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COASTAL COMMAND REVIEW

September 1944

Vol. III, No. 9

HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE

COASTAL COMMAND REVIEW

Vol. III, No. 9—September 1944

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

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

The Month's Work: September

The Anti U-Boat Effort

During September the Biscay U-Boat force has withdrawn out into the Atlantic and northabout into Norwegian ports. D/F.s giving positions on such a route, as well as sightings and attacks at the Norwegian end confirm this movement. The fall of Brest and the investment of Lorient and St. Nazaire make it probable that every U-Boat capable of making the passage has now left this coast. As might have been expected, these U-Boats seldom showed themselves above water, as it was their intention to make the passage undetected. No doubt they carried extra passengers, stores and spare parts.

2. Five sightings were made in the North-Western Approaches and there were indications that there were four other U-Boats in that area. The positions of these make it almost certain that all the U-Boats except one were on offensive patrol to the north and north-west of Ireland. Apart from torpedoing two ships early in the month, these U-Boats have effected nothing. Two sightings off the north coast of Cornwall, also early in the month, indicated a similar situation in the South-Western Approaches, but the absence of further evidence makes it likely that these U-Boats have withdrawn to join the general move round to Norway.

3. At the end of the month one U-Boat was sighted off the Moray Firth, and there have been indications that a U-Boat may be in the Cape Wrath area. All these sightings confirm that the enemy intends to take advantage of the schnorkel and maintain offensive billets close to our coasts at what he considers to be the focal points of our shipping lanes.

4. When the stream of U-Boats bound for Norway reached waters and landmarks which were unfamiliar, they seem to have surfaced a great deal more than when they were on passage. This gave 18 Group a chance of getting in among them and consequently this Group had the lion's share of attacks in a very bare month. Eight U-Boats were sighted, of which six were attacked. Of these one was scuttled after attack, one was probably sunk, two were possibly damaged and one was so badly shot up by a party of eight Mosquitos armed with cannon, depth charges, and 6-pounders that it is more than likely that she subsequently foundered.

5. Fortresses from the Azores again made a welcome contribution by locating a U-Boat, hunting her and finally delivering an excellent attack. The U-Boat disappeared amid a very large patch of oil which ultimately spread over an area of three or four square miles.

6. Except for sporadic inshore patrols round our coasts the enemy is likely to spend the next few weeks in redistributing, reorganizing and refitting his U-Boats in Norwegian ports. When and what his next move will be is conjecture, but it is a fair bet that the Battle of the Atlantic will be resumed. We have a few photographs, taken by P.R. aircraft, of the enemy's pre-fabricated U-Boats under construction. These boats, together with the latest 500-ton class, will doubtless come into service when the battle begins. Existing 500-ton boats will continue the inshore offensive and the 740-ton type will probably be employed overseas. It can be taken for granted that all types will be fitted with schnorkels and though the winter seas will hamper their use, it is of the utmost importance that training and ever more training should be done in the Command. Only by training can we make certain that Radar operators will locate the schnorkel in seas of less than Force 3–4, and the U-Boats themselves when the weather is rough. As conditions become more difficult and targets more fleeting, it is equally important to improve our homing and bombing, both by day and by night.

Anti-Shipping

7. During September the area of anti-shipping activity has moved eastward in the wake of the Allied armies. There were no attacks in the Bay of Biscay area, which had been such a profitable hunting ground during August, and in the Channel, as the enemy-occupied ports fell into our hands, the night patrols of the Beaufighters, Avengers and Wellingtons moved eastwards along the coast. This happened so quickly that there were no attacks off the Belgian coast after September 7.

8. As a result of this eastward trend there was an increase in the number of attacks on shipping in Dutch waters where five Beaufighter Wing Strikes were made during the month. The fact that only one enemy merchant convoy was found sailing in daylight off the Frisian Islands during this period is an indication of the success of combined Wing tactics during July and August. But this reluctance of the German convoys to expose themselves to air attack presented a new tactical problem for the anti-shipping squadrons. Instead of finding their targets at sea, they were obliged to go into the enemy's harbours to look for them. This is a significant development in anti-shipping tactics. On two occasions large forces of Beaufighters attacked shipping in the anchorage at Marsdiep. These attacks were successfully supported by Mustang fighter-bombers which operated as anti-flak aircraft against land-based flak positions. The second operation involved 70 Beaufighters, the largest number of aircraft ever despatched by the Command against a shipping target. The results were good and included the sinking of an uncompleted destroyer. This new development means that the enemy's shipping is no longer safe from the Beaufighter Wings even when it is lying in well-defended anchorages. These operations were not carried out without loss and tribute is due to the gallantry with which the squadrons attacked in the face of the heaviest flak barrage they have ever encountered.

9. Naturally enough the greatest increase in anti-shipping activity has been on the Norwegian coast. No less than five Beaufighter Wing Strikes and four Mosquito Strikes have been made in this area. On the 12th of the month a Beaufighter Wing set fire to four " M " class minesweepers off Lister, and on the 14th a combined force of Beaufighters and Mosquitos attacked a merchant convoy near Kristiansand South with torpedoes, R.P. and cannon. Two merchant ships and three trawler-type auxiliaries are claimed as damaged. Four days later a similar formation attacked two merchant ships escorted by an armed trawler. All three vessels are claimed as damaged, one seriously. On four occasions small forces of Mosquitos have successfully attacked shipping whilst engaged on anti U-Boat patrols.

10. Despite the difficulties in locating reasonable targets, the campaign has been waged as vigorously as ever, and although lack of opportunity has deprived us of spectacular successes like those of August, our anti-shipping squadrons have continued the process of hounding enemy shipping from the seas.

I.—ANTI U-BOAT

SUMMARY OF ANTI U-BOAT OPERATIONS BY COASTAL COMMAND AIRCRAFT

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

SEPTEMBER, 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)
Convoy Cover.												
United Kingdom	51	555	326	—	1	—	—	555	326	1	—	1
Iceland	33	309	192	—	—	—	—	—	—	—	—	—
Gibraltar and Moroccan Sea Frontier	35	337	205	—	—	—	—	—	—	—	—	—
Azores	9	102	55	—	—	—	—	—	—	—	—	—
Channel Convoy Screen												
United Kingdom	16	55	42	—	—	—	—	—	—	—	—	—
TOTAL CONVOY EFFORT	144	1,358	820	—	1	—	—	1,358	820	1	—	1
A/U Patrols												
Northern Transit												
United Kingdom	893	8,382	4,846	6	3	4	2	931	538	16	9	3
Iceland	59	770	476	—	—	—	—	—	—	—	—	—
Northern Convoy												
United Kingdom	949	7,939	5,740	3	1	1	—	1,985	1,435	4	1	—
Iceland	17	160	143	—	—	—	—	—	—	—	—	—
Azores	26	326	124	2	1	1	—	109	41	3	1	1
Bay of Biscay (excluding Channel Approaches)												
United Kingdom	105	1,121	725	—	1	—	—	1,121	725	1	—	—
Gibraltar and Moroccan Sea Frontier	1	12	5	—	—	—	—	—	—	—	—	—
Channel and Approaches												
United Kingdom	572	5,578	4,553	1	—	—	—	5,578	4,553	1	—	—
Central Convoy												
Gibraltar and Moroccan Sea Frontier	212	1,335	899	—	—	—	—	—	—	—	—	—
Azores	103	1,231	604	—	—	—	—	—	—	—	—	—
TOTAL A/U PATROLS	2,937	26,854	18,115	12	6	6	2	1,492	1,006	25	11	4
ADD CONVOY EFFORT	144	1,358	820	—	1	—	—	—	—	1	—	1
TOTAL A/U EFFORT	3,081	28,212	18,935	12	7	6	2	1,485	996	26	11	5
				19 U-Boats Sighted.		8 U-Boats Attacked.						

Note.—In addition to the above there were three chance sightings, two of them by Coastal Aircraft.

Assessments

(Received up to October 2)

Month.	Known Sunk.	Probably Sunk.	Damaged A.	Damaged B.	Slight Damage.	Insufficient Evidence of Damage.	No Damage.	Insufficient Evidence of U-Boat.	Non-Sub-Marine.	Unassessed.
July	2	4	—	3	6	18	7	6	1	—
August	3*	2*	1	3	3	9	1	1	—	2
September ..	1	—	—	—	—	1	—	—	—	6

* In August one of the attacks assessed as Sunk and one assessed as Probably Sunk are shared with surface craft.

Analysis of U-Boats Sighted by A/U Aircraft during September

Particulars of Incidents.		U-Boats.		Sorties when Aircraft.	
		Sighted.	Attacked.	Sighted.	Attacked.
On 18 occasions 1 U-Boat was sighted by 1 aircraft—attacked.	7 aircraft	18	7	18	7
On 1 occasion 1 U-Boat was sighted by 8 aircraft—attacked.	4 aircraft	1	1	8	4
TOTALS		19	8	26	11

Squadron Results—September

			No. of Sorties when U-Boat Sighted.	*No. of Sorties when U-Boat Attacked.*
220	Fortress	Lagens	3	1
502	Halifax	Stornoway	1	—
120	Liberator L.L.	Ballykelly	1	—
206	Liberator	Leuchars	2	1
224	Liberator L.L.	Milltown	4	4
547	Liberator L.L.	St. Eval	1	—
103 (U.S.N.)	Liberator	Dunkeswell	1	—
248	Mosquito	Banff	6 } 1 U.B.	4 } 1 U.B.
235	Mosquito	Banff	2 }	— }
330 (Norwegian)	Sunderland	Sullom Voe	2	—
423 (R.C.A.F.)	Sunderland	Castle Archdale ..	2	1
179	Wellington L.L.	Predannack	1	—
			26	11

Chance Sightings by Coastal Aircraft on Other Duties

			U-Boat Sighted.	*U-Boat Attacked.*
518 (Met.)	Halifax	Tiree	1	(No weapons)
547	Liberator	St. Eval	1	(Non-operational)

RECENT ATTACKS ON U-BOATS

U-Boat Sunk at Periscope Depth

In the afternoon of August 18 **Sunderland W/201** was on anti U-Boat patrol in good weather over a calm sea. The second pilot was flying the aircraft while the captain was on the lower deck. Simultaneously the front gunner, who was using binoculars, and the second pilot reported a wake 4 miles away on the port bow. The aircraft continued on course until the wake was on the port beam, when it was seen that the wake was caused by a periscope moving south-east at 4 knots. The position was 46° 46′ N., 03° 39′ W. The Sunderland captain took over in the second pilot's seat and attacked the periscope from Red 90°, releasing from 50 feet six depth charges spaced at 50 feet. The depth charges straddled the periscope, three on either side, and exploded as the aircraft was turning away to port. Immediately after the explosion plumes had subsided, a great circular eruption of bubbles rose slightly above the surface of the sea and continued to effervesce for 20 minutes. The eruption was so violent that it seemed to form a continuous greenish phosphorescence in the centre of the bubbles. This phosphorescence formed a circle at least 100 feet in diameter. A few minutes after the attack oil came to the surface and an hour and a half later the slick had grown to a length of 2 miles. Miscellaneous wreckage also appeared, including pieces of wood, sheets of white paper, dark shapes which might have been bodies, a wheel-like object made of wood and a big piece of yellow material which looked as if it was made of wiry wool. An escort group and two Wellingtons were homed to the area before the Sunderland left. The surface vessels picked up some of the wreckage, identifying the pieces of white paper as German charts and the oil as U-Boat diesel oil.

Comments

A very fine look-out enabled the captain to deliver an exceedingly good attack. The crew are to be congratulated on their excellent drill. It is of great value to be able to publish the fact that a U-Boat showing only her periscope can be killed provided that the attack is accurate. It is also significant that such kills are accompanied by convincing after-evidence, which in this case is confirmed by photographs.

Remarks by the Admiralty Assessment Committee

Photographs confirm an excellent attack. In view of the evidence of wreckage on the surface, some of which was collected by the Third Escort Group, the attack is assessed as "U-Boat probably sunk."

Very Bad Visibility

In the early morning of August 19 **Catalina K/202,** carrying Mark VIIIA A.S.V., was patrolling in cloud at 1,000 feet on a track of 020°, when the Radar operator picked up a contact bearing Red 035° at a range of 18 miles. The aircraft homed, and when the range was down to 12 miles the contact bore Red 025°; the aircraft was still flying at 1,000 feet and was steering 343°. At 6 miles, when the aircraft was steering 325° at 600 feet, the target bore Red 010°. At 3 miles the captain released a flare, but the visibility under the rain cloud was so bad that it was impossible even to determine the state of the sea. When flying on a track of 310° at 150 feet the captain released another flare and soon after (when the track was 320°) he sighted a wake at the head of which was the vague shape of a surfaced U-Boat. She was steering due south at 8 knots in position 37° 49′ N., 16° 30′ W. At the time of sighting the U-Boat was a quarter of a mile from the aircraft and bore Red 040°. Neither the wake nor the U-Boat was seen by the front gunner and the captain was the only member of the crew to see the target. He decided to turn and attack the enemy down track. He kept the target in view during the turn and attacked from Red 135°, releasing from 150 feet four depth charges spaced at 100 feet. Neither the points of entry nor the explosions were seen, and the visibility was so poor and the air under the cloud so unstable that the blister gunners could not see the explosions at all although they heard and felt them. It is therefore impossible to say where the depth charges exploded in relation to the target. The Catalina's crew did not sight the U-Boat again, but the Radar operator regained contact four times at ranges between 5 and 6 miles. The final contact was lost just over half an hour after the attack. The crew considered that the U-Boat had dived and left decoys on the surface. When "K" had reached P.L.E., surface vessels and other aircraft were in the area.

Comments

This crew was not night trained and they were not carrying a searchlight. As a result they did not make the correct night approach, and in any case the weather conditions were very bad indeed. Despite these handicaps the approach was reasonably good and the captain was able to sight the target. The attack was made after a fairly sharp turn and the points of entry of the depth charges were not seen. Previous experience has shown that attacks which end in a last minute turn are not usually effective. As there is no evidence that the U-Boat was damaged, the Admiralty assessment will probably be "Insufficient evidence of damage." It is quite likely that the Radar contacts after the attack were caused by decoys, but, on the other hand, it is possible that the U-Boat remained on the surface trimmed down.

PLATE 1

Above.—Survivors from the U-Boat attacked by Liberator Q/224 on September 19. *See* letterpress, page 7.

Below.—On September 28 Mosquitos of 248 Squadron attacked an ex-Norwegian torpedo boat of the *Kjell* class with 6-pounder guns, cannon and depth-charges. After the attack, which was made off Kristiansand South, the ship sank without leaving either wreckage or survivors. These Norwegian torpedo boats are used by the Germans for escort duties. The picture below was taken by S/248 during the action.

PLATE 2

On September 11, off Lister in south Norway, Beaufighters of Nos. 254, 455 and 489 Squadrons attacked four "M" class minesweepers with torpedoes, R.P. and cannon. The above photographs show incidents in the attack during which two of the ships were sunk and the other two seriously damaged. *See* page 10.

Unusual Evidence

In the evening of August 22 **Sunderland A/228** was circling a marker dropped by another aircraft when the crew sighted a flash of light about 9 miles to the north-west. The captain turned towards the position, and soon afterwards the Radar operator got a contact 2 miles away on the port bow. The aircraft homed and the crew sighted a periscope and schnorkel half a mile away on the port side in position 46° 21′ N., 01° 46′ W. The schnorkel was moving westwards at 2 knots. As the Sunderland turned away to starboard to get into position, the mid-upper gunner opened fire. The Sunderland then turned steeply to port and attacked from Red 30° to the enemy's course. The captain released six depth charges spaced at 60 feet, while the schnorkel and the periscope were visible. The second pilot, who was at the port galley hatch, saw the schnorkel in the middle of the splashes of entry before the explosion plumes obscured it. Three minutes later a twisted object came up in the middle of the depth charge scum. It was about 8 feet across, looked like an aircraft fin much distorted, and was apparently attached to a larger body which could be seen just below the surface of the sea. The captain then turned and attacked this wreckage with one depth charge. The rear gunner saw the depth charge enter the water three or four yards to port of the wreckage. After the explosion the wreckage was still visible and a small oil slick formed to the south-east of it. The Sunderland captain then returned to the marker which he had been circling at the beginning. However, he found another aircraft there so he returned to the scene of the attacks. The oil slick, which was then about a mile long, was light and filmy and clearly discernible throughout its whole length. The depth charge scum was still faintly visible and a short distance away to the south-east six or seven patches of heavy black liquid could be seen. Each patch was about 30 feet across. The aircraft then attacked the wreckage with the one remaining depth charge, which was seen to hit the water close to the target. The wreckage was damaged by the explosion and appeared more twisted than before and lower in the water. Despite this damage the object continued to give a firm Radar contact and the aircraft homed on to it in the darkness over an hour after the third attack.

Comments

From the unanimity of their evidence and the sketches they made at the time, there seems no doubt that this crew sighted a periscope and schnorkel tube and delivered an accurate attack. It is impossible to say anything definite about the black object 8 feet across which was apparently part of a larger body which could be seen just below the surface. It may have been floating or it may have been the upper part of the larger body. It was high water at the time of the first attack and the depth of water in this position is 12–13 fathoms. It is therefore possible that the larger body was resting on the bottom. The second and third attacks seem to have further twisted and battered the visible object, which emitted first a growing oil slick and then some patches of black fluid. The tidal stream in this position sets to the westward (almost due west, in fact) soon after high water. If the larger object was fixed, it would thus be unlikely that oil from it would stream to the south-east. On the other hand there is probably a period of slack water for about an hour each side of high water. We shall have to wait for further evidence before this very interesting attack can be assessed.

A Most Difficult Target

On September 11 **Sunderland D/423** was patrolling at 1,200 feet over a calm sea when the crew sighted whitish vapour or steam on the surface of the sea some 9 miles away. The position was 56° 51′ N., 08° 04′ W. The Radar was on but no contact was picked up. The Sunderland captain turned to investigate and lost height. With the aid of binoculars it was seen that the vapour was issuing in a low lying stream from a point on the surface. It dispersed freely in the wind but its source could not be seen, neither was there any visible feather. When the Sunderland was still two miles away the vapour ceased as if it had been cut off. Then a slight wake was seen extending for about 100 feet. This indicated that the supposed U-Boat was steering 195°. The Sunderland captain attacked down track from ahead and from 50 feet released four depth charges spaced at 70 feet. He aimed at a point about 700 feet ahead of the apex of the wake. The points of entry relative to the wake were not seen as the wake was very indistinct and had almost disappeared at the time of the attack. After releasing the depth charges the Sunderland dropped a marker and circled the position. Some three hours after the attack escort vessels arrived in response to homing transmissions. They picked up a positive submarine contact and made a depth charge attack. The Sunderland saw no evidence of damage to the U-Boat by either air or surface attack although it was over the position for nearly six and a half hours.

Comments

From the evidence it would seem that the target was in fact a U-Boat at schnorkel depth. Although the time interval between the disappearance of the exhaust vapour and the attack was probably long enough to allow the U-Boat to reach a safe depth, the captain of the aircraft was quite right to make an attack. Such an attack, although unlikely to do serious damage to the U-Boat herself, might well upset the not very robust schnorkel and thereby force the U-Boat to charge on the surface for the rest of her patrol. This would give other aircraft an excellent chance of finding and attacking her later.

An Attack by Eight Mosquitos

On September 18 eight **Mosquitos** of **248** and **235 Squadrons** flew an anti U-Boat strike off the coast of Norway. They made a landfall just north of Yiteroene Light and turned to starboard, following the coast line about 1½ miles off shore. The original intention was to fly the anti-flak aircraft at 1,000 feet, the 6-pounder aircraft at 1,500 feet and the fighters to seaward at 2,000 feet. However, low cloud and poor visibility made it necessary for the whole formation to fly at 500 feet. The leader in J/248 was flying due south when he sighted a U-Boat two miles away on his port bow in position 61° 02′ N., 04° 30 ′ E. The U-Boat was steering due east at 6 knots and only her conning tower and part of the bows were visible. She was a 500 tonner, carrying two separate Oerlikon mountings on the bandstand aft of the conning tower. The leader ordered the formation to wheel to port and the aircraft made diving attacks. "O" went in first with the 6-pounder gun, followed by "D" and "J" with cannon, "U" and "B" with cannon and depth charges, "E" with the 6-pounder, and finally "J" (235) and "H" with cannon. All the aircraft then broke away to port, formed line astern and attacked again until all their ammunition was exhausted. The U-Boat did not return the aircraft's fire but the shore batteries opened up with light and accurate flak. The guns on the U-Boat's conning tower were mounted but the crews were not seen.

"U" released two depth charges in salvo from 200 feet and "B" released two depth charges, also in salvo, from 25 feet. These attacks were made from dead astern, "U's" depth charges fell astern but "B's" entered the water 20 feet from the target's port beam and exploded on the port side of the conning tower, 5–10 feet away. Two of "O's" 6-pounder shells hit the U-Boat on the waterline, one near the stern and the other near the conning tower; "E" got five hits, three round the conning tower and two on the waterline forward and aft of the conning tower. "O's" second attack scored four more hits around the conning tower. In both attacks the U-Boat was thoroughly raked with cannon and machine gun fire and a cloud of grey smoke was seen after the second attack. The depth charge explosions lifted the U-Boat out of the water, and later she began to settle with a list of 10°–15° to port. She was probably not trying to submerge as she was heading straight for Utvaer Island only half a mile away and, if she had dived, she would have collided with the island.

Comments

Photographs confirm that this well co-ordinated and successful attack did a good deal of damage. It is possible that the damage was severe enough to cause the U-Boat to founder before she could be beached on the rocks of Utvaer Island. Altogether an excellent performance.

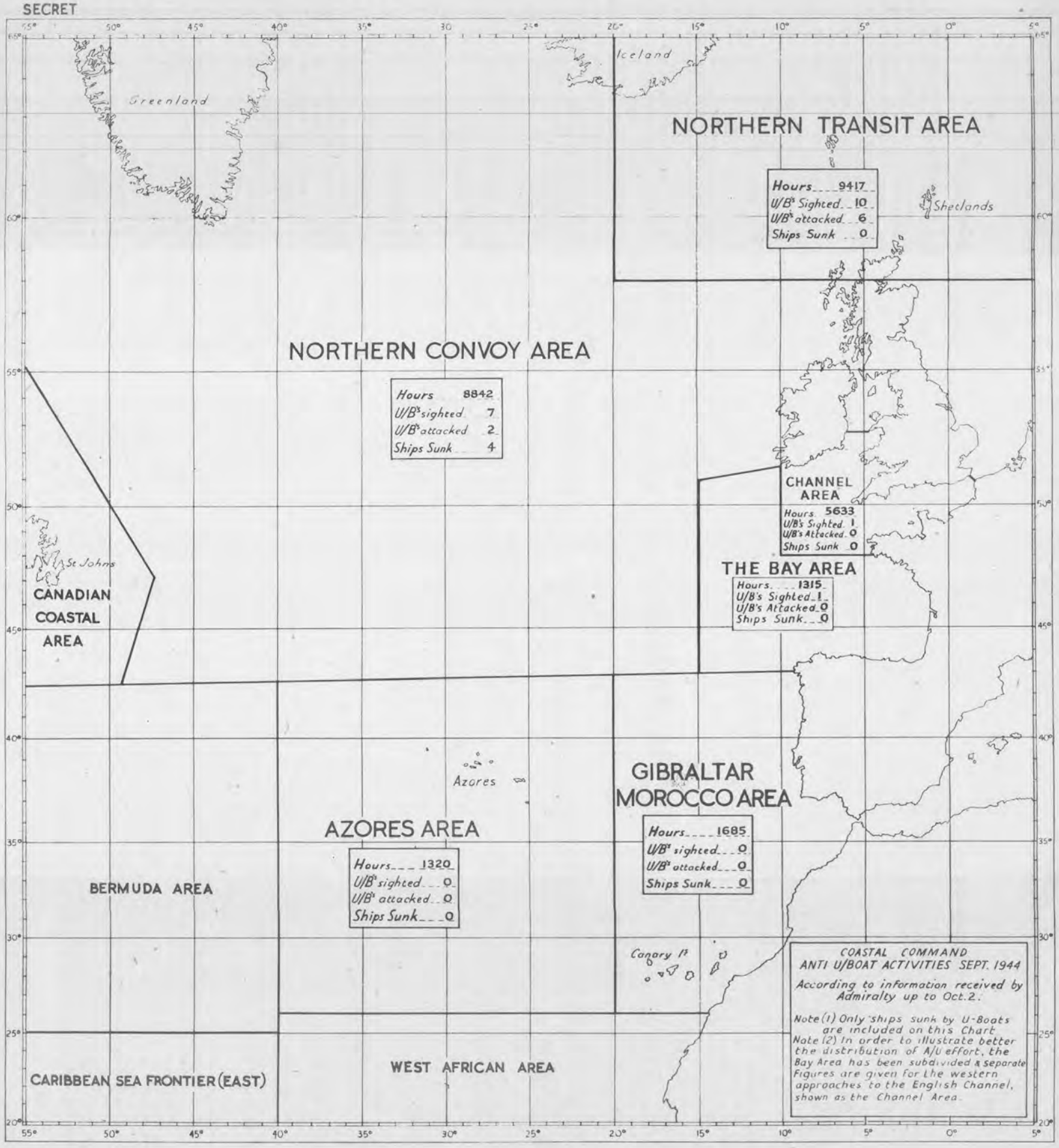
A Good Shot with the Last Depth Charge

Just before dark on September 19 **Liberator S/206** was on anti U-Boat patrol in northern waters when the Radar operator picked up a contact 7½ miles away on the port bow. The aircraft homed and at 3½ miles range the crew sighted a U-Boat steering due south at 10 knots. Her position was 62° 20′ N., 02° 30′ E. The U-Boat, which was dark grey in colour, mounted six small guns and two bigger ones on the conning tower, one medium gun forward and another aft. However, the fire of these guns was only slight and inaccurate. The Liberator attacked from the enemy's starboard quarter and from 100 feet released seven depth charges spaced at 55 feet. The low level bomb sight was used. The first three depth charges were said to have entered the water astern of the U-Boat and about 30 feet to starboard of her track, the next two were closer owing to the aircraft's turn and the last two, which were flung to port as the aircraft skidded, fell alongside the enemy's stern on the starboard side. The first five explosions were astern of the target and slightly to starboard but the last two were believed to have straddled the U-Boat's stern. During the attack the enemy took evasive action by turning sharply to port. The Liberator circled to port and immediately made a second attack from dead ahead, releasing one depth charge from 100 feet. The U-Boat began to submerge as the second attack was being made and the depth charge fell 70 feet ahead of the swirl about three seconds after the boat had disappeared. The periscope, however, was still visible and was seen to be travelling towards the point where the depth charge entered the water. The depth charge exploded about 20 feet ahead of the swirl and aft of the conning tower, which was seen to break surface during the explosion. Twenty minutes later the Liberator's crew saw an oil slick 800 yards long and 200 yards wide, and also a patch of air bubbles 20 yards in diameter rising to the surface half a mile away to the north. Then, about 900 yards north of the position of the second attack, 21 dinghies containing survivors were seen.

Comments

The first approach was good and fine work with the front guns effectively smothered the enemy's flak. However, the U-Boat's last-minute turn to port spoilt the attack and the photographs show that the stick exploded roughly parallel with the U-Boat's starboard side and at least 70 feet away. However, a quick turn and an exceedingly good shot with the last depth charge seem to have been lethal. This is borne out by the big oil slick and the 21 dinghies containing survivors.

SECRET



COASTAL COMMAND
ANTI U/BOAT ACTIVITIES SEPT. 1944

According to information received by Admiralty up to Oct. 2.

Note (1) Only ships sunk by U-Boats are included on this Chart.
Note (2) In order to illustrate better the distribution of A/U effort, the Bay Area has been subdivided & separate Figures are given for the western approaches to the English Channel, shown as the Channel Area.

U-Boat Scuttles herself after Attack

On September 19 **Liberator Q/224** was on anti-U-Boat patrol when the Radar operator picked up a contact 15 miles away fine on the starboard bow. The Liberator captain homed, making two alterations of course to starboard, but at eight miles the contact was lost in the sea returns. The captain held his course and soon afterwards he sighted the U-Boat two miles away on the starboard beam. She was steering 280° at 6 knots and her position was 62° 15′ N., 01° 50′ E. She was leaving a trail of oil. The Liberator turned to starboard in order to get into position to attack down sun, but the U-Boat made a tight turn to port. The Liberator captain accordingly tightened his turn and attacked from just forward of the U-Boat's starboard beam. During the run in the enemy gunners put up inaccurate flak but they desisted when the Liberator's front and mid-upper gunners replied from 1,000 yards range. Their fire was seen to hit the U-Boat on and around the conning tower. From 160 feet the aircraft released six depth charges spaced at 55 feet. The low level bombsight was used. The stick overshot and the first depth charge was estimated by the wireless operator who was looking through the bomb doors, to have hit the water 10 feet from the U-Boat's port beam and slightly ahead of the conning tower. At least four explosions were seen in a line ahead of the conning tower and the rear gunner estimated that the first explosion was about 30 feet from the hull. Photographs show that at least one large and one small dinghy were on the water close to the U-Boat when the first explosion plume began to form. After the attack the U-Boat lost way, stopped, and then sank on an even keel. A patch of oil formed in the position and on completing their second circuit the Liberator's crew saw one big dinghy and about 40 small ones floating in the oil. In the dinghies were about 50 survivors (*see* Plate 1). The slick which the U-Boat was trailing before the attack, was still visible, running right into the oil patch. There was no evidence that the rate of leakage had increased, nor were there any air or oil bubbles, though they would have been difficult to see in the haze. Among the dinghies the Liberator's crew also saw about 10 pieces of timber and a tarpaulin.

Comments

Photographs confirm that this attack overshot, the nearest explosion being 230 feet from the U-Boat's port side. It is therefore probable that the U-Boat was already damaged—she was trailing oil and had her dinghies ready—and that the Liberator's attack finally decided the U-Boat's Commanding Officer to scuttle his ship. The likelihood that the aircraft would summon air or surface help doubtless clinched the matter.

Prisoners' Evidence of Damage

The *Coastal Command Review*, Vol. III, No. 4 (April, 1944) printed on page 6 an account of an attack made by Mosquitos of 248 Squadron on two heavily escorted U-Boats. Since that attack, which was made on March 27, one of the U-Boats, *U 960* (Oberleutnant zur See Günther Heinrich), has been sunk in the Mediterranean as the result of a co-ordinated air and surface operation which lasted 42 hours. Among the forces taking part in the action were Wellingtons of No. 36 Squadron.

Prisoners from this U-Boat have now told the story of the earlier Mosquito attack. *U 960* was making for La Pallice with a large escort, which included an anti-aircraft ship and three torpedo boats, when the Mosquito formation delivered a surprise attack. *U 960* was in the most exposed position and bore the brunt of the attack. She tried to defend herself with her anti-aircraft armament, but the 37 mm. gun jammed after the first round and had to be fed by hand. One of the Mosquitos scored a direct hit (presumably with a six-pounder shell) on the U-Boat's conning tower and demolished the attack periscope. Fourteen of her company were wounded, four of them seriously. The other U-Boat was not damaged, but one of the escort vessels had her bridge shot away and another ship, which was probably a sperrbrecher, was so heavily damaged that she had to be towed into port. In all the convoy suffered 36 casualties, though none of them was fatal.

It should be added that this information comes from prisoners of war and that it deals with events which happened some time ago ; it may not, therefore, be entirely accurate. Nevertheless the Mosquitos' attack, which was originally assessed as "Insufficient Evidence of Damage," will probably be reconsidered.

II.—ANTI-SHIPPING

SUMMARY OF ANTI-SHIPPING OPERATIONS BY COASTAL COMMAND AIRCRAFT

SEPTEMBER, 1944

Weapon Carried.	Number of Sorties.			Number of Aircraft to Attack.			Target.	
	On Reconnaissance.	On Strike.	Total.	On Reconnaissance.	On Strike.	Total.	M/V.	Naval.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DAY OPERATIONS								
Torpedo	157	10	167	33	4	37	13	24
R.P.	413	79	492	90	13	103	44	59
Bomb	27	—	27	—	—	—	—	—
Depth Charge	35 (2)	—	35 (2)	— (2)	—	— (2)	—	— (2)
Tsetse	11 (6)	—	11 (6)	— (6)	—	— (6)	— (2)	— (4)
Cannon and M.G. only	469 (14)	76	545 (14)	93 (14)	21	114 (14)	48 (2)	66 (12)
TOTAL DAY	1,112 (22)	165	1,277 (22)	216 (22)	38	254 (22)	105 (4)	149 (18)
NIGHT OPERATIONS								
Torpedo	15	—	15	3	—	3	1	2
R.P.	19	—	19	—	—	—	—	—
Bomb	369 (1)	5	374 (1)	161 (1)	3	164 (1)	22	142 (1)
Depth Charge	—	—	—	—	—	—	—	—
Tsetse	—	—	—	—	—	—	—	—
Cannon and M.G. only	17	—	17	—	—	—	—	—
TOTAL NIGHT	420 (1)	5	425 (1)	164 (1)	3	167 (1)	23	144 (1)
ALL OPERATIONS								
Torpedo	172	10	182	36	4	40	14	26
R.P.	432	79	511	90	13	103	44	59
Bomb	396 (1)	5	401 (1)	161 (1)	3	164 (1)	22	142 (1)
Depth Charge	35 (2)	—	35 (2)	— (2)	—	— (2)	—	— (2)
Tsetse	11 (6)	—	11 (6)	— (6)	—	— (6)	— (2)	— (4)
Cannon and M.G. only	486 (14)	76	562 (14)	93 (14)	21	114 (14)	48 (2)	66 (12)
GRAND TOTAL	1,532 (23)	170	1,702 (23)	380 (23)	41	421 (23)	128 (4)	293 (19)

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

FINAL ASSESSMENTS FOR AUGUST, 1944

Day :—

Torpedo

2 M/V.s (totalling 1,000 tons) sunk.
1 M/V (2,000 tons) seriously damaged.

Day :—

R.P. and Cannon

1 (*Seetier*) destroyer sunk.
1 (*Elbing*) destroyer sunk.
1 (*Sans Souci*) E/V sunk.
4 " M " class M/S sunk.
2 Sperrbrechers (totalling 12,426 tons) sunk.
3 T.T.A.s sunk.
1 Sperrbrecher (7,087 tons) sunk (shared with the Royal Navy).
1 " M " class M/S seriously damaged.
3 E/V.s seriously damaged.
3 M/V.s (totalling 5,500 tons) damaged.
2 Coasters (totalling 800 tons) damaged.
11 E/V.s damaged.
1 " M " class M/S damaged.
1 Floating Dock damaged.

Day :—

Depth Charge

1 " M " class M/S seriously damaged.

Day :—

Bombs

1 Sperrbrecher (2,500 tons) sunk.
1 " M " class M/S sunk.
1 Sperrbrecher (6,000 tons) damaged.
1 (*Seetier*) destroyer damaged.
1 Coaster (600 tons) damaged.

Day :—

Cannon

2 T.T.A.s seriously damaged.
1 Tanker (3,371 tons) damaged.
2 " M " class M/S damaged.
4 T.T.A.s damaged.

Night :—

Bombs

4 T.T.A.s sunk.
1 E/R-Boat sunk.
1 M/V (1,000 tons) seriously damaged.
1 Unidentified vessel seriously damaged.
1 E/R-Boat seriously damaged.
2 T.T.A.s seriously damaged.
1. T.L.C. seriously damaged.
2 Unidentified vessels damaged.
4 E/R-Boats damaged.
3 T.T.A.s damaged.
2 T.L.C.s damaged.

RESULTS CLAIMED FOR SEPTEMBER

(Subject to Assessment)

Day :—

Torpedo

1 E/V sunk.
2 M/V.s (totalling 6,000 tons) seriously damaged.
1 Lightship seriously damaged.

Day :—

R.P. and Cannon

Uncompleted destroyer sunk.
2 E/V.s sunk.
M/V hull (3,000 tons) seriously damaged.
M/V (1,367 tons) seriously damaged.
5 E/V.s seriously damaged.
4 M/V.s (totalling 10,523 tons) damaged.
2 Coasters damaged.
7 E/V.s damaged.
1 Unidentified vessel damaged.

Day :—

Cannon

2 M/V.s (totalling 2,458 tons) damaged.
13 E/V.s damaged.

Day :—

Tsetse

1 Torpedo boat sunk.

Night :—

Bombs

1 E/V seriously damaged.
1 Unidentified vessel seriously damaged.
4 E/R-Boats seriously damaged.
2 M/V.s damaged.
3 E/V.s damaged.
1 Unidentified vessel damaged.
3 E/R-Boats damaged.

Recent Attacks on Shipping

During the early hours of September 2, **Albacore T/119** attacked four E- or R-Boats about 4 miles east of Calais. The pilot dropped four 250 lb. G.P. bombs from 1,500 feet, and scored a direct hit on one of the boats, which was afterwards seen to be smoking heavily. A few minutes later a second attack was made with the remaining two bombs. One of these hit the second vessel which blew up at once. Two E- or R-Boats are claimed as seriously damaged.

On September 6 another successful night attack was made by **Avenger C/855.** The aircraft first obtained a Radar contact, and then the crew sighted five E- or R-Boats north of the Hook. The pilot attacked with 250 lb. and 500 lb. G.P. bombs and scored a direct hit on the leading vessel which burst into flames, and was still burning when "C" left the area.

On the evening of September 6, 26 **Beaufighters** of the **Langham Wing** on armed reconnaissance off the Frisian Islands sighted a convoy of four merchant ships with eight escorts. The Torbeaus dropped six torpedoes and seriously damaged two merchant vessels of 2–3,000 tons each. The rest of the Beaufighters attacked with 25 lb. R.P. and cannon and besides hitting two of the merchantmen, they seriously damaged a trawler-type auxiliary and a lightship. Flak from the ships was comparatively slight, but after the attack severe fire was encountered from the shore batteries. All the Beaufighters returned to base, although five of them were damaged by flak.

On September 11 a force of 39 **Beaufighters** from **North Coates** and **Langham** sighted four "M" class minesweepers off the Norwegian coast. The ships were intercepted on a westerly course near Lister, and attacked with torpedoes, R.P. and cannon. One of the minesweepers was enveloped in a great column of smoke and steam, probably the result of a torpedo hit. A second vessel was hit by no less than 32 R.P.s and a third by 14. At the end of the attack all four minesweepers were burning fiercely. As a result of this operation two minesweepers are claimed as sunk and two others as seriously damaged. None of the aircraft was lost, but five of them sustained flak damage.

The **North Coates** and **Langham Wings** operated again on September 12, when another 39 Beaufighters attacked shipping off the Dutch coast. An uncompleted destroyer and a stationary convoy comprising four merchant ships and about 10 escort vessels were sighted in the Marsdiep anchorage. Attacking with torpedoes, R.P. and cannon, our aircraft sank the destroyer and damaged three escorts. Several of the Beaufighters beat up enemy installations on Texel with their cannons; these targets included an R.D.F. station, barracks, hangars and several gun positions. Throughout the attack the ships and shore batteries put up severe flak. Two Beaufighters failed to return, and more than half the remainder were damaged.

On September 14 a mixed force of 19 **Beaufighters** from **144** and **404 Squadrons** and 21 **Mosquitos** from **248** and **235 Squadrons** sighted an enemy convoy off Kristiansand South. They attacked with torpedoes, R.P. and cannon. R.P. hits above and below the waterline were scored on a merchant ship of over 3,000 tons and on another of 2,500 tons. A trawler-type auxiliary was also hit with R.P. and two others were well beaten up with cannon fire. One Beaufighter failed to return and two were damaged, but at least five of the ships were damaged and left smoking heavily.

On September 17 26 **Beaufighters** of the **North Coates Wing** attacked two trawler-type auxiliaries south of Heligoland. One of the trawlers was hit amidships by a torpedo and seen to blow up and sink, leaving wreckage and survivors on the water. The other vessel was hit by many R.P.s and cannon shells; she was last seen burning fiercely and steaming round in a circle, apparently out of control. No aircraft were lost, but four were damaged by flak.

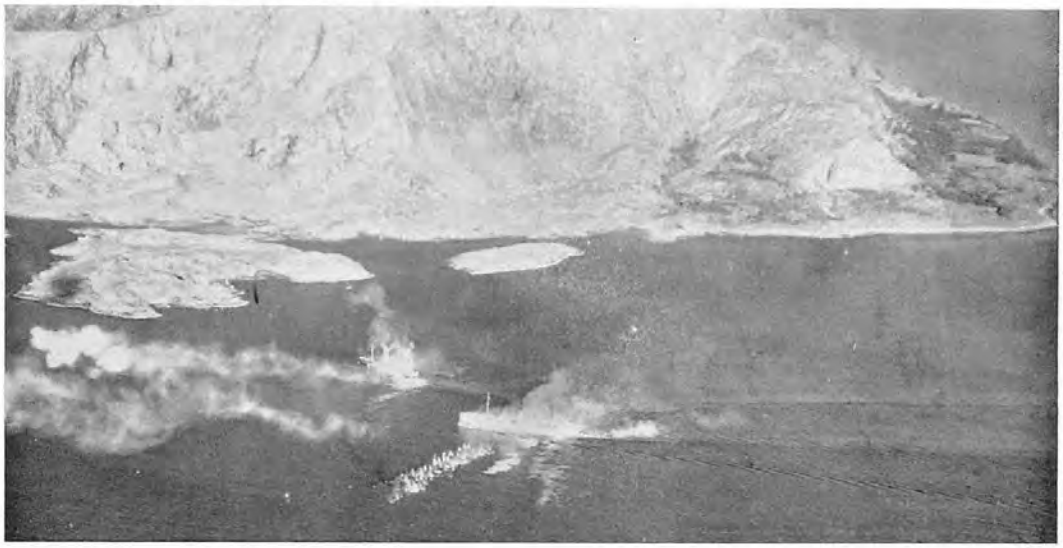
Beaufighters of **144** and **404 Squadrons** and **Mosquitos** of **235 Squadron** attacked a convoy in Stav Fjord on September 19. The targets were a merchantman of 3,500-tons, two others of between 1,000 and 1,500-tons, and an armed trawler. Our aircraft sank two ships, the *Lynx* of 1,367-tons and the 3,500-tonner, and damaged the others. One Beaufighter is missing.

On September 24 four **Mosquitos** of **248 Squadron** attacked shipping in Hjelte Fjord. A merchant ship of 1,500 tons and an armed trawler were well beaten up with 6-pounders, cannon and machine-gun fire. Both vessels were damaged and the trawler was last seen blazing furiously.

Less than an hour after this attack seven more Mosquitos from the same squadron sighted an "M" class minesweeper and an armed trawler in Sogne Loch. Both the ships were attacked with 6-pounders and cannon. Fires broke out on the trawler and she was seen to be running aground; the minesweeper was also damaged and left smoking satisfactorily. All the Mosquitos returned from these two attacks.

The **North Coates** and **Langham Wings** combined to attack shipping in Marsdiep on September 25. Explosions were seen on the hull of a 3,000-ton merchant ship and many R.P. and cannon strikes were scored on minesweepers, tugs and trawlers. One minesweeper blew up and another was left burning fiercely. Four trawlers, three tugs and a barge were also set on fire. Apart from the ships, a floating crane and land targets were attacked. The ships and shore batteries put up intense flak. Three Beaufighters failed to return and 17 others were damaged.

On September 28 a vessel of the torpedo-boat type flying the German flag was sunk south-west of Kristiansand by **Mosquitos** of **248 Squadron.** The Mosquitos attacked with Tse-Tse, cannon and depth charges. Our aircraft scored 24 hits with 6-pounder shells as well as many cannon strikes, and one depth charge exploded just under the target's starboard beam. There were several explosions aboard the vessel and she was covered by a thick cloud of smoke. Shortly afterwards she sank on an even keel, without leaving any sign of wreckage or survivors on the surface of the water. The Mosquitos all returned and none of them was damaged.



On September 19, shipping in Stav Fjord was attacked by Beaufighters of Nos. 144 and 404 Squadrons, escorted by Mosquitos of No. 235 Squadron. The targets were a northbound convoy of two ships, the *Lynx*, of 1,367 tons, and an unidentified ship of some 3,500 tons, and a single southbound ship, the *Ursa*, of 958 tons. The photographs on this and the following page illustrate the success of the attack, in which the two larger ships were sunk.

PLATE 4

These photographs show the development of the attack on the *Lynx* referred to on the preceding page. The lower picture shows an explosion caused by an R.P. hit.

III.—OTHER OPERATIONAL FLYING

Photographic Reconnaissance

Keeping watch on the enemy's preparations for blocking and demolishing the Dutch ports has provided most of the month's work. Ex-Dutch merchant ships, long since laid up, and newly-launched German hulls together form quite a substantial fleet of blockships and already some of these vessels are being sunk in the North Sea Canal and at Maasluis in the New Waterway. Others are being assembled at Rotterdam, Ijmuiden and Den Helder. The balance of sorties was made up with routine cover of German ports in the North Sea and the Baltic, and repeated cover of wide areas in Holland for planning and research purposes. On September 20, five days after Bomber Command's attack, damage assessment photographs were taken of the battleship *Tirpitz* in the Kaa Fjord. Unfortunately, however, the enemy put up a thin smoke screen which prevented a definite interpretation of the photographs. Nevertheless, discolouration and other factors suggested that the ship might have been damaged. It has since become known that she received at least one direct hit and was extensively damaged.

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

540 Squadron, Mosquito

While on a Photographic Reconnaissance sortie on September 4 I was intercepted by two Me.262's. As we were approaching one of our targets a few miles north of Neuberg at 28,000 feet, I.A.S. 210 m.p.h., I jinked the aircraft to enable the navigator to see behind and below. He reported all clear, but about 30 seconds later, just as I was about to tell him to go down into the nose, he reported that a jet-propelled aircraft was coming up from behind and slightly to port. It was about 800 yards away and closing rapidly. I immediately turned steeply to port and opened up to 2,650 revs. for better manœuvring. I also began losing height at between 300 and 500 feet per minute. The jet aircraft overshot and tried to turn with us but after holding a tight turn for about 15 to 30 seconds it fell away. It came in again, turned with us for another 30 seconds or more, and then again broke away. During the first encounter I saw another aircraft standing off. After the first aircraft had broken away the second one came in to attack and we identified it as another Me.262. This aircraft tried a climbing attack but the Mosquito's rate of turn prevented the enemy from getting into a position from which he could open fire. He then tried to turn with us but the same happened as in the first attack. The second Me. then broke off and the first one returned to the attack. This procedure, first one aircraft attacking and then the other, went on continuously from the time we met the first aircraft at 28,000 feet until we were down to about 3,000 feet. At this height, after one aircraft had broken off I saw the other still standing off and apparently not yet coming in to attack us. I therefore levelled out and dived to the deck in the hope of being able to fly a more or less straight course out of the area, and at the same time presenting a fairly difficult target. We were flying at zero feet by the time the jet aircraft came up to us some 20 minutes after the first encounter at height, but instead of coming down to our level as we had expected, it remained at about 2,000 feet. Once it came down to between 1,000 and 1,500 feet, but immediately went up again to 2,000 feet and followed us, weaving from side to side above the Mosquito. The other aircraft had then disappeared, apparently short of fuel. We were followed for about 10 minutes before the Me. turned away and disappeared.

During the first few minutes of our flight at deck level we were above a pine forest on an upward slope, when a taller tree than the rest suddenly appeared in front of the aircraft. Before I could clear it, the top of the tree struck the bottom of the bomb aimer's window, making a hole of about 4 inches diameter, splintering the rest of the perspex and making several cuts on the belly of the aircraft. We continued flying at ground level until we reached the Alps and we then flew part of the way up the Brenner Pass before climbing up over the main range of mountains to 27,000 feet. (While we were at ground level we had steered an easterly course in order to clear Munich before heading south.) We then flew on to San Severo where we landed.

During the turns our airspeed was 180 to 190 I.A.S. and the rate of turn was as high as I could make it. We left wing-tip trails most of the time and the aircraft shuddered quite often as I approached a high speed stall. After each attack I levelled out a little if the other aircraft was still a little way off, to enable the navigator to see which way it was coming in to attack. Throughout the action the navigator stood with his legs braced and his head forced hard against the top blister. From that position he was able to give a running commentary on what the enemy aircraft were doing. Kneeling on the seat would not have been satisfactory as the centrifugal force would have slid him out of it. Because we lost height at 300 to 500 feet a minute in the turns the enemy aircraft were forced to put their noses down in order to turn with us and their speed seemed to build up so much that they could stay with us for only a very short time before their rate of turn decreased and they had to break off. The second aircraft came from slightly below each time so as to get the highest rate of turn. At no time were the enemy aircraft in a good position to fire at us and neither the navigator nor I saw any firing. While in a steep turn they were never able to get their noses sufficiently in front of ours to enable them to take a deflection shot.

544 Squadron, Mosquito

We took off at 0805 hours and climbed over a cold front towards Den Helder on our way to photograph targets in the Peenemunde and Stettin areas. At Bremerhafen the cirrus ended and there was no cloud beneath us. As we approached Peenemunde at 27,500 feet a few minutes before 1000 hours, we sighted two FW.190s 1,500 feet above us making trails and approaching head on and slightly to starboard. The pilot immediately turned in towards the FWs. which passed overhead and tried to turn and follow us. We then lost sight of them for some time as they had come down below the trail level. By then we were over our first target and the navigator went down to the nose while we made two runs over the experimental station at Peenemunde. As soon as he came up from the nose the navigator saw a FW.190 800 yards away diving on our tail. The pilot increased revs. and went into a shallow dive. The FW. closed to 600 yards but the Mosquito's speed was great enough to hold the enemy aircraft at that distance. We were then flying at 26,500 feet with glycol streaming from the starboard engine. The enemy aircraft seemed unable to get nearer, but soon afterwards we saw that a trail of brownish-black smoke was coming from the FW.'s exhaust and that he had gained about 400 feet on our height and was now directly behind us. We were then approaching Stettin and almost immediately 30–40 bursts of flak came up slightly to port and at our height. The enemy aircraft turned to starboard as if to avoid the flak bursts, so we turned to port into the flak and thereby gained about 500 yards on the enemy who then settled down to chase us, sometimes closing but gradually falling behind. With the FW. about 2 miles behind, we pinpointed ourselves near Woldenberg where we had a target. The navigator went down to the nose in preparation for a photographic run, but the necessary corrections to our course enabled the FW. to close to within a mile, so we abandoned the attempt. At 1029 hours as we neared Posen airfield the FW turned away to port and was not seen again. Friendly cirrus was forming so we increased height to 29,000 feet and crossed Austria and Hungary, photographing the airfield at Zagreb without further incident. After having been in the air for five hours we landed at San Severo, where we were able to bathe in the Adriatic.

544 Squadron, Mosquito

We were briefed to photograph aerodromes, oil storage depots, factories and a wireless station in the Hannover, Magdeburg, Leipzig and Prague areas. We set course at 1040 hours and reached trail level at 29,000 feet. After crossing the Belgian coast at Zeebrugge at 1129 hours, we saw a convoy of five small merchant ships, and soon after, a vertical trail which seemed to come from the north of the Ruhr. The trail only lasted 3 or 4 seconds and then disappeared. Beyond Brussels the clouds rapidly thickened and cirrus and alto-stratus began to form. Trails were patchy and varied between 26,000 feet and 30,000 feet. After several alterations of course, during which we could not find a gap in the clouds, we set course for Grieben, north of Magdeburg. Just afterwards we heard American voices on the V.H.F. and sighted a twin-engined trail 10 miles to port heading west very fast. At first, we could hear a conversation, but after a few minutes all we could hear was one pilot vainly trying to contact the other. On our E.T.A. at Grieben we came to a gap in the clouds 10 miles long and we saw the two targets through it. We photographed the first and just as we approached the second, the pilot reported two enemy aircraft on the port beam. The navigator came up from the nose and when he reached his look-out position he saw the two aircraft 5 miles behind, still slightly to port and beginning to turn in. We had already increased speed to 265 m.p.h. (I.A.S.) at 28,000 feet. Revs. were 3,000 and boost +16. Soon afterwards we saw one of the enemy aircraft immediately behind, about 4 miles away. This aircraft closed very rapidly, and as it pulled up we saw it right behind at 1,000 yards range. We began a gentle turn to port and at first the enemy aircraft seemed to hold the turn but when we tightened it up until we were making wing-tip trails, the enemy fell away and disappeared at very high speed under the port wing. We then identified him as a Me.262. The next attack seemed to be made by the other enemy aircraft while the first was regaining an attacking position. The next attack began about 500 feet above us and the Me. dived in order to try to attack from below, but by gentle jinking we kept him in sight. When he had closed to 600–800 yards, we turned violently to port and again the 262 disappeared below the port wing. These two efforts seemed to put the enemy aircraft some distance away, so we began a gentle dive for the cloud. The next two attacks were exactly similar to the first, and when we saw the two aircraft well away from us we dived for the cloud in real earnest. We were then heading 270° (M), and the enemy aircraft, whose efforts had hitherto been poorly co-ordinated, tried a combined attack. They both started from directly behind us and closed very fast, one coming from below and one from above. At about 800 yards the upper one began firing short bursts but we allowed them to close to 600 yards before making a very violent turn to starboard. This turn was so violent that the navigator's head was forced to his knees, but at least we lost the enemy aircraft for some seconds. Then one of them emerged straight in front of the Mosquito. The pilot lined up on the Me. and, as far as the vast discrepancy in speed allowed, he made a dummy attack. This shook the Me's pilot somewhat, as he seemed to open up and pull away even faster. The best enemy attack came near the end of the engagement when one Me. came out of the sun, with the other in wide formation with it. This attack came from about 60° on the port beam, but a turn into the attack enabled us to evade it. The final attack was made by a single aircraft at 8,000 feet. We met it by another steep turn. The cloud was at 6,000 feet and as we entered it 20 bursts of flak came up, accurate for height but some distance to port. After about 10 minutes in the cloud, we found a gap above us, and saw a 262 about 200 feet above us and 400 yards to starboard. It was visible for only about 10 seconds but it did not seem to be travelling particularly fast. Nor did the pilot appear to have seen us. We emerged from the low cloud about 10 minutes after this, so, keeping a careful look out, we climbed to the next layer at 22,000 feet. Seeing nothing we climbed up to the trail level, and stayed at that height, which was about 28,000 feet. We crossed the coast at Den Helder and landed at base at 1500 hours.

On September 13, after the capitulation of Le Havre, Liberator O/547 dropped depth charges in the harbour in an attempt to detonate the mines laid by the enemy. The upper photograph shows one of the depth charges exploding. The lower photograph was taken as the aircraft passed over the port, and it shows all that remains of the E-Boat shelter pens.

PLATE 6

Air/Sea Rescue units played a notable part in the airborne operations in Holland. Constant patrols were flown and many glider crews were picked up. The above photographs show two of the ditched gliders. *See* page 13.

Air/Sea Rescue

During September, 330 men, including aircrews and airborne troops, were picked up by the Air/Sea Rescue Service. During the airborne attack on Holland, 228 men were rescued by High Speed Launches, Motor Anti-Submarine Boats, Rescue Motor Launches, M.T.B.s or Walrus amphibious aircraft. 205 of those rescued were glider or Dakota crews.

This operation was backed up by Air/Sea Rescue aircraft of Coastal Command and the Air Defence of Great Britain, and by American spotter aircraft controlled by Saffron Walden. In supporting the operation a total of 251 sorties were made by Air/Sea Rescue aircraft, and 104 by High Speed Launches belonging to this Command. These launches were at sea for just under 900 hours and they saved 144 lives.

Naval Rescue Motor Launches, Motor Anti-Submarine Boats and M.T.B.s were also used. These vessels made 100 sorties, and saved 79 lives. Four men were picked up by Walruses belonging to the Air Defence of Great Britain and one by the Royal National Lifeboat Institution.

Throughout the month precautionary patrols were flown by Air/Sea Rescue aircraft, and Air/Sea Rescue surface craft were at rendezvous positions whenever operations were carried out against the enemy by Bomber Command, the U.S.A.A.F. or by our own anti-shipping aircraft. These precautionary patrols have already paid handsome dividends quite apart from the feeling of confidence which they give to the aircrews engaged on these operations.

The following are accounts of the outstanding rescues of the month.

On September 8, on the report of a faded plot in position 54° 45′ N., 00° 40′ E., a search was laid on at 1558 hours by Warwicks of 280 Squadron and three High Speed Launches from Blyth. Soon after the aircraft reached the area they sighted an American dinghy containing four survivors in position 54° 57′ N., 00° 37′ E. L/280 dropped a Lindholme Dinghy close by, and the survivors boarded it. The aircraft sent a message stating that the sea was so rough that it might prevent surface craft reaching the area. U/280 immediately took off with an Airborne Lifeboat and dropped it, but unfortunately it was so badly damaged by the heavy seas that the four men did not board it. Accordingly another aircraft, O/280, was despatched with another lifeboat, while the circling aircraft dropped markers and homed O/280 to the position. This time the drop was successful. The lifeboat fell within 15 feet of the dinghy and the survivors climbed aboard. While O/280 remained circling, other Warwicks located the High Speed Launches and despite the weather it was not long before they were alongside the lifeboat and had taken the survivors aboard.

At 0140 hours on September 13 the Flying Control Liaison Officer of 13 Group, reported that an aircraft was sending an S.O.S. from position 56° 42′ N., 02° 40′ E. Flying Control 18 Group immediately got in touch with Hull, who confirmed this, and stated they were almost certain that the wireless operator in the aircraft had clamped his key down. Warwicks of 281 Squadron were despatched from Wick as the weather was unfit at Leuchars, and High Speed Launch 2721 sailed from Tayport. In the meantime it was learned that Halifax B/429 from Leeming was missing. Bomber Command lent Halifaxes from Leeming to help in the search. At 1715 hours High Speed Launch 2721 signalled that she had seven survivors on board, all well, but at 1851 hours she sent another signal to say that she had only enough fuel to last until 2100 hours by which time she would reach position 56° 30′ N., 01° 43′ W. and would require assistance. High Speed Launch 2720 immediately sailed from Tayport with extra fuel and made contact with High Speed Launch 2721. At 1105 hours on September 14 both Launches arrived at Tayport.

On the night of September 16 Halifax M/420 sent an S.O.S. and then nothing more was heard. The last fix, at 0402 hours, gave the aircraft's position as 52° 25′ N., 02° 30′ E. Hudson X/279 took off and on reaching the area, it dropped a marker and remained circling until daylight. Nothing was seen, but the search continued all day and at 1743 hours a dinghy with survivors on board was sighted. Two Walruses were sent to the position and a Rescue Motor Launch was diverted. One Walrus landed, taxied to the dinghy and picked up eight survivors. In the meantime L/279 had made contact with the Rescue Motor Launch and guided her to the Walrus. The eight survivors, the entire crew of the Halifax, were then safely transferred to the Launch and brought back to port.

IV.—SPECIALIST AND GENERAL ARTICLES

Recent Developments in Anti-Shipping Operations

The flexibility of Coastal Command's anti-shipping squadrons has been the keynote of their work during the past nine months. The campaign which has been waged with such success by day and by night, from Kristiansund North in Norway to the Gironde in the Bay of Biscay, has played an invaluable part in the invasion of Europe. It presents an interesting study in the development and variation of anti-shipping tactics.

The beginning of the year saw one Beaufighter Wing striking at the enemy's shipping off the coast of Norway, while a second Wing, which had been replacing obsolete Hampdens with Beaufighters, became fully operational by March, the torpedo half of it having come into the line in the middle of January. Their success was such that despite the need for reinforcing his hard-pressed fighter squadrons in the west, the enemy was obliged to maintain the strength of his single-engined fighters in the Stavanger area in order to safeguard his highly important supply ships from Norway. For us fighter cover was not available, so the activities of the Beaufighter Wing were restricted. However, the torpedo squadrons evolved suitable tactics. They would appear at very last light, or first light, in twos and threes, regardless of cloud cover, and get amongst the convoys just leaving or entering the southern ports of Norway. When cloud cover was available the Wing operated as such, and employed the normal tactics.

North of Stavanger the coastal shipping route makes its tortuous way through the Leads. In this area intercepting enemy shipping in waters suitable for torpedoes is a poor gamble, no matter how carefully the timing is worked out on reconnaissance reports. This fact, coupled with bad weather and mountainous seas, brought about a concentrated R.P. effort in these waters. The torpedo squadron, using only cannon, took the anti-flak rôle against the escorts, whilst the R.P. aircraft attacked the main targets. The experience gained in these R.P. attacks was to prove very valuable in the operations which began on D-day. Tactics were modified and improved continuously, always with the main object of developing a surprise saturation attack co-ordinated to a split second. No deviation was made from the basic principle that three anti-flak aircraft must be detailed to deal with each escort. But the various ways in which a wing may fly in formation, deploy whilst manœuvring, and attack in one lightning stroke, were explored fully.

Meanwhile, the third Beaufighter Wing, based on the east coast of England, struck continually at enemy convoys plying along the Dutch coast route. For operating by night their tactics are to employ flare-dropping Wellingtons, which locate the target by Radar and summon the waiting Beaufighter pack by V.H.F. The shipping is illuminated by parachute flares and attacked with torpedoes. Despite the successful use of radio altimeters and Radar, night attacks on enemy shipping remain the most difficult problem of the anti-shipping squadrons. Tactics are being revised and improved upon continuously.

This was the general outline of the anti-shipping squadrons' efforts during the first quarter of the year. By these tactics Coastal Command was able to strike at the enemy convoys, sinking large quantities of supplies destined to help the Reich hold out against the threatened Allied invasion.

In the summer the enemy was expected to exert the utmost effort to attack our invasion fleets as they sailed back and forth across the Channel. The greatest threat was the use of E-Boats, or other small, fast naval auxiliaries by night. The half-dozen or so destroyers and torpedo boats in the western ports of France constituted a secondary threat. In May, the squadrons began intensive training in shallow dive bombing. The torpedo crews, realizing that there would be no use for their particular weapon, yet anxious to play a part in the invasion, tackled their training task with enthusiasm. Much night training was done and tactics and methods of sighting were evolved to meet the new commitment. Throughout this important training period all three wings continued their operational work.

On D-day the Allied assault forces sailed for Europe. At their invasion stations the three Beaufighter Wings waited to carry out their task of guarding the convoys from attack by enemy surface craft. Meanwhile immediately before D-day, whilst our ships assembled, night patrols were flown to counter sporadic E-Boat activity.

On the afternoon of June 6 the experience gained by the Wick Wing in using R.P. as a main weapon bore fruit. The Wing, then based in the south-west, was despatched to locate and attack a force of three heavy destroyers which was heading north from the Gironde, with the supposed intention of marauding by night in the Channel.

The difficulty of achieving a well co-ordinated attack by 31 aircraft on three fast moving ships is obvious. Yet tactically this attack was a model. The force flew out in four "vics," stepped up, the cannon anti-flak aircraft leading and forming the bottom two "vics." The formation was very compact, and on sighting the target the Wing Leader was able to climb and manœuvre to attack directly out of the sun. Each destroyer was attacked by two successive waves of three cannon aircraft, closely followed by the R.P. aircraft.

The expected destroyer and E-Boat menace from the west did not materialize, and although hundreds of hours were flown this Wing had disappointingly few encounters with the enemy during June. At the end of the month it moved to join the other two Wings under one Group Headquarters.

Meanwhile, on June 15, another foundation stone had been laid in the ever-changing structure of anti-shipping tactics. The enemy, who had gained a healthy respect for the attacks of our

PLATE 7

On September 25, the largest force of Beaufighters ever despatched attacked shipping lying at anchor off Marsdiep, between Den Helder and Texel. The main target, which was attacked by aircraft of Nos. 143, 236, 254, 455 and 489 Squadrons, was the hull of an uncompleted merchant ship of 3,000 tons. The upper photograph shows the hull surrounded by minesweepers and auxiliaries ; the picture also shows something of the formidable flak barrage. The action is described on page 10. The lower photograph shows a Giant Wurzburg Radar site near Den Helder, which was attacked during the same operation.

These photographs were taken during the action at Marsdiep which is also illustrated on the preceding page. The upper picture shows some of the strong force of minesweepers and trawler-type auxiliaries which were lying in the anchorage. The lower photograph is of an " M " class minesweeper under heavy attack.

Beaufighters, had continued to increase the escorts to his precious merchant ships. Our counter measure was to send a combined Wing strike to attack such convoys. The new tactics were tried out on June 15 when a convoy comprising a merchantman of 8,000 tons and a big E-Boat depôt ship, escorted by ten "M" class minesweepers and seven R-Boats, was attacked by a strike force which consisted of the combined Langham and North Coates Wings. The results were impressive. Our losses were nil, and damage to our own aircraft negligible, but the enemy lost both his big ships, and the escorts were badly mauled. Over 30 Beaufighters were used as the anti-flak force to blast a path for the 12 torpedo aircraft.

July was an epic month. With three Beaufighter Wings under one Headquarters, combined Wing strikes became the order of the day. When necessary, A.D.G.B. provided fighter escort—usually Mustangs. The weight of the attack of the anti-flak aircraft became a telling factor in these actions. Success bred success, and the enthusiasm of the crews is reflected in the many remarkable photographs they took from mast height. The lot of the German sailor was decidedly not a happy one.

Two tactical developments emerged from this month's operations. First, since fighter cover had removed the risk of our aircraft being chased by enemy fighters—a sport which uses much petrol very fast—it was found possible to increase the range of the Beaufighter Wings. The Heligoland Bight became their hunting ground. Then, doubtless to the enemy's surprise, a combined Wing appeared off the Norwegian coast at Lister, on July 15 and struck hard at a convoy. One of the ships damaged was a valuable tanker. We suffered no losses.

The second development came towards the end of the month, when the enemy gave up sailing in daylight. However, he could still be found at first or last light, either hurrying to get into port or forming up in his anchorages for the nightly dash down the coast. Tactical flexibility provided the answer. The squadrons took off as individual aircraft and flew out over the North Sea in the dark. A co-operating Wellington laid a "Drem" system of flares at a pre-arranged sea position. While it was yet scarcely light enough to fly without navigation lights, the Wing formed up and set course for its patrol area, not far away.

Throughout July the anti E-Boat effort in the Eastern Approaches was sustained. One squadron in particular was used solely for this task, but all three Wings gave support. The difficulty of assessing the damage inflicted on the enemy by night dimmed the limelight which these incessant attacks might otherwise have earned. However, evidence has come to light which proves conclusively that the "air burst pistol" with which the Beaufighters' bombs are fuzed, was most judiciously chosen for the difficult task of attacking enemy light naval craft at night. Wellingtons, Avengers and Albacores, as well as Beaufighters, have taken part in these night attacks to hinder the enemy's attempts to raid our Channel convoys.

August brought the outflanking sweep of the American armies and the isolation of the ports on the west coast of France. Two R.P. squadrons were detached from their Wings and sent to the south-west of England. The move was made swiftly and without a pause in operations. The targets to be attacked skulked in the harbours and anchorages of the small Biscay ports, and the squadrons had to change their tactics yet again. The aircraft flew at tree-top height across France, 50 miles inland, and thereby achieved surprise. They climbed only at the last moment and attacked from the landward side. It was doubtless a new and pleasurable experience for the anti-shipping pilots to hedge-hop, legally, across the land.

The month was a particular triumph for the R.P. squadrons. The 25 lb. "J" type head was used on every occasion and the results were excellent, as the many splendid action photographs have shown. In this series of operations two destroyers and two sperrbrechers were among the ships sunk. The worth of R.P. as an anti-shipping weapon against even big ships was irrefutably established.

The work of the Beaufighter Wing in the Biscay area was augmented by the efforts of the Mosquito Wing which had been operating in a dual rôle. With our convoys freed from the menace of enemy air action, and with little anti U-Boat work to be done, the Mosquitos proved a useful addition to Coastal Command's anti-shipping striking power. Their speed and manœuvrability are a great asset in anti-shipping work and they are highly successful with bombs, 6-pounder and 20 mm. cannon. The tactics they employ are similar to those of the Beaufighter Wings, with emphasis laid on the need to quell the flak in order that the main weapon may be used effectively.

The present phase of anti-shipping operations centres on the Norwegian coast, although there is still some enemy activity off the Frisian Islands. This is becoming so slight, however, that latterly the Strike Wing tactics have had to be changed yet again, as it is becoming necessary for the aircraft to go right into heavily defended anchorages for targets. Recently the record number of 70 Beaufighters attacked a variety of escort vessels lying at anchor in Marsdiep. The attack was carefully planned and was co-ordinated with a dive-bombing attack by Mustangs. Some aircraft out of the large force of Beaufighters taking part were detailed to attack the formidable flak defences of the anchorage.

The need to supply his U-Boat bases in Norway, his ever increasing demand for iron ore, and the possibility of having to evacuate some 100,000 of the Wehrmacht who have arrived in northern Norway from Finland, mean that the enemy will have to use his remaining shipping to its fullest capacity on the Norwegian coastal route.

The flexibility of the very powerful anti-shipping forces at the disposal of Coastal Command will be the dominating factor in the final stages of the campaign to destroy the enemy's shipping resources. Whatever methods the enemy may adopt it is certain the the Strike Wing tactics will be adjusted so that the full weight of the tremendous fire-power, built up over the past six months or so, will be brought to bear on the last remnants of Germany's merchant shipping.

Recent Information on German Radar and G.S.R.

The *Coastal Command Review*, Vol. III, No. 3 (March, 1944), contained an article on German Radar and counter-Radar equipment. Since then the enemy has been able to make some progress in this direction, and the following account, which is based entirely on prisoners' evidence, takes the story up to late August, 1944. Other information as well as previous accounts will be found in C.B. 04051 (103) and in S.N.I.P.s. Many of the statements in the following article have been confirmed by captured documents.

Radar

The new enemy Radar set, the 50 cm. *Hohentwiel* (adapted from the G.A.F. FuG 200), is apparently being fitted to U-Boats, but so far prisoners have been taken from only one boat carrying this set. Another boat had had her *Gema* (80 cm.) set removed just before her last patrol, and her W/T cabin had been rebuilt to receive the *Hohentwiel*. However, no set was available and she had sailed without one. It appears that there is an acute shortage of these sets as well as of all W/T equipment.

One prisoner was taken who had done the fortnight's course on *Hohentwiel* at Den Haan, but he could add nothing to the brief descriptions which we already have.

A certain Dr. Bracher is reported to have said in July this year that he had studied all Radar sets captured from the Allies, and that he had designed a new and reliable Radar set for U-Boats. This new set, which was designed on the basis of what had been learnt from our equipment, was not in production. The prisoner believed that Dr. Bracher was the designer of the *Wanz* G.S.R.

G.S.R.

Wanz G.2. A Runddipol (drum type) aerial is still fitted to all U-Boats as standard equipment and the *Wanz* G.2 set is carried for use with it. A further Runddipol is also fitted to the top of all Schnorkels. The *Wanz* G.2, however, is considered by prisoners to be unsatisfactory and it is known to overheat.

Borkum. This set is carried but little used.

Naxos (8–12 cm. waveband). No reliable figures are available for the effective range of *Naxos*, but it is clear from the various developments that the set was not at first regarded as satisfactory. As a result at least two improvements are reported to have been introduced. One is the replacement of the ordinary *Naxos* aerial by a new aerial known as the *Fliege*. This consists of a semi-circle of wire mesh about 12 inches in diameter by 3 inches wide, mounted either in the D/F loop or, more usually, on a special support on the periscope housing. At its centre is a block, thought to contain a crystal rectifier unit, with a dipole which looks like a bow tie (*Fliege* means "fly," or in slang "bow tie"). Various modifications of this arrangement have been tried out and the dipole has been fitted horizontally, vertically or obliquely. The aerial must be carried below when the boat dives.

Another variant, mentioned by a prisoner who said he had fitted it to an E-Boat, had a wave guide instead of the dipole. This consisted of two copper tubes, one sliding inside the other, for tuning purposes. This may be a 2–4 cm. aerial.

The other notable alteration to the *Naxos* equipment is the introduction of a new amplifier unit, the details of which are unknown to prisoners. Instead of keeping *Naxos* watch by plugging the aerial lead into the gramophone terminals of the ship's *Radione* wireless set, headphones are used in conjunction with the new amplifier. The amplifier contains a neon lamp which is variously stated to light up on very strong contacts or when the set is faulty.

Tunis (2–4 cm. and 8–20 cm. cover, according to captured documents). Rumours of the existence of *Tunis* were first heard in June, 1944. The only U-Boat to be sunk with it on board and from which prisoners were taken, was *U 672* which had been fitted with the equipment at St. Nazaire early in July, 1944. *Tunis* consists of two sets, a *Fliege* aerial with a *Naxos* amplifier, which will pick up 10 cm. Radar transmission, and a *Mücke* aerial with a similar amplifier, which covers the 3 cm. waveband. No useful estimate of the range is available, although *Mücke* is said to have a shorter range than *Fliege*.

In *U 672* a *Fliege* aerial was fitted to the top of a 1¼ inch diameter steel bar and underneath it, facing in the opposite direction, was a *Mücke* aerial. This consisted of a funnel, stated variously to be made of celluloid-like material or celluloid-covered metal, 18 inches long, 6 inches in diameter at the larger end and 3 inches at the smaller. In the smaller end a dipole and a saucer-shaped wire gauze reflector are said to be fitted. The rod was carried on the periscope housing and could be rotated. One lead from the aerial passed down the conning tower hatch to the W/T cabin. The aerial must be carried below on diving.

In the W/T cabin there were two amplifiers, both thought to be *Naxos* amplifiers. The G.S.R. watch was kept with headphones, a three-way switch enabling the operator to listen either on *Fliege* or *Mücke* or both.

Infra Red

All U-Boats are still being painted with a camouflage paint which is intended to absorb infra red radiation. Many U-Boat officers still believe that Allied aircraft are equipped with infra red searchlights. A captured document written not earlier than July 1, 1944, lists three paints which are to be used for infra red camouflage. They are No. 38 *zwei*, which is blue; No. 38, which is mud-grey; and No. 58 *eins*, which is blue-grey.

The Operational Use of Radar and G.S.R.

The introduction of *Tunis* is believed by prisoners to have brought their G.S.R. development level with our Radar development, though the new set has so far been fitted to few U-Boats. It may also be noted that Commanding Officers are now beginning to place more trust in their

On September 19, Beaufighters of Nos. 143, 236 and 254 Squadrons attacked two auxiliaries in the Heligoland Bight. Photographs show that one of these ships was a Swinemunde-type drifter, and it is possible that the other also belonged to this class. One of them blew up and sank after being hit by a torpedo, and the other was left in flames. The above photographs fully support the crews' claims.

PLATE 10

The airfield at Lagens, Azores, photographed on September 2 by Fortress J/220. The new runways, which are still under construction, can be clearly seen. At present only the original metal strip is in use. The picture was taken from 5,000 feet.

Radar sets than formerly, despite the fact that very few boats have yet been fitted with *Hohentwiel*, and that the *Gema* 80 cm. set is inclined to break down.

The two main reasons for this trend are, firstly, inherent difficulties with and distrust of G.S.R. equipment, due partly to its poor design and partly to its limitation in being only able to indicate bearing and not distance; and, secondly, propaganda by the German Admiralty in favour of the use of Radar is at last taking effect.

It appears that the *Naxos* G.S.R. set, when fitted with the *Fliege* aerial, normally gives accurate bearings of contacts in time to enable the guns' crews to train their weapons. This is offset, however, by the acknowledged fact that protection is low if the *Fliege* is fitted in the D/F loop, and the W/T operator does not carry out a constant 360° search, or if it is fitted on the periscope housing and the man whose job it is to train it is feeling lazy. It is also offset in most boats by the need for an extra rating on the bridge to train the *Fliege* and to pass it down through the conning tower hatch to a rating stationed in the conning tower to receive it when the crash dive alarm is sounded. This results in an increase in diving time.

Prisoners from U-Boats who have used their *Gema* sets were enthusiastic, and were looking forward to getting *Hohentwiel*. They reported obtaining good contacts on single aircraft at 11–14 miles and bearing accuracy is considered to be good.

Radar Decoys

Radar Decoy Balloons (Aphrodite) are still carried by most boats, and some C.O.s have faith in them; Radar Decoy Spar Buoys (Thetis) are not frequently carried. No new types have been reported in general use, although a prisoner from *U 385* said that they carried a new variety containing a Radar and noise decoy known as Bolschen.

The Eye and the Schnorkel

The use of schnorkel by U-Boats has presented a new problem for visual look-outs which is different in some respects from that of searching for surfaced U-Boats. Since it is difficult even in a moderate sea to pick up schnorkels on Radar, it is more important than ever for the visual look-outs to be up to scratch.

The average range at which schnorkels have been sighted is about 3 miles, compared with an average range for surfaced U-Boats of about 6 miles. In some instances smoke was coming from the schnorkel, and this considerably increased the range at which it could be seen. The rough guide to scanning for surfaced U-Boats, which was issued recently in the form of a poster, will help in deciding the best way to scan when searching for schnorkels. The important point is that the shorter range of pick-up necessitates scanning at a bigger angle below the visible horizon. For example, when flying at 1,000 feet in average conditions the look-out should scan an area from the visible horizon down to about 12 degrees below, which is about equal to the angle subtended at the eye by the knuckles of the clenched fist when the arm is fully extended. (See *Coastal Command Review*, Vol. I, No. 6 (October, 1942), pages 10–13, and Air Diagram No. 3969.)

Owing to the great importance of defeating schnorkel, visual look-outs should be carefully placed in the aircraft. It cannot be too often stressed that the beam look-out positions are of very great importance, especially when searching for schnorkels and periscopes. Captains should organize two look-outs, one on each side of the aircraft, facing at right angles to the aircraft's course. How easily such a position can be found and manned will depend on the type of aircraft and on the size of the crew.

Binoculars are now largely used for recognition in anti U-Boat operations. About one in every three U-Boats sighted by day has been examined with binoculars. Binoculars have also been found useful in picking out the details of schnorkels, and should be used for this purpose whenever possible. Furthermore, if the beam look-outs use binoculars for scanning, the search will be much more effective.

In spite of the difficulties of using binoculars for scanning, 8 per cent of the U-Boats sighted by day during the period June to September, 1943, were picked up with binoculars. The previous figure was about 2 per cent. This result was achieved after a series of lectures to squadrons, but since then the use of binoculars for scanning has fallen back to the old level. This lack of interest was largely due to the strain of having to hold the binoculars up to the eyes for any length of time. A light holder is now in production, which will solve this problem, but until this comes along aircrews should themselves make a special effort to use binoculars for scanning. A home-made holder can easily be made out of a stick of wood of suitable length with a notch cut in the top to hold the binoculars, and a hole in the bottom through which a piece of cord can be fitted. Then if the cord is tied round the neck and the bottom of the stick rested on the cushion of the seat or in a fold of the flying jacket, the home-made rest will carry the weight of the binoculars and all the arms have to do is to balance the binoculars on the notch.

It should be remembered that the superiority of binoculars over the naked eye is very much greater for schnorkel than for surfaced U-boats, and that those look-outs who use them will get a greater return for their effort than did those of June–September, 1943.

The introduction of schnorkel has given the visual look-out a more difficult task, but the proper allocation of look-out duties, a knowledge of where and how to scan, and a real effort to use binoculars for scanning, will go a long way to decreasing the number of flying hours per schnorkel sighted. The look-out is already equipped with all the aids he requires, but they could be used more effectively.

The Radar Responder Beacon

A radar method of homing an aircraft to its base or to any particular airfield, is as essential to flying as a lighthouse is to shipping. In thick weather, particularly over the sea, the homing beacon, when effectively used, will return the aircraft to its own doorstep.

In the *Coastal Command Review*, Vol. II, No. 7 (November, 1943), a description is given of the use of Radar for A.S.V. This same A.S.V. equipment is also used in many cases to form the aircraft end of the homing system. The ground equipment, the beacon, consists of a low power transmitter, a receiver, a modulator and a coding unit. The equipment functions on ordinary I.F.F. principles, in that it responds or transmits signals on receiving an interrogating signal sent out by the aircraft.

Figure 1.

In Fig. 1 an aircraft is shown sending out interrogating signals at "A," and the beacon on the ground is shown replying, at "B."

This is what happens. The aircraft's interrogating signal on 176 Mc/s. is picked up by the beacon receiver which, in turn, triggers the beacon transmitter on a slightly different frequency, 177 Mc/s. The receiver output is also utilized to operate a modulator unit; in the circuit of the modulator there is a keying unit, which can be adjusted to key with any combination of two letters or even a single letter. The result is a keyed response to the aircraft's interrogating signal. The aircraft's operator will recognize the particular coding of his own beacon, and therefore he has a means of identification. The code is followed by a continuous transmission for 20 seconds, the whole cycle lasting about 30 seconds. (*See* Fig. 2.)

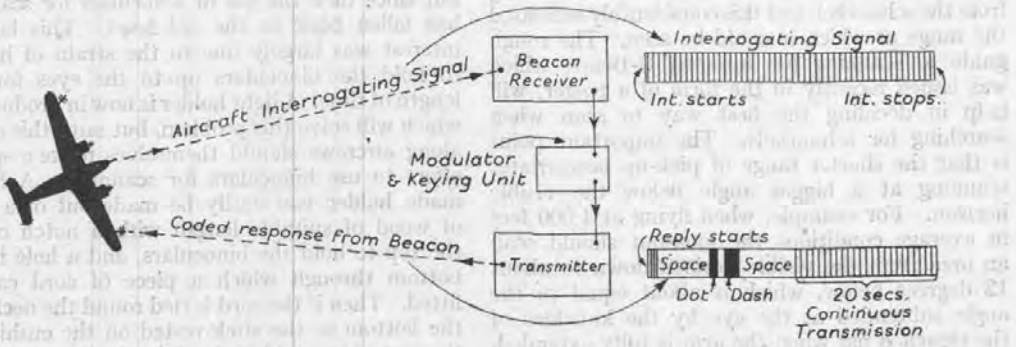


Figure 2.

The reply received by the aircraft takes the form shown in Fig. 3. In "a," the beacon is to starboard, in "b," to port, and in "c," dead ahead.

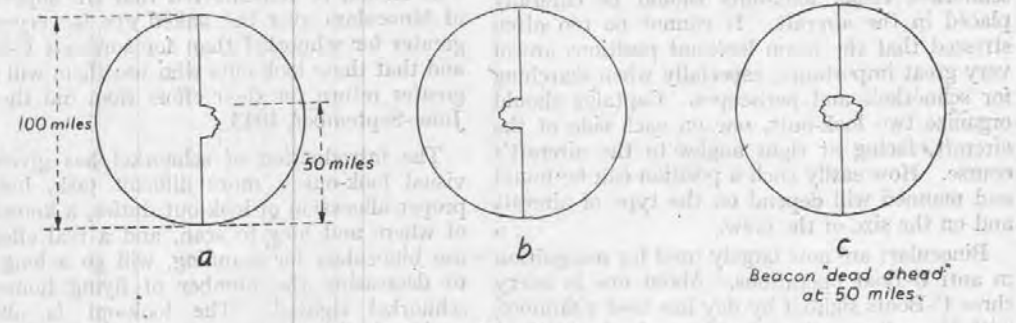
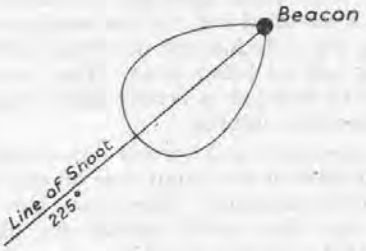


Figure 3.



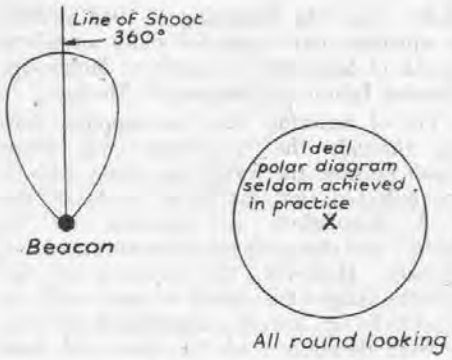


Figure 4.

The aerial switching mechanism (*see also Coastal Command Review*, Vol. II, No. 7) enables the aircraft to position itself with respect to the beacon for the homing run. The length of the vertical trace indicates the range, and different ranges are chosen by operating a switch. If, in Fig. 3 (*a*), the vertical trace is set on the 100 miles range, then the blip on the starboard side shows that the beacon is about 50 miles from the aircraft.

Some beacon aerial systems are set up to radiate on a definite bearing (L.O.S.), while others are adjusted to give, approximately, all round radiation, as shown in Fig. 4.

The reason for this is to home aircraft along a definite line of approach, so that they may avoid hills or other obstructions in the area.

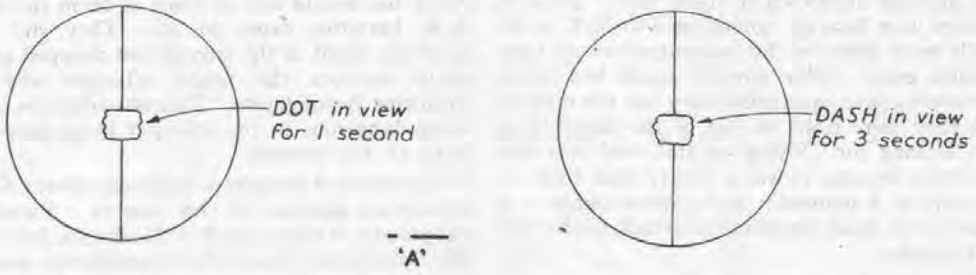


Figure 5.

The presentation seen by the aircraft operator when the beacon is dead ahead, varies in unison with the code being keyed by the beacon. The operator thus gets a picture which grows and collapses to form the short and long characters of the morse code. If the beacon is coded with the letter A (· —); his presentation would show a blip (dot) for about one second equally displaced on either side of the vertical line, then a blank during the space, followed by a blip (dash) which will remain in view for about three seconds. (*See* Fig. 5.)

Finally, in addition to A.S.V., Mark II, as an interrogator for beacons, we can also use Lucero, Rebecca, Mark IIB, and S.C.R. 729. In fact, with the exception of Rebecca IIB the other forms of interrogator are already fitted in various types of Coastal Command aircraft. Lucero and S.C.R. 729 are fitted as interrogators in aircraft where only centimetre A.S.V. is installed.

A Beaufighter G.R. Squadron in Burma

When British air and ground forces withdrew from Burma in 1942, the Japanese were able to supply their armies through the ports of Rangoon, Moulmein and Akyab. At first lack of air power prevented us from seriously interfering with the enemy's use of these ports, but gradually the air forces in India were built up. Our squadrons passed from the defensive to the offensive and were able to harass the Japanese lines of communication in central and southern Burma, and practically to neutralize the occupied ports. The process was fairly gradual and the enemy evolved a means of solving his supply problems.

Supplies for Akyab and the Arakan were sent by rail from Rangoon to Prome, where they were ferried across the Irrawaddy and carried by road over the Taungup Pass to the coast town of Taungup. There they were loaded on to small native craft and ferried up in small loads through the waterways behind Ramree Island, Hunters Bay and the Baronga Islands to Akyab. In that area there is a network of waterways ideally suitable for unobtrusively conveying supplies along the coast.

The Japanese also built a railway across the hills from Thailand to link up with the existing Rangoon-Moulmein-Ye railway line, south of Moulmein. The importance of this link can be judged by the regularity with which South East Asia Command heavy bombers did the trip to Bangkok, the port of supply for the new line.

Realizing how the enemy was solving his supply problem, the High Command in India put into the line a squadron of G.R. Beaufighters armed

with R.P. Since the beginning of 1944 aircraft of this squadron have operated daily anywhere from north of Mandalay to south of Moulmein, from Ramree Island to Chengmai in Thailand.

The job of ensuring that no supplies were slipping through the waterways was often unpleasant because the water was glassy smooth and the reflected sun was liable to dazzle the pilots. A Beaufighter is notorious for its "mushing" and this tendency is accentuated in a hot climate. However, the presence of the Beaufighters obliged the enemy to move only by night and to lie up, heavily camouflaged, by day. Sorties were therefore made at dawn and dusk in the hope of catching some craft setting out or coming in. The low angle of the sun at these times of the day made the glare off the water worse and the danger of low flying was increased. This, however, was the only real danger as the Japanese never seemed to bother to use Kyaukpyu aerodrome on Ramree Island. Had they done so, they could have made things very embarrassing. At Taungup itself the enemy used to greet attackers with light machine-gun fire which could be most effective at the low altitude at which the Beaufighters operated.

On the Taungup Pass the enemy's movement was similarly restricted to night time. By day, vehicles were heavily camouflaged in M.T. parks which were defended by concentrations of light machine guns. Often aircraft would find themselves being fired upon when they had not realized that they were right on top of the target they were looking for. Flying on this road was also dangerous because it was a twisty road built on the edge of a mountain and downdraughts or a tendency to delay breaking an attack might well spell disaster.

The pilots of this squadron were drawn from a variety of sources. Some were ex-single seater fighter pilots, some were ex-bomber pilots and some were ex-Coastal Command G.R. pilots; the navigators were, of course, all G.R. trained and came from Coastal Command. Irrespective of origin, all aircrews prayed for one thing—a ship. The Irrawaddy river steamers, which would have made an ideal target for R.P., had all been either destroyed by the retreating army in 1942 or had since been accounted for by a "rival" Beaufighter squadron during the previous year. A flight down the Chindwin from Kalewa to Pakkokku and up the Irrawaddy to Bhamo will quickly convert anyone who doubts the power or efficiency of the Beaufighter's four cannons.

In the midst of a daily round of attacking railway bridges and locomotive blast pens it suddenly seemed as though the crews' prayers had been answered in a disconcertingly generous measure. The daily press published the news that the main Japanese Fleet had arrived in Singapore with the aim of operating in the Bay of Bengal. Rumours of an immediate move to Ceylon in order to attack this Fleet flew and grew from hour to hour. A ship at last! Dozens of them! But what ships! Gradually the rumours died down and when it was made known that Admiral Nimitz had neutralized Truk and that the Japanese Fleet had come to Singapore because there was nowhere else for it to go, life returned to normal.

The thirst for ships, however, remained. Plans were carefully worked out for a visit to Moulmein. It necessitated a six-hour trip but there might be some ships there. The island in front of Moulmein was very useful tactically because the raiding force could approach unobserved from behind a thousand foot hill and suddenly appear over the top of the hill with the whole of Moulmein harbour laid out before them. They would then be able to attack at a perfect angle of dive and with complete surprise.

This operation was carried out several times and a number of small craft were hit and harbour installations damaged. There were, however, no large ships that would provide the big, deep target that is ideal for R.P.

The search for ships took some of the aircraft of this squadron to Elephant Point, at the mouth of the Rangoon river, where small ships were reported to be creeping in. All that was found in the way of waterborne traffic was a large number of native fishing craft, which were not worth attacking, and a few small sailing vessels of the schooner type. These, though not as large as an R.P. pilot would have liked, were attacked. After the second run on some of them the shore A.A. batteries came to life. They did not, however, shoot at the aircraft but dropped heavy shells between the target schooner and the attacking Beaufighters. This was felt to be much more dangerous to the schooner being protected than to the aircraft.

September 9 brought a generous answer to the squadron's prayers for ship targets. Patrolling the stretch of coast, south of Moulmein, known as the Tenasserim Coast, the Beaufighters found a number of small ships near Double Island and Ka-la-gauk Island. In attacks on that and the following day they accounted for 14 ships damaged and probably destroyed. These included a 1,000 ton motor vessel, cargo vessels between 250 and 500 tons; and escort sloops.

Thus was patience rewarded. The Japanese can be certain that any more of their shipping that ventures within Beaufighter range of our forward Arakan strips, will run a grave risk of being similarly dealt with.

Finally, there is one observation, made by many pilots, which is perhaps the most eloquent demonstration of the reversal of the air situation between 1942 and 1944. No crew returning from a sortie can ever be in two minds about which side of the bomb line they are. In Japanese-held territory all roads, rivers and railways are deserted, but in Allied-held territory they are all working to capacity day and night.

It is an encouraging thought for the Beaufighter crews that when the Japanese are forced out to fight in the open plain of Central Burma, they, too, will be forced to maintain a similar flow along their lines of communication by day as well as by night. That is the day for which the Beaufighter crews in India are waiting and the Spitfire pilots are hoping that the enemy will put a fighter cover up to protect these supply lines. That will be the true test of the Spirit of Bushido!

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