wellington circled this for 20 minutes and began automatic homing, but no other aircraft was available as the other aircraft detailed for operations had not been able to take off. During this time "H" saw nothing and got no Radar contacts. After staying on the scene for over an hour the aircraft switched on the Leigh Light and fired two illuminating cartridges; nothing was seen. Before leaving for base the Wellington dropped a Mark III marine marker set to function at 0700 hours.

Comment

An excellent attack which shows that the crew have taken their training seriously. We can ask no more than for the depth charges to straddle the U-Boat on the first run in. As is often the case with night attacks, there is no evidence to show how badly the U-Boat was damaged.

Night Attack on a Swirl

Wellington L/612 was patrolling at 800 feet on the night of January 3 when a Radar contact was obtained broad on the port beam at a range of 5 miles. The Wellington circled to port trying to get the best light conditions, but the contact was lost in the turn. As a result the aircraft tracked over the U-Boat and did not see her until she was only $\frac{1}{2}$ mile away. The Captain maintained his course for about two minutes and then turned steeply through 180° regaining contact at 3 miles. At $\frac{1}{2}$ mile the Leigh Light was switched on and illuminated a U-Boat in position 46° 13' N., 06° 58' W. The enemy, who was steering 315° at 15 knots, was on the surface but well trimmed down. Immediately after sighting her the Wellington crew saw a spume of water as the U-Boat began to dive and she had completely disappeared three seconds before the Wellington attacked. The attack was made from the enemy's

port quarter and six depth charges spaced at 60 feet were dropped from 70 feet; they were aimed 80 feet ahead of the swirl. Just before attacking the aircraft had turned 40° to port, for there was considerable starboard drift and the U-Boat, which was moving to port, had been 5° on the Wellington's port bow when illuminated. The rear gunner saw at least three explosions, one to port of the enemy's track, one on track, and the third to starboard. The wireless operator felt four explosions and it is probable that the remaining depth charges fell to starboard. The aircraft immediately turned to port and dropped a marine marker near the three flame floats which had been dropped with the depth charges. Five minutes later a Radar contact was picked up 2 miles away and the U-Boat was seen to have re-surfaced. As the Wellington flew over, the U-Boat opened fire with what appeared to be a single cannon and machine gun, but the fire was not accurate. The aircraft then shadowed at a range of 3 to 6 miles and about half an hour later it was apparent from the Radar bearings on the U-Boat in relation to the marine marker that the enemy's mean line of advance since the attack was about 075°. At 2140 hours the Wellington began homing procedure and after half an hour one of the aircraft which had been ordered to home, was seen to attack. This was **Liberator H/224**. The Liberator's depth charges were seen to explode, but the U-Boat continued to fire. About two minutes after this attack an orange glow was seen on the water. At 2338 hours the Wellington dropped a Mark III marker set to two hours delay and then left for base.

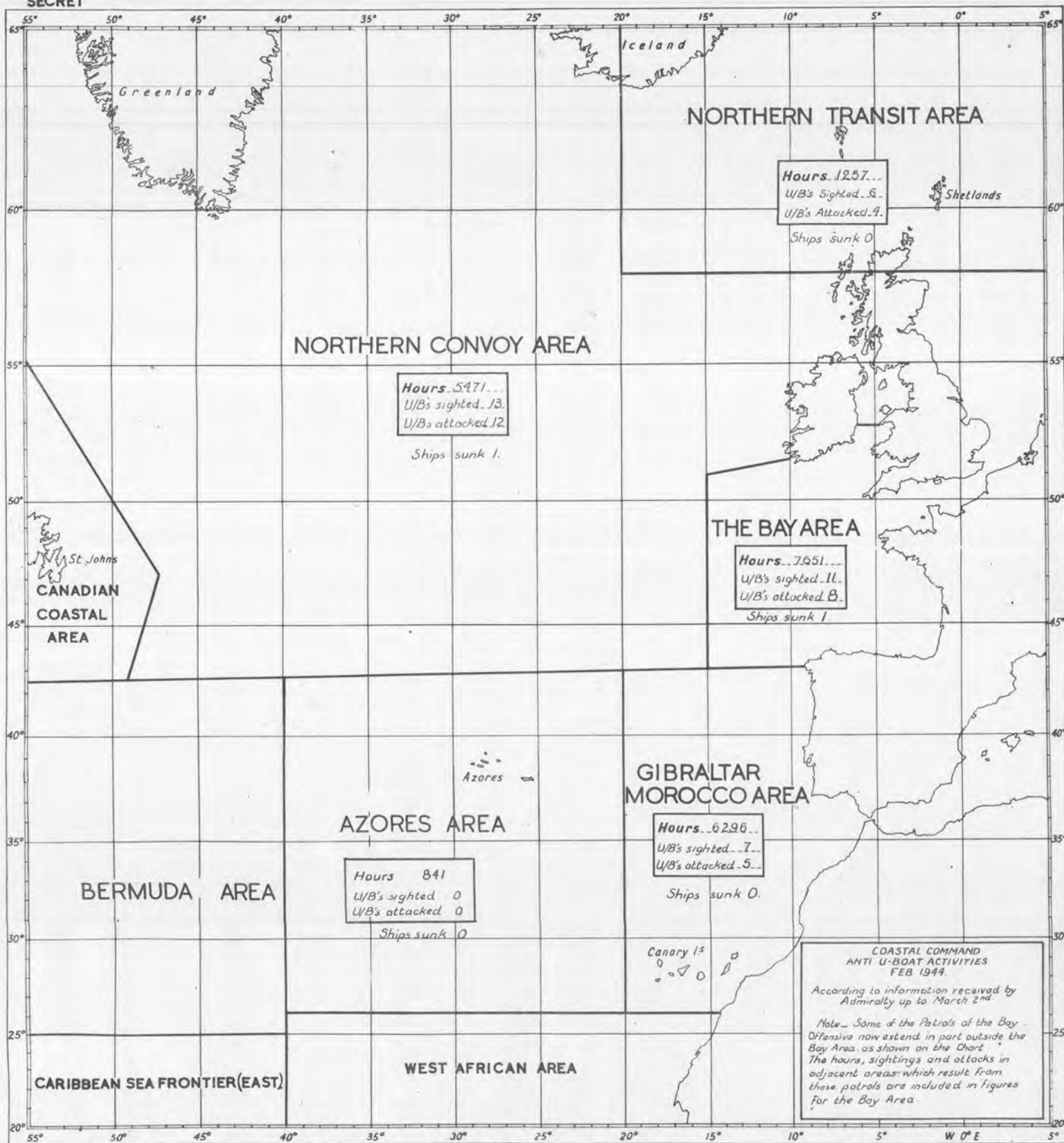
Comment

An excellent attack. It was unfortunate that efforts to re-locate the initial Radar contact led to the unintentional tracking over which enabled the U-Boat to dive during the aircraft's run in. The attack caused damage to the U-Boat which probably prevented its diving when H/224 made a dummy run some two hours later. (See Admiralty Assessment below.)

Same U Boat Attacked without the Searchlight

Liberator H/224 was patrolling at 1,000 feet on the night of January 3 when a Radar contact was obtained on the port bow at a range of 12 miles. The aircraft homed and the navigator sighted a very pronounced wake 1 mile on the port bow. Immediately afterwards the U-Boat was seen steering 060° at 12 knots. The Liberator closed to $\frac{1}{2}$ mile but the Captain considered it impossible to make an immediate attack and turned away to starboard. At that moment the U-Boat opened fire and the aircraft replied with the mid-upper and beam guns. The Liberator made a wide sweep astern of the enemy and attacked from the U-Boat's starboard quarter from a height of 200 feet without using the searchlight. Using the Mark III bomb sight the navigator released eight depth charges spaced at 60 feet, while the aircraft was slightly banked to starboard. The rear gunner estimates that the stick overshot, the first plumes being about half the U-Boat's length away on the port quarter. All the Liberator's guns were firing as the attack was

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made and the crew claim hits on the conning tower from which the enemy fired throughout the attack. One of the aircraft's crew also saw four flashes which may have come from a large calibre gun forward of the conning tower. As the aircraft weaved away the crew saw an orange glow and smoke which broke out just forward of the wake and continued for about 15 minutes. The glow is believed to have come from the U-Boat's stern. The Liberator closed the range again to investigate but was very heavily engaged by the enemy's guns. The U-Boat was then zig-zagging at much reduced speed. At this point three Radar contacts were obtained, one 4 miles on the starboard beam the second 5 miles dead astern, and the third on the port beam. One of these contacts was believed to be a U-Boat and the Liberator set course to investigate the contact astern. Nothing was seen and the aircraft returned to the position of the attack. The markers were still burning but there was no trace of the enemy. The Liberator searched for four hours without seeing anything further.

Comment

Unfortunately the Radar homing was not good enough to enable an attack to be carried out on the first run. This meant that the aircraft became the target for a lot of flak—but nevertheless, a second run was made. This U-Boat had been attacked by L/612 less than two hours before: the near miss by H/224 may have inflicted further damage and it is probable that the U-Boat had to return to base for repairs.

Admiralty Assessment

The same U-Boat was the object of attention in attacks by both L/612 and H/224. The first attack by L/612 was made when the U-Boat was outward bound and in the act of submerging. This was apparently a very good attack, and, when the U-Boat surfaced again, it was seen to be making towards its base. The U-Boat was then attacked by H/224 but the stick apparently overshot though an orange glow with smoke was seen to start at a point just forward of the wake. It continued to glow for 10 or 15 minutes. From this evidence it appears that the U-Boat was damaged sufficiently to cause it to return to base. The attack is assessed as "probably seriously damaged, had to return to base."

Excellent Radar Performance

Shortly before midnight on January 14 Halifax H/58 reached its patrol area and found very low cloud. The Captain therefore decided to patrol an area further north where he expected to find clearer weather. On reaching position 45° 20' N., 08° 00' W., a Radar contact was made just abaft the port beam at a range of 12 miles. The Halifax was flying due west at 1,000 feet and the wind was blowing at 38 miles per hour from the south. The Captain immediately turned on to a course of 157° and lost height to 500 feet. The contact faded on the turn and was not regained although the Captain lifted the nose of the aircraft during the descent. He nevertheless continued on his course at 500 feet until 12 miles had been covered and then regained contact on the port bow at 7 miles range. He turned on to 107° but again lost contact in the turn. When the Halifax reached the estimated position of the contact the

blip reappeared on the port beam 1 mile away. The Captain continued on his course of 107° for 5 miles and maintained contact until the target was bearing Red 170° at a range of 5 miles. He then turned on to the reciprocal and lost height to 200 feet. Contact was again lost in the turn but was regained immediately afterwards. At 4½ miles range the Captain altered 10° to port and opened the bomb doors. At 3 miles a further alteration of 5° to port was necessary, and soon afterwards the Halifax climbed to 600 feet. At 1½ miles six A/S flares were released and at 1¼ miles the Captain sighted a surfaced U-Boat on the port bow steering due east at 12 knots. Radar contact was maintained during the climb but was lost at half a mile when the aircraft had again come down to 200 feet. The U-Boat was a 500-tonner and no guns were actually seen, but it appeared from the enemy's fire that there were two guns forward and two aft of the conning tower, probably on bandstands. The aircraft altered course to attack and the enemy opened fire with cannon and machine guns from both gun positions, aiming at the flares slightly to port of the Halifax. At half a mile fire was shifted to the aircraft but most of it passed by the port wing. The navigator fired three long bursts from the nose gun and estimated hits, but the enemy then corrected his aim and his fire came closer, passing just over the aircraft. At 400 yards the Germans ceased fire. The Halifax attacked from the U-Boat's port bow and released from less than 100 feet six depth charges spaced at 90 feet. No bomb sight was used. The aircraft tracked over the conning tower but during the run in the U-Boat turned hard to starboard which necessitated a very steep turn to port by the aircraft. A flash calibrator container fitted with an illuminating cartridge was released at the end of the depth charge stick, but it failed to light up the U-Boat. The rear and mid-upper gunners saw one explosion against the starboard side of the U-Boat midway between the conning tower and the stern, followed by two or at the most three, other explosions. About one minute after the attack the enemy was seen to be stopped with a large disturbance of churned up water all along the starboard side. The U-Boat was then clear of the explosion marks, and her fire, which had been spasmodic since the attack, had ceased. The rear gunner fired a long burst as the Halifax tracked over, and both rear and mid-upper gunners opened fire after the attack while the aircraft turned and climbed to 800 feet. A flame float was released about 1,500 yards from the target and later a marine marker was dropped near the flame float. The aircraft circled but lost contact 14 minutes after the attack. Five more flares were dropped from 5,000 feet but there was no sign of the U-Boat.

Comment

The very full and accurate U/Bat report enabled a most useful analysis of the homing to be made. The whole performance is most encouraging: it should be studied by all our night crews. The excellent Radar watch was able to re-locate the contact which was lost in the turns. It appears that failure to track accurately to the U-Boat on the first two attempts was due to the effect of inaccurate reading of the Radar bearings plus inaccurate navigation after the contact had first been obtained.

In the final homing run the successive alterations to port were due to the strong cross-wind which gave a drift of about 10° starboard. These alterations could have been avoided by offsetting the target between 5° and 10° to starboard when the aircraft would have tracked towards the target.

Admiralty Assessment

The attack was made in the face of considerable flak, which the aircraft replied to, hits being esti-

mated. Six Torpex depth charges were dropped and from the evidence of the rear and mid-upper gunners these appear to have fallen very close to starboard of the U-Boat. There is, however, no other evidence of the distance of the explosions from the U-Boat, which continued to fire spasmodically after the attack. The U-Boat was seen to be stopped, but there is no other evidence of the effect of the depth charges. The attack is assessed as "Insufficient evidence of damage."

U-Boat Probably Sunk by U.S.N. Liberator

On January 28 **Liberator E/103** (U.S.N.) was patrolling in the north-western approaches when a U-Boat was sighted 8 miles away on the starboard beam. A 40-knot wind was blowing. The U-Boat was steering 300° at 10 knots and her position was 53° 15' N., 15° 52' W. She was dark in colour and fairly large and though two periscopes stood out clearly no guns were seen. The Liberator crew state that she looked old. The aircraft immediately turned 90° to starboard and approached out of sun. The enemy must have been surprised as only a few bursts of flak were fired and none hit the aircraft which replied vigorously from the nose turret and the beam guns. The Liberator tracked over the U-Boat's port beam just forward of the conning tower and released from 50 feet six depth charges spaced at 50 feet. The explosions straddled abaft the conning tower, four to port and two to starboard. Photographs show the explosions close to the port side but the camera then jammed and prevented photographs being taken of the starboard explosions. The U-Boat's stern was at first lifted and then began to settle, and the vessel lost all forward motion. As the U-Boat settled lower the surrounding water was filled with air bubbles. After circling twice the Liberator crew lost the U-Boat in the very high sea that was running at the time. However, when the aircraft passed over

the estimated position of the attack the crew saw a light green patch of swirling water filled with air bubbles. No wreckage or oil was seen, but this may have been due to the very high waves. The aircraft then made a square search of the area and after 40 minutes set course for the convoy 38 miles away. The attack was reported to the S.N.O. who ordered the Liberator to resume the search. After two more searches a second Liberator and a corvette arrived and "E" set course for base.

Comment

An excellent visual sighting in very difficult conditions. Luckily the sighting was made downwind with the result that the U-Boat lookouts, who just cannot search into a strong wind, were surprised. Some excellent photographs show that two depth charges exploded close to the stern and may have caused lethal damage. After evidence tends to confirm this.

Admiralty Provisional Assessment

From the photographic evidence the Committee consider that the depth charges exploded sufficiently near the stern to have been lethal. The attack is therefore provisionally assessed as "U-Boat probably sunk."

A Flare Attack with the 600-lb. A/S Bomb

During the night of January 29 **Halifax S/502** was patrolling at 1,400 feet in very bad visibility when a Radar contact was obtained 5 miles on the port bow. The Captain maintained his course for 2½ minutes until the contact was on his port quarter and then turned on to the reciprocal. The position of the contact was 46° 57' N., 05° 17' W. At 2 miles range the stop-watch was started and run for 24 seconds during which time the aircraft covered 1 mile. This was checked by Radar, and two A/S flares were dropped. The aircraft flew on for another 20 seconds and released two A/S bombs blind from 1,400 feet. The spacing was 120 feet. The Radar operator considers that the contact passed slightly to port. The explosion of the bombs was felt but not seen, and no further information about this attack is available. Immediately afterwards, however, a second Radar contact was obtained 6 miles on the port beam. The Halifax homed and at 2 miles range the stop-watch was started. After 24 seconds, when the range was 1 mile, two A/S flares were dropped. The Radar operator continued to home the pilot

and the contact was followed until the aircraft was overhead. At 300 yards the crew saw flak and then a U-Boat dead ahead. The enemy, who was steering 070° at 12 knots, was firing white tracer from the conning tower and two streams of red tracer from abaft the conning tower. The aircraft flew in at 1,300 feet and attacked from the U-Boat's port quarter releasing two 600-lb. A/S bombs spaced at 120 feet. The Mark XIV bomb sight was used and the navigator released the bombs when he saw the conning tower on the graticule. He had levelled and adjusted the sight within 10 minutes of the attack and put a new wind on it. The automatic pilot was in the fully out position when the bombs were dropped. The enemy opened fire immediately the flares were released and the tracer seemed to pass slightly to starboard on the beam and behind the starboard wing; the propeller of the starboard outer engine was hit. The points of entry of the bombs were not seen, but it was estimated by means of the graticule that they straddled the enemy forward of the conning tower. The explosions were felt in the aircraft and



These photographs were taken during an attack by E/103 (U.S.N.) on January 28 (*see* opposite page). So far no explanation has accounted for the raising of what appears to be the periscopes during the action and while the U-Boat was fully surfaced. It is possible that concussion damage to the hydraulic system may have had this unexpected result.



PLATE 4

Gibraltar Bay photographed by 202 Squadron



immediately afterwards the flak ceased. The Halifax made a steady turn to port and dropped two Mark II marine markers when tracking over the position again. Nothing further was seen and no other definite contact was made, though when the Halifax returned again to the position of the attack the Radar operator reported a faint blur on the screen. After 15 minutes the aircraft reached P.L.E. and returned to base.

Comment

An excellent attack, which should have damaged the U-Boat. It is unfortunately not possible to say how serious this damage was. In view of the successful illumination of the second contact it would appear that the homing on the first run was not quite up to the supreme standard called for by this type of attack.

A Splendid Flare Attack

On the night of January 30 **Halifax L/502** was on A/U patrol. It was a pitch dark night with no moon, little wind and a calm sea. When flying at 1,400 feet the aircraft obtained a Radar contact on the starboard bow at a range of 5 miles. The pilot altered course and flew over the position of the contact, then turned slightly to port and continued for 6 miles. The Radar operator then gave the contact as Red 160 and the pilot turned to home. Contact was lost on the turn but regained on levelling out: a further turn of 20° was necessary during the run-in. At 1½ miles range three high intensity flares were released and as soon as these ignited, a surfaced U-Boat was sighted dead ahead. It was thought that the U-Boat was larger than the 500-ton type. The aircraft lost height and the Radar operator continued to give the necessary slight alterations to course. Flak was experienced as soon as the flares ignited, but the aircraft was not hit. The attack was made from the U-Boat's port beam, and three 600 lb. A/S bombs set to 35 feet and spaced at 120 feet were released with the aid of the Mark XIV bomb sight. Evidence states that only two bombs detonated and that these straddled the U-Boat, whose fire ceased immediately. At 3 miles the blip disappeared. The Captain circled, climbed and dropped a

marker over the estimated position, where a large ring of foam was seen and illuminated with more flares. A long steady wake was seen entering this ring and a short wake emerging from it on the opposite side, but the U-Boat was not seen. A short while later four white intense flares were seen well below the aircraft, which was then at 4,000 feet. They appeared to come from a surface ship or surfaced U-Boat. Flak also was seen from the same direction. The aircraft made a run-up on Radar and dropped one delayed action marker set at 3 hour delay. Another white flare was then seen rising with trailing smoke like a rocket.

Comment

Excellent Radar work and good co-operation with the pilot enabled an exceedingly good approach to be made. The attack, using the Mark XIV bomb-sight, was first class and appears to have straddled across the bows. The efficiency of Radar operating in both Halifax squadrons is outstanding, and this, together with the flare technique bids fair to revolutionize night work provided there is no mist or rain. The four white flares were probably from a flak ship or an escort vessel of some kind making a rendezvous with this U-Boat.

Same time, same area, same Squadron

On February 7 at 2100 hours, **Wellington W/407** on A/U patrol obtained a Radar contact fine on the port bow 12 miles away. Visibility was estimated at 5 miles up moon and the sea was smooth. On making contact the pilot did not immediately home but worked into a position for an up-moon attack. When the range was three-quarters of a mile, a wake was sighted from 200 feet and then a U-Boat, although the moon was momentarily obscured. The searchlight was switched on at half-mile and this immediately drew fire from the U-Boat. Determined fire from the front gun, however, soon damped the U-Boat's ardour and the fire decreased and finally petered out. The U-Boat appeared unusually large and well streamlined. The attack was made from nearly dead astern of U-Boat and the depth charges are considered to have straddled just abaft the conning tower. After the attack the U-Boat lay stopped for about 40 minutes and gunfire was exchanged. When the Radar contact disappeared, low-power blue lights were seen on the water in the position of the attack.

Comment

A determined run-in against flak, and good front gun fire. From the evidence a very accurate attack was delivered from nearly up track, which should be lethal. The fact that U-Boat was stopped near the flame float for 40 minutes indicates damage to engines and/or propellers. The further evidence of a bunch of small blue lights of low power on the surface of the water just after the blip had faded suggests that the U-Boat may have foundered. It was a pity that a quick search with Leigh Light could not be made as these blue lights might have been from survivors in the water.

On the same day and from the same squadron another splendid Leigh Light attack was made. The aircraft was **O/407**. A Radar contact was obtained nine miles on the port beam. The pilot homed immediately and switched on the Leigh Light at half a mile range, illuminating a U-Boat fine on his starboard bow. The attack was made from just abaft the U-Boat's starboard beam from 50 feet and six depth charges spaced

at 60 feet straddled the enemy abaft the conning tower. At least three explosions were seen, the second being larger than the other two. After the second explosion the U-Boat appeared to be heavily down by the bows and after the third explosion the angle seemed to be steeper. No flak was experienced. Radar contact was never regained, though a dark patch was seen on the water but it was not possible to estimate its size.

Comment

Very good homing and approach. From the evidence an accurate attack was delivered which should have been lethal. Absence of flak suggests either complete surprise or that the crew had gone below to diving stations and U-Boat was beginning to dive as the depth charges exploded. (This latter would account for the report that U-Boat was heavily bow down.)

Two Searchlight Attacks in the same Bombing Run

While escorting H.X.227 soon after midnight on February 10, **Liberator G/53** sighted a U-Boat but was not able to attack. Three-and-a-half hours later the Captain returned to the marker he had dropped and began Search II, using 12 miles visibility. After three-quarters of an hour a Radar contact was obtained 14 miles abaft the starboard beam. The aircraft turned and lost height, but twice during the homing the blip was lost owing to the tilt sticking in the down position. At 4 miles range the Radar clearly indicated that there were two targets. When the range was believed to be 1 mile (though it is probable that the range was really a mile and a half) the Leigh Light was switched on and it illuminated an object dead ahead. The object immediately opened fire and was identified as a U-Boat 1 mile ahead. Her position was 50° 10' N., 17° 48' W., and she was steering 252° at 12 knots. The aircraft came in at 70 feet and dropped six depth charges spaced at 50 feet across the U-Boat's beam. The **Liberator** tracked over the U-Boat slightly forward of the conning tower and both the Captain and the Navigator pressed the release button; the Captain judging by eye and the Navigator using the Mark III bomb sight. The nose gunner opened fire at 1,500 yards and fired bursts all the way in. As the **Liberator** tracked over the target the Flight Engineer from his position in the bomb bay saw the depth charges fall, and at least one entered the water on either side of the U-Boat. The rear gunner saw the depth charges explode and completely envelop the U-Boat, whose fire promptly ceased. Immediately after the first attack the

Navigator saw another U-Boat moving down the graticule of his sight. He at once selected the other two depth charges, using the same spacing, and released them at the appropriate moment. The nose gunner also saw the second U-Boat and estimated the time between passing over the two vessels to have been 4 seconds. He was able to fire a few rounds at point blank range as the **Liberator** was flying at 50 feet. This U-Boat also returned the fire. The rear gunner saw at least one depth charge explode abaft the enemy's conning tower close to his port side. The beam gunner dropped a flame float with each stick of depth charges. The second U-Boat remained on the surface until she was beyond visibility range. The Captain then returned to the flame floats within 3 minutes and swept between them with the Leigh Light. Neither U-Boats nor swirls were clearly identified, but both the rear and beam gunners saw about a dozen pieces of yellow flotsam which may have been deck planking. These were seen between the two flame floats. Markers were then dropped and both the convoy and a near-by escort group were informed of the position by R/T. Forty minutes after the attack the **Liberator** dropped a final marker and set course for base, having received neither damage nor casualties.

Comment

An excellent performance. The navigator is to be congratulated on his presence of mind in selecting and releasing the remaining depth charges on the second U-Boat. It is to be hoped that the evidence will enable the Admiralty to give a good assessment.

A Night Attack without the Searchlight: Wreckage seen

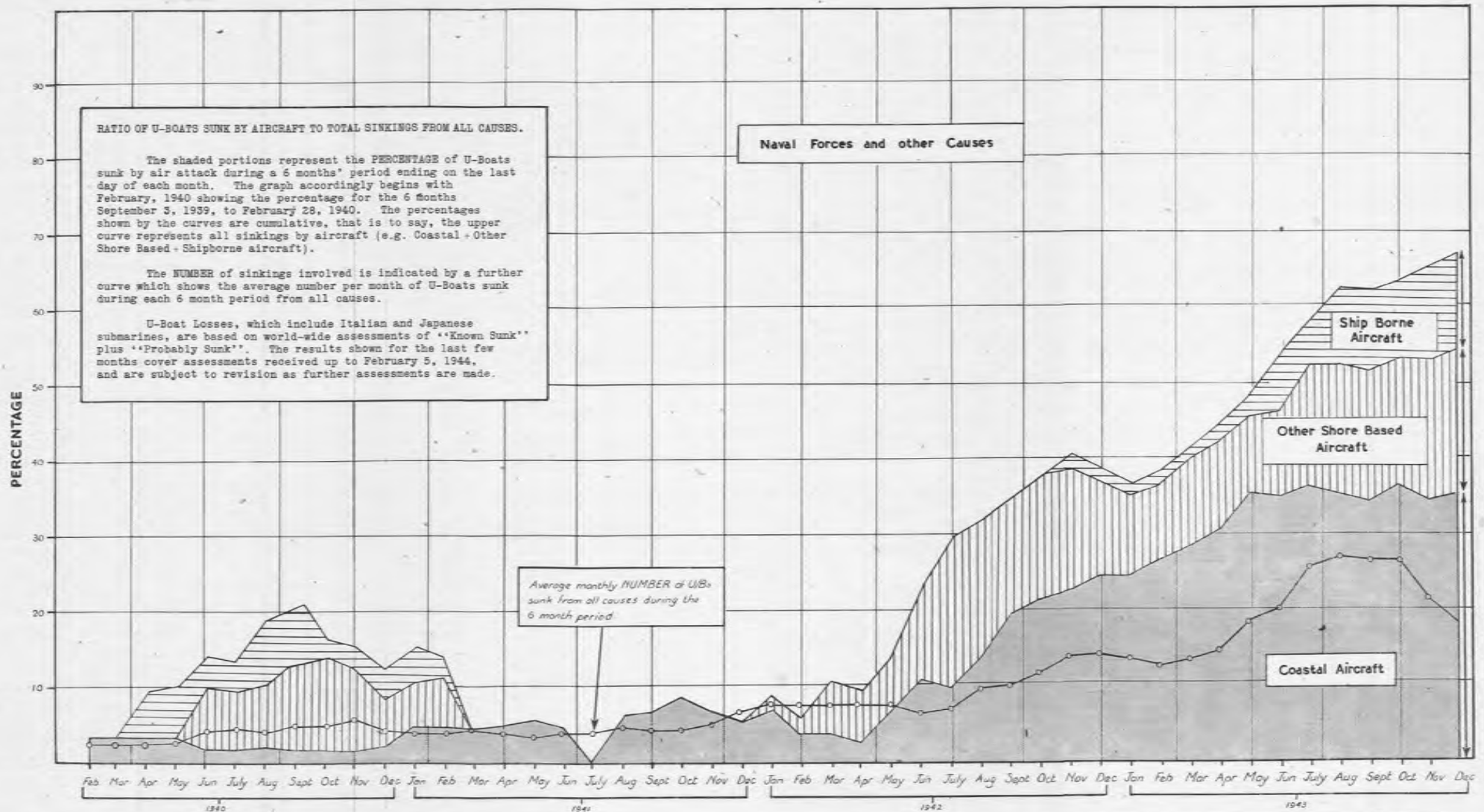
Just before midnight on February 10, **Wellington O/612** was patrolling at 600 feet when a Radar contact was obtained 7 miles away on the starboard bow. The visibility was about 2 miles, and after homing and descending to 200 feet the pilot sighted a U-Boat dead ahead, 1-1½ miles away. The Leigh Light was not used. The moon at the time was a point or two on the port bow. The U-Boat, which looked much bigger than the 500-ton type, was steering 250° at 4 knots. The conning tower appeared to be rectangular with two steps and is described by one of the **Wellington's** crew as streamlined and small compared with the length of the hull. The **Wellington** came in at 50 feet and attacked from the U-Boat's starboard quarter, releasing six depth charges spaced at 60 feet. During the attack the **Wellington's** gunners raked the enemy's decks and conning tower, but the U-Boat did not reply. The depth charges are stated to have straddled the U-Boat just forward of the conning tower, and the rear gunner saw the U-Boat silhouetted against the earlier depth charge plumes before she was obliterated by the rest of the stick. The pilot circled and when he reached the scene of the attack

3 minutes later, a Radar contact was obtained which denoted a U-Boat in the same position as before and apparently stationary (as indicated by flame floats). After two minutes this contact disappeared, though it is not certain whether this was due to the U-Boat submerging or the aircraft banking. A careful Radar sweep 5 minutes later revealed nothing. Ten minutes after the attack the **Wellington** flew over the flame floats at 200 feet and four members of the crew saw what they describe as oval shapes about 6 feet long and some rectangular pieces of wreckage which might have been planks and which were more numerous than the oval shapes. The crew also saw at least six yellowish orange lights similar to those on a **Mae West**, which were distinctly smaller than the flame floats and different in colour.

Comment

An excellent attack which shows the good training of the crew. This is an interesting attack in that debris was clearly seen without the assistance of the searchlight, but even more evidence might have been obtained if the Leigh Light had been switched on.

Ratio of U-Boats Sunk by Aircraft to Total Sinkings from All Causes



The above graph demonstrates that from 1942 onwards aircraft have steadily become the most effective means of killing U-Boats. The curve shows that during the latter part of 1943, aircraft as a whole accounted for over 60 per cent. of world sinkings and for the period of six months ending May, 1943, and onwards, Coastal Command alone can claim approximately 35 per cent. of the enemy submarines sunk throughout the world.

The graph is not intended to show the actual numbers sunk each month, but to indicate the trend of operations. For this reason each point on the graph represents the percentage sunk by air attack

during the preceding six months. Sinkings by Coastal Command include kills scored by U.S. aircraft operating with the Command from bases in the United Kingdom. Sinkings by other shore-based aircraft include kills by aircraft operating from North Africa, in both the Mediterranean and the Atlantic.

The graph also includes a curve showing the average monthly number of U-Boats sunk from all causes, during each of these six-month periods. As the object is to show the trend, the actual

number sunk each month is not given. It will be seen that the average monthly sinkings increase side by side with the effectiveness of air attack until for the eight-month period to the end of October an average of over 26 U-Boats per month was sunk from all causes. This curve declines sharply at the end of the year. This is partly accounted for by the fact that there may be more assessments yet to come in. But the principal explanation is no doubt the extremely cautious tactics employed by German U-Boats during the last few months of 1943. The obvious result was that fewer targets presented themselves for attack.

A Moonlight Sighting: Two U-Boats in Company

When **Wellington C/304** (Polish) was patrolling in the early hours of February 13 the sea was calm with a light wind and the visibility was between 4 and 6 miles. The Radar operator was not able to be at his set as he was trying to mend the aircraft's petrol pump which was leaking dangerously. Nevertheless the Captain sighted a U-Boat in the act of diving 2 miles away fine on the port bow. Her position was 44° 21' N., 09° 30' W. and her course 060° at 7 knots. She was sighted against the reflection of the moon on the water. The Wellington immediately dived to attack across the enemy's port beam and dropped six depth charges spaced at 60-70 feet while the conning tower and stern were still visible. The height of release was 150 feet. The depth charges straddled and the fifth entered the water just ahead of the forward part of the conning tower.

A few seconds after the attack the first and second pilots saw another U-Boat about 150 yards away on the same course as the first and also in the act of diving. As the Wellington had no more depth charges to drop it returned to the scene of the first attack to investigate. The moon, however, was then obscured by cloud and nothing more was seen of either U-Boat though the Wellington stayed in the area for an hour and three quarters.

Comment

A very good attack—but it seems most undesirable that the Radar operator, rather than any other member of the crew, should have had to be engaged elsewhere. Had the searchlight been used after the attack it may have been possible to get evidence of damage.

An Attack at Last Light

At about 2000 hours on February 16 **Liberator U/53** was flying at 900 feet when a Radar contact was obtained forward of the port beam 3½ miles away. The Liberator turned to investigate, losing height, and almost immediately the second pilot sighted a white object 3 miles on the port bow. As the range was closed a U-Boat was sighted moving slowly with very little wake. She appeared to have just surfaced and she was steering 030° at 7 knots. Her position was 51° 10' N., 20° 00' W. No guns were seen either forward or aft of the conning tower which was long, low, and compact. The Liberator flew in from the U-Boat's port beam and was fired at when the range was 2 miles. Very shortly after opening fire the U-Boat began to turn to starboard. The enemy's fire seemed to come from a single gun of fairly large calibre which fired both tracer and self-destroying ammunition. The tracer was orange and the self-destroying shells exploded with a large flash in sequences of four. The enemy's aim, however, was low, and when the range had closed to 1 mile the flashes were behind the aircraft. At about 1,500 yards the enemy opened up with intense light machine gun fire using deep pink tracer, but this gunner was as inaccurate as his colleague and did not once hit his target. The Liberator's nose gunner held his fire until the range was down to 800 yards and then fired two bursts which he believed hit the conning tower. The tail gunner fired a long burst as he passed over the U-Boat and though he saw no hits he is confident that he could not have missed. When the U-Boat turned to starboard the Liberator continued to track for the conning tower by the most direct route and attacked over the enemy's port quarter from 100 feet. The evasive action consisted of slight undulations. Six depth charges spaced at 60 feet were dropped with the aid of the Mark III bomb sight. Nos. 6 and 8 depth charges failed to release, so that the spacing between Nos. 5 and 7 was 120 feet. The depth charges are thought to have straddled but no one saw the points of entry, though the rear gunner saw one big plume just beginning to subside. The U-Boat appeared to be to port of this plume as if it had just been flung up from below the surface, and in plan the U-Boat would

have been in the centre of the plume. The Captain maintained his course for about 15 seconds, turned to port, and saw the U-Boat apparently stationary in the middle of a large swirl. About 30 seconds after the attack the Germans fired a few erratic rounds from the single gun. The Captain intended to make another attack with his two remaining depth charges and held his new course for about 9 miles before turning. The contact was held on the Radar screen all the way out, but on the run back it faded at 6 miles. The Captain continued to the scene of the attack, dropped a marker and began a hunt. At 2112 hours he was ordered to home C/407. At 2238 hours a Radar contact was picked up which turned out to be another aircraft circling the marker and sweeping with a Leigh Light. After failing to contact the other aircraft on R/T the Liberator left the scene to try baiting tactics and returned an hour and a half later. The marker was found but there was no sign of either the U-Boat or the other aircraft. Before leaving the Liberator dropped one Mark II and one Mark III marker.

Comment

This is an excellent performance. It is a pity that we are unable to say definitely that the attack resulted in a straddle. At the expense of foregoing his opportunity to fire as the aircraft passed over the conning tower, the rear gunner might have been able to see the points of entry of the depth charges. Until night attacks can be photographed, it will be more satisfactory for the crew if the rear gunner looks for the points of entry of the depth charges. The danger of being hit by U-Boat flak in the short time after the aircraft passes over and before the depth charges go off is small, and, if hits are obtained on the U-Boat, we are very unlikely to hear of the results. On the other hand, the rear gunner's evidence as to points of entry in relation to the U-Boat or the white water may enable the Admiralty to give an assessment more definite than "insufficient evidence of damage." Even on a dark night it is possible for the rear gunner to see points of entry so long as careful watching of practice bombing has taught him where to look.

II.—ANTI-SHIPPING

Hidden Profits

In order to deny the enemy the free use of his ships we can attack them either directly or indirectly. The direct attack is made by the strike squadrons of Coastal Command with torpedoes, R.P. and cannon, and by the Royal Navy, whereas Bomber Command delivers the indirect attack with its large-scale sea-mining. Both forms of attack are intended primarily to sink ships, but the ever-present threat that the attacks will succeed also produces secondary results—the hidden profits. Moreover, it is now clear that these secondary results are almost as effective as the actual sinking of ships for they produce very much the same effect on the enemy's economy.

In face of the threat that his ships will be sunk the enemy's immediate and obvious reaction is to institute a convoy system and then to begin selective routing through specially conserved channels. His next step may be to abandon convenient ports for others that are less suitable. Rotterdam is a case in point. It is the most favourably situated and the best equipped port for handling large quantities of essential imports and exports, but the enemy has renounced these advantages in favour of ports which are more congested but safer. This is more than a mere inconvenience for it increases the turn-round time and reduces the amount of cargo that the enemy can lift.

Increased turn-round time is the first symptom of inefficiency and in terms of carrying capacity it is almost equivalent to ships sunk. The ultimate object of our attacks is to reduce the enemy's carrying capacity, and it does not matter very much whether this is achieved by actually sinking ships or by reducing the efficiency of those which remain. Clearly, however, the threat which produces these secondary results will be effective only if we do sink ships whenever possible.

Sometimes it has been possible so to constrict the enemy's movements that he has lost more imports through this than through his ships being sunk. For instance, it is estimated that during the late summer and early autumn of 1943 the enemy was unable to make the best use of his shipping and that in consequence he failed to lift $1\frac{1}{2}$ million tons of imports. To have achieved this solely by destroying shipping we should have needed to sink or immobilize about 475,000 G.R.T.

The actual tonnage sunk in northern waters in August, September and October, 1943, was only 66,000 G.R.T.

Although increased turn-round time is the most tangible of the hidden profits, there are also others. For instance, the cost of the enemy's efforts to counter our attacks is easily visible and should be placed on the credit side of the balance of our achievement against enemy ships.

For example, the enemy is forced to allocate substantial air forces largely, if not solely, to protect his shipping. In the Norwegian area, in spite of some reduction in recent months, owing to increasing commitments elsewhere, there is a useful fighter force whose only apparent "raison d'être" is convoy escort, though clearly it could also be used to ward off threats to land targets if required. Off the North German and Dutch coasts also the enemy constantly has to use on convoy protection a number of fighters which could with advantage be used at other points which are more favourable for the defence of vital inland targets. So hard is the enemy pressed for fighters that he would not spare any were not his shipping commitments a compelling reason.

The employment (and misemployment) of large numbers of craft on convoy escort and mine-sweeping is another manifestation of the secondary result of air attack. The number of craft employed on these duties has more than doubled in the past two years, and it is estimated that some 50,000 men are needed to man them and that a further 50,000 are engaged in the ancillary administration. This total of 100,000 men makes no allowance for the large numbers required for repair and maintenance. Repair and maintenance in their turn take up valuable space on slipways and in the yards which could otherwise be devoted to building new ships to replace those sunk.

The hidden profits are substantial but not immediately apparent. Even though at times the targets presenting themselves to our torpedoes, bombs or mines, may seem to have grown fewer, the threat of attack is a constant embarrassment to the efficiency of the enemy's shipping operations, and the degree to which he is forced to accept a loss of carrying capacity is a proof of this embarrassment.

Shipping Strikes in February

The **Wick Beaufighter Wing** began the month with a successful R.P. and cannon attack on a German convoy near Stadlandet on February 1. The striking force was made up of nine Beaufighters of 404 Squadron, four armed with 60 lb. H.E., R.P., and five with 25 lb. A.P., R.P., and five anti-flak aircraft of 144 Squadron armed with 20 mm. cannon. The convoy consisted of one 5,000-ton M/V escorted by four E/V.s, one ahead, one astern, and two to seaward of the M/V. It was proceeding on a southerly course at 6 knots. After sighting the convoy in very bad visibility, the formation turned in to attack. The anti-flak

aircraft of 144 Squadron concentrated on the large E/V, which was to seaward and astern of the M/V, and attacked with cannon. Strikes were seen all over this vessel, and before the end of the attack a large explosion was seen in the after well deck, clouds of smoke rising to 150 ft. The R.P. aircraft then attacked with R.P. and cannon, three concentrating on the 5,000-ton M/V, three on the leading seaward E/V, and three on the rear seaward E/V. The main target was hit with R.P. at the waterline and on the superstructure, as well as by cannon fire, and is claimed as damaged. The leading seaward E/V was raked

from stern to stern with cannon fire and hit under-water by R.P. She was left enveloped in white smoke. The E/V astern, already burning as a result of the attack by the anti-flak aircraft, was smothered by a salvo of 60-lb. R.P., which must have caused extensive damage.

The attack was made in the face of intense flak from the convoy, and very accurate heavy and light flak from the shore. Rocket projectiles were again seen but caused no damage. The day's score—three vessels damaged for slight damage to one aircraft—is highly satisfactory.

On the evening of February 15 **Albacore S/415** was on anti-shipping patrol off Barfleur armed with six 250 lb. G.P. bombs. At 2120 hours whilst patrolling at 2,500 feet near Barfleur, the pilot saw a wake six miles off shore. He believed it was made by an E-Boat steering a course of 100° at 30 to 35 knots. "S" made a complete circle to port and attacked the E-Boat across the stern from the landward side, releasing all six bombs from 1,200 feet. A brilliant white flash from the first bomb indicated a direct hit and the second bomb must have been a very near miss.

This excellent attack on a very fast moving target met with the success it deserved.

Early on the morning of February 21 a convoy was attacked by the **North Coates Wing** at the entrance to Den Helder. Six Beaufighters of 254 Squadron carried torpedoes, and the anti-flak escort, armed with cannon only, was provided by eight Beaufighters of 236 Squadron and nine of 143. At the time of the attack the convoy was turning into Den Helder. It comprised at least one 1,500/2,000-ton merchant vessel with a close escort of three "M" class minesweepers and six "R" boats in two columns, one on either flank. The ships were undoubtedly surprised as no flak was met until the attack was well developed. Four torpedoes were dropped. Two were seen to run, one jumped out of the water and dived again, and the other was unobserved. Several crews reported seeing a torpedo hit on the M/V, which was left covered in a dense cloud of smoke or steam. The anti-flak aircraft did their job well. One "M" class minesweeper was set on fire, an "R" boat blew up after being hit several times, and numerous strikes were scored on the other vessels. One of the 143 Beaufighters ditched after being hit by flak in the starboard engine. One survivor who was seen in a dinghy was rescued later by the enemy.

Thirty-eight Beaufighters were despatched on this job, but owing to poor weather and a drawn out take off, little more than half of them reached the target area. In spite of this the attack was well co-ordinated and the results were satisfactory. The final score was one M/V seriously damaged, one "R" boat sunk, one "M" class minesweeper seriously damaged, and three "R" boats damaged. We lost one Beaufighter.

On February 22 **Albacore M/415** was vectored over a target about two and a half miles southwest of Boulogne. The pilot at first saw six small wakes and later was able to make out six vessels, probably E/R boats. Choosing one of the rearmost boats as his target the pilot attacked in a steep dive from 2,500 feet and released six 250-lb. G.P. bombs from 800 feet. A direct hit followed by a great yellow explosion was seen. This must have resulted in at least serious damage to the E/R boat.

On February 23 **Albacore F/415** came on six vessels half a mile north of Calais. The pilot believed them to be minesweepers or armed trawlers. After circling he attacked the leading vessel with six 250-lb. bombs, one of them falling within 10 feet of the target. No subsequent results were seen. A little while later **L/415** was vectored over shipping in approximately the same position. The pilot could not see any vessels but their position was marked by the flak which was being put up. Six 250-lb. bombs were dropped on one of the firing vessels but results were unobserved on account of the brilliance of the heavy flak.

Two torpedo attacks were made on enemy shipping off the coast of Norway early on February 23. **Beaufighter M/489** sighted a convoy of twelve vessels stationary off Egero. The pilot decided to attack the largest ship, a merchant vessel of about 5,000 tons. He released his torpedo from 1,000 yards range and on breaking away saw a great column of black smoke rising from the ship. This determined attack was made in the face of heavy flak from the vessel and from shore batteries.

A 4,000-ton merchant ship in convoy with one other merchant vessel and three escorts was attacked by **Z/489** near Farsund. One of the escorts turned sharply towards "Z" as if trying to avoid a torpedo, but no other results were seen. There was flak from the shore and from the ships but our aircraft were not damaged.

Beaufighters B, F, K and P/489 on Rover Patrols off the Norwegian coast carried out torpedo attacks on enemy shipping just before dawn on February 25. "B" sighted a convoy of two merchant vessels with three escorts about half way between Lister and the Naze. It was so dark that the Beaufighter was almost on top of the ships before they were sighted. The larger M/V, a ship of about 3,000 tons, was attacked. The torpedo was dropped from short range but it was impossible to see any results on breakaway as the ships merged into the dark background of the land.

"F" came across a 3,000-ton merchant ship just coming out of Egersund to join four other vessels which were stationary south of Egero. The M/V was moving very slowly and the Beaufighter attacked it from the sea towards the land. As he broke away the pilot saw a large orange explosion on the target. No further results were seen.

A large ship, believed to be a modern tanker of 8,000 tons, was attacked by "K" between Karmoy and Bokn. It was with six or seven other vessels and appeared to be stationary. The aircraft broke away over Karmoy and the crew were not able to see the result of their attack.

The pilot of Beaufighter "P" sighted a 3/4,000 ton merchant vessel a few miles south of Karmoy. There were a lot of fishing vessels in the area, all of them lighted. On his first approach the pilot found himself too near for a good attack so he circled and came in a second time. He attacked towards the land but darkness prevented results being observed from the aircraft.

It was disappointing to the crews engaged in these attacks that lack of light made it impossible for them to observe results.

III.—OTHER OPERATIONAL FLYING

Combats with Enemy Aircraft

After a shipping attack off the Norwegian coast on January 21, **Beaufighter M/144** was on the way home with the rest of the formation, when three Me. 109s appeared, one of which gave chase to "M". The Beaufighter pilot tried to reach cloud at 4,000 feet but was attacked before he could do so. He began violent corkscrew evasive action and carried on for nearly fifteen minutes, being hit several times by the 109. **Beaufighter U/404** then took a hand; the pilot turned back towards the enemy coast and attacked the Me. so that "M" was able to break clear. The enemy turned his attention to "U" who also took evasive action and gained cloud cover after being chased for twelve minutes. This praiseworthy action by the pilot of "U" undoubtedly saved "M" from a very dangerous situation.

On February 6 **Mosquito P/333** was carrying out a shipping reconnaissance along the Norwegian coast when the pilot sighted an He.115 about three miles away on the port bow. The enemy aircraft was on a reciprocal course at 100 feet "P" climbed to 200 feet and turned through 180° to get on the enemy's tail. The Mosquito pilot opened fire from 600 yards dead astern and closed to 200 yards, firing short bursts. After the second burst both engines of the He. caught fire. Some attempt seems to have been made to extinguish the flames, but the enemy aircraft crashed into the sea and broke up. The navigator took some excellent photographs of the He.115 burning in the air and of the wreckage on the water. After this action the Mosquito resumed patrol.

Just after making a landfall on the Norwegian coast on February 13, **Mosquito R/333** sighted a convoy eight miles ahead, and at the same time a B.V.138 on the starboard quarter two miles away. The pilot continued on course to investigate the convoy. Having completed his reconnaissance he turned towards the enemy aircraft and, approaching from astern, fired a short burst at 400 yards. Hits were seen on the two outer engines and fuselage of the B.V., which caught fire and crashed into the sea. The navigator took some good photographs which confirm the enemy's destruction. Flak from a nearby coastal battery hit the Mosquito, and it was forced to return to base on one engine.

This was the Mosquito pilot's third victory off the Norwegian coast since the beginning of December; he has destroyed one Ju.88 and two B.V.138s.

One Sunderland and Twenty Ju. 88s.

On February 15 **Sunderland Q/10** (R.A.A.F.) was on patrol in the Bay area, flying at 1,500 feet on a course of 240°, when twelve Ju.88s at 300 feet

were sighted 5 miles away on the starboard quarter. The enemy aircraft were heading west, so the captain of the Sunderland at once turned 180° to port to reach cloud cover 7 miles away. When he came out of this turn he saw two other formations of four Ju.88s each: one of these formations, however, did not join in the attack. The twelve 88s, now on "Q's" port bow, split into three sections of four, and the individual aircraft formed line abreast with each section about 100 yards behind and 100 feet below the one in front. The formation of four on the starboard quarter went into line astern. All the enemy aircraft were then flying at the same height as the Sunderland, which increased speed and held course until the enemy opened fire. The large formation attacked from 70° on the port bow: at least eight of them and possibly the whole twelve, began firing simultaneously at 500 yards and kept it up to within about 100 yards. "Q" immediately made a climbing turn to port, and passed over the formation, which had apparently expected the Sunderland to dive as most of their fire went low. At the same time the four 88s attacked from the starboard quarter, but were baulked by the others and did not score any hits. During the attack the nose gunner fired at one of the aircraft in the leading formation and saw tracer enter the cockpit; he also got in a burst at the leading Ju. of the first section and estimated hits. Only very slight damage was done to the Sunderland, but unfortunately a stray bullet killed the tail gunner outright. As soon as the first attack was over "Q" turned to starboard again and reached cloud cover before a new attack could develop.

Quick action on the part of the captain and good training all round undoubtedly saved the Sunderland and her crew from destruction by overwhelming odds.

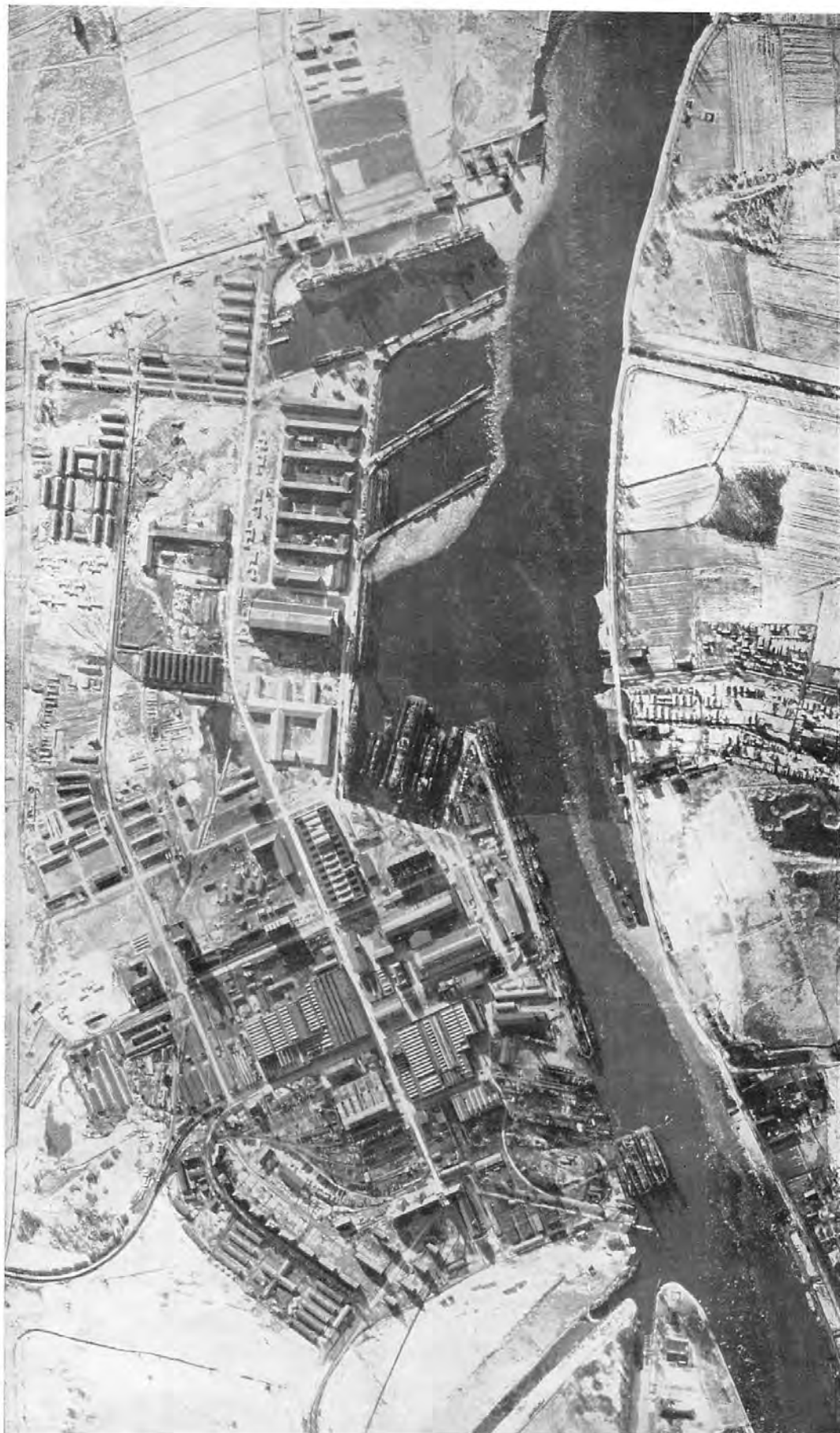
On February 16 **Beaufighter N/235**, flying at 8,000 feet, was vectored by the convoy it was escorting on to an enemy aircraft. The enemy, a Ju.290, was sighted five miles dead ahead at 6,000 feet "N" dived to 7,000 feet and, after turning to port, attacked on the beam out of sun. The Ju. took no evasive action, but returned very inaccurate return fire from the tail and beam guns. "N" then made another beam attack on the starboard side and numerous hits were seen on the fuselage and starboard engines. The enemy entered a cloud and the Beaufighter got into position for a third attack. However, when the Ju.290 emerged from cloud, both starboard engines were pouring out dense black smoke. The aircraft lost height rapidly and from 1,000 feet went into a sudden steep dive and crashed into the sea. "N" was undamaged and returned to the convoy.



On February 20 Beaufighters of Nos. 144 and 404 Squadrons attacked shipping in the Stadtlandet area and claimed hits on a medium sized ship. She was identified as the German *Emsland*, 5,170 tons, and the above photograph taken by 333 Squadron shows her beached at Ervik. She has broken in two and is assessed as a total loss. This vessel was one of the few remaining trunk-decked ships, and her sister ship, the *Stadt Emden*, was sunk last year by the North Coates Wing.



A Heinkel 115 shot down off Bremanger by a Mosquito of No. 333 (Norwegian) Squadron.



KONIGSBERG, photographed by 540 Squadron on February 19 from 23,000 feet. The light cruiser *Köln* is seen alongside at the New Naval Base, having been last seen at KIEL. Her main guns have been removed and she appears to have been stripped of all her fighting equipment. 16 U-Boats, including one of 1,000 tons, are present in the port.

Photographic Reconnaissance

After two months of disappointing attempts, it was possible to make two complete photographic covers of Berlin during February. Most of the targets attacked by Bomber Command were photographed, and aircraft from 106 Wing frequently followed close behind Fortresses and Liberators of the United States Strategic Air Force to confirm the results of the offensive against the Luftwaffe's main bases and aircraft factories.

One of the sorties described below made a new record in long distance photographic reconnaissance. On February 12 a Mosquito of

540 Squadron photographed Königsberg and Pillau during a sortie which covered 1,880 miles in 6 hours 40 minutes. Photographs taken during routine sorties did not reveal anything of outstanding interest except a definite decline in the number of U-Boats being built in the German yards.

Figures for the month reveal new records for Benson. The previous record for output of photographs was exceeded by 33½ per cent. One one day alone 9,832 negatives were made, yielding 31,063 prints.

The following selection of reports of photographic reconnaissance were written by members of the aircrews concerned.

540 Squadron (Mosquito)

We took off at 1020 hours with the object of covering all the Eastern Baltic ports as far as Königsberg. We set course for Catfoss to refuel. We took off from Catfoss at 1130 hours and set course for Sylt. After climbing through 28,000 feet of cloud, encountering slight icing on the way, we altered course on a D.R. position at Sylt. Five minutes later, when still flying in cloud, we were surprised to see puffs of black flak round the aircraft, all accurate. One was seen just below the starboard nacelle and a slight rattling was heard on the fuselage. When we landed we found that the perspex of the nose had been punctured. The position was estimated to be Flensburg.

Over Denmark there was 10/10th cloud of all types, but this cleared to 5/10th south of Copenhagen. Eventually it cleared altogether and the whole Baltic Coast and North Germany were clear.

A smoke screen was operating at Swinemünde and Peenemünde, no doubt because of the activities of our own aircraft which were covering Berlin and Poznan. We turned slightly south to photograph Rugenwaldermünde and a coastal strip in that area. Then we carried on to Gdynia, arriving at 1420 hours, slightly ahead of E.T.A. Gdynia and its airfields were photographed from 25,000 feet, trail level being slightly above this. After two runs over Gdynia from east to west and north to south, Danzig and Neufshrwasser were covered at 24,000 feet with two runs, again east to west and north to south. Trail level was coming down slightly so height was reduced to 23,000 feet and Marienburg and the airfield were photographed. Elbing was then photographed at 23,000 feet, from south to north.

We set course then for Pillau which was covered at 23,000 feet from south to north, including its airfield. At this stage the pilot remarked that we needn't watch out for enemy fighters because if they saw us we would have had it anyway! Two runs were then made over Königsberg and three airfields in the vicinity, at 23,000 feet. Three parallel runs were then made from east to west at 23,000 feet over Bruesterort and course was set for base at 1500 hours.

Two convoys were photographed at 28,000 feet in the Baltic, and a run was made over Bornholm

and Ronne airfield at 28,000 feet to use up the rest of the film. On the way back we found 10/10th cloud over Denmark. The starboard engine began to run very roughly but there was no further trouble and we landed at base at 1810 hours with 60 gallons of fuel left, after 6 hours 40 minutes flying. We had covered 1,880 miles.

The drop tanks were jettisoned on Rugenwaldermünde on the way out because of the length of the trip. The starboard drop tank damaged the engine nacelle but this did not inconvenience us in the slightest.

542 Squadron (Spitfire)

Soon after midday on February 25 I was briefed to be over Stuttgart and Nurnberg approximately an hour after attacks by the 8th U.S.B.C. I was airborne from base at 1300 hours, refuelled on the coast and was airborne again within an hour. I crossed the Belgian coast over cloud in the Ostend area but quite soon I was able to pinpoint myself and it was good to see that I was dead on track. The weather was so clear that I was able to pinpoint myself all the way to Stuttgart. The view from 37,000 feet was remarkable—to starboard I could even see the Alps gleaming white in the sunlight. Targets in the centre of Stuttgart were well alight as I began my first run over the city a few minutes before 1500 hours. As I began a second run I realized in no uncertain manner that my presence was known. A heavy barrage began, very accurate for height and direction. It followed me as I did my run and one burst was far too close to be comfortable. I changed height and direction every few seconds and made a short third run over the target before setting course for Nurnberg.

As I left Stuttgart I saw a big column of black smoke on my starboard and immediately veered off in that direction. I assumed this to be Nurnberg and I made three runs over two separate targets which looked badly knocked about. On the third run I decided to check the target against the map and was suddenly aware that the rivers did not coincide. I was certain then that I was not at Nurnberg after all. Then some more flak came up at me, this time not at all accurate.

I set course home from this target as if it were Nurnberg. In a few minutes I came upon another town which had obviously been raided. Several large fires were burning among the buildings on an airfield. I saw that this was Nurnberg and realized that my previous target had been Regensburg. I made two runs over Nurnberg and then set course for home.

When I reached Frankfurt I realized that my fuel was getting low so I pulled the revs. back and descended to 32,000 feet where fuel consumption would be appreciably less. I pinpointed myself at Liège, kept on course and began to have doubts as to whether I should reach England. I was now flying over 10/10ths cloud, entirely by compass, and decided to wait until the gauge showed 10 gallons before asking for a homing. I pressed the gauge button at intervals. It showed 15 gallons then 12 gallons, then 10, and I called for a homing. I was given a vector of 300° but at 1720 hours, just as I crossed out over Dunkirk, my engine cut completely. I was then at 28,000 ft. and told Manston I was gliding. They gave me cloud base at 3,000 feet and a new vector. I turned west—went into cloud at 3,000 feet and out at 2,500 feet Manston told me that I had passed right over the airfield. I turned round and seeing it immediately behind me, I headed towards it. I then realized that I would never make it so I aimed to set down in a small field just in front of the airfield. I saw smoke from a chimney and thought about getting into wind. Houses, pylons and cables seemed to be all over the place. I found myself going under the wires straight for an orchard. I pulled back hard on the stick and ditched on the tree tops. I must have been out for a moment. When I came to suddenly I saw flames in front of me. I released my straps and dived over the side, landing on the wing. Releasing my parachute, I made for the cameras. By this time, several people came through the hedge. I got a knife from one of them and prised open the plate and got the magazines out. Someone was throwing buckets of water over the fire and it was soon out. The engine had been knocked off and the port wing was lying on its own. But the magazines were untouched, and I got away with a few scratches and bruises.

541 Squadron (Spitfire)

I was airborne at 1230 hours on February 20 having put down at an advanced refuelling base. I was an hour late taking off because of a faulty oxygen cock. This caused me some anxiety at the time because of the met. forecast but it turned out to be fortunate.

I climbed to 39,000 feet and set course for Berlin. I got a lucky pinpoint as I crossed the Dutch coast near The Hague. Cloud seemed to extend all along my track and to the north of it. This persisted until I was beyond Brunswick (D.R. position), and I was not at all sure of my exact position. The cloud suddenly broke and I found myself over Magdeburg, having drifted south of track. Magdeburg was quite clear of cloud and I pushed on to Berlin full of hope. Mine was the forty-sixth attempt to photograph Berlin since the last successful cover.

As I approached the city I could see that it was to be clear so I felt very pleased with life. It was my first view of Berlin. I started my first run at 1415 hours over the eastern end, running westwards across the centre of the city. I was

at 38,000 feet and no one seemed concerned about my presence. The only incident was an attack of bends in my right arm, but not so unbearable that I had to lose height. I made ten runs in all and finding myself over the Siemensstadt area on the western side of the city, I realized that petrol was going to be on the short side.

As Magdeburg added only 10 miles to the straight track to base, I decided to go home that way. I let my cameras run over Brandenburg on the way. I did two quick runs over Magdeburg and set course for base.

When I was on the way home I throttled right back and gradually lost height to 31,000 feet. I could see Brunswick and Hanover quite clearly as the cloud had moved south since my inward trip.

I crossed out over cloud in the Dunkirk area. When I was down to 20 gallons I called up for a homing and a fix of position, having been over cloud for some time. I was told that I was approximately 80 miles from the English coast and I was given a homing. I then began gliding and losing height and was down to 3,000 feet with 8 gallons left when I saw the English coast. I landed at Manston with just 4 gallons left, after being airborne just over four hours.

541 Squadron (Spitfire)

On February 24 I was briefed to take photographs of a factory at Erkner, about 15 miles beyond Berlin. This was a longish sortie for a Spitfire XI, so I refuelled on the coast and took good care to see that all my tanks were really full.

The forecast was clear weather with an easterly wind, strong at 30,000 feet, but considerably less at 40,000 feet. I took off at 1135 hours and climbed fast up to 40,000 feet. I then did a shallow dive to 38,000 feet, to build up airspeed and reduced to 2,500 r.p.m. I soon found that I was making such good speed that I reduced r.p.m. further to 2,400, at which I continued all the way to the target.

I crossed the enemy coast at the Hague at 1218 hours and found the weather true to forecast. It was slightly hazy but remarkably cloudless, and I was able to map-read the whole way to Berlin. I passed Rheine, the half-way mark, about 1 minute ahead of time. Shortly afterwards I saw Hanover. I had been unable to get above trails, which were non-persistent but fairly long. The flak batteries at Hanover are manned by enthusiasts, so I decided to fly to the south of the town and make them shoot into the sun. As it happened they did not shoot at all.

On nearing Berlin I could see big patches of strato-cu. over the north of the city, but the southern half was clear and there were clear patches beyond. I turned on the cameras as I passed over Berlin, which I reached a few minutes early. Then I began to look for Erkner. All the countryside was snow-covered and this made pin-pointing difficult. Also, I had considerable frosting on the perspex hood. But I spotted the Muggelsee, a lake near Erkner, and shortly after saw the roofs of the factory itself. It was a very small target but I made three runs over it to make sure and then set course for the coast at 1352 hours.

As I had plenty of film left I let the cameras run whenever I thought I was passing over places of interest. I got pictures of Potsdam, Brandenburg, about half Hanover, which again did not shoot, Minden and Osnabruck.

For the return journey I reduced my r.p.m. still further in order to save petrol. I gradually lost height to about 32,000 feet to take advantage of the stronger easterly wind.

While near Brandenburg I saw a big pillar of smoke rising from Gotha, which had been bombed by the Fortresses that morning. I also saw a trail in the same direction, but it was a long way off; probably another Spitfire taking photographs.

Just west of Osnabruck I saw two trails about 20 miles ahead and rather above me. I thought these might be interceptions, so I increased to

2,600 r.p.m. and climbed up to 39,000 feet again. The trails carried on to the south and took no notice of me.

When just south of the Zuyder Zee I saw another trail some distance away, apparently in the neighbourhood of Ostend. I steered slightly to starboard and took the opportunity to photograph Schipol aerodrome. The aircraft over Ostend did not come my way, so I left the Dutch coast at Ijmuiden at 1500 hours and landed at Bradwell at 1530 with 23 gallons of fuel left after being airborne 3 hours 55 minutes.

The Spitfire had made very good speed all the way, but it always had enough fuel in hand to permit about 10 minutes really hard going at high boost and r.p.m. for a get-away. A comforting thought.

Air-Sea Rescue

During the 29 days of February there were 72 air sea rescue incidents in which the lives of 80 members of aircrews were saved.

The most interesting rescue saved eight members of the crew of a Liberator which ditched after being attacked by two Ju.88's. The Liberator was on anti U-Boat patrol on February 14, flying at 3,000 feet when it was attacked, out of clouds. The Captain described the attack afterwards.

"They just came in shooting on our starboard beam. Our guns got into action but the bow gun was knocked out after firing about 50 rounds. The port outer engine was hit immediately and it ceased to function. Nor was it possible to feather the propeller. During the action we came down to 1,100 feet. They riddled us from end to end but by some miracle no one was hit. One of the crew got a hole through his flight suit and he had his heater cord cut off close to his leg, without being scratched. Another member of the crew who was in the nose turret had his gun knocked out and saw a hole appear in the turret glass just a fraction of an inch from his left ear. The starboard waist gunner was talking through his inter-com. 'mike' when a bullet severed the 'mike' cord about 3 in. below his hand. None of the bullets came into the cockpit but several banged into the workings behind the instrument panel. The compass and other instruments failed. My men kept up their fire and the top turret gunner saw his bursts and those from the tail gun smack into one of the Ju.88's. We feel pretty sure that plane went down later. But we didn't stay around to watch. We ducked into the clouds, escaped and limped along on three engines.

"I had given orders for an O-A to be sent by the wireless operator when we were attacked. When I found that the port propeller would not feather I had ordered an S.O.S. to be sent and fixes obtained.

"D.R. position was transmitted and two first and one second class fix were obtained before the aircraft was ditched. The depth charges and all spare ammunition had been jettisoned. About 45 minutes later the outer starboard engine failed. Bomb doors were closed and a tail down approach was made, across a slight swell into wind at an

I.A.S. of 85 knots. We had come down just as daylight was fading. We hit very hard and the nose went under water almost immediately. Water rushed in through the nose and the aircraft broke in half, aft of the bomb bay.

"I was stunned and had trouble unfastening my safety belt. One of the crew reached back and pulled me above water. I was still dazed and don't remember much. Our two radio men were hurt in the crash and the others could not get them out in time when the plane sank. One of the others was badly hurt and he died during the night in the dinghy.

"Two of the crew went out of the break, three out of the port waist escape hatch and one out of the starboard. The second pilot and myself got out of the top of the cockpit which was torn away."

"Both the A.2 rafts inflated and the nine of us who escaped got aboard and were clear of the aircraft when it sank, five minutes after. Unfortunately the dinghy radio was not salvaged.

"It was very cold. We tied the two rafts together and five of us got into one and three others with the injured man, into the other. During the night we saw a searchlight. We picked up because we thought we were being rescued. We stripped the cover off a verey cartridge which was swollen with damp, and fired it. But nothing happened. We learned afterwards that a British aircraft had investigated the flares and that it had been badly shot up by a number of Ju.88's which were circling in the vicinity. I guess those flares came from survivors of the Ju.88 we hope we shot down. Perhaps they were getting protection from the air to prevent them being taken prisoner.

"It got colder and colder during the night. One of the boys had kicked his boots off in the water and his feet were freezing. So one of us held his face against his feet to keep them warm. We didn't talk much.

"When morning came the sea was calm—just a 5-foot ground swell. We got out a compass and found the wind was in the south. We rigged up our sail thinking we might eventually hit England. One seagull found us and circled over us for a

few minutes. Then, out of all that vast area of ocean, he chose us for his target. He let go his charge right above us with perfect marksmanship.

"About 1015 hours, Sunderland F/461 spotted us after we had fired three parachute flares. An 'H' type dinghy and rations were dropped and all were recovered by the crew. The 'H' type dinghy alighted upside down but was righted quite easily.

"A little later a Catalina from one of our squadrons came out and attempted to land, but we waved it off. The Captain of the aircraft then signalled base for permission to land but this was refused as surface craft were already on their way.

It turned out that there were two British craft coming to pick us up. It developed into quite a race. One was a corvette and the other was one of the fast air-sea rescue craft which of course, won the sprint. We had been in the water just 19 hours and 34 minutes. We were all pretty much the worse for wear but I don't think we had doubted that we would be rescued from the beginning."

The above account shows the result of dinghy drills, carried out with precision. The Liberator is a notoriously bad ditcher and the Captain is to be commended on his handling of the aircraft after the attack.

OTHER RESCUES

On February 22 the Air/Sea Rescue service put out its usual standing patrols to help distressed bombers of the U.S.A.A.F. which were returning from operations over enemy territory. Hudsons of 279 Squadron and Warwicks of 280 Squadron were airborne and high speed launches from Harwich and the Humber were ready at a rendezvous.

At 1805 hours **Hudson E/279** signalled that it was over a dinghy with nine survivors. The position was 52° 04' N., 02° 37' E. Immediately afterwards the aircraft called **Hudson J/279** to help. The latter had been investigating a column of black smoke some distance away. When J arrived over E's dinghy it dropped a Lindholme dinghy. The survivors climbed in and the two

Hudsons circled until darkness came when J had to return to base. E remained and was able to find *H.S.L.s* 2557 and 2558 which had been diverted to the position. The Hudson switched on its landing lights and succeeded in leading the launches to the dinghy. When the survivors had been safely taken aboard the launch, the aircraft returned to base. The Hudson Captain reported that he had been greatly assisted by the pyrotechnics used by the occupants of the dinghy.

The column of black smoke which J had been investigating came from a crashed and burning aircraft. One man with a parachute on was seen near the wreckage, but he disappeared while the aircraft was circling. He is believed to have been dead.

PLATE 7 opposite

Above. The Bachman, von Blumenthal Bomber Components and Repair Factory at FURTH near NURNBERG, photographed by 542 Squadron from 27,000 feet. The photograph was taken one hour after the factory had been attacked by the U.S.A.A.F. on February 25.

Below. The rescue of eight survivors of the crew of Liberator C/103 (U.S.N.). See letterpress on page 17.



PLATE 7





PLATE 8

Kindley Field, Bermuda.



IV.—SPECIALIST AND GENERAL ARTICLES

Quislings in an Invasion Exercise

An unusual exercise recently held at the R.A.F. Station, Tain, had three objects: to give aircrews practice in avoiding detection while escaping across enemy territory by night; to give a small tactical force some idea of what would happen if they had to land on enemy coast from a U-Boat and steal a secret bomber from an airfield; and to test the defences of the Station and the tactical resources of unit commanders against air and sea raiders.

Escape

Reports of enemy aircraft began to come in as the last light faded across the Firth. It was a clear moonlit night, darkened by small clouds. Two hours before midnight word reached Battle Headquarters of two enemy aircraft brought down by night fighters, and of parachutes floating down. More reports of crashed enemy bombers followed, but there was no sign of the crews who were thought to have baled out. In actual fact aircrew in pairs, each with food, maps, and compasses, were conveyed by a blacked-out bus to secret starting places, whence they had to make their way undetected to points within the defences of the aerodrome.

Battle stations were manned, armoured cars circled the aerodrome and patrols, afoot and in Jeeps, searched the countryside. But the escaping airmen had vanished. It was not until 0200 hours that the first clue to their movements was discovered, when the officer in command of Battle Headquarters was lucky enough to intercept a telephone message reporting the theft of two bicycles from a village dance hall.

The aircrews were then realizing what it is like to escape through a hostile country, crossing a landscape flooded with moonlight and alive with patrols and guards. One pair, F/Sgt. F. and F/Sgt. S. were examining their map in the light of the moon at a crossroads when they looked up and saw a Home Guard leaning on his bicycle up the road and watching them. They slipped into a field, crouching in the shadows as they hurried from the road. They heard their pursuer crossing the field on the other side of the hedge so they turned back and crossed the road into another field.

After this they kept to the fields, following the road behind hedges in the direction of Fearn. Several times they were almost discovered by pedestrians, but they froze into the shadows until the danger was past. As they approached the outskirts of Fearn it became more difficult to avoid detection. They clambered over garden walls and crept through the grounds of private houses. Once when about to drop from a wall they saw two armoured cars below them. For ten minutes the men lay on top of the wall. They slunk into the village when the cars moved off.

Their objective was the Police Station. They knew that one of the constables was a quisling, who might be able to help them. Near the Post

Office they ran into a patrol and just managed to dodge into a dark doorway. They crouched in the shadow while the patrol stood a few feet away, arguing about the futility of their job. When the patrol resumed its march the two men decided that it might be safer to make the constable come to them. They rang up the Police Station from a public call box and the quisling answered. He came on his bicycle and gave them all the information he could, showing them the best way to reach the aerodrome.

They would never have achieved this if luck had not been with them. They had to pass many patrols and they were chased by a farmer, playing hide-and-seek with him in the farmyard and escaping through the stables. After crawling through the barbed wire, being chased by guards and hidden by a quisling officer, they spent many minutes on their hands and knees stalking a patrol which turned out to be a flock of sheep. They reached their contact point at last. They were the first to arrive home.

F/Sgts. M. and W. soon fell into trouble. After creeping from a wood toward two lorries parked outside a cottage they were attacked by a Highlander who leapt from the shadows. They took to the fields with the Scot in pursuit and went to cover in a thicket. The moonlight was then as bright as it could be and they waited a long time before they thought it safe to leave their hiding place. As soon as they broke cover their pursuer pounced upon them, tripping and holding F/Sgt. W. It did not take the airman long to realize that this was no part of the exercise. The Scot overpowered him with a painful arm-lock, took him to a cottage and sent for the police. The policeman turned out to be the quisling. The airman was arrested and taken to a lonely spot, where he was given details of the movements of patrols and shown the easiest way into the aerodrome.

In the meantime, F/Sgt. M. escaped and managed to contact a quisling officer who gave him clothing, information of patrol activities, and the password. At 0200 hours he was crawling on his stomach toward the boundary fence a quarter of a mile away. He waited in a ditch while a guard searched all round him. Worming his way through the wire, he passed the patrols, stole a bicycle, pedalled past sentries, called out the password when challenged, and at last arrived safely at his contact point.

As F/O. A. and F/Sgt. C. were nearing Arabella, they heard the music of a dance band coming from the village hall. They crept up and found some bicycles outside the hall, unlocked and ready to ride away. They thought it would be a good thing if they made use of the stealing chits with which all aircrew had been provided. They sauntered into the hall and mingled with the dancers. Before they could take the bicycles they needed, they had to leave signed chits with somebody without arousing suspicion. They began

to speak excitedly in mock French, gesticulating wildly at the dancers while the band played a slow foxtrot. Nobody could understand them, so they wrote their names on a couple of stealing chits and handed them to a man telling him to "Giff zem to ze M.C." The man was startled but the F/O. and the F/Sgt. did not wait to see what effect the chits had on the M.C. They walked out of the hall, took a couple of bicycles and rode away.

The ruse was successful but it gave Battle Headquarters its first news of the whereabouts of the invaders. Twelve members of aircrews reached their contact points inside the aerodrome. The remainder were either captured or arrived too late.

Quislings

A valuable feature of the exercise was the organization of quislings. In addition to two officers on the aerodrome, Sgt.-major S. of the Home Guard and a constable at Fearn Police Station gave valuable help to the escaping aircrew and the submarine raiders. Without this they would have failed. The identity of the quislings was known only to the enemy and the umpires. It is all the more interesting, therefore, to learn how easily patriotic subjects may be gulled by unscrupulous agents, and how a man might betray his country without realizing it.

F/O. T. was a quisling on the ground staff of the aerodrome. While he was seeking out the disposition of sentries and patrols, a guard challenged him. The guard was not satisfied by F/O. T.'s identity card and he was taken to the Guard Room. While skirting Battle Headquarters they were stopped by a sentry to whom the guard shouted the secret password of the aerodrome defence, thus presenting the quisling with a vital piece of information. At the Guard Room he was interrogated by an officer and he pretended to be indignant. He protested that he had no part in the exercise; that he had been flying all the previous night and that there were several other pilots in the same predicament. This story was swallowed without question by the officer, in spite of the fact that the Operation Order had clearly stated that *all* ranks would join in the exercise. F/O. T. was given one of the special passes for the exercise and set free, a circumstance of which he made full use in a further reconnaissance of the aerodrome. When escaping aircrew contacted him he was able to help them, to guide them through the defences, tell them the disposition of sentries and patrols, to give them the password and lend them his special pass. All these things were handed to him as a gift by men who imagined they were doing their duty.

Sea Raiders

As dusk fell over the Firth a raiding party was supposed to have landed from a U-Boat and to have reached the house of a quisling. They were actually taken secretly to the home of Sgt.-major S. before the exercise began. There they held a council of war. Their task was to steal or destroy (in theory) a new and secret type of bomber known to be on the aerodrome; to capture at least one officer; to disrupt communications and to damage aircraft and buildings. Their most pressing need was to find out the password.

A small party was sent to watch the local inn with the hope that a patrol might be so foolish as to leave their armoured car outside while they went inside to interrogate the people in the saloon bar. If this was a success they were to immobilize the armoured car, capture the crew when they came out of the inn and force them to give the password and any other useful information. The main party, led by Sgt.-major S. then left the house and hid in the grounds of a house overlooking the Firth. They were glad of the cover under the trees and in the long grass, for the moon was then well up.

Just before midnight, the main party crept from their hiding place and made their way across the sands to meet the party from the inn on a lonely headland. Here they received a setback, for the party from the inn had been unable to learn the password. This made their task more difficult but there was nothing for it but to go on. Led by Sgt.-major S. they walked inland to a point near the aerodrome, guided by the quisling who showed them a covered way where there was little chance of being discovered by patrols. Sometimes they crawled through the heather; sometimes they squelched over rough bog, sinking to the thighs in slime; sometimes they wormed their way on their stomachs over hundreds of yards of smooth turf in brilliant moonlight.

When they reached the barbed-wire defences of the aerodrome a patrol was passing on the inside. When it had gone by, two of the party went forward to cut the wire. The rest crawled forward like Apaches and at 0230 hours the force was inside the aerodrome. The defenders then became suspicious. A telephone line had been cut along with the barbed wire. When a patrol arrived to investigate the sea raiders were lying less than a hundred yards away, in full moonlight. Their luck was in. For some extraordinary reason the patrol decided to accept the fact of the cut wire without bothering to reconnoitre the immediate vicinity of the aerodrome. The patrol departed and the raiders continued on their stomachs toward the hangar that housed the secret bomber. At 0325 hours they chalked their sign on the aircraft, thus indicating that their first task of stealing the bomber was completed. In accordance with the exercise programme a thunder-flash was lit to rouse the defence. This was to represent the noise of a bomber taking off.

The raiders then made their way towards the Flying Control tower. As they were closing on it they saw two figures running toward them from the perimeter of the airfield. When the sentries divided, one to either side of the control tower, the raiders also split and so captured their discoverers. The sentries denied all knowledge of the password and when further questioned about the disposition of Flying Control guards, one of them glanced up instinctively at the roof. The raiders saw a man's helmet outlined against the moonlit sky and they flung up a thunder-flash to put him out. In order to advertise the iron control of his nerves the guard made no sign nor any attempt to challenge the raiders on the ground below. They therefore "blew up" the control tower, began to "destroy" aircraft and "set fire" to a petrol dump. Armoured cars dashed up, their occupants bravely shouting to

an empty hangar, "Come out! We've got you covered!" But the raiders were some distance away, hiding in the W.A.A.F. lavatory.

Two of their tasks were complete. They had only to capture an officer and then they could make their escape. But things were becoming desperate and the defence was alert. The raiders stole a car from the M.T. yard and drove out on to the perimeter. An armoured car gave chase and "opened fire" on them. At 0410 hours they were all officially "dead," just before their task was completed.

Conclusions

From the point of view of the escaping aircrew and the sea raiders, the defence was often most helpful. Sentries and patrols continually gave away their positions by talking, moving, and showing lights. On many occasions members of the defending force were slow on the up-take when confronted with evidence that all was not well. It was obviously too easy to avoid detection by lying low in sparse cover while patrols searched around. Had the night been dark and moonless the enemy would have had considerable success. Also, some of the defenders were too prone to act first and think afterwards. The password would never have been discovered by the escaping aircrew or the quislings but for this weakness. And finally, there was a lack of the suspicious alertness so essential in those who take part in wars. However true facts may seem, their accuracy must be tested before they are accepted.

Many members of aircrews would have been shot instead of being able to escape had this not

been an exercise. Some airmen put too much faith in the powers of bluff. If one is going to bluff one must leave a way of escape open. Only a fool trusts entirely to luck.

The quisling element was surprisingly successful. It was disturbing to note the ease with which they gulled people who were not civilians, but men supposed to be security-minded. Many plausible stories were accepted without checking the facts. The sight of a uniform and a service identity card had a curious psychological effect, a numbing of critical perception that led some defenders to accept any spurious set of facts without question.

Two points stand out in regard to the part played by the sea raiders. They were unable to discover the password, possibly because they did not go the right way about it, and they were greatly helped by the lack of machine-gun nests on the perimeter of the aerodrome and by the inexperience of the patrols. According to the officer in charge of the raiders, they were helped by the obviousness of the defence. Patrols were seen clearly and armoured cars toured about with headlights full on. "It is amazing," he said, "how a band of armed men can wander over the countryside, completely unchallenged. No one took the slightest notice of us. At one point we wandered on to the platform at Larksands station and found a man with a lamp, helping with shunting operations in the sidings. We stood about but he took no notice. Perhaps he showed the average and dangerous belief that any man in uniform is above suspicion."

H.M. Submarine "Stubborn"

The following account of an incident during a British submarine patrol brings home very forcibly the strength of submarine construction. In the hands of a skilful and resolute commanding officer, a submarine is capable of taking, as well as giving, very heavy punishment. It is more than likely that the usual issue of Iron Crosses was made for the "certain destruction" of the submarine.

H.M. submarine *Stubborn* was on patrol with the object of attacking enemy convoys. She had already made a very successful attack on a convoy during the same patrol and at 1130 hours on a Sunday morning she sighted five ships, varying between 2,000 and 4,500 tons, escorted by four trawlers, all seaward of the convoy. In addition there was a continuous anti-submarine patrol of one "M" class minesweeper and one armed whaler to seaward of the trawlers. *Stubborn* attacked and at 1148 hours she manoeuvred close under the stern of the armed whaler and fired six torpedoes at a range of 3,000 yards. Three were aimed at the leading ship of the near column and three at a ship in the far column of the convoy which was sailing in two divisions disposed abeam. Three hits were estimated.

Immediately on firing, *Stubborn* went to 150 feet and turned away to the north-west. The enemy anti-submarine vessels took no action until 1155 hours when the "M" class minesweeper and the three trawlers began a hunt. But no charges were dropped for the next 20 minutes. Then 16 charges were heard, but they were not very close. At 1220 hours the "M" class minesweeper, which seemed to be fitted with Asdic, apparently got a good contact. In the

next 15 minutes 36 charges were dropped very close indeed. The submarine held her course at 150 feet.

The result of this attack was that the after planes were jammed at "hard-a-dive" and the starboard propeller was stopped, possibly by pieces of the after plane guard which had gone adrift. As the result of this the starboard main motor stopped and began to smoke. Various lights and fuses were also broken. The main motor starting switches were broken at once and at the same time it was found that a "Q" tank had flooded through the outboard vent.

Stubborn was apparently out of control and she sank to 390 feet before being pulled up by blowing main ballast. She was unable to work her after planes and was trying to obtain a trim on main ballast and by moving the crew about the boat. All this happened at a depth of between 200 and 300 feet.

At 1310 hours for some unknown reason, *Stubborn* got out of control, and she broke surface for a very short period. Possibly she encountered a lighter layer of water. At the time of breaking surface the nearest enemy vessel in sight was the armed whaler, about two miles away.

Apparently the submarine was not sighted during the brief period on the surface and although she was still out of full control, she was soon able to get under again. She was able to stop herself at 500 feet only by blowing all main ballast. Although the whaler had apparently not seen *Stubborn* she must have heard her, or perhaps the submarine left some trace on the surface as 10 charges were dropped an hour later. Fortunately they were not close.

The submarine eventually got a Main Ballast trim with most of the crew forward and with the ship lying 25° bow up. She stayed like this between 350 and 400 feet and varied the speed of the port motor, proceeding quite comfortably on a course of 270° until 1445 hours. The starboard motor was still out of action.

At 1445 hours *Stubborn* again lost control, for some unknown reason, and she broke surface once more for a few seconds. This time she was certainly seen by the "M" class minesweeper which was only 1½ miles away, on her port beam. The submarine went down again quickly, 10° bow up, blowing all main ballast, with the port motor full speed ahead, grouper up. She passed the 500-foot mark, still going down. In his report the Commanding Officer wrote, "Here our guardian angel stepped in and provided an entirely unexpected bottom." A study of the chart shows no shallow patch anywhere in the vicinity, but there must have been one. Most of the soundings in the area are about 200 fathoms. *Stubborn* estimated that she was lying in a depth between 550 and 600 feet. The needle of the deep depth gauge was stopped at the second "E" in FEET.

The submarine had hit bottom very hard, bumping four times and coming to rest with an angle of 9° bow down. The Commanding Officer considered that the after end of the ship had collapsed.

Between 1500 hours and 1510 hours, 16 depth charges were dropped, very close indeed, in one pattern of 10 and two patterns of three. This action ended the enemy's counter-attack and nothing more was heard. *Stubborn* remained on the bottom for 4½ hours, and then tried to get up. But she found that she was firmly stuck in the ground. The starboard propeller had fortunately freed itself and the after planes were also free. It is possible that they had already fallen off as the diver who examined the submarine afterwards reported them as missing, together with the rudder.

At 2045 hours the submarine was becoming short of high-pressure air. She had but one group left and the pressure in that group was only 2,000 lbs. per square inch. In addition there was a pressure inside the submarine of 10 ins. The Commanding Officer therefore decided to run his main air compressors, drawing air from inside the boat. In this way he pumped up No. 3 H.P. air group, which was apparently

empty, to 3,000 lbs. per square inch. The operation was completed by 2215 hours. By working both motors ahead and astern and by blowing all main ballast, *Stubborn* eventually broke out of the ground and rushed to the surface. The Commanding Officer estimated that she rose at an angle of from 60° to 70°, with the bubble right forward. He was lying flat on the conning tower ladder during the ascent. Curiously enough very little acid was spilled from the battery. The submarine surfaced about 2230 hours on Sunday. There were no enemy ships in sight and the submarine was able to get both her engines going and to proceed at 7 knots, away from the land. At this time she was able to steer. The weather was moderate, sea 32, wind south, force 3. Unfortunately the weather increased next forenoon and after the submarine had been steaming for over 18 hours, it was found that she refused to steer and the rudder failed to answer the wheel. It was then that she sent her first signal reporting that she was damaged and needed help. During Monday the submarine sighted three enemy aircraft which passed 2-3 miles away. Fortunately they did not sight her.

Throughout the next day, Tuesday, *Stubborn* lay immobile within 70 miles of the Norwegian Coast. She was unable to steer, but she was not idle. The Commanding Officer spent the day experimenting with the trim. He found that with 1 main ballast flooded and 3 starboard main ballast partly flooded he could steer his ship ahead to sea, despite the fact that he had no rudder. Next day, Wednesday, the submarine was able to communicate with *Musketeer* by W/T during the forenoon and she carried out homing procedure with her. At 1455 hours, *Stubborn* sighted *Musketeer* and *Scourge*, but the weather was too bad for them to attempt to take her in tow until 2200 hours. At that hour they began to pass over the towing wires from *Scourge* but it was not until five hours later, at 0300 hours on the Thursday, that a 4-in. wire from *Scourge* was made fast to *Stubborn's* cable. *Scourge* towed the submarine until 1102 hours on the same day when the cable parted in her bull ring. The sea was then 43 and the wind south-west by west, force 5. *Stubborn* proceeded on her own power. The experiments in steering without a rudder were well rewarded. She was again taken in tow by *Scourge*, using her own towing pendant. But this parted at once. *Scourge* then passed another wire and towed the submarine to the coast of Britain where she was taken over by *Molde* and brought to port.

Before sailing on this patrol *Stubborn* had been berthed alongside the Flagship of the Commander-in-Chief, Home Fleet.

On the submarine's return, the following signal was received from Admiral Fraser:—

"I am proud to have had the privilege of being berthed alongside you."



The German Battleship *Tirpitz* in Kaa Fjord after the attack by British "X" craft.
See letterpress on page 23.



The French Battleship *Richelieu* now operating with the Home Fleet.



PLATE 10 Mt. Pico (7,613 feet) on Pico Island, the highest point in the Azores. Photographs taken by 220 Squadron.



Is Your Aircraft Really Serviceable?

Ever since flying began there have been comparisons between this aircraft and that, and pilots will always have their preferences. Nowadays there is less difference than there was, but aircraft will probably never feel exactly the same to fly. There are (a) differences affecting actual handling, and (b) differences in the feel of controls, the time lag in flap and undercarriage movements, the effect of brakes, etc. Under (a) there are imperfect aerofoil sections due to mass production, slightly distorted ailerons, badly matched wing tips and that besetting sin of all fitters, dented, distorted or ill-fitting cowlings. There are also badly fitting wing gun panels, landing lamps that do not fully retract, and so on. All these things add up to an aircraft which perhaps needs more aileron for a given reaction, more elevator or rudder. It stalls a little bit sooner, it will not climb quite as fast and it needs more trim than it ought to have, leaving less for emergency. It may not matter much, but if someone else's aircraft is better than yours you may track down some of the reasons here.

It is the differences under (b) which we will consider. That sloppy aileron control, about which the rigger only knows half because he never tries it under load, may mean a stretched chain or cable, or wear in pin holes, or it may mean a joint "giving" in some secluded place where the rigger is not told to look. That high spot on the port throttle control that you have got used to, may not be so noticeable on the ground (due to wing flexing or wind pressure) and may indicate wear that the fitter knows nothing about. The flat spot in the elevator trimmer is known only to you because it will not normally be found on the ground, and it means that something is wearing out. A slow undercarriage or flap action may indicate a tired pump or shaky relief valve which will pack up soon. (They have stopped fitting gauges to tell the rigger what is happening.) The list could be prolonged but this is enough to emphasize that some of the onus of serviceability is on *you*, the pilot.

It may not be understood that while the designer of the aeroplane expects the structure to last at least 1,000 hours, he knows that the working parts will not last so long. And everybody knows that certain parts need lubrication at certain intervals. So the designer turns over the drawings to his back-room boys, who also study the prototype, and they draw up a schedule telling the various tradesmen where to look for what, and when. The designer and his staff are up against the difficulty of having to guess the amount and effect of vibration, the effect of greater power or greater altitude, the effect of low and high temperatures, of sand and snow,

and plain ham-fistedness on the part of both pilots and ground crews. And if they guess wrong, the rigger will not look at that concealed joint, control or whatnot until too late unless you find it going wrong and say so, *on paper*. Then we get an amendment to the Maintenance Schedule. In some cases we find a bit of structure failing, a crack, perhaps, or a wrinkle. Then the experts will examine the defect and all aircraft of that type may be grounded for modification. Variations on this theme continue throughout the life of all types.

So we can say there are no aircraft in perfect condition. This fact need not alarm you, but it does emphasize the need for vigilance. The Engineer Officer and his staff will be grateful for the help of the pilot and a good pilot always has a good aircraft. The wartime N.C.O.s, riggers and fitters are amazingly keen in spite of the tough conditions in which they have to work, so carry them with you psychologically as well as literally. Take them up and let them fly whenever possible. Demonstrate in preference to talking, and note the differences between the various aircraft in the squadron. But whatever happens avoid getting a reputation for being fussy. If that occurs there is the risk of getting "paper adjustments," which is bad and very difficult to stop. Paper adjustment is a very old tradition and many respected Very Senior Officers would be surprised at the merriment caused in the ground crew hut by the astounding success of paper adjustments. At all costs be precise! The pilot whose memory wobbles from port to starboard can hardly expect much co-operation on the ground.

Everybody recognizes that it is extremely difficult to get down to a considered entry on the Form 700 at the end of a long patrol or an unpleasant experience off the Dutch coast. But nothing else will suffice. Even a careful recounting of snags to a fitter or rigger will get nowhere. He may go sick the next day or perhaps on leave. Or *his* memory may wander from port to starboard resulting in a whole day's work being wasted by several men. The only answer is *put it down in the Form 700*. Then, when the Forms 700 get into Servicing Wing H.Q.s it will come to light that there have been three vacuum pump failures in a month and all of them at 60/70 hours; or three inner tank fuel gauges have failed—why? The engineers will take steps to put a stop to the trouble. And if a snag repeats itself the records will show it and it may be necessary to look further afield for the cause.

So help those on the ground, who are trying to keep your aircraft safe and serviceable by telling them your troubles. That is one of the many uses of the Form 700.

R.A.A.F. Squadrons in Coastal Command

The most successful period of anti U-Boat work of the three Australian Coastal Command Squadrons operating in the United Kingdom was during the 10 days of May, 1943, when, of five submarines definitely sunk, one was claimed by a Hampden of No. 455 Squadron (R.A.A.F.), a second by the crew of No. 461 Squadron (R.A.A.F.) and a third was shared by two Sunderlands of No. 10 Squadron (R.A.A.F.).

By February, 1944, these three squadrons had flown 37,000 operational hours in over 4,000 sorties, and had sunk 13 U-Boats and damaged another 12. Their total of enemy ships destroyed was 10 with 15 others damaged. There had also been many combats with Ju.88s and other protectors of the German underwater fleet, during which the Luftwaffe lost 11 aircraft destroyed, 10 probably destroyed, and 39 damaged.

The oldest squadron, No. 10, with over 2,000 sorties and 22,000 odd hours to its credit, became operational in February, 1940. It was the first Dominion squadron in this war to operate overseas. The formation of No. 10 is an interesting story in itself.

In July, 1939, a contingent from the Royal Australian Air Force arrived in this country to ferry home nine Short Sunderland flying boats which had been bought by Australia for its own defence. When war broke out the Australians were still awaiting delivery of these aircraft. The Australian Government immediately offered men and the flying boats to Great Britain, to form the members of a Coastal Command squadron. The British Government accepted and, on Boxing Day, 1939, the second contingent of R.A.A.F. men arrived to complete the squadron.

During the early months of the war the pilots of No. 10 ferried many distinguished officers and members of the Cabinet on special missions. It was on one of these journeys that a Flight Lieutenant of the squadron rescued Lord Gort and Mr. Duff Cooper from a dangerous situation in Morocco.

In that first year, 1940, detachments of the squadron patrolled from bases in Malta, Gibraltar, Cairo, Alexandria and Scotland. These convoy and anti U-Boat patrols were varied by special reconnaissances of Casablanca and the German occupied French ports and by several air/sea rescues.

In September, 1940, a lifeboat was sighted full of young evacuees, whose ship, the *City of Benares*, had been sunk on its way to the United States. The sea was so rough that a landing could not be risked, but a message was dropped to the children and a destroyer was directed to them. Less than a month later a pilot gambled on landing in a heavy swell, drew alongside a lifeboat and took aboard 21 survivors from a torpedoed merchant ship.

The squadron's first kill was in July, 1940, when a U-Boat was attacked, blown to the surface and then sunk. Forty-one survivors were taken on board a British destroyer. Between then and last month, January, 1944, during which No. 10 marked up its latest kill, the squadron has recorded almost 70 attacks and an additional 45 sightings of U-Boats. Between April 9 and 19, 1943, for

example, five separate attacks were made on U-Boats: one for every two days. In three weeks of the following month five more submarines were attacked. In its 3,000,000 operational miles No. 10 Squadron has sunk six U-Boats and damaged eight, and destroyed one ship and damaged eight.

Sightings of and attacks by enemy aircraft have long since passed the century mark and every now and then there are periods of fierce enemy aircraft activity. On July 27, 1943, a Sunderland was attacked by four Ju.88s, three of which were damaged before the engagement was broken off. On August 8, 1943, a pilot out-maneuvred six more Ju.88s, and his Sunderland was damaged. In between those two dates was the August 3 encounter when a captain of No. 10 fought off the attacks of seven Ju.88s for over an hour. There were five casualties among the crew, one of them fatal. But the pilot brought his Sunderland home.

Several maintenance and flying hours records are held by No. 10—a tribute to the work of the ground staff. Perhaps their finest achievement was the removal of an old engine and the testing and fitting of a new one in seven hours—under black-out conditions.

One of the most unusual stories of the war concerns a navigator of No. 10 who spent 14 days with the Royal Navy, to see the other side of submarine hunting. During this time he saw an encounter between a Sunderland and a surfaced U-Boat, which was sunk. The pilot was badly wounded but he pressed home his attack. The Sunderland had to ditch in a very heavy swell where it plunged into a 15 ft. wave. When the destroyer came alongside to rescue the survivors, the navigator found that they were members of his own squadron.

In December, 1943, as though to mark the fourth anniversary of the squadron, aircraft of No. 10 helped to shadow the German destroyers which were escorting a valuable blockade runner in the Bay of Biscay. In the naval engagement which followed, the blockade runner and three destroyers were sunk, a victory which was made possible, said an official message, by the consistent accuracy of the positions given by shadowing aircraft. Aircraft of the other Australian Sunderland squadron, No. 461, were also present in the same action. This squadron, formed on Anzac Day, April 25, 1942, has already flown 8,000 operational hours in more than 700 sorties. In 1943 alone, it sank four U-Boats for certain, and its total is now five sunk and two damaged.

From the earliest days of No. 461, engagements with Ju.88s and other aircraft were frequent. Four enemy aircraft attacks were recorded before the first submarine sighting. The squadron's total now stands at four aircraft destroyed, six probably destroyed, and eight damaged. The best known of these was when eight Ju.88s attacked a lone Sunderland whose Captain, earlier in the year, in February, 1943, had successfully fought off four attackers and brought home his aircraft full of cannon shell holes plugged with old pieces of clothing.

This time also, he not only out-maneuvred the eight enemy aircraft but shot down three, probably destroyed another two and almost certainly damaged the remaining three. The A.O.C.-in-C., in writing to the crew, commented on the "epic battle" which, he said, "will go down in history as one of the finest instances in this war, of the triumph of coolness, skill and determination against overwhelming odds."

There have been many air/sea rescues, alternating with convoy and anti-submarine patrols and air combats with the enemy. On July, 8, 1942, six members of the crew of a Whitley were rescued. A month later an aircraft which had been directed to search for another Whitley crew was attacked by a Ju.88 and two Arado 196's. The captain eluded and continued his search, locating the dinghy and took on board six survivors which he brought home to base.

On December 22, 1942, a dangerous oil pipe leakage threatened an aircraft on patrol. The fitter crawled into the port wing to the port outer engine, found the leak, crept back for the necessary tools and completed the repair. The captain of this aircraft has had many excitements. Months later, he sank one of three U-Boats which he, with other aircraft, found fully surfaced. While the fire of the U-Boats was concentrated on the other aircraft he came in to make his attack. A Halifax sank the second submarine and the Royal Navy the third. On the way home, the Sunderland pilot spotted yet another surfaced U-Boat and although very short of petrol, he went down to machine-gun it against heavy defensive fire. A small fire began in the aircraft but it was quickly put out.

Later on the pilot was presented by the captain of the *Woodpecker* with part of the U-Boat—U.461. The incident will be remembered by many. The Sunderland's number was also U/461.

The same pilot was attacked by six Ju.88's a few weeks later. The flying boat was badly damaged but the pilot fought back. Eventually he had to ditch the Sunderland. Luckily the crew were rescued by a sloop which transferred them to the *Woodpecker*—the same vessel which had picked up the survivors of the U.461.

In its million operational miles, not the least exciting event of No. 461, was the landing of one of its damaged flying boats on an ordinary airfield. (See Coastal Command Review, Vol. II, No. 2.)

Australia's third Coastal Command squadron was formed in June, 1941. It completed 50 bombing raids on such targets as Berlin, Hamburg and Cologne before it transferred to Coastal Command as a torpedo squadron in April, 1942. From that date its principal function has been to attack armed and escorted merchantmen sneaking down the coast of Norway. But its attacks have not been limited to these craft. Its bag of nine ships sunk and seven damaged does not include two U-Boats damaged and one known sunk.

No. 455, like No. 10 and No. 461 Squadrons, had early experience of enemy aircraft counter-attacking. On its first operational flight as a torpedo squadron several Hampdens were attacked by Me.109s. Although four of the Hampdens were damaged and, although there were two casualties, all the aircraft got back to base safely.

On August 13, 1942, the ground crew of a detachment of No. 455 left Scotland for Northern Russia and two weeks later, the air detachments set out. By October 8, 1942, Russian pilots were flying the Hampdens and four days later, the British aircraft had been handed over to the Russians, after pilots of 455 had made several patrols to protect the incoming convoys to Murmansk and to plot the far north ice edge.

A few weeks after their return from Russia, one of the crews had an unusual experience while out on a shipping strike. In very bad visibility, they sighted two small ships and another of 2,000 tons, which was immediately attacked. The torpedo was released but no one saw the results because, as they passed over the vessel at about 500 feet, their aircraft was turned upside down, probably by the explosion below. Though an engine cut out and an enemy fighter attacked them, the crew made base.

One of the squadron's busiest days was June 19, 1943, when three separate attacks were made on armed shipping. In the first engagement, a crew attacked two ships of 2,000 tons which were so close to the Norwegian shore that the coast batteries added their weight to the anti-aircraft fire of the two vessels. One of the ships received a direct hit. On another part of the Norwegian coast, a ship of 2,500 tons was being attacked by a crew of the same squadron. Thirty seconds after the torpedo was released a brilliant flash completely enveloped the ship which must have been badly damaged.

The third attack was made by two Hampdens on three medium-sized merchant vessels. Both aircraft flew in through heavy flak to attack the same ship. Because of the violent evasive action which followed no hit was actually seen but both crews were convinced that their torpedoes could not have missed.

One of the most determined attacks was made by one of three Hampdens on August 2, 1943, when an enemy convoy of one destroyer, two flak ships and two merchantmen were sighted. This Hampden defied the concentrated fire of all the vessels to torpedo a 4,000-ton ship which was later confirmed sunk.

This Hampden squadron has taken part in many air-sea rescues. On June 29, 1943, two Hampdens on patrol sighted two dinghies with five men in each. They were U.S.A.A.F. bomber crews who had been out the day before. A launch was directed to their rescue.

In November, 1943, just as the squadron was approaching its 1200th sortie in 6,000 operational hours, word was received that the squadron was to convert to Beaufighters.

Operation against the "Tirpitz"

On September 22, 1943, a daring and successful attack was carried out by His Majesty's midget submarines on the German battleship *Tirpitz* lying in her protected anchorage in Kaafjord, northern Norway. The midgets were small craft, about 50 ft. long, each manned by a crew of four.

To reach this German hide-out necessitated an ocean voyage of over 1,000 miles from the British Isles in varying weather conditions, the penetration of an enemy minefield, and a hazardous passage of 50 miles up a fiord, known to be vigilantly patrolled and guarded by nets, gun defences, searchlights and listening posts.

Having reached the fleet anchorage, it was necessary for these small craft to work their way past the net defences at the entrance to the fiord, and then to penetrate within the nets surrounding the *Tirpitz* to deliver their attacks.

Three of the midget submarines failed to return. One which was in the neighbourhood during the attack could not take part in the action owing to mechanical defects. On her return the crew reported that at the time arranged for the submarines to be in position, two heavy explosions were heard, followed by other explosions. The first two explosions were from the charges carried by the attacking midgets and the subsequent explosions were caused by enemy counter-attacks.

The midget submarines carried out a determined attack which was pressed home to the full. Subsequent reports indicate that the explosion caused severe damage to the *Tirpitz's* hull, machinery and armament. There was considerable flooding and a large leakage of oil fuel. The latter was confirmed by photographic reconnaissance after the attack, which showed the whole fiord covered in oil fuel extending 4-5 miles from the *Tirpitz's* berth.

The *Tirpitz* is being repaired in Kaafjord, but it is considered that she must be docked in Germany before she can be made battle-worthy again.

The operation followed careful planning and preparation: and up-to-date information of the

disposition of the main German units and their defences was indispensable. This information could be obtained only through photographic reconnaissance.

The distance from the British Isles made it impossible for aircraft to fly their sorties from the United Kingdom so it was decided to send a P.R. unit to north Russia. The unit was embarked in destroyers on August 27 and arrived at Kola inlet on August 31.

It was intended to run a shuttle service between Vaenga and the United Kingdom, using Mosquito aircraft for the preliminary reconnaissances and Spitfires based on Vaenga for the final reconnaissances. The photographs were to be flown to the United Kingdom by Catalina. The Mosquitos were ready by August 21, but the weather was never satisfactory and they did not leave the United Kingdom.

Three Spitfires arrived at Vaenga on September 3, all within half an hour of their E.T.A. The first sortie was flown on September 5, but 10/10 cloud over the target area prevented visual or photographic reconnaissance. The first successful sortie flown by the Spitfires on September 7 showed that the *Tirpitz* and the *Scharnhorst* were not at their berths. It was confirmed afterwards that they were operating against Spitzbergen.

A successful sortie was flown on September 10 and the two ships were seen to have returned to their berths. The same evening a Catalina left for Britain with all the photographs that had been taken. More sorties were flown before the attack at irregular intervals, and they were continued after the attack until the 24th, when the Spitfires were handed over to the Russians. The unit returned home.

The aircraft had to fly in all weathers and they were operating under difficult conditions. The official report described the reconnaissances flown by this unit as "invaluable to the operation." The success with which the unit performed their task was one more example of the close liaison between the Royal Navy and Coastal Command.