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COASTAL COMMAND REVIEW

November 1943

Vol. II, No. 7

HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE

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

COASTAL COMMAND REVIEW

Vol. II, No. 7—November 1943

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Summary of the Month's Work—November 1943

There has been no lessening of the enemy's effort against our shipping during November, but this effort has been conspicuously unsuccessful. The U-Boats have simply failed to press home their attacks. This has resulted not only in very few ships being lost, but also, unfortunately, in our being denied the opportunity of making many kills.

2. This is partly explained by the extreme caution with which the U-Boats are crossing the Bay. We have carried on our tactics of flooding the area, but this has not yielded much in the way of direct dividends. It is, however, quite clear that our policy is having an excellent effect on the enemy's fighting spirit and has made his crews literally terrified of the transit area. The growing number of Leigh Light aircraft available should increase both our direct dividends and the strain on the enemy's morale.

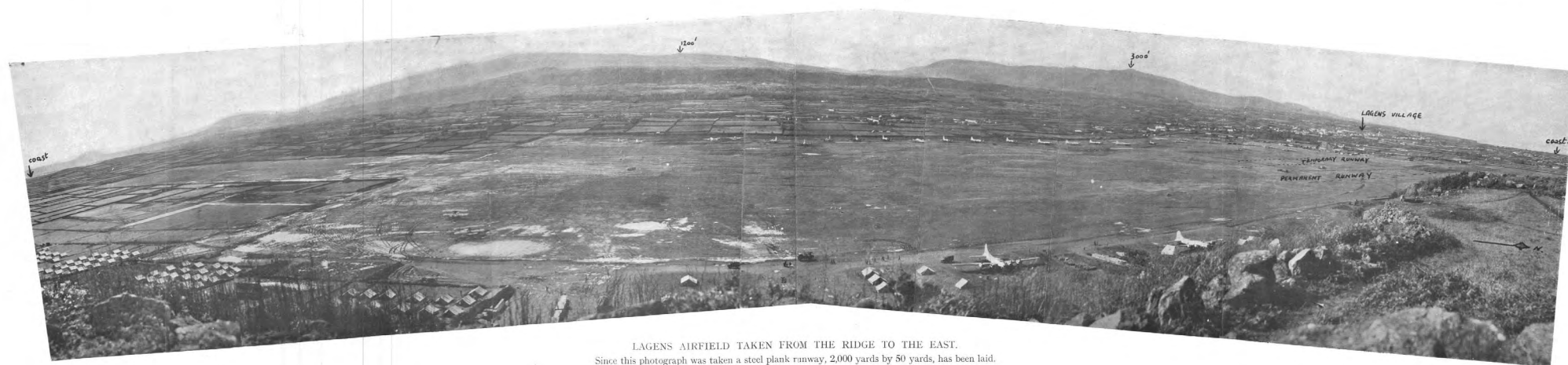
3. The convoy situation also reflects the enemy's ineffectiveness. After the satisfactory defeat which he suffered last month in the North Atlantic around Convoys SC. 143, ONS. 20 and ON. 206, he switched his concentrations to the Gibraltar and Africa convoy routes. In the middle of the month both sides disposed their forces for what looked like becoming one of the biggest convoy battles of the war. But the battle petered out in a skirmish. Although the U-Boats were strongly concentrated around Convoys SL. 139 and KMS. 30, they failed to sink a single ship and generally behaved so timidly that our aircraft and escort vessels had very few opportunities to attack.

4. This action was remarkable for the appearance in strength of the enemy's long range aircraft. He.177s, Ju.290s and Fw.200s were out in considerable numbers and made attacks with radio-controlled and ordinary bombs. They succeeded in hitting only two ships, one of which got home. The enemy apparently intends to employ the Ju.290, the Bv.222 and the Fw.200 with the task of finding and shadowing our convoys, while the He.177 and possibly the Fw.200 will carry out the attacks, the former with glider bombs. The result in this instance was anything but alarming for us. Not only were the aircraft only partially successful themselves, but their co-operation with the U-Boats was confused and unproductive. Moreover the much vaunted He.177 proved anything but favourable and two were probably destroyed by one Liberator.

5. The belief that the enemy's forces were not on the top of their form was strengthened when, during the last days of the month, Convoy SL. 140 sailed through another, though smaller, concentration of U-Boats; the ships were strongly escorted by air and surface craft and not one vessel was lost, though several U-Boats were destroyed by the surface escorts.

6. Other notable events of the month's anti U-Boat work was the first sinking achieved by an Azores-based aircraft, and the scuttling of a U-Boat which was trying to run the Straits of Gibraltar. This boat, the "U 340," was continuously attacked by ships and aircraft for several days at the end of October, and finally on November 1 she gave up the battle and scuttled herself. Another kill was scored on November 10, when a U-Boat foundered off the north-west coast of Spain after attacks by squadrons of the U.S. Navy Liberators from Dunkeswell, and 311 (Czech) Squadron. All are to be congratulated on this outstanding success in a lean month.

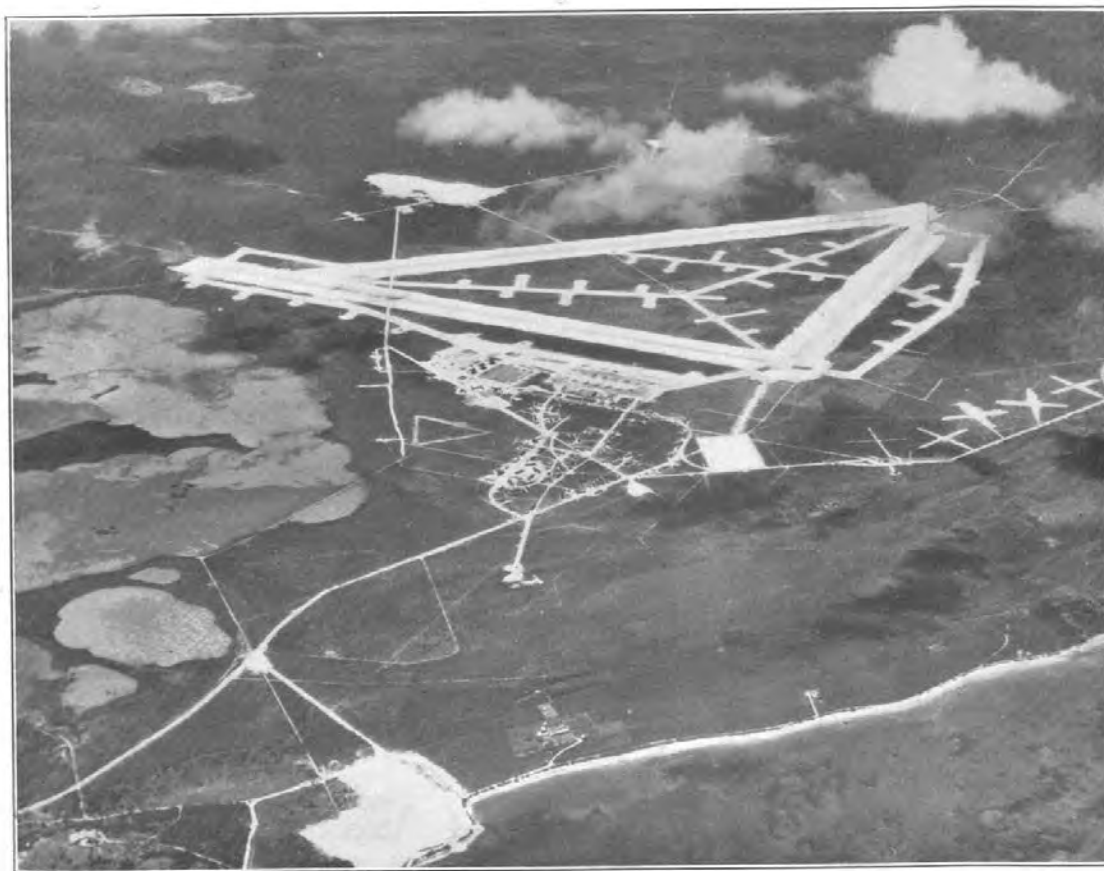
7. The anti-shipping offensive was stepped-up in November, and four satisfactory strikes were carried out. On November 5, a force of E-Boats was beaten up by Beaufighters and all the enemy vessels were damaged. On the 22nd, three ships were attacked off Stadlandet and though no torpedo hits were scored, all the ships were damaged by cannon fire. The North Coates Wing seriously damaged an 8,000-ton tanker—a most valuable ship—in a torpedo attack near Texel on November 23. On the last day of the month two ships were damaged by R.P. off Norwegian coast. Altogether a total of damage which will add considerably to the strain on the enemy's already overworked repair yards.



LAGENS AIRFIELD TAKEN FROM THE RIDGE TO THE EAST.
 Since this photograph was taken a steel plank runway, 2,000 yards by 50 yards, has been laid.
 (See letterpress, page 17.)



NASSAU IN THE BAHAMAS: The Town and Oakes Field, looking north-west.



NASSAU IN THE BAHAMAS.

I.—ANTI U-BOAT

(See notes below.)

ANTI U-BOAT SCORES FROM MAY TO OCTOBER, 1943

PERCENTAGE FIGURES OF MERIT
IN BIG NUMERALS

63 Sq. U.S.N.	10 Sq.	48 Sq.	53 Sq.	59 Sq.	59 Sq.	86 Sq.	120 Sq.	172 Sq.
$\frac{0}{10} = \text{NIL}$	$\frac{33}{120} = 28$	$\frac{33}{50} = 66$	$\frac{33}{80} = 41$	$\frac{98}{190} = 52$	$\frac{19}{180} = 49$	$\frac{123}{260} = 47$	$\frac{169}{430} = 43$	$\frac{49}{70} = 70$
179 Sq.	190 Sq.	201 Sq.	202 Sq.	206 Sq.	210 Sq.	220 Sq.	224 Sq.	228 Sq.
$\frac{118}{210} = 56$	$\frac{16}{30} = 53$	$\frac{13}{30} = 43$	$\frac{9}{30} = 30$	$\frac{30}{50} = 60$	$\frac{19}{40} = 48$	$\frac{10}{100} = 10$	$\frac{55}{250} = 22$	$\frac{40}{60} = 67$
233 Sq.	269 Sq.	304 Sq.	311 Sq.	330 Sq.	333 Sq.	407 Sq.	423 Sq.	461 Sq.
$\frac{26}{50} = 52$	$\frac{107}{270} = 40$	$\frac{3}{10} = 30$	$\frac{13}{20} = 65$	—	—	$\frac{42}{70} = 60$	$\frac{23}{40} = 58$	$\frac{36}{70} = 51$
502 Sq.	547 Sq.	612 Sq.	236 Sq. (R.P.)	422 Sq.	128 Sq. U.S.N.	105 Sq. U.S.N.		
$\frac{29}{150} = 19$	$\frac{6}{50} = 12$	$\frac{29}{90} = 32$	$\frac{10}{20} = 50$	$\frac{20}{20} = 100$	$\frac{13}{50} = 26$	$\frac{0}{20} = \text{NIL}$		

Attacks on U-Boats

Note on Table above, showing Squadron Scores for the Six Months, May to October, 1943

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

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

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

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

The greatest number of attacks during October were made by 120 Squadron, followed by 59 Squadron, 86 Squadron and 179 Squadron, the last named in the Gibraltar area and the other three mainly in protection of convoys. Of these four, 86 Squadron achieved the highest monthly percentage, namely 76 per cent.

422 Squadron figure on the scoreboard for the first time with 2 attacks, giving them a percentage of 100.

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

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

NOVEMBER 1943

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Duty and Base or Area.	Total Sorties.	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per Sighting.		No. of Sorties.		Col. 10 Sorties with Flak.
		Base to Base.	On Patrol.	Day.	Night.	Day.	Night.	Base to Base.	On Patrol.	When U-Boat Sighted.	When U-Boat Attacked.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Convoy Cover</i>												
United Kingdom	84	1,179	325	3	3	1	1	196	54	5	2	2
Iceland	5	48	17	—	—	—	—	—	—	—	—	—
Gibraltar and Moroccan Sea Frontier	234	2,112	1,132	—	—	—	—	—	—	—	—	—
Azores	92	802	301	2	1	1	1	267	100	3	2	2
TOTAL CONVOY EFFORT	415	4,141	1,775	5	4	2	2	460	197	8	4	4
<i>A/U Patrols</i>												
Northern Transit												
United Kingdom	87	915	265	—	—	—	—	—	—	—	—	—
Iceland	69	317	104	—	—	—	—	—	—	—	—	—
Northern Convoy												
United Kingdom	7	92	16	—	—	—	—	—	—	—	—	—
Iceland	57	324	256	—	—	—	—	—	—	—	—	—
Azores	20	203	72	—	1	—	1	203	72	1	1	1
Bay of Biscay (including adjacent patrols)												
United Kingdom	991	9,967	4,493	3	5	2	1	1,246	562	11	6	7
Gibraltar and Moroccan Sea Frontier	135	1,714	551	1	—	—	—	1,714	551	1	—	—
Central Convoy												
Azores	143	1,305	652	—	4	—	4	326	163	4	4	3
Gibraltar and Moroccan Sea Frontier	268	2,361	1,315	—	1	—	1	2,361	1,315	1	1	1
TOTAL A/U PATROLS	1,777	17,198	7,724	4	11	2	7	1,146	515	18	12	12
Add Convoy Effort	415	4,141	1,775	5	4	2	2	—	—	8	4	4
TOTAL COASTAL COMMAND A/U EFFORT	2,192	21,339	9,499	9	15	4	9	889	396	26	16	16
				24 U-Boats Sighted.		13 U-Boats Attacked.						

Note.—In addition to the above there were five chance sightings by transit aircraft.

Assessments

Month.	Known Sunk.	Probably Sunk.	Damaged A.	Damaged B.	Slight Damage.	Insufficient Evidence of Damage.	No Damage.	Insufficient Evidence of U-Boat.	Un-assessed.
August ..	5	1	—	2	—	—	3	1	—
September ..	1	2	1	2	—	13	2	1	2
October ..	10	—	1	1	3	12	13	—	2
November .. (Provisional).	2	—	1	1	1	7	1	—	—

Note.—In addition to the 10 U-Boats sunk during October as shown above, Coastal Command aircraft share with H.M. ships in the assessment of two further U-Boats known sunk; in one case two aircraft are credited with 66½ per cent. and in the other case one aircraft with 15 per cent. of the sinking.

Analysis of U-Boats Sighted during November

Particulars of Incidents.	U-Boats		Number of Sorties when Aircraft	
	Sighted.	Attacked.	Sighted.	Attacked.
On 21 occasions 1 U-Boat was sighted by 1 aircraft—11 aircraft attacked	21	11	21	11
On 1 occasion 1 U-Boat was sighted by 4 aircraft—all aircraft attacked	1	1	4	4
On 1 occasion 2 U-Boats were sighted by 1 aircraft—1 U-Boat was attacked	2	1	1	1
Totals	24	13	26	16

Squadron Results—November

				Sorties when U-Boat sighted.	Sorties when U-Boat attacked.
(i) United Kingdom and Iceland					
248	Beaufighter	Predannack ..	..	1	1
502	Halifax	Holmesley South ..	..	2 (night)	0
53	L/L Liberator	Beaulieu ..	..	2 (night)	1 (night)
86	Liberator	Ballykelly ..	..	2	1
103 (U.S.N.)	Liberator	Dunkeswell ..	..	2 (1 night)	1
105 (U.S.N.)	Liberator	Dunkeswell ..	..	1	1
110 (U.S.N.)	Liberator	Dunkeswell ..	..	1	1
311	Liberator	Beaulieu ..	..	1	1
422	Sunderland	Castle Archdale ..	..	1	0
407	L/L Wellington	Chivenor ..	..	2 (1 night)	0
612	L/L Wellington	Chivenor ..	..	1 (night)	1 (night)
(ii) Gibraltar and Moroccan Sea Frontier					
179	L/L Wellington	North Front ..	..	1 (night)	1 (night) See Note.
	(See also Azores).				
111 (U.S.N.)	Liberator	Port Lyautey ..	..	1	—
(iii) Azores					
220	Fortress	Lagens ..	..	2	1
172	L/L Wellington	Lagens Detachment ..	..	5 (night)	5 (night) See Note.
179	L/L Wellington	Lagens Detachment ..	..	1 (night)	1 (night)
				26	16

Note.—The score of 172 Squadron includes one sighting and attack made in an aircraft of 179 Squadron with a 172 crew.

Recent Attacks on U-Boats

TWO RESCUES BY THE NAVY

Two aircraft, **Sunderland S/422** and **Liberator L/86**, were forced to ditch in the North Atlantic after attacking U-Boats on October 16 and 17. The aircraft were escorting Convoy ON.206. The crews of both aircraft have expressed great appreciation of the skill and courage of the ships' companies in rescuing them, and of the great kindness with which they were treated.

Liberator L/86 was flying at 2,500 ft. when a U-Boat was sighted on the surface, bearing Green 10°, 8 miles away. It was in position 58° 30' N., 27° 16' W., course 287°, speed 16 knots. This position was 15 miles south of the convoy. The U-Boat was of the 517 ton type with no gun forward and no step to the conning tower. The aircraft made straight for the U-Boat which opened fire at 2,000 yards range. The Liberator took switchback evasive action but, at 100 yards range, the two port engines were hit. During the next few seconds there were repeated hits on the port side and on the fuselage.

The flak was intense and accurate. The aircraft continued its run, attacking from starboard beam, and attempted to release four depth charges from 50 ft. The U-Boat was still on the surface, but the depth charges failed to release. The Liberator turned to port and circled the U-Boat at 1,500 yards range while the crew assessed the damage. No. 2 engine was feathered, and No. 1 engine had been badly hit though it still ran at half power. The S.N.O. was informed and began homing an escort vessel to the vicinity of the U-Boat. After 10 minutes of homing, another Liberator was seen carrying out an attack on the same U-Boat which was still on the surface. L then turned to make another attack, just as the U-Boat was seen to be diving. The other Liberator, **S/59**, had dropped its second stick just before L arrived and 5 seconds after the U-Boat disappeared L tried once more to attack but again the depth charges failed to release. As S was still on the scene and as the escort vessel was quite near, L jettisoned its depth charges and set course for the convoy, intending to ditch because of the loss of petrol from No. 4 engine, because of overheating of the starboard engines and because there was doubt as to how much longer the port engine would continue to run, even at reduced power. The S.N.O. was informed of this intention. L had been unable to send a sighting report because of the necessity to home the escort vessel and because of damage to the aeriels. L was instructed to ditch on the port side of the convoy. This was done, near H.M.S. *Pink*. The sea was choppy, with no apparent swell. The ditching was made into wind. The aircraft touched the water tail first at 117 miles an hour and then buried its nose in a wave, apparently 10 ft. high. The shock of the impact broke up the aircraft and made normal ditching drill impossible. The entire crew were braced on the flight deck and the top turret hatch had been opened before the impact. All the crew were picked up by H.M.S. *Pink* within 10 minutes. Two did not survive. Those who have been saved have expressed their appreciation of the fine seamanship of the Captain of H.M.S. *Pink*, while

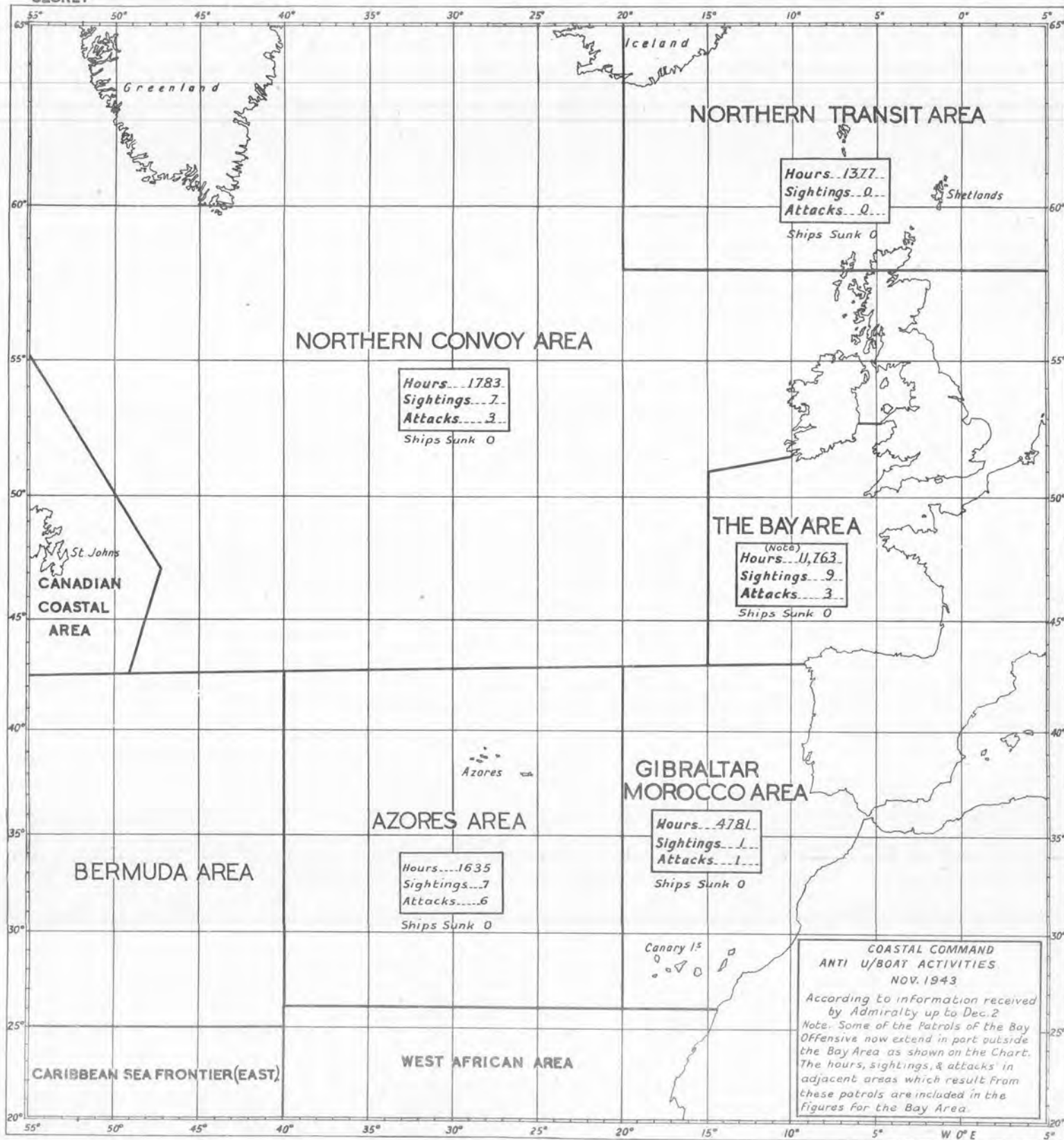
entering St. John's Harbour after nightfall, in very unfavourable weather, so that one of the crew of L/86 who had been seriously injured, could have expert medical attention ashore. They spoke also of the kindness of the officers in giving up their cabins to them and of the skill and attention of the ship's medical officer. They said that there is little doubt that his devotion to duty saved the life of a warrant officer who had been seriously injured.

Analysis

Bold and determined approach was made in face of very accurate flak and aircraft was badly hit. It was the worst of bad luck that this damage prevented release of depth charges on this and the subsequent attack. In spite of serious damage aircraft successfully carried out homing procedure and did not leave scene until another aircraft was present and escort vessel was quite close. A skilful ditching was effected but unfortunately two of the crew were lost.

On October 17 **Sunderland S/422** was escorting the same convoy when two Radar blips were obtained at a range of 5 miles. The aircraft was in a rain squall at the time, but on coming out of it the crew saw two surfaced U-Boats 5 miles ahead. They were 740 tonners with a 37 mm. gun forward and one quadruple 20 mm. on the lower bandstand and two 20 mm. on the upper bandstand abaft the conning tower. There were also several machine guns on the bridge. The position was about 20 miles south of the convoy. The sea was rough, with a north westerly wind of 35 knots, but visibility was about 25 miles. The two U-Boats were about 50 yards apart and the port vessel kept slightly astern of the other. The Sunderland flew in to attack taking evasive action by undulating. The U-Boat opened fire at 2,000 yards with every gun that would bear. The aircraft's evasive action and the good shooting of the air gunners, who cleared the enemy's decks, enabled the Sunderland to escape damage in her first run. The attack was made from the enemy's port beam from 50 ft. and three depth charges spaced at 60 ft. were released. The stick undershot by 30 ft. The Sunderland then did a tight turn to port at a range of $\frac{1}{2}$ mile and came in at 100 ft. for a second attack. On this run no evasive action was taken and the aircraft was heavily shelled by both U-Boats. The R/T was shot away and the front turret recuperator destroyed; the automatic pilot was blown out of the aircraft, the W/T destroyed and the Radar damaged; the control quadrant was hit and the throttle and pitch controls shot away; the wing dinghy was blown out, the mid-upper turret and the hull generally riddled. The navigator was mortally wounded but was able to give the pilot a course for the convoy before he died. The Group Gunnery Officer and the front gunner were also killed. In spite of this heavy and accurate shooting the captain carried on and from 50 ft. released two depth charges across the U-Boat's beam. The third failed to release. The U-Boat was straddled, lifted noticeably and disappeared

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without seeming to dive in the normal way. The second U-Boat remained on the surface throughout the action and fired continuously while the aircraft was in range. After the action the Sunderland returned to the convoy, reported the attack to H.M.S. *Drury* by V/S and informed the ship that she was going to ditch. She touched down on the top of the swell at 75 knots about 100 yards ahead of the escort. After bouncing once the aircraft buried its nose in the oncoming swell and disintegrated. Again the surviving members of the crew expressed their great appreciation of the Navy's

efforts in rescuing and caring for them. In particular one of the *Drury's* seamen gallantly swam to the aircraft and rescued an unconscious officer who was entangled in the wreckage. Unfortunately the attempt to extricate the captain was unsuccessful and he went down with his aircraft.

Analysis

An exceptionally fine action. All members of the crew deserve the highest praise. The visual evidence of the second attack and the after results indicate severe damage or the destruction of the U-Boat.

Sinking off Coast of Portugal

In the early hours of October 24 **Wellington A/179** was carrying out an anti U-Boat patrol off the Portuguese coast when a Radar contact was obtained at 6 miles range from 2,000 feet. The position was a few miles north-west of Oporto. The aircraft immediately altered course and began homing, and at a range of one mile a large phosphorescent wake was seen. This was at first thought to be the lights of a neutral vessel and consequently the Leigh light was not switched on, but as the aircraft passed over, a fully surfaced U-Boat was seen travelling at high speed. The aircraft immediately circled and homed again until the wake was sighted at one mile range. At three-quarters of a mile the Leigh light was switched on and a fully surfaced U-Boat travelling due south at high speed was illuminated. It was thought to be a 740-tonner. The U-Boat immediately opened fire hitting the aircraft's tailplane, and A/179 replied with the front guns. The attack was made from the U-Boat's starboard quarter and six depth charges spaced 60 feet straddled her roughly midway between the stern

and conning tower, three depth charges falling on each side. As the explosion plumes subsided, an orange light shot vertically into the air to a height of about 200 feet. It looked rather like a rocket, but it left no trace on its upward flight and appeared to go out on the way. As soon as the depth charges exploded the U-Boat ceased fire and lay stationary on the surface. The Wellington shadowed by Radar until after 0400 hours and then set course to the nearest land to check position as P.L.E. had been reached. On returning at 0422 hours no Radar contact was obtained although a flame float which had been dropped, was seen. The aircraft then returned to base. Subsequently it became known that 40 survivors from the U-Boat were landed at Oporto by a Spanish trawler.

Analysis

An excellent attack well pressed home in face of accurate flak resulting in the eventual destruction of the U-Boat.

Blockading the Straits of Gibraltar

Shortly after midnight on November 1 **Wellington R/179**, which was on an anti U-Boat patrol just to the west of the Straits of Gibraltar, obtained a Radar contact on a U-Boat at 2½ miles range from 1,000 feet. After a few minutes manoeuvring to get into an attacking position the Leigh Light was switched on and a fully surfaced U-Boat believed to be 740-tonner was illuminated. The enemy was on an E.N.E. course, apparently trying to run the Straits. Intense but inaccurate flak was at once encountered as the aircraft attacked from fine on the starboard quarter, releasing six depth charges, spaced 60-70 feet. The last depth charge was reported by the Rear Gunner to have entered the water close to the port bow and the U-Boat disappeared under the explosion plumes. After the attack the aircraft searched the area, illuminating the position with flame floats and with the

Leigh Light, but no results were seen. Surface vessels arrived at the scene of the attack just after 0200 hours, after being homed on to the aircraft by W/T.

Analysis

Good approach tactics and a determined attack delivered in face of flak. If the aircraft tracked truly over the U-Boat, the rear gunner's evidence of No. 6 depth charge entering the water just ahead of and slightly to port of the U-Boat's bow indicates a complete straddle with at least four depth charges in a lethal position. But it is odd that no bits or pieces, survivors or oil were seen, even with the aid of the searchlight, and that nothing was observed by surface vessels. It looks an excellent attack but no assessment can definitely be made in view of the lack of after evidence.

First Kill from the Azores

On November 9 **Fortress J/220** was flying about midway between the Azores and Portugal on route to escort a convoy, when at 0725 hours a fully surfaced U-Boat was suddenly spotted almost below the aircraft 37 miles south-west of the convoy. The U-Boat was believed to be a 740-tonner, dark grey in colour with a least one flak gun forward and a number of other guns abaft the conning tower. The U-Boat at once opened fire on the aircraft, rather wildly at first. The Captain turned to port and the navigator immediately began setting up his bombing gear, but he had not finished when the aircraft passed over the U-Boat the second time. The bomb doors were not fully opened and depth charges were not released. During this run, which was made up the U-Boat's track, flak was heavy and fairly accurate. The tail gunner fired long bursts at the conning tower as the aircraft passed over. The aircraft again circled to port and attacked up the U-Boat's track, releasing four depth charges spaced at 100 feet, while the U-Boat zigzagged. The exact points of entry of the depth charges were not seen owing to bad light, but the U-Boat was hidden by the explosion plume. After this attack the U-Boat was seen to be stopped and down by the stern, her bows well clear of the water. She had a 45° list to port and all flak had ceased. The aircraft again circled to port to make a second attack from the port beam and three more depth charges were released which again completely enveloped the U-Boat in their explosion plumes. On the run in to this attack the crew of the **Fortress** thought they saw 10 to 15 men in the water. After the plumes from the second

attack had subsided, there was a mild glow under water as if from an under water explosion, after which the U-Boat disappeared stern first. A large oil patch began to form, part of which was thick and treacly and part iridescent. It eventually reached a length of nearly half a mile. Much wooden wreckage was seen including a large square yellow object like a wooden hatch or raft. Four or five big shapeless objects were seen just beneath the surface. Half an hour after the attack one man was seen swimming amongst the wreckage and two "K" type dinghies were dropped with the usual "K" rations. The second of these was secured by the survivor who climbed in. A parachute bag with rations and a Mae West inside was also dropped, but the survivor was unable to pick these up. The aircraft remained circling for an hour and three-quarters, then proceeded to the convoy and reported the sinking and the survivor by V/S to the S.N.O., who replied "Well done."

Analysis

A very good effort in the face of intense flak and first rate bombing in poor light resulting in a clean kill.

This attack serves to emphasise the vital importance of being ready for action at all times, and the bombing gear should have been set up immediately the aircraft left the coast. Failure to do this meant that the aircraft had to make an unnecessary run through the U-Boat's flak. This criticism, however, in no way detracts from the credit which goes to the crew of J/220 for a gallant and most successful action.

A Combined Kill

Liberators E and Z/120 and C/59 were escorting convoy O.N. 206 several hundred miles south-west of Iceland, when at 1912 hours on October 16, a 500-ton U-Boat was sighted by E/120 about 35 miles south of the convoy. E/120 reported the U-Boat's position by R/T to the S.N.O., and ran in to attack. The U-Boat manoeuvred stern on and opened fire, and the aircraft replied with the nose gun. During the final stages of the run in, the aircraft lurched slightly to starboard. This was at first thought to be due to a flak hit, but it was later found that the lurch was caused by the starboard beam window falling out and hitting the leading edge of the tail plane. Due partly to this and partly to the U-Boat's manoeuvring a poor line of attack resulted, and the Captain decided not to release his depth charges. The aircraft circled to starboard and attacked from the port beam, releasing four depth charges spaced at 60 feet. According to visual evidence the depth charges were thought to have straddled, but analysis and the evidence of other aircraft suggest that in fact the stick may have just overshot with the nearest depth charge very close to the U-Boat's starboard side. Meanwhile Z/120 had intercepted E's R/T message, and at 1918 hours sighted the U-Boat, but before an attack could be made C/59, which had previously obtained a Radar contact, had sighted the U-Boat, and at once attacked from the port quarter, obtaining either a straddle

with six depth charges spaced at 60 feet or a near miss just ahead. Z/120 then ran in for the first attack from the beam. This was achieved by flying on a parallel course to the U-Boat on the starboard side and then turning to port in a steep curve; but on the approach the U-Boat still managed to swing stern on so as to bring the main armament to bear. Intense flak was encountered, and two bursts were seen just ahead of the nose of the aircraft. The actual attack was carried out from the starboard quarter, and six depth charges spaced at 50 feet were released. The stick overshot slightly, but the U-Boat's stern was lifted out of the water by the explosion.

E/120 then made its second attack from a position forward of the U-Boat's starboard beam, and four more depth charges, spaced at 60 feet, were released. During this run up the U-Boat seems to have been surprised, and her gunners concentrated on C/59, which was also making a run. When the aircraft tracked over the U-Boat the gun crews were in a state of confusion and did not fire at all, although tracer followed the aircraft after the attack. The depth charges, according to all available evidence, may have overshot, exploding close to U-Boat's starboard quarter. Meanwhile C/59, owing to the evasive action of the U-Boat, decided not to attack, but made a dummy run, and the gunners swept the conning tower and deck with all guns.

The events that led up to the final destruction of the U-Boat are somewhat confusing, and it is not entirely apparent whether Z/120 or C/59 delivered the *coup de grâce*. C/59 made a third run up, but abandoned it at the last moment to allow Z/120 to get in an attack as it was better placed. C/59 was unable to get out of the way in time and had to pass through the spray from the explosion of the depth charges. Z/120's second attack was carried out from the starboard quarter, and a perfect straddle with two depth charges was obtained with the aid of the Mark III bombsight. C/59 also made another attack in the face of

intense and accurate light flak, and a stick of charges fell close alongside the hull.

In the end the U-Boat's bow rose to a very steep angle, hung there for a few seconds and then sank. The S.N.O. was informed and the escort vessel *Bassanio* was homed. There appeared to be about 15 survivors and large quantities of oil and air bubbles.

Analysis

The final stages of the attack are rather difficult to follow, but there is no doubt about the result. This was a very fine action fought by these three aircraft against a flak-minded U-Boat.

Another Good Attack near Convoy ONS. 20

Liberator O/120 was returning to Convoy ONS. 20 after attacking another U-Boat, when at 1510 hours on October 17 a fully surfaced U-Boat was sighted about 10 miles due south of the convoy. The aircraft at once manoeuvred to carry out a head-on or beam attack, but it became obvious that the U-Boat intended to keep her stern towards the aircraft and fight back. The Captain therefore decided to make full use of the sun and cloud cover and approached from astern. As soon as the aircraft broke cloud, about two miles from U-Boat, accurate light flak was encountered but the first burst from Liberator's nose gun silenced the U-Boat's guns. Four depth charges were released in a dive from 400 feet, and were seen to enter the water very close to the port side of U-Boat. As the bows of the U-Boat emerged from the depth charge plumes she was seen to be badly down by the stern and the bows

were lifted out of the water. The aircraft continued circling the U-Boat, which was still down by the stern, and considerable flak was again encountered. The S.N.O. was kept informed of the situation by R/T and at 1525 hours the aircraft returned to the convoy having now used up all its depth charges.

Analysis

A very well executed attack making good use of cloud cover and sun. Photographs indicate an accurate attack. The visual evidence of after results point to the possibility of damage aft; in addition the U-Boat made no attempt to dive. It would be of interest to know whether the S.N.O. asked the aircraft to return to the convoy, because it seems unfortunate that a possibly crippled U-Boat should be left unhunted only 10 miles from the convoy.

Pitched Battles

Many of the stories of successful actions against U-Boats published in both the October and the November issues of the *Coastal Command Review* referred to attacks in protection of convoys. The following account gives a more general picture of the battles which were fought and won during the passage of SC. 143 and ONS. 20. Incidentally it is interesting that this is the first time for many months that the enemy has been seen fit to operate U-Boats so near to our land bases. He has paid dearly for his temerity.

Convoy SC. 143, comprising 39 ships, sailed from Halifax on September 28, 1943. The voyage was uneventful until the evening of October 7, when the presence of a U-Boat was suspected some 12 miles to the north of the convoy. The ships then escorting the convoy were the C.2 Escort Group and the 10th Escort Group. The former provided close escort and comprised H.M.S. *Kamloops*, *Icarus*, *Drumheller*, *Sackville* and *Morden* with the addition of H.M.S. *Duckworth*, *Antares* and *Galeshead*; the 10th Escort Group was the support Group and consisted of H.M.S. *Musketeer*, *Orwell*, *Oribi* and the Polish *Orkan*, which had joined on the morning of the 6th.

The 10th Escort Group swept out at 25 knots to investigate the area, but nothing was sighted, though at 2100 hours O.R.P. *Orkan* reported an

explosion in her wake. Just after midnight the Support Group carried out an energetic and imaginative diversion some 30 miles astern of the convoy, and while the Group was steaming at 20 knots to rejoin the convoy *Orkan* was torpedoed. She was about seven miles astern of the convoy and was starboard wing ship when an explosion was seen and heard in her wake followed half a minute later by a large flash and a second explosion of a torpedo hit in her after magazine. Fires spread quickly and within five minutes *Orkan* sank stern first. *Musketeer* closed to pick up survivors while the remaining escorts carried out operation "Observant." In all one Officer and 43 ratings were rescued. It is concluded that *Orkan* was hit by one of a salvo of straight-running torpedoes.

Meanwhile all available aircraft of 15 Group had been briefed to escort this convoy through the approximate area 30° W to 25° W on latitude 56° N. Soon after daybreak on the 8th ships of the 10th Escort Group saw a Liberator (R/86) dropping depth charges some 8 miles away. On closing the position *Oribi* picked up the Commanding Officer, the sole survivor, who was floating in a large patch of oil from his U-Boat. Shortly after noon R/86 began to home the group to a position some 30 miles astern of the convoy where in company with two other Liberators (T/120 and Z/86) it had attacked and

disabled a U-Boat. This U-Boat (U. 643) blew up before the 10th Escort Group arrived on the scene, but some 21 survivors were picked up, including the Commanding Officer, who stated that he had seen *Orkan's* sinking through his periscope. Before daylight faded a *Sunderland* (J/423) was able to report that she had sunk a third U-Boat and seen 15 to 20 survivors among considerable debris and oil. (For details of these attacks see *Coastal Command Review*, Volume II No. 6.)

As a result of the excellent air cover it was considered that by nightfall only two out of a possible 20 U-Boats had been able to maintain contact. Soon after 6 o'clock on the 9th the American *Yorkmar* (5,612 tons) was torpedoed and sunk. *Kamloops* rescued 51 survivors.

This was the only attack on the convoy, which was by now well within the range of home-based aircraft. Thanks to the efforts of Coastal Command aircraft and the Support Group the enemy had not been able to launch a concentrated attack; and the passage of this convoy, despite the much regretted loss of O.R.P. *Orkan* and a merchant ship, may be regarded as a well merited victory, adding three more nails to Admiral Doenitz' coffin.

Convoy ONS. 20 (52 ships) sailed from Oversay on the morning of October 10, 1943. Close escort was provided by seven "Captain" Class Frigates of the 4th Escort Group: H.M.S. *Bentinck*, *Blackwood*, *Drury*, *Burges*, *Byard*, *Berry* and *Bazeley*, with the addition of H.M.S. *Northern Sky*, *Northern Wave* and the Rescue Ship *Accrington*. Apart from heavy weather, which elicited some heartfelt comments from the S.N.O. on the lively qualities of his new command in a seaway, the first few days were uneventful. For a time ONS. 20 was joined by ON. 206 with its escort.

The expected battle developed during October 16 and 17 and was fought in the area bounded by latitudes 57° N and 60° N and longitudes 36° W and 33° W. At 0237 hours H.M.S. *Vanquisher* of the 6th Escort Group opened the proceedings with an attack on a U-Boat astern of ON. 206 but a subsequent hunt with H.M.S. *Duncan* was unproductive.

Formidable air cover was arranged for both convoys during daylight hours, and aircraft were soon sending in reports of U-Boats in the vicinity of the convoys.

The first attack of the day by an aircraft was made by L/86, which was forced to ditch, survivors being picked up by H.M.S. *Pink* (details will be found on page 6). A number of other attacks were made as a result of which two U-Boats were sunk by E and Z/120 and C/59 and Y/86 respectively. Other U-Boats were forced to dive.

At 2240 hours the British *Essex Lance* (6,625 tons) was torpedoed when 2 miles astern of convoy; later she broke in half and was abandoned, the entire crew being taken off by the Rescue Ship. Several U-Boats were now in contact with the convoy and the escorts hunted many contacts, *Bentinck*, *Drury* and *Berry* each putting down U-Boats astern of the convoy during the night.

By the morning of the 17th it was apparent that the pack, estimated at about 12, was concentrating on O.N.S. 20. The faster convoy

had by now drawn ahead and, aided by the excellent air cover and a Support Group, had passed on unmolested. The Support Group, B.7 Escort Group, was therefore ordered back to assist in the battle.

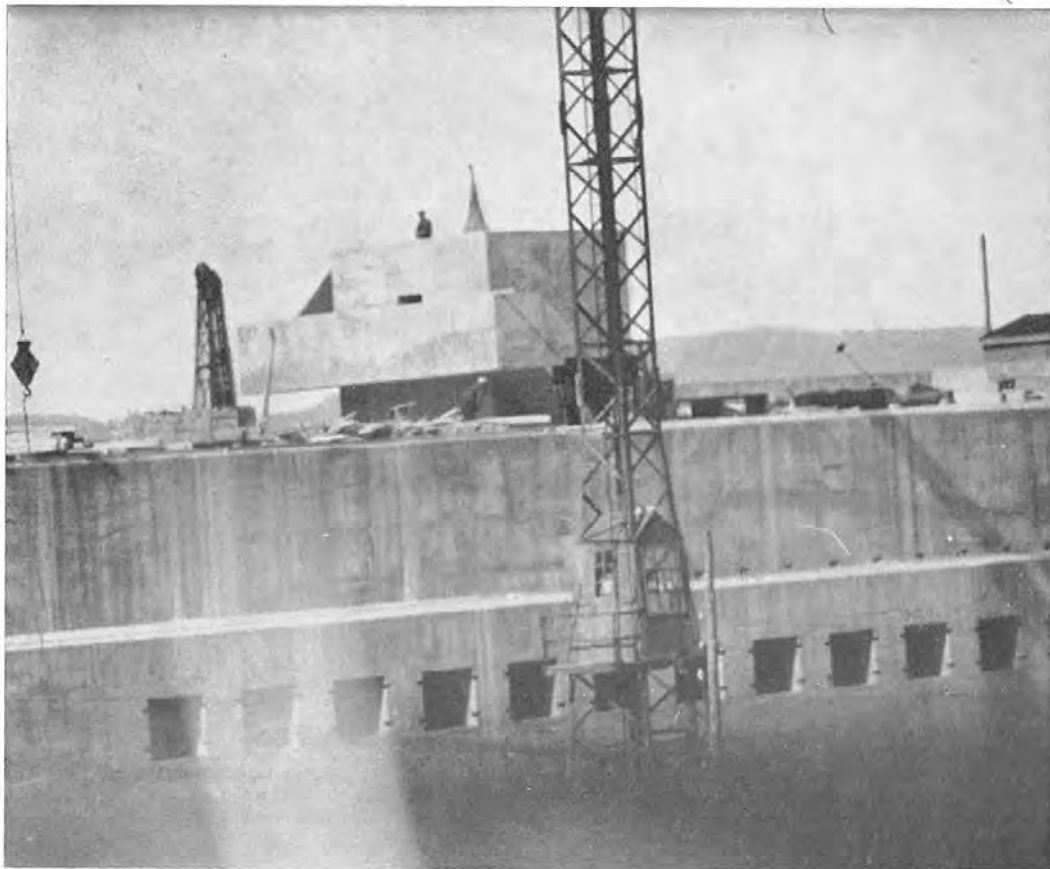
Strong air cover was also provided for both convoys on the 17th and a number of parallel sweeps were laid on. During this day a number of good attacks were made by aircraft and one U-Boat was sunk by D/59 and H/120 (see Vol. II, No. 6), who reported 20 or 30 survivors in the sea after their combined depth charge attacks had blown the submarine in half. *Drury* had also rescued some of the crew of a *Sunderland* (S/422), who claimed that their depth charges had straddled another U-Boat before damage from flak, which killed three of the crew, forced them to ditch (see page 6). Then at 1945 hours *Byard* attacked and sank a 750-ton U-Boat, bagging 27 prisoners.

So far no serious attack had developed against the convoy. The approach of B.7 Escort Group at about 2200 hours on the 17th broke up a concentration on the starboard bow, and *Sunflower* carried out a most promising attack on a U-Boat. Although the enemy were in contact until the 19th they had not the stomach to face this increased defence.

Vanquisher (B.6 Escort Group) was ordered back from close escort duty on the O.N. 206 to swell the ranks and, joining on the afternoon of the 19th, she carried out an attack on a contact some 22 miles astern of the convoy, thus delivering the parting shot to a disgruntled enemy.

The final aircraft attack of the series was carried out a hundred miles to the north by Z/224, which made an R/P and depth-charge attack on a U-Boat. Although the enemy was not seriously damaged, excellent homing procedure brought H.M.S. *Duncan* and *Vidette* of the 7th Escort Group on to the scene and the explosion plumes from the depth charges, which were sighted by H.M.S. *Duncan*, were a valuable guide to the scene of the attack. After an hour and 40 minutes, while searching at 12 knots, *Duncan* detected the U-Boat and carried out a Hedgehog attack. The first salvo missed, but three hits were obtained with the second after an interval of 16 seconds from the charges hitting the water. *Vidette* then attacked with depth charges and *Duncan* followed up with Mark X.s, after which the contact gradually faded. Within 10 minutes a large amount of oil and wreckage had come to the surface, including parts identified as interior fittings by the prisoners already aboard *Duncan*.

Altogether in these battles the enemy paid a heavy price and aircraft were responsible for the sinking of no less than six U-Boats for certain, three on each convoy, and had a hand in the sinking of others. The initiative was decisively wrested from the enemy and in no case was he able to mount a mass attack nor carry out his pack tactics. Escort Commanders reported that a high level of co-operation was achieved and that homing procedure was carried out with efficiency, not the least result of which was that prisoners were taken by Escorts from several of the U-Boats sunk in these attacks.



TRONDHEIM. A vertical photograph of the U-Boat base at Trondheim was printed on plate 7, Coastal Command Review, Vol. 11, No. 3. It was taken shortly after the attack by U.S.A.A.F. on July 24, 1943. The above photograph, taken about the same time, shows the massive nature of the concrete shelter pens for the U-Boats.



The above photograph, also of Trondheim, shows some of the damage on the north quays of the Ladehammeren Basin, after the fires had been extinguished.



A torpedo hit on a 6,500 ton Etrema type tanker during an attack by Beaufighters of 254 and 236 Squadrons on November 23, off Texel. The tilt of the poop relative to the remainder of the ship suggests that her back is broken, and she may well be a total loss. This is the second time that this ship has been torpedoed by Coastal Command aircraft, having been hit and severely damaged by Hampdens of 489 Squadron in April. After the earlier attack she lay in Bergen for some time with a large hole in her side, before being sent to Hamburg for repairs. She remained there until October, so the attack illustrated above may well have been one of her first since returning to service.



A Ju.88 hit by cannon fire of a 333 (Norwegian) Squadron Mosquito off the coast of Norway. It is seen in flames before diving into the sea.

II.—ANTI-SHIPPING

Shipping Strikes in November

Another determined and successful attack was carried out in face of heavy opposition by the **North Coates Wing** on November 23, 1943.

Beaufighter J/254 sighted an enemy convoy north of the western end of Ameland. It consisted of one large tanker 7-8,000 tons, followed by two 3,000-ton three-island type merchant vessels and escorted by a Sperrbrecher, four minesweepers and four armed trawlers.

The striking force consisted of five Beaufighters of No. 254 Squadron, armed with 18-in. torpedoes, and an anti-flak force of nine Beaufighters of No. 254 Squadron and nine Beaufighters of No. 236 Squadron, all armed with four 20-mm. cannon. Fighter escort was provided by No. 12 Group and consisted of four Squadrons of long-range Spitfires.

The Wing was airborne about 1320 hours and after picking up the fighter escort, set course for Ijmuiden in order to turn north and meet the southbound convoy from ahead. After making a landfall and flying north for 10 minutes, a large convoy was sighted directly ahead. The Wing leader immediately gave the order to attack. This convoy turned out to be very much larger than the one which had been the subject of briefing, and it is suspected that more escorts had joined the convoy from the north end of Texel.

The attack developed from the landward side of the convoy from south-east to north-west. Five torpedo aircraft attacked the tanker. One was shot down by flak before its torpedo could be released. The anti-flak aircraft attacked the escort vessels ranged on either side of the convoy, in the face of extremely heavy opposition. The flak from the escort vessels was accurate, and appeared to be in the form of a barrage bursting at approximately 1,200 ft., designed to prevent aircraft from diving to attack. One further Beaufighter was hit and it crashed into the sea.

After the attack, four enemy fighters appeared and shot down two of our aircraft before our fighters could intervene.

Of the four torpedoes aimed, two were seen to hit the tanker. Two large explosions followed and it is thought that the tanker's back was broken. Thus 50 per cent. of the torpedoes found their mark, reflecting great credit on the skill and determination of the torpedo pilots.

The flak busters pressed home their attacks to such good effect that three torpedo aircraft met no flak on the way into the attack. Numerous cannon strikes were seen. One minesweeper and one armed trawler were on fire, one minesweeper was seriously damaged and two further armed trawlers damaged.

Once again the Wing has demonstrated what damage a determined attack can inflict on the enemy, although it is regretted that our losses were on such a heavy scale.

On November 22, 1943, the **18 Group Wing** carried out a Rover Patrol in force off the coast of Norway.

The force consisted of six Beaufighters of No. 144 Squadron, escorted by eight Beaufighters of No. 404 Squadron (armed with four 20-mm. cannon).

An enemy convoy, consisting of two escort vessels and one merchant vessel of 900-1,500 tons, was sighted near Stadlandet on a course of 330 degrees and at a speed of 8 knots. The Wing leader decided that these vessels were too small for torpedo attack and he gave the order "Do not attack." Unknown to him, however, his V.H.F. was not operating and the Wing attacked on the orders of the leader of the anti-flak force. Five torpedoes were released at ranges varying from 700-1,100 yards. No hits were seen.

Meanwhile the anti-flak aircraft attacked all the vessels with cannon fire, pressing their attacks home to mast height. All the vessels were damaged, numerous hits being registered on the bridges, bows and sterns.

Flak from the convoy was light, but C/404 was damaged by land-based flak from Stadlandet. U/144 returned on one engine and ditched near Fair Isle. The navigator was picked up.

Security among the Masters

*Oh, what a tangled web we weave,
When first we practise to deceive.*

SIR WALTER SCOTT.

By indirections find directions out.

"Hamlet."

*We must distinguish between speaking to deceive and
being silent to be impenetrable.*

VOLTAIRE.

*You believe him to be your dupe; but if he is pretending
to be so, who is the greater dupe, he or you?*

LA BRUYÈRE.

*The surest way to be deceived is to think oneself more
clever than the others.*

LA ROCHEFOUCAULD.

Why have I blabbed?

"Troilus and Cressida."

III.—OTHER OPERATIONAL FLYING

Combats with Enemy Aircraft

Liberator C/22 (U.S.A.A.F.) on anti U-Boat patrol on October 17 sighted eight Ju.88s. The enemy aircraft positioned themselves three on the port quarter at 1,000 yards and five on the starboard at the same range. The three enemy aircraft on the port side pulled up to 500 ft. above, and one fired a red flare. At this signal the leading aircraft on the port side drew ahead and attacked from the port bow, opening fire at 600 yards and breaking away at 300 yards. "C" countered with a violent diving turn to port. The aircraft on the starboard side now attacked from the starboard bow, opening fire at 600 yards, closing to point blank range and breaking away just above the sea. "C" turned into this attack and as the enemy passed over he was caught in the cross fire from the top turret, the nose and the right waist guns, all of which scored hits. Much black smoke was seen coming from his starboard engine. Another enemy aircraft then attacked from the port quarter, opening fire at 800 yards and breaking away at 600 yards. As this aircraft broke away it exposed its belly and the gunners were able to get in several good bursts. This aircraft was claimed as damaged. At that moment the Liberator entered cloud and the enemy were not seen again. The action had lasted for 17 minutes. The starboard outer engine of the Liberator was hit, the starboard wing damaged and the starboard tyre punctured. The crew was uninjured.

On November 5 **Liberator V/105** (U.S.N.) while on anti U-Boat patrol sighted six Ju.88s two miles astern. The first attack came from the starboard quarter, the enemy aircraft opening fire at 800 yards. The top turret gunner and the tail gunner returned the fire with .5 machine guns, and tracers appeared to enter the enemy aircraft from wing tip to wing tip. The enemy broke off the attack and the Liberator jettisoned its depth charges. The enemy aircraft then made single attacks from all angles. The gunners of the Liberator fired at extreme range, which apparently acted as a deterrent and discouraged the enemy from pressing home his attacks. The action lasted ten minutes before "V" made cloud cover. Hits were scored on three of the enemy aircraft, although no visible damage was done. The Liberator and crew were unscathed.

On November 10 **Sunderland S/461** (R.A.A.F.) flying in the Bay of Biscay sighted an unidentified ship fifteen miles on the port bow. Shortly afterwards four enemy aircraft were seen by the tail gunner six miles away, two on the port beam and two on the port quarter. The enemy stayed in this position for some minutes, during which time S/461 gained height, jettisoned the depth charges and parachute flares and prepared for action. The enemy aircraft then closed for

the attack. Two stayed on the port beam and two crossed over to the starboard and began a starboard quarter attack at 1,200 yards, closing to 700 yards. The fire from this attack fell short. No evasive action was taken. The other two enemy aircraft then carried out a port beam attack, opening fire at 800 yards and breaking away at 300 yards. S/461 countered with a diving turn to port. Again no hits were made on the Sunderland. These tactics were repeated two or three times by the Ju.88s. The enemy aircraft then broke up and carried out single attacks on both the beam and quarters. After half an hour the enemy aircraft made off in a south-westerly direction. No damage was done to the Sunderland or the crew. All attacks were met by corkscrew evasive action and diving turns towards the attacks.

Mosquito K/333 (Norwegian) on reconnaissance off the Norwegian coast on November 17, sighted a Ju.52 ahead and 1,000 ft. above. "K" kept at sea level until within range, and at 400 yards climbed up dead astern and opened fire with all guns. The starboard engine of the enemy aircraft immediately burst into flames and it crashed into the sea. There was no return fire from the enemy but an identification cartridge was fired just before "K" attacked. Photographs were taken of the wreckage burning on the sea.

Sunderland W/228 on anti U-Boat patrol in the Bay of Biscay on November 19 sighted four Ju.88s in line abreast seven to eight miles on the port beam. The enemy aircraft closed to attack and W/228 dived for the nearest cloud. The Sunderland made every effort to use the scattered cloud to the best advantage, but the enemy aircraft came in from all directions except the stern. The enemy's attacks did not seem to be co-ordinated for they came in haphazardly and did not always open fire. W/228 eventually climbed to 5,000 ft. where icing on the nose turret of the .5 gun position prevented the front gunner from seeing the targets. One of the enemy aircraft with white camouflage attacked on the starboard beam but was caught in the fire of the port galley gun at 200 yards range. Hits were seen on the wing roots and the fuselage and the after end of the main plane. This aircraft immediately broke away and was not seen again. During one attack two enemy aircraft closed to 200 yards; the mid-upper turret fired at these and hits were scored on the rear aircraft. A plume of black smoke growing in size was seen to come from the port engine. At this moment W/228 entered cloud and the fate of the enemy aircraft is unknown. The action had lasted for approximately 45 minutes and no damage was received by the Sunderland or crew. Once again the Sunderland is becoming a headache to the Ju.88 pilots who go stalking in the Bay.

On November 21 **Sunderland O/201** having completed her escort and set course from the convoy, sighted two enemy aircraft about 500 yards away. The pilot altered course and increased speed in pursuit of the enemy, who were flying in and out of cloud. One of the enemy aircraft, an **He.177**, appeared just ahead and above O, whose front gunner opened fire at 400 yards, and saw tracer enter the enemy. The **He.177** returned a few short bursts and, although 8 miles away from the convoy, dropped a rocket bomb, which fell into the sea. Climbing to 3,000 feet, O saw two aircraft below, but some miles away. He gave chase, and, drawing nearer, the aircraft were identified as **F.W.200s**. The front gunner opened fire on one **F.W.** at 600 yards and saw tracer enter the enemy, who returned the fire and increased speed. The **Sunderland** was forced to break off the action owing to the enemy's superior speed. Later an **F.W.200** dived out of cloud in front of the **Sunderland** and dropped a bomb. The port and galley guns opened fire on this aircraft, but no hits are claimed. After a few more minutes the **He.177** was sighted again; the pilot of O attacked from 200 feet below and on its starboard bow. The front gunner opened fire followed by the port galley gun, and finally the rear gunner was able to bring his guns to bear also. Tracer was again seen to enter the enemy aircraft, and hits are claimed. When the **He.** was out of range O broke off the attack, and, having reached **P.L.E.**, left the convoy. A praise-worthy action by the Captain of the **Sunderland** against three aircraft of superior performance and armament.

On November 22 **Mosquito R/333** (Norwegian) while returning from a shipping reconnaissance on the Norwegian coast sighted a **Ju.88** 1,000 yards away. Weather conditions were hazy and showery with patches of sunshine and 10/10ths cloud at 2,000 ft. The **Ju.88** seemed to increase speed when it sighted the **Mosquito**, but **R/333** closed the enemy aircraft to a range of 600 yards and opened fire with all guns. Pieces fell off the enemy aircraft, the starboard engine caught fire and the aircraft glided into the sea and disappeared. The enemy did not return the fire. Two excellent photographs were taken of the enemy aircraft on fire. (See plate 4.)

Liberator H/59 on convoy escort on November 22 sighted an enemy aircraft about 5 miles away. On closing the aircraft was identified as a **BV.222**, which did a steep turn through 180° and made for cloud cover. It did not enter cloud, however, and when H was about 1,000 yards astern red tracer and smoke puffs, as if from self-destroying shells, were seen from the tail of the enemy aircraft. The shells burst around H, which was slightly damaged in the nose by splinters. The **Liberator** pilot decided to engage with his port beam gun and overtook the enemy aircraft on its starboard side, but the gun fired only single shots and no hits were

obtained. H then drew ahead and climbed. The tail gunner fired a burst from 200 yards and estimated hits near the tailplane. The **BV.222** gained cloud cover and was lost. No return fire was experienced from the enemy aircraft except from the tail gun, and no other gun positions were seen.

On November 23 **Liberator K/224** while escorting a convoy engaged no fewer than four **He.177s** in succession. One **He.** was hit in the starboard engine, which started to smoke, and it left the convoy. The **Liberator** attacked another **He.177**, which dived and jettisoned its bombs and then tried to escape in cloud. The pilot of K followed through cloud, and closing to 400 yards enabled his nose gunner to rake the **He.** with machine-gun fire. The starboard engine of this enemy aircraft also began to smoke and it lost height to sea level, but after straightening out the **He.177** gained cover in low cloud and was not seen again. Another **He.** engaged by K was damaged and had its rear cannon knocked out, and machine-gun hits were seen on yet another **He.** The aggressive action of the **Liberator** Captain undoubtedly saved much valuable shipping. K was not damaged in any way.

Beaufighters N, K, J, and G/248 on offensive patrol in the Bay on November 25 sighted a **F.W.200** flying on a reciprocal course at 50 feet and about 2,000 yards away on the port bow. The section leader, N, attacked from the port beam to the port quarter and hit the enemy's fuselage. J continued the attack from the port quarter, getting astern of the enemy aircraft, which turned 30° to starboard, and, closing to 100 yards, damaged his fuselage and starboard engines. Meanwhile N was attacking again from the starboard, followed by K and G, who attacked from port beam to port quarter. With flames coming from amidships and from the engines the enemy tried to ditch, but the aircraft struck the sea heavily and broke up and sank within a minute of touching down. Defensive fire from the side and upper rearward firing guns was experienced until the enemy aircraft caught fire, but no damage was done to the **Beaufighters**.

No attempt at evasion appears to have been made by the **F.W.** with the exception of the one turn to starboard, which caused it to present its tail to three out of the four **Beaufighters**.

On November 27 **Ventura H/519**, on a long-range met. flight, sighted an **F.W.200** half a mile away on a course of 270°. Turning to get on the enemy's tail "H" opened fire from 1,000 yards and closed to 400 yards, concentrating machine-gun fire on the fuselage and rear turret of the enemy aircraft. Many hits are estimated. Return machine-gun fire came from the side guns and heavy self-destroying shells were seen from the rear under cannon position. Before the **F.W.** disappeared in cloud its starboard inner engine was smoking.

An Attack on Four E-Boats

On the morning of November 5 six **Beaufighters** of **No. 254 Squadron** on patrol in the North Sea sighted four **E-Boats** about 50 miles west of Ijmuiden. The **E-Boats** were disposed in two columns and were on an easterly course making about 20 knots. The **Beaufighters** split into pairs and attacked with cannon. Two made their attack from dead astern, two from the port

quarter and the remaining pair from the port beam. The aircraft dived from 2,000 ft. to about 50 ft. Hits were seen on all the boats, most of the fire being concentrated amidships. All the **E-Boats** were damaged, one of them was left on fire and another with smoke pouring from it. One **Beaufighter** failed to return from this operation.

Photographic Reconnaissance

Photographic reconnaissance during November was hampered by the poor weather over the Continent and at base. But it was possible to maintain constant watch on the Channel ports where the recent move of two destroyers to the south was recorded. Reconnaissance was also made of the trend of merchant vessels from Bay of Biscay ports towards Brest, Cherbourg and Le Havre.

Numerous bomb damage assessment flights were made although the weather marred the success of most of them. But excellent photographs were taken of Mannheim, Ludwigshaven, Dusseldorf, Munster and Rjukan.

The following selection of reports of Photographic Reconnaissance were written by members of the aircrews concerned.

540 Squadron (Mosquito)

We were briefed on September 30 for a D/A of Hanover and Bochum. We were airborne at 1105 hours and flew over cloud until reaching our target area at 1215 hours. Here the cloud was breaking, and we identified the town of Bochum. One run was made from north to south and a second one from south to north. At the end of the second run we set course for Hanover. We met fairly heavy flak on the second run, which was accurate for height but not for position. When approximately half way between Bochum and Hanover, my observer, who was looking behind through the top blister, said, in his slow North Country drawl, "Oh, there's a Fighter on your tail." Sure enough a Hun was climbing and trying to keep in our blind spot. Had it not been for the blister I doubt whether we should have seen him in time. I immediately opened up to 2,800 revs. and +12 boost and jettisoned my drop tanks, which were full of petrol as they had failed to feed. The enemy aircraft was about 1,500 yards away and had closed in to 1,000 yards when we began to hold it. The enemy fighter was held for about 2 minutes and then we gradually drew away. After about 7 minutes it was only a speck, eventually disappearing from our sight. During this period I had been turning slowly on to a northerly course which took us towards some high cirrus at 28,000 feet, running approximately east to west. As the enemy aircraft finally disappeared I reduced to 2,600 revs. and +6 boost. Approximately 2 minutes later we sighted three more enemy aircraft on the port side about 5,000 feet below and climbing fast towards us. They seemed to be about a mile and a half away. I again opened up and headed north. Within 2 minutes the enemy aircraft had begun to drop away, and at this stage we had reached the cover of the cirrus cloud, which we dived into, with the relieved remark from the Navigator, "Aye, lad, it's just like getting into bed." We flew in and out of this cloud for 20 minutes and nothing more was seen of the enemy.

As I had been forced to jettison my drop tanks full, and owing to the subsequent interceptions, I decided I would have insufficient petrol to reach Hanover so I set course for home. On returning to base I was told that an enemy aircraft had been sent up to intercept us over the North Sea, but I had not seen it and the return trip was quite uneventful.

170 Squadron (Mustang 1A)

I took off with my No. 2 from Benson at 1132 on November 24 in a Mustang 1A. The weather was quite fine with a strongish wind, and I was glad to see that there was quite good cloud cover at about 3,000 feet. We crossed out at Beachy Head and flew low across the Channel in the hope of defeating the enemy R.D.F. system. In the light of what happened later, we were probably unsuccessful. When I saw the French coast looming up, I pulled up to about 5,000 feet, dodging in and out of the clouds to confuse the flak gunners. However, they appeared to be at lunch since nothing fired at us, and I continued towards Hesdin, checking my position as best I could through gaps in the clouds.

As I approached the target I came down to about 600 ft. to take my photographs, and was immediately met by some 20-millimetre red tracer, which passed unpleasantly close. At the same time a lone machine-gunner joined in, fortunately to no effect. I switched my cameras on and did my run over the target. After I had passed the target I began a gentle turn to the left and looked round to see where my No. 2 had got to. There was an aircraft on my port beam and I looked ahead again, thinking all was well. Suddenly I realised that this other aircraft had a radial engine and I broke left as hard as I could. It was well that I did so for at that moment tracer began to fly over my aircraft. I think that the enemy aircraft had just about lined me up in his gunsight when I broke. I saw an F.W.190 just above me, climbing steeply. I opened my throttle and pulled the stick hard back. I got in a 3-second burst, seeing strikes on the wing roots and tail plane, but he had the legs of me and disappeared into cloud. Almost immediately another burst of tracer passed quite close and I saw another F.W.190 closing in on me from behind and slightly above. I tightened my turn as much as I could, and both aircraft began to orbit like a roundabout at a fair. I saw that I was beginning to out-turn the 190. But he must have realised this for he shot off up into cloud. I was not long in following suit, feeling considerably relieved. I crossed out in cloud at about 12,000 feet and landed at base at 1315 hours, just ahead of my No. 2 who had returned independently.

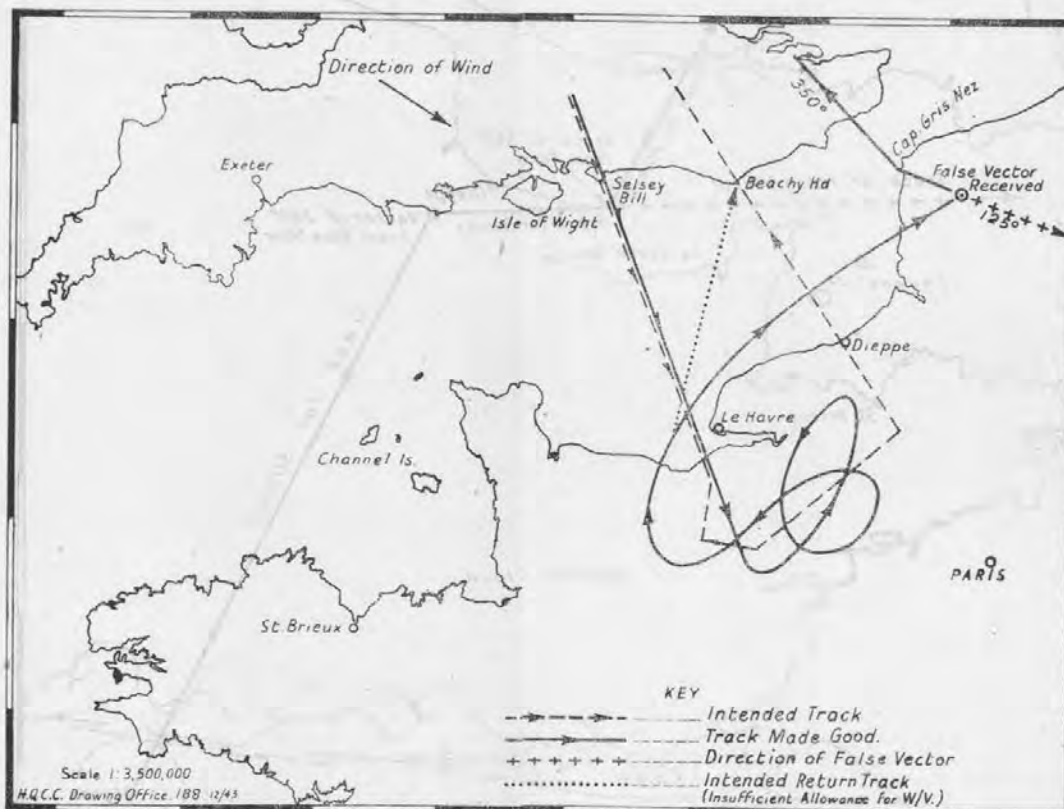
Two False Vectors

541 Squadron

At 1346 hours on November 7 I took off to photograph targets south of Le Havre. The weather was indifferent and I was forced to photograph through gaps in the clouds. After a while I found that I was off track. I flew on a rough vector for Beachy Head and after a while I began to let down and broke cloud over land. At first I thought I was over England, but suddenly the coast loomed up and I realized that I had not made sufficient allowance for the very strong northerly wind (340°), and that I was still over France. I pinpointed myself in the Cap Gris Nez area. I then climbed back into cloud and at 1615 hours, at 15,000 ft., I called Manston on Channel D. I received no reply so called again, giving my own call sign.

I then received a message, very loud and clear, from a station with a call sign which sounded like Binweed, giving a vector of 125° . I immediately suspected this vector, as it would have turned me back into the Continent. I turned on to a reciprocal of the given course to head away from the station. After flying on this course for a short while I received a message from Bradwell Bay giving a vector of 330° . I turned on to this course, and for about 10 minutes I was continuously called by both stations, each giving their own bearing. Often they were completely jamming each other.

I continued to home on Bradwell Bay, and on instruction let down and then lost contact with the Continental station, landing at Base at 1659A.



541 Squadron (Spitfire)

On November 9 I was briefed to photograph targets in the Lyons area. After a good start I unfortunately developed engine trouble 50 miles from the target (oil pressure 35 lbs. and oil temperature 95°), so I decided to set course for base.

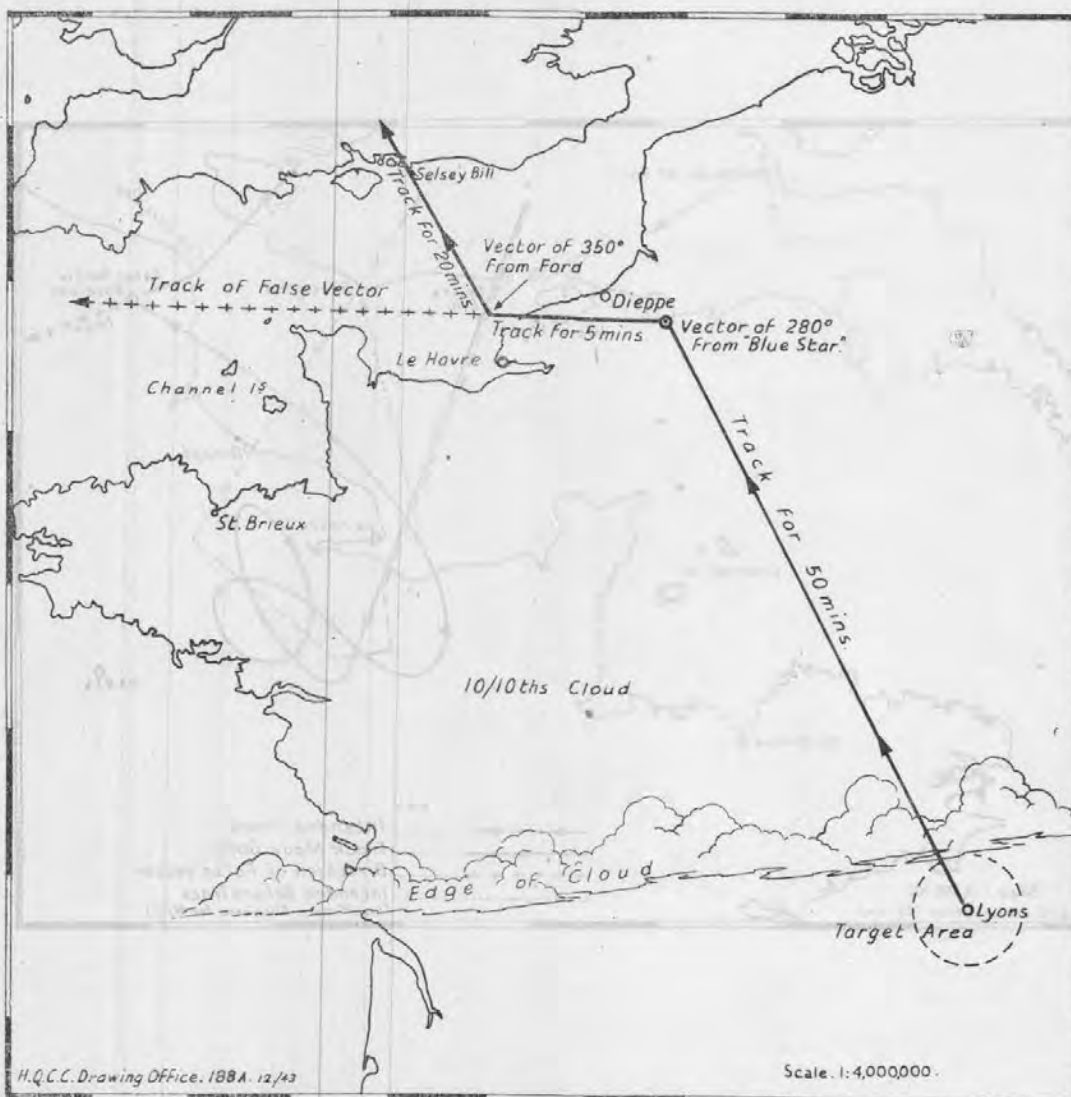
I flew a course of 330° above ten-tenths cloud and estimated that this would take me 75 minutes, allowing for a 75 m.p.h. head wind. After 50 minutes flying, listening out on channel C, I heard Base calling another aircraft and decided that I must be much nearer home than I had estimated.

I called up my Base three times but received no reply. Suddenly I was answered by a Station with a call sign which sounded like "Blue Star." I was asked if I required any help. I requested a vector and was given 280°. I then asked if I had crossed in, and if so where?

He told me to "hang-on" for a few minutes, and then came back to say that I had crossed in 7 miles east of my home Station.

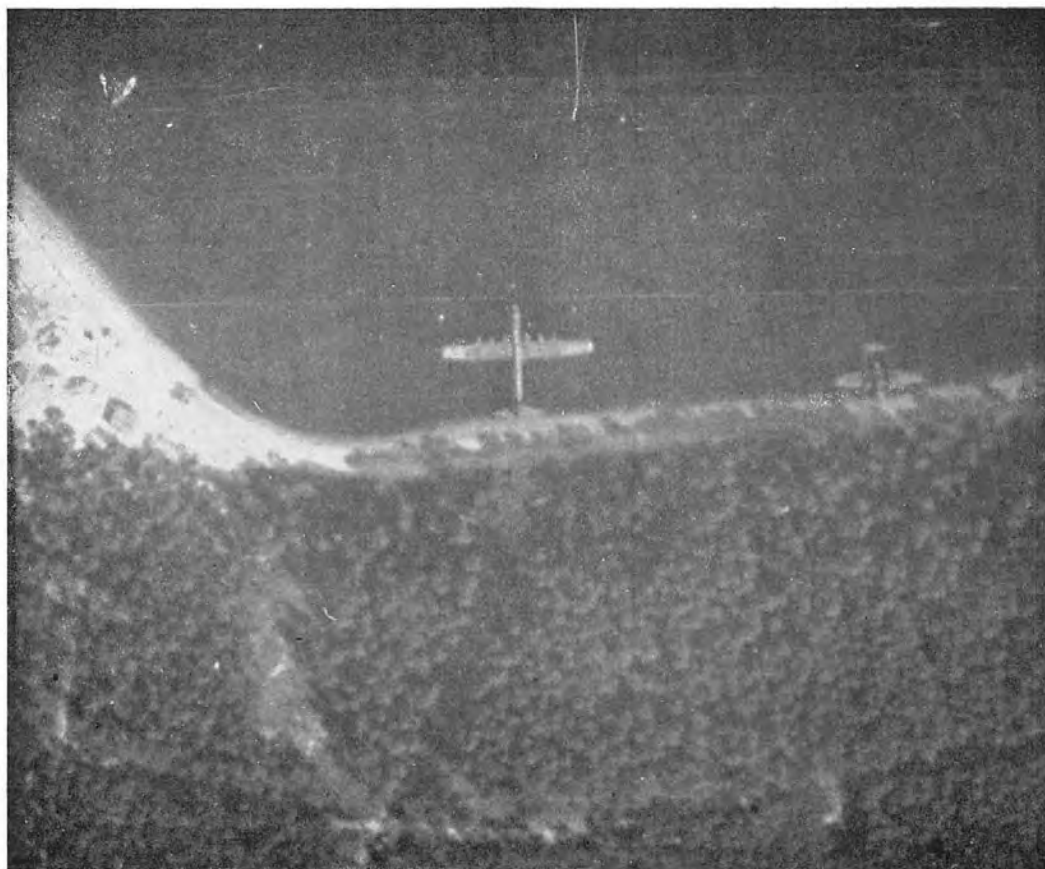
I thanked the operator and then called Base, but was unable to make contact. A moment later Ford piped up and, to my surprise, gave me a vector of 350°.

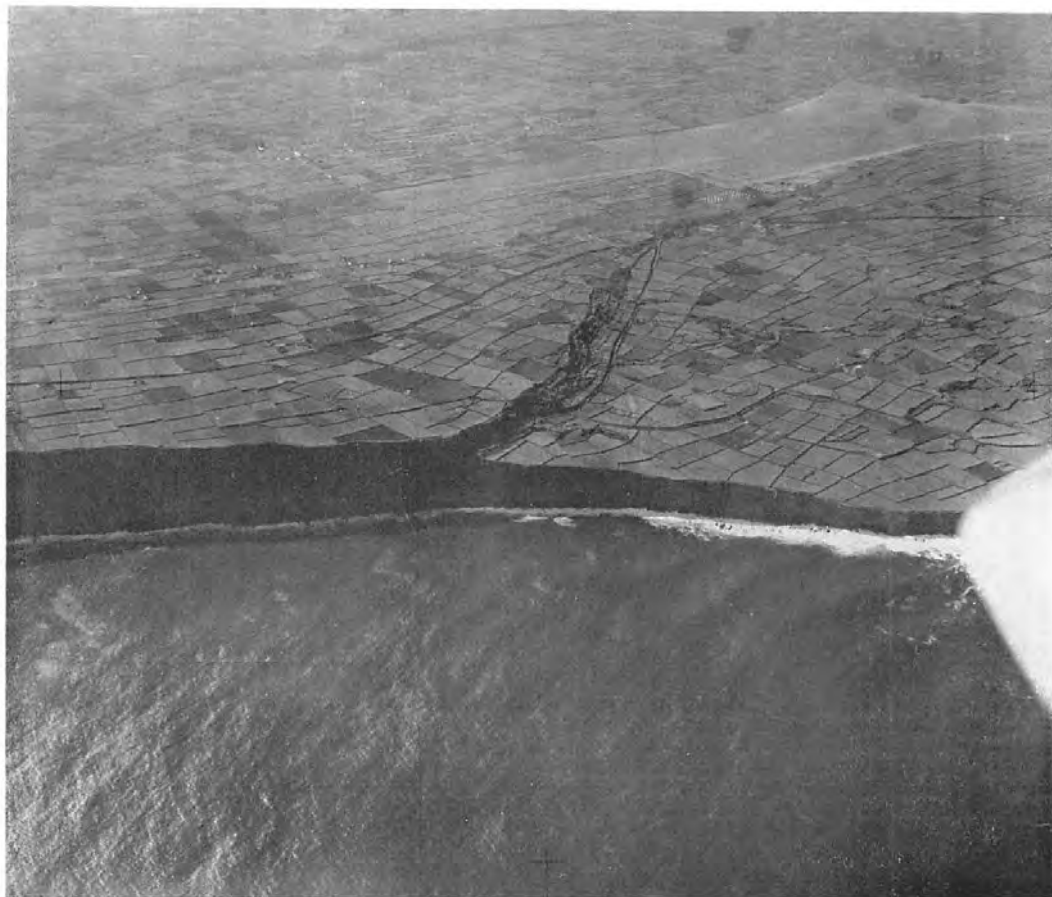
I felt confident that the last message was authentic, but suspected the origin of the previous conversation. I turned on to the new course and broke cloud over the sea. After 20 minutes I crossed in and pinpointed myself over Selsey Bill.





For some time reconnaissance of Allied shipping on behalf of U-Boats was carried out by the Focke Wulfe 200, an aircraft familiar to Coastal Command. It continues to operate, but in recent months a newcomer, the Blohm & Voss 222 six-engined flying boat has joined these long range reconnaissances, and has been seen several times by our aircraft. The top photograph, taken by 59 Squadron, shows this aircraft in silhouette; the lower one, taken by 541 Squadron, shows one moored to the shore at its base at Biscarosse. Its great size is realized in comparison with the B.V.138 flying boat a few hundred yards to the right. The B.V.222 is estimated to have an endurance of some 18 hours and could clearly be of considerable help in shadowing and reporting our convoys to the Admiral/U-Boats.





LAGENS AIRFIELD looking west. *See letterpress, page 17.*



LAGENS AIRFIELD looking north-east, showing the ridge to the east of the airfield and Carneiros Point beyond.

IV.—SPECIALIST AND GENERAL ARTICLES

Landing in the Azores

The Azores were discovered by a Portuguese explorer in 1431 and have belonged to Portugal ever since. They were uninhabited, but were quickly settled by Portuguese, Flemings, and Moors. These races have long since lost their individual characteristics and the inhabitants are now simply Portuguese. Between 1580 and 1640, when Portugal was part of Spain, the Azores became a port of call for the Spanish ships trading with the West Indies. This was an irresistible attraction for the Elizabethan adventurers, and it was in 1591 off the island of Flores that Sir Richard Grenville fought his heroic action in the *Revenge*.

Until about a hundred years ago the Azores were a colony of the Portuguese crown, but they are now a province of Portugal, though they enjoy a certain autonomy.

The alliance between Great Britain and Portugal has survived and been honoured for almost six hundred years—much longer than most international agreements. This is probably because both countries look westwards and depend on the sea. The alliance is no mere sentimental formality. In the last war Portugal provided the Allies with troops and many valuable bases including the Azores and others in Africa.

In the Napoleonic wars the Portuguese alliance opened our only way into a hostile continent—an entry we have had to win by force in this war—and it was from Portuguese bases that Wellington began his victorious Peninsular campaign which freed Portugal and helped to break Napoleon. In the seventeenth century the marriage of Catherine of Braganza and Charles II reaffirmed the alliance and brought us valuable colonial possessions, particularly in India.

The value of the Azores in this war is obvious to anyone concerned with the Battle of the Atlantic. Lagens airfield is just over a thousand miles west of Gibraltar and only a few hundred miles further from Land's End. These distances speak for themselves. This valuable base has been acquired without firing a shot and without exposing our ally to German reprisals, for the

enemy is no longer in a position to extend his commitments. Also by granting these facilities Portugal has put herself on the winning side of the fence. The arrangement is thus satisfactory to both sides.

The islands lie on a submerged ridge and are in three groups. The north-western group consists of Flores and Corvo; the central group of Terceira, Graciosa, São Jorge, Pico and Faial; and the south-eastern group of São Miguel and Santa Maria. The climate is warm without extremes and there is abundant rain. The rain is usually showery and though it does not last long, it is sometimes heavy. The sky is often cloudy and winds are light. In the winter months the frequent depressions which pass north of the islands are liable to disturb the weather and bring occasional storms. Winter and summer are not as different as in England though weather is generally less good in the winter. Temperatures never rise above 90° F. or fall below freezing. The monthly average is about 73° F. in August and about 58° F. in the early part of the year.

The chief airfield in the Azores, and the one from which Coastal Command aircraft are operating, is Lagens (pronounced Larjenz) on the island of Terceira. It is situated on the north-east corner of the island in a wide valley which runs 330° — 150° T. The south-eastern end of the valley begins at the town of Praia da Victoria on the coast and rises gently to a height of 196 ft. in the middle of the airfield. The ground then falls away again to the coast at Villa Nova at the north-western end. The valley is about 4 miles wide at the north-western end and about 3 miles at the south-eastern end. In the centre, at the airfield, the width is about a mile and a half. The valley thus forms a natural funnel which keeps the wind always within 30° of the single runway. On the north-eastern side of the valley the ground rises fairly steeply to 210 feet, and on the south-western side it slopes gradually upwards to nearly 3,000 ft. This height is about 8 miles from the airfield.

Taking off towards the north-west the highest ground is 60 ft. above the airfield and a mile and

a half away. When taking off in the opposite direction the end of the north-eastern ridge is 20° to port and is 100 ft. above airfield level, two and a half miles from the end of the runway. There is also an obstruction 100 ft. high 4 miles dead ahead. Thus the approaches from either end are extremely good and pilots may safely come in from about sea-level provided they are familiar with the airfield and with the ridges on either side. The circuit is right handed when approaching from the south and left-handed when approaching from the north. At present there is only a hurricane lamp flarepath and a chance light for night flying. There are also two Sandra lights on the top of the north-east ridge level with the end of the runway, and a third on the north-east coast.

The soil at Lagens is lava dust over a subsoil of porous stone so that in rainy periods it soon turns to mud, and becomes very dusty when it dries. In many places the soil is only a few inches deep and passable roads can be made by running a scraper over the top, and even the unpleasant reddish mud formed in wet weather does not stop traffic or aircraft landing.

The existing buildings at Lagens are of stone with red tiled roofs. They were begun by the Portuguese Air Force and are being completed by the British Services with Portuguese help. They are all on the north-eastern ridge and consist of the operations block and above that the Area Combined Headquarters. This latter building is almost finished and the Headquarters staff moved in on December 7. Three other buildings are being completed, and are already being used as officers' quarters. Most of the officers and all the airmen still live in tents in the various squadron dispersal sites. 206 squadron officers and M/T section are quartered in a dismantled alcohol factory. The stock and plant had been previously removed.

Lagens also has one small hangar with stone walls and a galvanized iron roof. This is used as the main store. Tunnelled into the slopes on the north-east side are four or five small sheds which are used as squadron stores. The permanent Nissen camp for N.C.O.s and airmen has been sited on

the top of the north-east ridge and is still to be constructed.

The population is extremely friendly and helpful, but their standard of living is low. The R.A.F. lives on bread baked by the R.A.S.C., and they implement their rations with eggs, cheese, meat, vegetables, butter, wine and fruit bought locally.

At the time of writing the British Forces have been just two months in the Azores, during which they have made excellent progress towards the development of Lagens as the great operational and transit air base that it is bound to become. The weather was kind to us in the initial disembarkation which was carried out with great efficiency and despatch under the supervision of Commander R. V. Holt, C.B., D.S.O., M.V.O., R.N. Within 28 days of the arrival of the convoy at Angra all the force and its stores were ashore, base depôts and dumps were established at Angra and the squadrons were established under canvas on the airfield. Fifteen days after the initial landing, on October 23, a Flight of 233 Squadron (Hudson) relieved the F.A.A. aircraft which had covered the landing; by October 25, Nos. 206 and 220 Squadrons (Fortress) had arrived, and on November 9 the first U-Boat was killed from Lagens. These units were joined during November by detachments of Leigh Light Wellingtons from No. 172 and 179 Squadrons, and a small flow of transit aircraft from Newfoundland area were using the airfield. There is still much to be done in completing the hutted camp, hard standings and perimeter track, but the Royal Engineers under Lt.-Col. Bronson have done wonders already, and the rest of the work is well in hand. Every drop of petrol all rations and equipment have to come 18 miles over a rather indifferent road from Angra which has involved great efforts by the R.A.S.C., the R.A.F. transport and the R.E.M.E. Air Vice-Marshal Bromet has been fortunate in receiving most cordial co-operation from local Portuguese authorities, especially Brigadier Tamagnini Barbosa, the Military Governor, and Commander Lima of the Portuguese Navy. Lagens is surely destined to become one of the great airports of the world, and No. 247 Group may count themselves fortunate in having been able to pioneer its development.

CORRECTION

"C.C. REVIEW"—Vol. II., No. 7.
November 1943.

Page 18, col. II, line 16:—

"Commander R. V. Holt,
C.B., D.S.O., M.V.O., R.N.",

should read

"Commodore R. V. Holt,
C.B., D.S.O., M.V.O., R.N."

Interpretation of Air Photographs— Development during the War

During the last war the interpretation of air photographs was concerned mainly with supplying information about the defences of the enemy. During this war, interpretation has developed into an important science through which a formidable library of information has been built up for our benefit. This is of continuous use in planning our offensive against the enemy and in assessing the results of our sorties.

Four types of information are provided by photographic interpretation. The first is tactical, the second reveals the day-to-day activities of the enemy, the third covers special subjects and the fourth provides information for planning.

The technique of interpretation has changed very little during the four years, but, through developments in other directions, its usefulness and reliability have increased. These developments are: the increased skill of interpreters through experience and the use of accumulated reference material: the improved scale and definition of photographs: the fact that reconnaissance sorties can be flown over important targets as a matter of routine, by aircraft of increased range, the increased use of ground information and the development of night photography and its interpretation.

At the beginning of the war, when few sorties were flown, photographs were examined with an instrument, the Wild Autograph, which had been designed for peace-time survey work. With this instrument the tilt of the photograph could be eliminated and accurate measurements could be made.

As the number of sorties increased, this method was found to be too slow and complicated and pocket stereoscopes were used instead. Measurements became more accurate as experience showed to what extent the scale of a photograph could be relied upon. Another factor which made for accuracy was that when the measurement of a ship, building or other object was known, this could be related to other objects in the same photograph. As this knowledge increased it was possible to determine a scale of measurements.

At the beginning of the war there were not many experienced interpreters, and of these, few knew anything of war reconnaissance. They could refer to *Jane's Ships* and other reference books for details of enemy vessels, but these publications usually gave only a broadside view or a deck plan: not enough to identify ships in air photographs with their stereoscopic subtleties of light and shade. So the first attempts at interpretation of shipping photographs were often vague. There are examples of this in early reports on photographs of Den Helder, the Dutch naval base, where the interpreter could do no more than write of "a somewhat curious vessel mounting guns and thoroughly camouflaged" or of a "very curious vessel which could be a motor ferry." Peace-time reference books like *Jane's Ships* are no longer necessary, because we now possess photographs of every important vessel

in the German Navy and mercantile fleet. These photographs, taken at various angles of light, are so comprehensive that they guarantee correct recognition. The same method applies to other subjects of reconnaissance.

The early interpreters were equally ignorant of the normal shipping activity in European ports. Now, after studying the results of continuous sorties, they know the normal life of these ports as familiarly as they know the lines on their hands, and they quickly recognize any exceptional circumstance and sign of activity or change.

The enemy's decoy system was another mystery to the early interpreters. It was not until the middle of 1941 that we could define the policy of the enemy in the construction of their decoys. When one or two decoys had been identified, other types were more easily unmasked, for, as these structures were often used in association with one another, they gave each other away. The experience with other enemy activities was similar, especially in the cases of shipbuilding yards, ammunition dumps and industrial plants. As records were collected, interpretation became more easy, because it could be made in the light of experience.

At the beginning, aircraft were identified by their plan view, but research in the past four years has made it possible to deduce wing positions, wing dihedral, fuselage angle, and many other features, by using shadows in photographs as indications of the third dimension.

The study of shadows has also increased our knowledge of enemy oilfields. On a vertical photograph the plan view of an oil derrick is very small, but the details of its structure may be learned from the pattern of its shadow. It has become possible to decide from these shadows whether the drilling tools were in the tower and, by studying consecutive photographs, to know whether the drill was in action.

Another development has been based on Lord Kelvin's theories on ship waves which proved that in normal circumstances the wave patterns set up by the bows of all types of ships are similar and in accordance with definite physical laws. It is possible, therefore, to measure the spacing of waves and then determine the speed of the ships with a special protractor.

A new method of predicting the fall of bombs has been of great help in assessing the results of daylight strikes. Cameras sometimes fail to photograph the point of impact, or the exposure is spoiled by a smoke screen, by cloud, or by earlier bomb bursts. But, by knowing the location of the photograph, the direction of the fall of the bombs, the ground speed and the altitude of the aircraft above the target, photographs of falling bombs can reveal a great deal to an interpreter. He can know whether a general target area has been hit, although it is not possible to determine whether a specific target, such as a building, has been bombed.

The development of the Pin Hole Camera method of taking oblique photographs of enemy convoys during strikes has been another help to interpreters, and it is now possible to gain information about the disposition of the ships in a convoy. This is done by assembling the same number of cone-shaped boxes as there were cameras photographing the convoy. The length of each box is equal to the focal length of each camera. An artificial horizon is erected and the Pin Hole Cameras are aligned so that they are in the same position as the cameras were. The relative positions of the ships in the convoy can then be fixed. If the length of one ship is known, the approximate sizes of the others can be determined.

Improved Scale and Definition

Interpreters found another difficulty at the beginning of the war, when photographic prints were small. The superstructure of naval units could not be seen in these small prints and we had to rely on the length of ships to identify them. Mistakes were made and on one occasion, it will be remembered, 70 U-Boats were reported to be at Emden. When better prints were made, it was found that the U-Boats were only harmless commercial barges, of exactly the same length as one type of U-Boat. This source of error was mostly removed when the 20-in. and, later, the 36-in. focal length camera were introduced. On March 12, 1941, when a sortie over Kiel was covered by 20-in. focal length cameras, it was realized how much detail had been lost by the old method. For the first time it was possible to assess the number of U-Boats being built. An extract from one report, on a sortie over a shipbuilding yard, reveals the advantages that came with this improvement. The report stated, "What have previously been thought to be 11 mine sweepers under construction at these yards can now definitely be defined from these photographs to be U-Boats." A report on another yard photographed by the 20-in. focal length camera stated, "It has been assumed that U-Boats are being constructed and fitted out under cover at these yards, but now these excellent photographs show an additional seven being constructed in-the open, on the building slips."

The new cameras also made it possible to verify information which had been merely theoretical before. For example, photographs taken by small-scale cameras had revealed groups of white lines which had been recognized as decoy structures. It was assumed that they were illuminated in some way, but it was not until the improved cameras were used that the interpreters could make certain that at intervals along the white lines there were faint diagonal shadows cast by poles about 12 feet high. There was little doubt then that the poles carried lamps which illuminated the white surfaces of the lines, producing a faint glow.

In early photographs of aircraft it was often impossible to recognize even such simple facts as the number of fins and engines, and the aircraft could be identified only by the wing span and length. Large-scale photographs and the measuring magnifier have changed this and now every type can be identified, together with such details as engine nacelle shape (indicating the type of

engines) and the position of dorsal turrets. Measurements are now made so accurately that new types of aircraft are recognized before ground reports have been received. The F.W.190 and the Me.323 were first measured on air photographs and when these types of aircraft were afterwards captured it was found that these measurements were remarkably accurate. The wing span of the F.W.190 had been correct within 1 foot and there was less than 3 feet difference in the Me 323.

The 36-in. camera has been equally successful in photographing industrial plants and it is now possible to determine whether the switches in a transformer station are open or shut and to gauge the relative widths of pipes in an industrial plant. Such information helps the interpreters to identify the different parts of the plants and to make estimates of the rate of production. This work has been helped further by the use of stereoscopic instruments which produce excellent results from the improved enlargements now being produced.

Our knowledge of the movements of enemy shipping has grown since the large-scale photographs have been available and since regular and wide reconnaissances have been flown (details of this will be given later on) it has become possible to estimate approximately how much shipping is being used by the enemy. With the help of the large-scale photographs, every vessel over a certain size was identified and given a code number for reference. The movements of each coded vessel were then recorded on a graph and analysed. The results from this have been very profitable. It is now possible to assess the active merchant tonnage available to the enemy, to analyse the turnover at any port and therefore to understand the full extent of enemy shipping movements.

In the Bay of Biscay area, for instance, this system showed that what had previously appeared to be an enormous turnover of shipping in Bordeaux and other ports, was largely due to internal movements. This information, linked with other accumulated knowledge, made it possible to predict with remarkable accuracy the movements of certain ships, which later assisted the identification of vessels on Coastal Command obliques.

Coastal Command has obtained many excellent oblique photographs and these have yielded information which could never have been deduced from the best vertical photographs that could be taken. The armament of the broad beam type of U-Boat was first identified on obliques taken by Coastal Command and other photographs, also by the Command, have yielded the first information about the new and unidentified armament with which U-Boats are now being equipped.

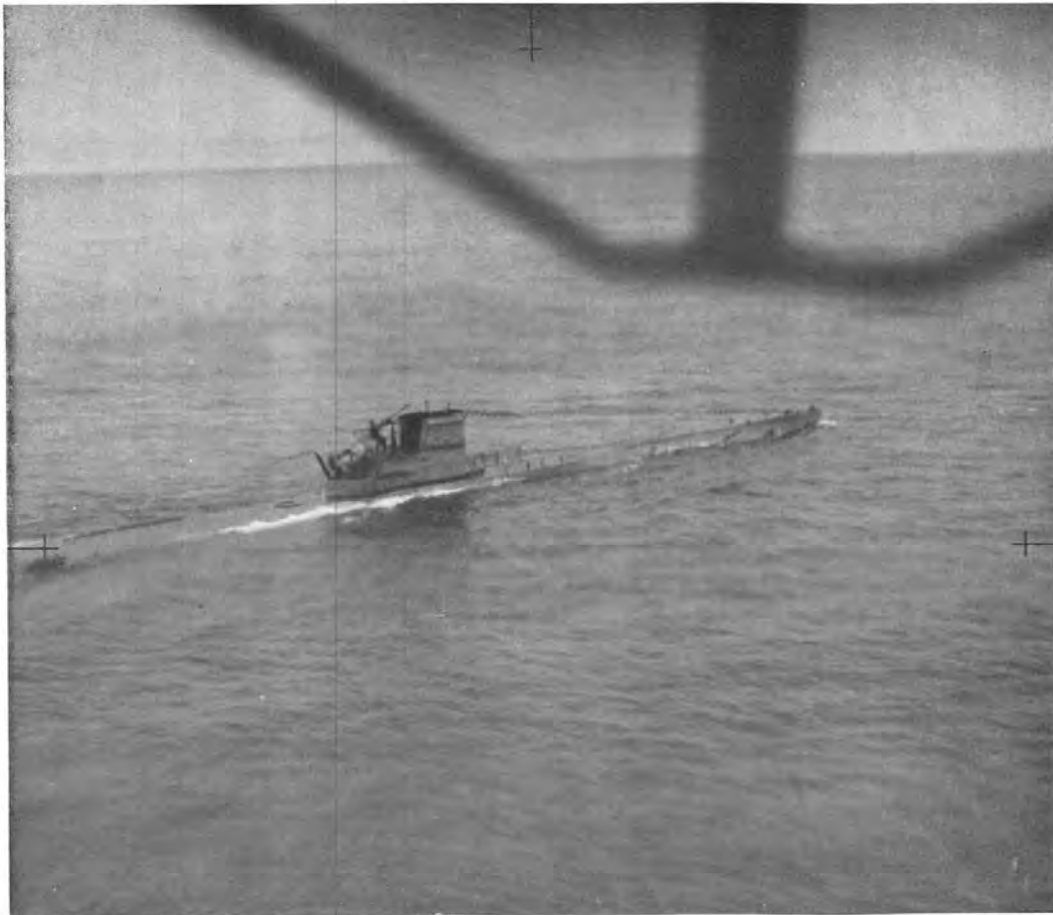
An occasional oblique photograph is indispensable in the study of small-scale objects such as wireless installations. Much of the modern apparatus is so complex that no vertical photograph could give full details. For example, an oblique of a wireless installation at Anderville supplied the first proof that the Germans were using radio detection against our aircraft. By measuring the aerial arrays, data on the probable frequencies was obtained, and by studying the



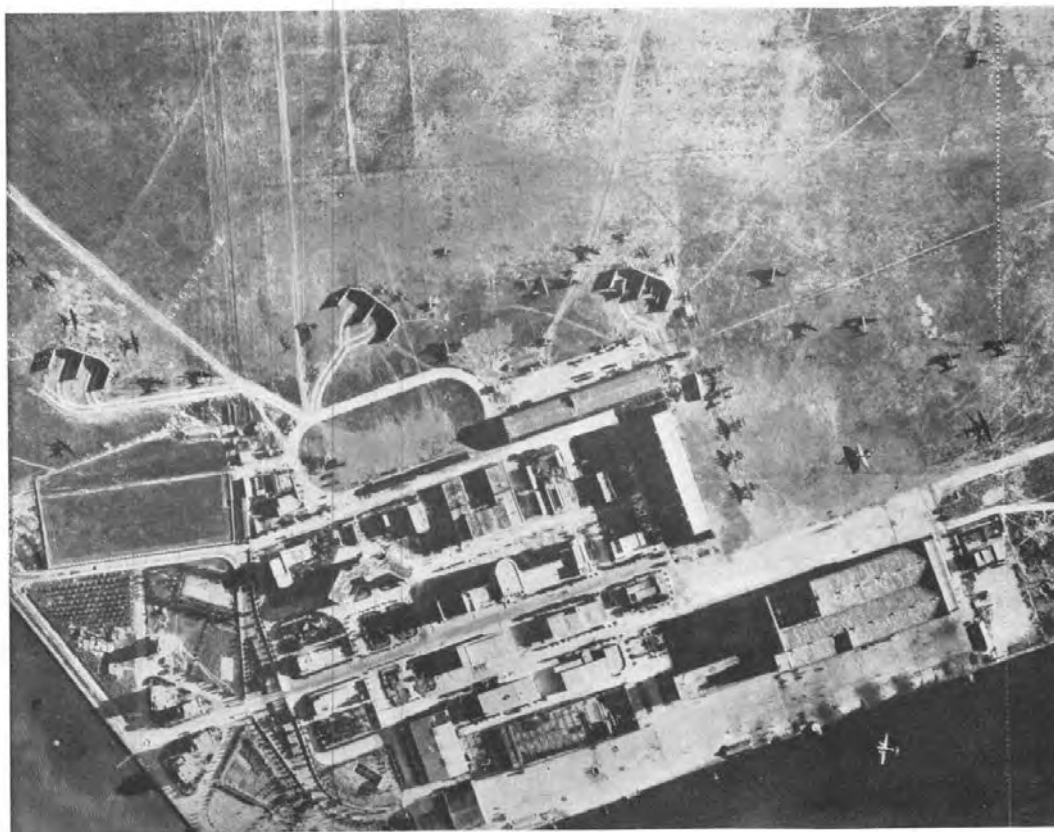
SHIPBUILDING YARDS, KIEL. Note size of *Prinz Eugen* alongside quay and of the battle cruiser in floating dock. Taken with 14" focal length camera, August, 1940. See letterpress, page 20.



This photograph covers the same area as is enclosed in the white lines in the photograph at the top of the page. Showing increased scale and quality obtained with 36" focal length camera. Taken April 20, 1943. Note comparative size of floating dock "A" in the two photographs.



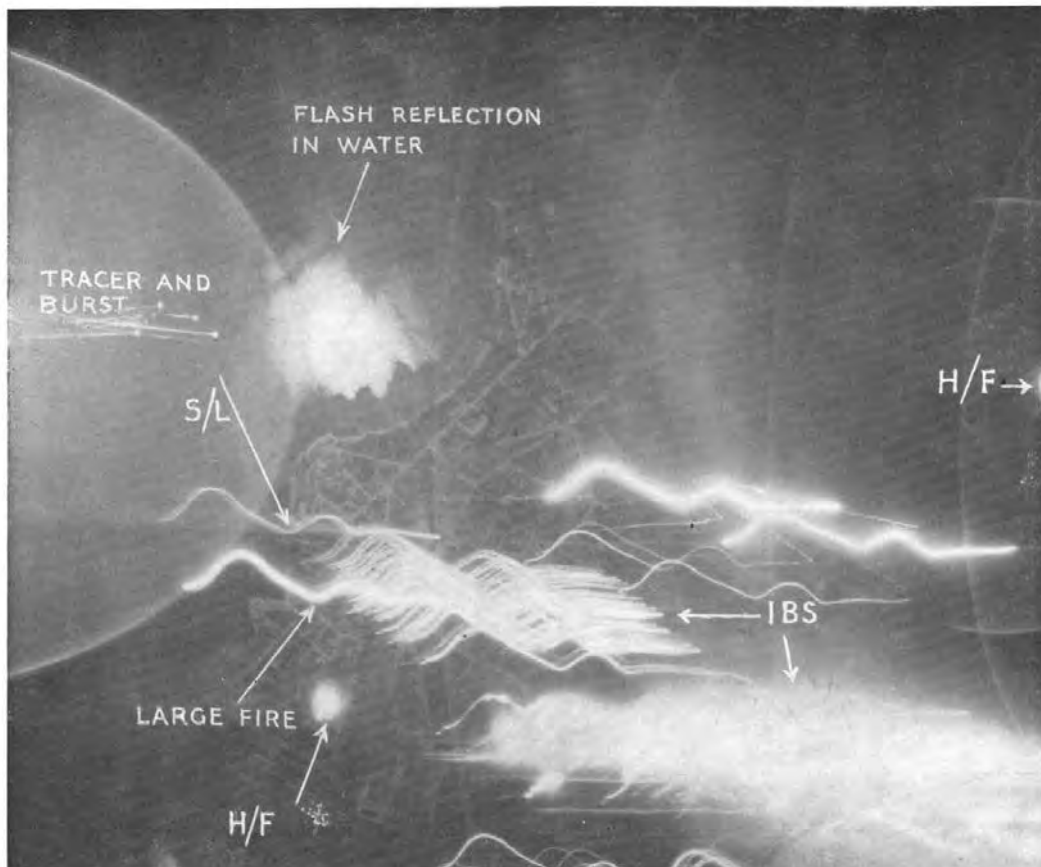
A 500-ton U-Boat with re-designed conning tower, carrying 20-mm. guns. The first photograph to reveal substitution of increased A.A. armament for 88-mm. guns. See letterpress, page 20.



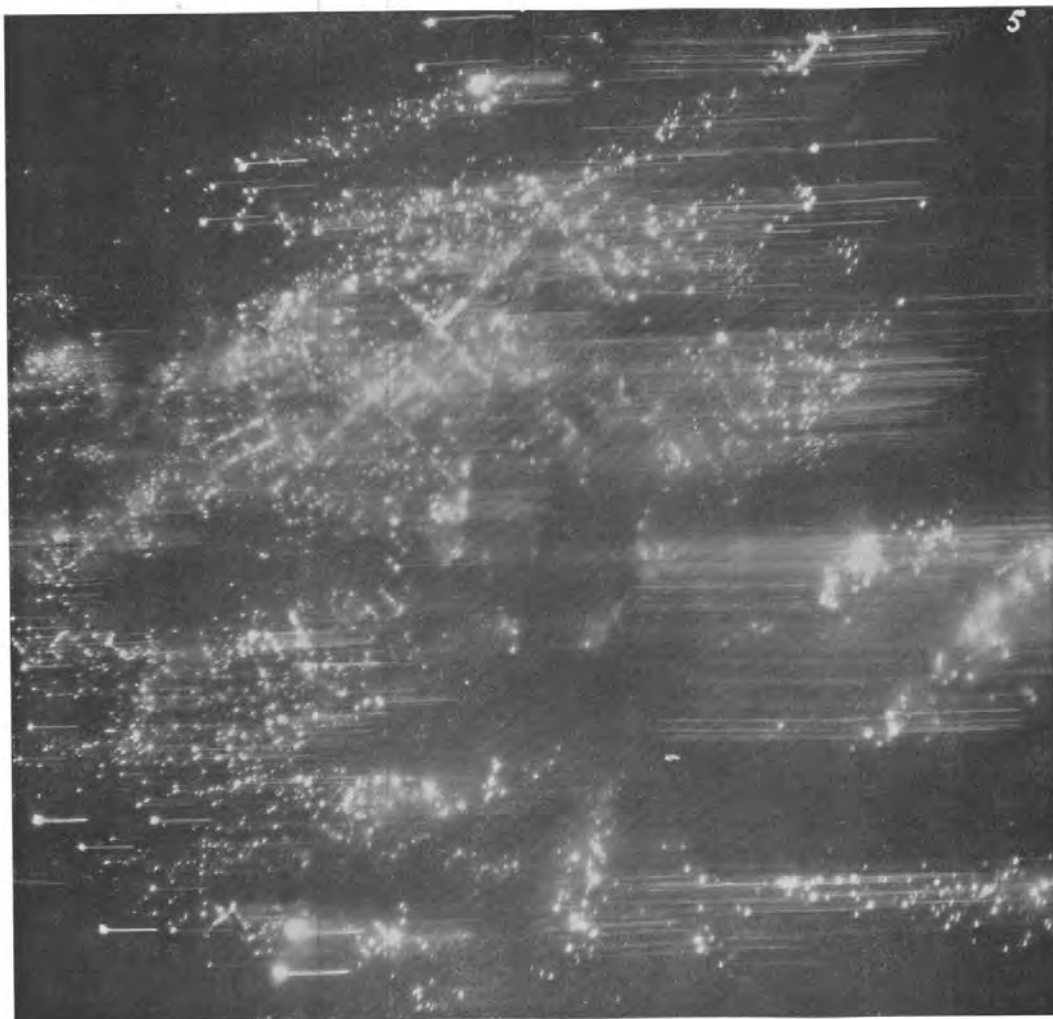
CAGLIARI AIRFIELD. This photograph illustrates profile shadows of aircraft, indicating dihedral, engine nacelle shapes, etc.



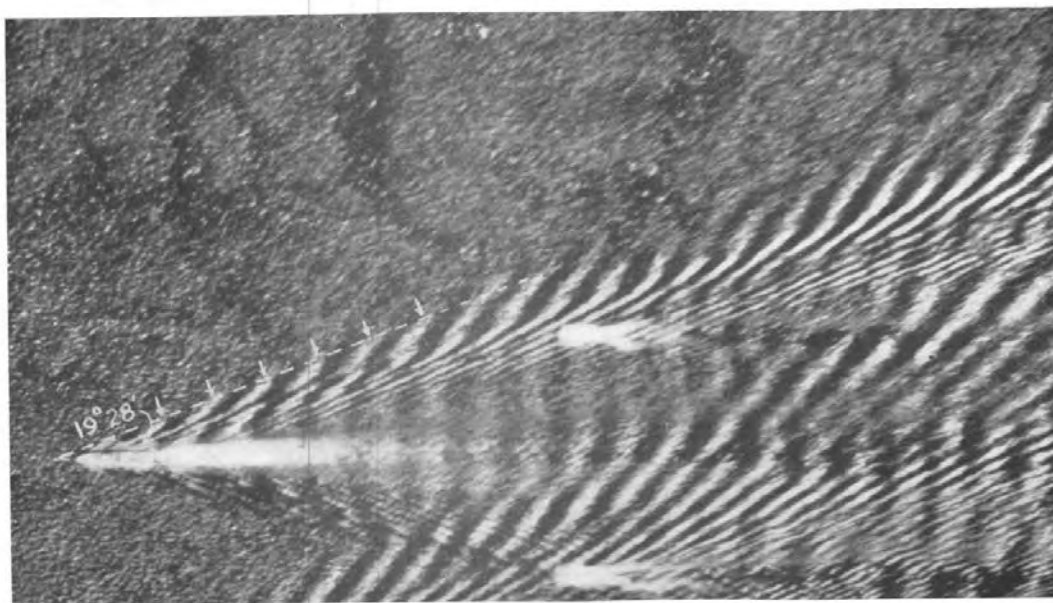
Coast Watching Radar Station at Hook of Holland, showing details of frame aerial array from which it is possible to discover the type of emissions which this station sends out. It would not be possible to find this out from vertical photographs. See letterpress, pages 20-21.



Night photograph showing ground detail illuminated by flash bomb, Searchlights (S/L), the tracks made by incendiary bombs (IBS), and flashes from a heavy Flak battery (H/F). See letterpress, page 21.



Night photograph showing light made by vast number of incendiary bombs. The pattern of the streets can be seen. Night photographs can sometimes be plotted by this means. See letterpress, page 21.



An unusually pronounced wave pattern which serves to show how easily measurements may be made to determine speed of ship. See letterpress, page 19.

contours of the surrounding area it was possible to determine the characteristics of the wave lengths.

Development Due to Routine Reconnaissance and Increased Range of Aircraft

Comparison is the basis of most interpretation and it follows, therefore, that there must be continuous photographic cover to provide the prints necessary for reliable analysis. As more and more areas have been photographed repeatedly, knowledge has naturally increased. This has come not only by photographing areas known to be of interest, but also areas about and between targets. New points of interest are often found merely by chance. A great deal of information about the enemy's decoy system was obtained in this way.

By examining the gradual changes of enemy activity, in a succession of photographs, a complete picture may be built up. In this way the turnover of shipping in any port can be assessed. Similarly, regular reconnaissance of ports, in a given area (all photographed within a short space of time) make it possible to know approximately the amount of tonnage in the area.

This method is equally effective in following the construction of U-Boats. By making regular photographic cover of the yards, at definite intervals, the number of U-Boats under construction can be learned and, by noting the progress being made with each U-Boat, the approximate building time can be estimated. This scheme was most effective in following the construction of U-Boat shelters on the west coast of France. Photographs taken over a period told us most of what we wished to know of the method of construction. The same method has been effective in following the building of industrial plants.

In this connection we must realise the advantages that have come to us through the use of long-range reconnaissance aircraft and the acquisition of new bases through the occupation of southern Italy. We may now follow the building of factories and plants as far away as Czechoslovakia and Eastern Germany.

Development in Interpretation of Night Photographs

Interpretation of night photographs has always been complicated by the fact that light may be recorded on the films from three different sources; from the light of the flash bomb, from sources of light on the ground, which make continuous lines across the negative as the aircraft moves, and from light, as from Flak batteries, recorded as flashes. The purpose of night photography, to illuminate ground detail and thus determine the

position of the aircraft, is therefore often confused. The photograph on plate 9 is an instance of this.

Photographs of ground detail taken by the light of a flash bomb are now comparable with day photographs (see article and plates, *Coastal Command Review*, No. 11, March 1943), as far as the principles of interpretation are concerned except that the illumination is limited and that it falls away sharply with increasing distances from the source.

The incidental flashes of flak and the streaks formed by the light from incendiaries, at first considered a hindrance, now provide most of the information valuable in night photographs. An increasing number of these photographs showed no detail and could not be plotted. The incidental details of the photographs were therefore studied more closely and principles were worked out to govern their interpretation.

By tracing the pattern made by incendiary bombs, which show no ground detail, and by then linking them with those which can be easily plotted, the number of aircraft over a target can be estimated. And by comparing the patterns of light on a succession of films the development of the attack can be followed and the reaction of the defences can be judged. The shape and pattern of these incendiary tracks also help the interpreter to analyse the movement of the aircraft and the lights themselves give information about Flak bursts, marker bombs, the lay-out of Flak batteries and the rate of their fire.

It was some time before Flak explosion marks could be identified from other light marks on films. But as time passed, films showed ground detail surrounding the bright discs of light, and it was then known that the flashes came from these sources on the ground and not from shell bursts.

In many ways night and day photographs are complementary, for the one often indicates where to look for damage on the other. And by comparing them they sometimes show exactly where a heavy bomb has exploded, thus making it possible to assess the damage done by bombs of different calibre.

Night photography is the only basis for a study of the enemy's strategy in the use of decoys. Photographs of them taken at night have confirmed earlier theories about the working of fire sites and other decoy structures. And they have often indicated the number of aircraft and the weight of H.E. and incendiary bombs drawn off the target.

Incendiaries are plotted from night photographs just as H.E. craters are plotted from day cover. These incendiary plots are actually more useful than plots of craters, because they can be analysed chronologically and can thus be used to show the order of the attack.

Allied Convoy Attacked off Coast of Algeria

A westbound convoy was attacked by 26 enemy aircraft 45 miles north-east of Cap Tenes on October 21. Two medium-sized merchant vessels were sunk and an L.S.T. was damaged. Our aircraft, Airacobras of 345 Squadron and Beaufighters of 153 Squadron, destroyed four of the enemy aircraft and damaged a fifth. The convoy anti-aircraft guns claimed two destroyed and one damaged.

The German force was made up of Ju.88s, He.111s and Do.217s.

The S.N.O. reported that only torpedoes were used in the attack but some of the aircraft crews reported bomb splashes and the pilot of a Beaufighter said that he saw a "trail of sparks going down in a shallow dive towards an isolated escort vessel." He, therefore, believed that a rocket bomb had been used.

The enemy aircraft were first sighted by the convoy at 1820 hours. They came in to attack 20 minutes later, approaching from astern on both quarters, in small groups and continuing the attack for about twenty minutes. The Heinkel 111s made their approach from the south-east, delivered their attack and then flew away northwards. Other aircraft approached the convoy singly from astern and, pulling away to starboard, made a near 90° turn into the ships, right on the deck. When they had released their torpedoes they continued at a low level and turned away to avoid passing over the ships.

Many flares were dropped. It is possible that early in the afternoon an attempt was made to mark the convoy route by dropping some sort of marker buoy near by.

At 1356 hours a Hudson which was on patrol north of Chenous, some distance east of the west-bound convoy, saw a puff of smoke on the water. This was 8 miles north of Chenous. The Hudson investigated and saw a silver patch on the sea. The pilot identified it as "possibly a marker." He saw an object beneath the surface, 20 yards away. In his words, it "looked like a body." Three hours after alighting on the water, this buoy began to transmit a signal on a frequency of 42.9 megacycles. This continued for between four and six hours. After performing its duty, the buoy is self destroying. The transmission is audible for 15 miles to an aircraft flying at 150 feet, for 30 miles to an aircraft at 900 feet, and for 50 miles to an aircraft at 1,800 feet.

After the action, the crew of one of the Ju.88s was rescued from dinghies and they stated that while they were on a regular reconnaissance mission, they were shot down by an Airacobra at 1815 hours. They had been operating under the usual orders to locate and shadow the convoy. It was verified that an aircraft had been shot down by Airacobras of 345 Squadron at the time quoted by the prisoners. But this had been identified by one of our pilots as a Do.217 and no claim had been made for the Ju.88.

Following are details of some of the combats, which resulted in the destruction of four and the damaging of one enemy aircraft. One Airacobra section was patrolling the north-west side of the convoy at 1800 hours when a twin engined aircraft was seen dropping six smoke flares. This was 20 miles west of the convoy, between the ships and the sun. The enemy aircraft was heading south and travelling swiftly. A second

twin engined aircraft was sighted slightly west of the first one. It was going south-east, flying on the deck. When the enemy sighted the Airacobras the second aircraft turned north and increased its speed to an estimated 250 miles an hour. The Airacobras went into attacks at 4,500 feet, up sun from the enemy. They were flying at 280 miles an hour. One approached from the port at an angle of 20° and the other approached from the starboard at the same angle. The enemy aircraft, then only 20 feet above the water, took no evasive action. One Airacobra opened fire at 400 yards from a 5° angle astern. The starboard engine of the enemy aircraft was hit by cannon and it burst into flames. One Airacobra was hit in the propeller and nose cowling by 13 mm. bullets, but the damage was not serious.

In the second attack, from astern, the fuselage and wings of the enemy were hit by both of our pilots. Pieces were seen flying off. At 1815 hours, the enemy aircraft ditched and two dinghies, appeared. Three Germans climbed into them. The Airacobras sent a May Day call and returned to base as the light was failing.

The other Airacobra section saw the parachute flares north of the convoy and heard the convoy control ship report the approach of enemy aircraft on the deck at 0655 hours. The Airacobras turned north-east of the convoy which was then putting up a smoke screen and firing anti-aircraft guns. The Airacobras saw two He.111s flying abreast, from 300 to 400 yards apart. They were flying on the deck and heading north, away from the convoy. What appeared to be bomb splashes were seen at the rear of the convoy. The Airacobras attacked the Heinkels jointly, making a 20° astern approach to the first enemy aircraft and swinging over to the other on the same attack. Range was closed from 150 to 50 yards.

In the first attack on the port Heinkel, the Airacobras set one of the engines on fire and scored hits along the fuselage. It is thought that the turret gunner was killed as there was no further return fire from his turret. Four similar attacks were made and during these the gunner of the starboard Heinkel hit one of the Airacobras but without causing any important damage. The port Heinkel crashed into the sea during the fourth attack, while one of the Airacobras was firing on it. The remaining Heinkel was attacked continuously until it was lost in the darkness. It was not seen to crash but the Airacobras believe that it was destroyed by the repeated point blank attacks during which it was hit many times.

Beaufighters definitely destroyed two more enemy aircraft. One of them turned towards a red light north of the convoy and obtained an instrument contact on the enemy aircraft, 2 miles away, below and to port. The Beaufighter was flying at 500 feet, north of the convoy. At 1920 hours, the Beaufighter got a visual contact on a He.111 at 1,100 to 1,200 feet and intercepted it. It was seen to ditch at 1930 hours. Another Beaufighter orbited outside the convoy flak after losing a visual contact on five aircraft towards which it had been vectored. He then got an instrument contact at 3 miles and closed in until he got a visual. The aircraft was identified as a Do.217. He engaged the enemy about 100 miles north of Cap Tenes at 1920 hours and saw the Dornier dive vertically into the sea. He afterwards saw fire on the surface of the water.

Fact and Fancy in Berlin

In last month's *Coastal Command Review* we published an article from the *Pariser Zeitung* claiming that a fantastic number of ships had been sunk by U-Boats. It was interesting to compare the enemy's imagined results with the truth, and find out that they had multiplied the figures by ten. This seems to have become a rule with them for again this month, in an article in the *Deutsche Allgemeine Zeitung*, the enemy claim to have sunk seven ships totalling 54,000 tons in the Mediterranean on October 21. The entire sinkings for all the month of October in the Mediterranean were one-tenth of this. One ship of 5,500 tons was lost and this not on date mentioned.

The article in the *Deutsche Allgemeine Zeitung* for October 22 claimed that the seven ships were carrying supplies and reinforcements for the southern Italian front. It was said that an eighth steamer was torpedoed and, although her sinking was not observed, that she also was possibly sunk. The article continues: "It is well known that the Mediterranean, where for two years past German U-Boats have carried on a successful and active campaign against a very strong enemy, is a particularly difficult operational area for our brave U-Boat commanders and their well-trying crews. The relatively limited sea area and the nearness of enemy bases, particularly air bases, forces the boats into almost continuous contact with the enemy. The highest degree of watchfulness is necessary in order not to offer any target to the fairly close-meshed aerial reconnaissance of the enemy, which tries with all technical means to find out the position of the U-Boats, day and night."

The article goes on: "Every U-Boat C.O. tries to remain as long as possible in his operation area without being discovered, and in some cases this is half the reason for success. This makes it necessary for the U-Boats operating in the Mediterranean to proceed mostly submerged during their long patrols. What this means physically and spiritually for the U-Boat man has often been described and may assumed to be well known. The heat in the boat and the lack

of fresh air tell on the men, who do not see the sun for weeks, particularly as the increased necessity of being ready at any moment to dive rarely allows any of the men apart from the bridge watch to go aloft for a breather.

"Unlike the U-Boats in the Atlantic, those in the Mediterranean often stay close inshore in order to meet the enemy. Even to-day, when the situation in the Mediterranean has altered so much in his favour, the enemy prefers this coastal route for particularly valuable transports. For the same reason the battle has become increasingly difficult for our U-Boats. Because of this increased difficulty the sinkings are all the more creditable, particularly those scored recently.

"When we compare the difficulties that our U-Boats have had to overcome since the beginning of the war with those that they meet to-day, it can be said that every ton sunk equals perhaps four times as much as formerly. The 54,000 G.R.T. announced to-day as sunk, are therefore a success which proves that our U-Boats are still able to fire and to hit. This was already proved by the high losses of enemy destroyers in the recent convoy battle in the North Atlantic. It will continue to be so in the future."

This statement can hardly be comforting to a people whose main hopes for victory are based on the U-Boat war, for the writer is saying in effect that to sink ships now is four times as difficult as it used to be. This presumably means that Allied anti U-Boat measures are four times as effective. Unintentional bouquets from Berlin are always appreciated.

The whole tone of this curious article is defensive. The writer is evidently answering imaginary (or actual) hecklers who seem to be asking, "Why are so few ships sunk?" To answer this question the writer has to multiply actual sinkings by 10 and to make excuses even for this figure. Things must be pretty bad when a German newspaper is glad to be able to quote something which "proves" that our U-Boats are still able to fire and to hit."

Radar

When a radio signal is transmitted it travels at a speed of about 186,000 miles per second. The direction in which it travels is governed by the design of the aerials.

Whenever a radio signal meets an obstruction

it is reflected to an extent governed by the size and nature of the obstacle. As a rule some of the reflected signal will be reflected back in the direction of the source from which the original came. See Fig. 1.

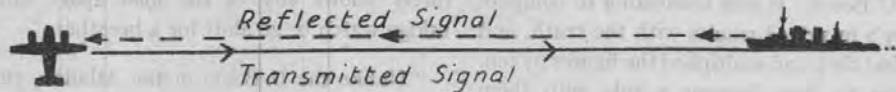


Fig. 1

It is fairly obvious, therefore, that as we know the speed of travel, we have only to measure the interval between the sending out of a signal and the reception of the reflected signal, multiply these together and divide by two to find the distance of the obstacle which causes the reflection. The division by two is necessary because the time which we have measured gives distance for the return journey, whereas we are only interested in distance away of the object.

To take an example: if we find that the time is .001 second then the distance of the object is .001 by $186,000 \div 2 = 93$ miles.

The practical difficulty now arises of measuring such small periods of time as .001 seconds or less.

This is where the Cathode Ray Tube comes to our aid.

It will be remembered that in our article on the Cathode Ray Tube in the *Coastal Command Review*, Vol. II, No. 5, for September, we explained how the beam could be moved up and down or from side to side by varying the voltages on the "X" and "Y" plates. Let us arrange for the beam to move from the bottom of the tube to the top by varying the voltage on the "Y" plates in the same time that it takes a signal to travel 200 miles, i.e., to a target 100 miles away and back again. If we arrange for the beam and the signal to start off simultaneously and apply the return signal to the "X" plates so that it moves the beam sideways, then we have a direct measure of the distance of the target. See Fig. 2.

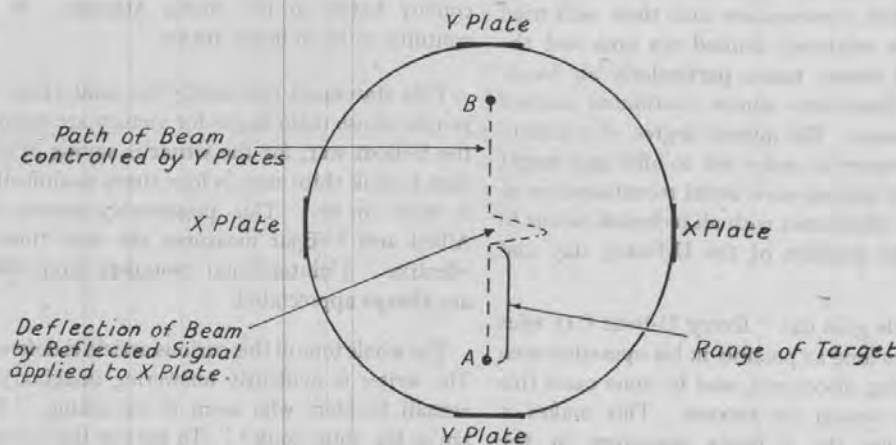


Fig. 2

Assuming that we wish the distance from "A" to "B" to represent distances of targets up to 100 miles, then the beam must move from "A" to "B" in a time which is equal to:—

$$\begin{aligned} \text{Distance} & \dots 100 \text{ miles.} \\ \text{Divided by speed} & \dots 186,000 \text{ miles per second.} \\ \text{Multiplied by 2 to allow for go and return,} & \\ \text{i.e., } \frac{100 \times 2}{186,000} & = .00107 \text{ sec.} \end{aligned}$$

At such a speed the spot of light on the fluorescent screen which indicates the movement of the beam would be invisible. But if it is repeated at say 500 times per second, then it becomes visible as a

continuous line of light. This frequency of repetition of the signal (pulse) and movement of the beam is called, oddly enough, the Pulse Repetition Frequency (P.R.F.).

It will be fairly obvious from the foregoing that the signals we are sending out must be of very short duration if they are not to swamp the reception of their reflections (incidentally a reflected signal is called an echo). If we wish to get an echo from a short distance, say 2 or 3 miles, the signal must be incredibly short, in Mark II, A.S.V. it is 2.5 millionths of a second.

So far we have a device for measuring the distance or range of an object; we also need a means of ascertaining its direction.

The direction from which the echo can be received is dependent on the aerial system. Therefore, if we arrange to receive the signal alternately first on one side of the aircraft and then on the other, we get a very crude indication

of direction, i.e., we can tell whether the target is to port or starboard. We can improve on this by arranging the aerals so that there is one direction in which a signal can be received by both aerals simultaneously. See Fig. 3.

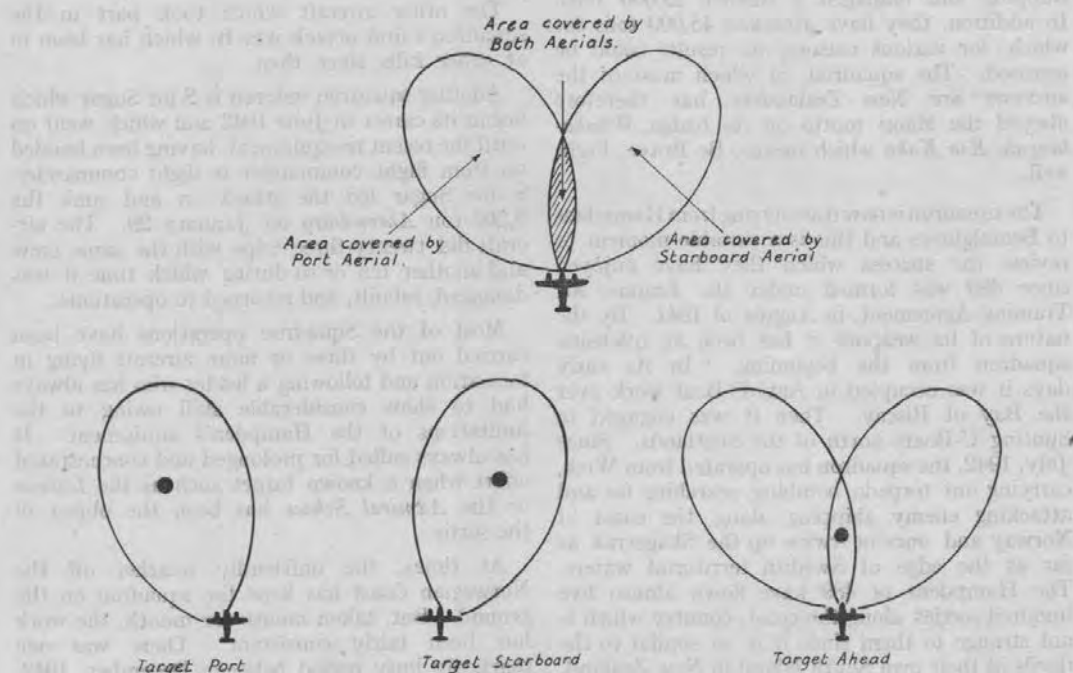


Fig. 3

To ascertain the direction of the target the aircraft is turned until the echo is received equally well on either aerial. The most suitable direction is straight ahead as then the act of manoeuvring the aircraft to maintain equal echoes on both aerals automatically heads the aircraft in the direction of the target.

We have said that direction is determined by comparison of the echoes received on our two

aerial systems. In order to enable this comparison to be made it is necessary to switch the receiver alternately from one aerial to the other. This could be done by hand, but in practice it is arranged to be done automatically at high speed. The comparison is made easy by arranging that an echo received on the port side is shown by deflecting the Cathode Ray Beam to the left of the centre line of the Cathode Ray Tube and vice versa. See Fig. 4.



Fig. 4

Have you seen the Mark II, A.S.V. film is available at all Groups and Stations? It shows

the principle of operation of A.S.V. much more effectively than can be done on paper.

New Zealanders Sink Enemy Shipping

Since 489 Squadron, R.N.Z.A.F. were posted to Wick, they have sunk 32,000 tons of enemy shipping and damaged a further 25,000 tons. In addition, they have attacked 45,000 tons for which, for various reasons, no results could be assessed. The squadron, of which most of the aircrews are New Zealanders, has therefore obeyed the Maori motto on its badge, *Whakatangata Kia Kaha* which means, Be Brave, Fight well.

The squadron is now transferring from Hampdens to Beaufighters and this is a suitable moment to review the success which they have enjoyed since 489 was formed under the Empire Air Training Agreement, in August of 1941. By the nature of its weapons it has been an offensive squadron from the beginning. In its early days it was occupied in Anti U-Boat work over the Bay of Biscay. Then it was engaged in hunting U-Boats north of the Shetlands. Since July, 1942, the squadron has operated from Wick, carrying out torpedo bombing, searching for and attacking enemy shipping along the coast of Norway and once or twice up the Skagerrak as far as the edge of Swedish territorial waters. The Hampdens of 489 have flown almost five hundred sorties along the coast, country which is not strange to them since it is so similar to the fjords of their own South Island in New Zealand.

The aircraft have flown by day and by night. Whenever there has been enough cloud cover (and often when there hasn't) to give the slow paced Hampdens a chance against the fighters, they have gone in to attack. And it may be said that the squadron has played a big part in forcing the enemy to keep those fighters in Norway. The enemy ships usually hug the coast and they are well protected by flak from the shore as well as by their own seaborne defences, so the fight has not been easy. The 36,000 tons sunk and the 29,000 tons damaged have included tankers, ore ships, transports and coasters.

Some of the Hampdens, now being accorded an honourable retirement, have been on operations for as long as the Squadron has been in action. A for Apple, with its villainous crest of a gentlemanly Hampden rampant, has flown on twenty-six sorties. It was in at the kill of the 5,000-ton *Karpfanger*, in September of 1942, the squadron's first success. G for George is an even greater veteran. In its early days, June 13, 1942, this aircraft met two F.W.190s over the Bay of Biscay, in a combat which resulted in one of the enemy being damaged and last seen with smoke pouring from the engine.

G for George also saw the end of the *Karpfanger*.

G for George lived to fly another thirty sorties after its combat in the Bay.

The other aircraft which took part in the squadron's first attack was B, which has been in at other kills since then.

Another squadron veteran is S for Sugar which began its career in June 1942 and which went on until the recent re-equipment, having been handed on from flight commander to flight commander. S for Sugar led the attack on and sunk the 3,200 ton *Ahrensburg* on January 29. The aircraft did twenty-three trips with the same crew and another ten or so during which time it was damaged, rebuilt, and returned to operations.

Most of the Squadron operations have been carried out by three or more aircraft flying in formation and following a leader who has always had to show considerable skill owing to the limitations of the Hampden's equipment. It has always called for prolonged and concentrated effort when a known target such as the *Ludlow* or the *Admiral Scheer* has been the object of the sortie.

At times, the unfriendly weather off the Norwegian Coast has kept the squadron on the ground. But, taken month for month, the work has been fairly consistent. There was one markedly busy period between December, 1942, and May, 1943. There were six attacks during December and again in April, when the same number of attacks were made. During this latter month, the squadron flew eighty-four sorties and during the six months 25,000 tons of enemy shipping were sunk.

The crews have not always been able to see the result of their attacks. But some of them have been dramatic and their results have been proved with excellent photographs. Sometimes, however, the crews have had to wait for confirmation from other sources to confirm their results. The *Coastal Command Review* for August, 1943, recorded the death of the *Sabine Howaldt* or a sister ship, of 5,956 tons, which was destroyed off the Norwegian Coast on August 8. This success was proved by a P.R.U. photograph. Sometimes the light during an attack is not enough for good photography and then the crews must rely on photographic reconnaissance, for Intelligence and the Assessment Committee to confirm their kills.

These kills form an excellent record for the time the Squadron has been operating off the coast of Norway and now that they are to return to the battle with Beaufighters, they will no doubt mark up even greater successes against the enemy.