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**HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE**

COASTAL COMMAND REVIEW

Vol. III, No. 7—July 1944

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

Summary of the Month's Work—July 1944

The Anti U-Boat Effort. In July the U-Boat situation crystallized into two definite and very different forms. In the south-west the U-Boats trying to get up Channel met such vigorous opposition in June that they have now been forced to adopt maximum diving tactics. On the other hand the equally vigorous offensive in the far north has been conducted against U-Boats which still believe they can deal with the attacking aircraft on the surface.

2. Any U-Boat intending to operate in the Channel now has to be fitted with a schnörkel if she is to have any hope of getting through the air patrols. As a result of this, 19 Group aircraft have had very few chances of attacking surfaced U-Boats. Disappearing and scarcely seen objects, ranging from possible wakes to doubtful periscopes with or without oil slicks, have been plentiful enough, but these are most unsatisfactory targets. Moreover, the craft of listening by sono buoy is still in its infancy and has inevitably produced some misleading results, particularly when the initial sighting is itself doubtful.

3. In spite of these handicaps 19 Group aircraft have sunk two of the very few U-Boats which were rash enough to be caught on or near the surface. In addition they have sighted 22 conning towers, periscopes or schnörkel pipes, of which they attacked 16. Hardly any of these attacks produced after evidence, and the most that can be said is that three of them look promising.

4. In the north, where we have continued to fight the old type of battle against U-Boats which defend themselves with flak, we have not only hunted the enemy close to the Norwegian coast, but we have struck out into Arctic waters. Between July 17th and 23rd, aircraft working under 18 Group conducted a remarkable offensive at a range of between 600 and 850 miles from their bases. During the month our aircraft in this area have made 31 sightings, which resulted in 23 attacks. Practically all the U-Boats fought back fiercely and caused losses, casualties and much damage. The aircrews have displayed great skill and determination both in their attacks and in bringing damaged aircraft back to base. On their side the Germans have lost four or five U-Boats destroyed and a like number damaged. Moreover, the ships' companies have suffered many casualties on the bridge and at the guns.

5. In addition to the work of 18 and 19 Groups there has been an attack in the North-Western Approaches by 15 Group and another, which looks promising, by a Fortress based in the Azores. This latter was probably very welcome to our forces in the area, for there have been very few targets in the Atlantic for a long time past.

6. The following figures of actual and provisional assessments give a picture of what has been achieved by Coastal Command against the U-Boats since D-day. In the Bay and Channel areas, 10 U-Boats have been sunk or probably sunk, and 10 damaged. In the northern area 11 have been sunk or probably sunk and 10 damaged.

7. In August it is likely that the enemy will continue to operate U-Boats in the Channel from the Bay ports as long as the military situation permits. The tactics of these boats will be to remain dived practically continuously. In the north it is probable that Doenitz will try to keep his U-Boats as far as possible outside air range, and will instruct any U-Boats which must pass inside that range to dive as much as possible. The schnörkel is likely to be used on all U-Boats as soon as supply and fitting difficulties are overcome. In the near future the lengthening nights may encourage the enemy to open another offensive against shipping in the Atlantic. He will operate from the Bay ports as long as he can, but will eventually be compelled to use the Norwegian ports alone.

8. Anti-Shipping. The offensive against enemy shipping grows in intensity every month. In July, the number of aircraft sent on anti-shipping duties was slightly lower than in June, but the number of aircraft attacking was a record. Out of 1,897 aircraft despatched, well over 500 delivered attacks. Of these aircraft, 268 attacked off the Dutch and Belgian coasts, 167 in the Channel area, 84 in the Bay, and 32 off the coast of Norway. It must be disconcerting for the German sailor to find that in the same month he is liable to be got at practically anywhere on the coast of western Europe.

9. Our claims for July are the highest for any single month. Three merchant ships, six escort vessels and two E- or R-Boats are claimed as sunk; six merchant ships and 12 escorts are claimed as seriously damaged; and 10 merchant ships, 34 escorts and seven E- or R-Boats as damaged. Thus in one month 11 ships are believed to have been sunk and 69 more have been damaged.

10. A feature of the month has been an increase in the number of Wing strikes, of which there were seven—one off Norway and six in Dutch waters. All the Beaufighter squadrons have reverted to this form of attack except No. 143 Squadron, which has continued to deal with E-Boats and other small naval craft in the Channel area. Two of these Wing attacks were particularly successful. On July 15th, 34 Beaufighters attacked a convoy off the Naze, with the result that one 3,000-ton tanker was left in flames from stem to stern, one merchantman was hit by a torpedo, another was seriously damaged and a third was left burning satisfactorily. Four of the escorts were also on fire. On the 21st a force of 29 Beaufighters caused an even bigger blaze south of Heligoland. Their score was one merchant ship of 4,000–5,000 tons hit by torpedoes, set on fire and left sinking, a merchantman of 3,000 tons set on fire, and another of 1,500 tons also on fire. The picture was completed by no less than eight burning escort vessels, all of which were seriously damaged by R.P. and cannon fire.

11. These and other successful Wing attacks have fully proved the value of increasing the number of anti-flak aircraft in strike forces. This has been the tendency during July, with the result that the enemy's flak has been swamped with fire and has caused very few losses to our Beaufighters.

I.—ANTI U-BOAT

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

Duty and Base or Area.	Total Sorties.	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per Sighting.		Number 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 ..	24	189	98	—	—	—	—	—	—	—	—	—
Iceland ..	4	51	30	—	—	—	—	—	—	—	—	—
Gibraltar and Moroccan Sea Frontier ..	87	878	484	—	—	—	—	—	—	—	—	—
Azores ..	13	140	61	—	—	—	—	—	—	—	—	—
<i>Channel Convoy Screen</i>												
United Kingdom ..	284	779	586	—	—	—	—	—	—	—	—	—
TOTAL CONVOY EFFORT	412	2,037	1,259	—	—	—	—	—	—	—	—	—
<i>A/U Patrols</i>												
<i>Northern Transit (including North Sea)</i>												
United Kingdom ..	512	6,107	2,579	28	2	22	1	203	86	30	24	20
Iceland ..	25	197	117	1	—	—	—	197	117	1	—	—
<i>Northern Convoy</i>												
United Kingdom ..	106	1,304	665	1	—	1	—	1,304	665	1	1	—
Iceland ..	10	69	58	—	—	—	—	—	—	—	—	—
Azores ..	16	181	100	—	—	—	—	—	—	—	—	—
<i>Bay of Biscay (excluding Channel and Approaches)</i>												
United Kingdom ..	533	4,974	2,958	4	7	2	6	452	269	13	10	8
<i>Channel and Approaches</i>												
United Kingdom ..	1,897	15,185	12,019	14	2	11	1	949	751	16	12	—
<i>Central Convoy</i>												
Gibraltar and Moroccan Sea Frontier ..	284	2,444	1,323	—	—	—	—	—	—	—	—	—
Azores ..	69	854	391	—	1	—	1	854	391	1	1	1
TOTAL A/U PATROLS	3,452	31,315	20,210	48	12	36	9	522	337	62	48	29
ADD CONVOY EFFORT	412	2,037	1,259	—	—	—	—	—	—	—	—	—
TOTAL A/U EFFORT	3,864	33,352	21,469	48	12	36	9	556	358	62	48	29

Notes.—(1) In addition to the above there were 4 chance sightings by Transit Aircraft.

(2) The figures for sightings and attacks are subject to revision when assessments by the Admiralty have been completed.

Assessments

(Received up to August 14)

Month.	Known Sunk.	Probably Sunk.	Damaged A.	Damaged B.	Slight Damage.	In-sufficient Evidence of Damage.	No Damage.	In-sufficient Evidence of U-Boat.	Target not Submarine.	Un-assessed.
May	3	4	2	1	2	5	6	—	—	3
June	9*	7*	—	5	8	16	17	4	4	2
July	1	1	—	—	2	3	4	3	—	31

Note.—* In June one of the attacks assessed as known sunk and one assessed as probably sunk are shared with surface craft.

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

Particulars of Incidents.	U-Boats.		Sorties when Aircraft	
	Sighted.	Attacked.	Sighted.	Attacked.
On 53 occasions 1 U-Boat was sighted by 1 aircraft—41 aircraft attacked.	53	41	53	41
On 2 occasions 1 U-Boat was sighted by 2 aircraft—2 aircraft attacked 1 U-Boat.	2	1	4	2
On 1 occasion 1 U-Boat was sighted by 3 aircraft—all aircraft attacked.	1	1	3	3
On 2 occasions 2 U-Boats were sighted by 1 aircraft—each aircraft attacked 1 U-Boat.	4	2	2	2
TOTALS	60	45	62	48

Squadron Results—July

			Sorties when U-Boat Sighted.	Sorties when U-Boat Attacked.
848 (F.A.A.)	Avenger	Thorney Island	.. 4	4
855 (F.A.A.)	Avenger	Hawkinge ..	.. 1	1
210	Catalina	Sullom Voe ..	.. 3	3
58	Halifax	St. Davids ..	.. 3	3
502	Halifax	St. Davids ..	.. 4	4
220	Fortress	Lagens ..	.. 1	1
53	Liberator L.L.	St. Eval ..	.. 1	1
59	Liberator	Tain ..	.. 2	2
86	Liberator	{ Tain ..	.. 10	8
		{ Reykjavik ..	.. 1	—
105 U.S.N.	Liberator	Dunkeswell ..	.. 2	1
120	Liberator L.L.	Tain ..	.. 3	3
		{ Leuchars ..	.. 3	1
206	Liberator	{ Tain ..	.. 1	1
		{ St. Eval ..	.. 1	1
248	Mosquito	Portreath ..	.. 2	—
333 (Norwegian)	Mosquito	Sumburgh ..	.. 5	5
10 (R.A.A.F.)	Sunderland	Mount Batten ..	.. 3	2
201	Sunderland	Pembroke Dock ..	.. 2	1
228	Sunderland	Pembroke Dock ..	.. 1	—
330 (Norwegian)	Sunderland	Sullom Voe ..	.. 3	1
423 (R.C.A.F.)	Sunderland	Castle Archdale ..	.. 1	1
172	Wellington L.L.	Chivenor ..	.. 1	1
179	Wellington L.L.	Predannack ..	.. 1	1
		{ Predannack ..	.. 1	1
304 (Polish)	Wellington L.L.	{ Chivenor ..	.. 1	1
407 (R.C.A.F.)	Wellington L.L.	{ Chivenor ..	.. 1	—
			62	48

Recent Attacks on U-Boats

On June 20 **Liberator K/86** was patrolling in northern waters when a wake and then a U-Boat were sighted six miles away on the port bow in position $61^{\circ} 08' \text{ N.}, 02^{\circ} 55' \text{ E.}$ The U-Boat was steering 320° at 15 knots. The Liberator captain held his course, climbed into cloud at 2,000 feet and then turned to port. Two minutes later he broke cloud, checked the position of the target and re-entered cloud. He then throttled back and again broke cloud in a left-hand turn. This manoeuvre put him a mile and a half astern of the U-Boat at 1,500 feet and he planned to attack along the enemy's track. At that time the U-Boat was turning to port and as soon as the aircraft was committed to the attack the enemy turned hard to starboard. The Liberator attempted to follow at the last moment and attacked from Red 20° , releasing from 50 feet six depth charges spaced at 60 feet. It is stated that the depth charges overshot, the nearest explosion being 30 to 40 yards away from the U-Boat's port bow. During the run-in the U-Boat opened fire and damaged the aircraft, which took no evasive action but replied with the front gun. After the attack the Liberator climbed to 1,500 feet and circled over the position while the U-Boat continued turning hard to port. When he was in a favourable position to attack up the U-Boat's track the Liberator captain began his run, but as the U-Boat took evasive action in the same way as before, he did not drop his depth charges. During this run the navigator saw at least three Germans lying flat in the conning tower. The U-Boat continued to turn to port and the Liberator climbed to 1,000 feet in order to make another attack. This time the aircraft took evasive action by undulating,

while the U-Boat was content to continue her turn. The Liberator attacked over the enemy's port bow and from 50 feet released two depth charges spaced at 100 feet. The depth charges seemed to straddle and the plume of the second explosion covered the target from conning tower to stern. The U-Boat continued to turn and then settled in the water until only the conning tower was visible. She then made an attempt to straighten but her course seemed to be uncontrolled. About 10 minutes after the attack the U-Boat was fully surfaced but was still performing erratically and streaming oil. She continued in this condition until she submerged about an hour after the last attack. During this period the aircraft was circling about two miles away, and keeping the enemy under observation with binoculars. None of the German crew was visible on deck. Just before she submerged the U-Boat steadied on course and dived normally, leaving a widened oil slick which did not continue beyond the point where she had submerged.

Comments

The tactics on the approach and the use of cloud cover were very good. The captain showed great determination in making his runs against intensive flak and cool judgment in not dropping his depth charges on the second run. He finally brought off a very good attack with his last two depth charges. He also displayed very fine airmanship in landing his aircraft at base, for the port tyre was flat, the brakes and hydraulics were unserviceable, the port aileron was out of action and the windscreen damaged. In spite of all this no further damage was done in landing.

Attack on a Schnörkel

Shortly before 0500 hours on June 23 **Liberator C/224** was patrolling in the Channel area when the radar operator obtained a contact six miles ahead in position $49^{\circ} 24' \text{ N.}, 04^{\circ} 40' \text{ W.}$ The Liberator captain maintained his course until the contact disappeared at $5\frac{1}{2}$ miles on the port quarter. He then turned on to the reciprocal course and regained contact five miles on the port bow. He held his course until the contact was abaft the port beam, still at five miles range, and then turned to home. The contact was lost at $2\frac{1}{2}$ miles dead ahead but it was picked up again $1\frac{1}{2}$ miles on the starboard bow. The Liberator was not in a position to attack so the captain again turned through 180° to port and held his new course for about three miles. The contact was then on the port quarter. The Liberator turned once more through 180° and ran in with the contact four miles dead ahead. The aircraft was attacking out of darkness towards the dawn and after losing and regaining contact the navigator and the first pilot sighted a schnörkel a mile away fine on the starboard bow. The enemy was steering 100° at between three and four knots. The aircraft turned towards the target and from 190 feet released six depth charges spaced at 55 feet while the schnörkel

was about six feet out of the water. The Mark III bombsight was used and the Liberator tracked over the U-Boat just ahead of the schnörkel. One of the aircraft's crew, looking through the open bomb doors, saw two of the depth charges falling on either side of the U-Boat's track just ahead of the schnörkel. The rear gunner saw the explosions and states that the schnörkel moved right into the middle of the plumes and disappeared from view. About five minutes after the attack the Liberator crew saw one big patch of oil and several smaller ones beginning to form about 300 yards south of the marker. When the aircraft left the position about an hour later the oil patch was more than 100 yards in diameter. Before the Liberator set course for base a Wellington arrived and six surface vessels were approaching from the east.

Comments

A very persistent hunt for an elusive target ending in what appears to have been an accurate attack. The big oil patch formed afterwards looks promising. The radar operator is to be congratulated on consistently regaining contact with the schnörkel.



PLATE 1

This remarkably fine close-up of a 500-ton U-Boat was taken during an attack by Liberator R/86 in northern waters.

It will be seen that the U-Boat has not been fitted with a schörkel.

Below.—It is probable that this U-Boat was damaged when she was caught and attacked by Mosquito K/333 close to the coast of Norway, which can be seen in the background.





PLATE 2

On July 8 a 740-ton U-Boat was sunk by H/10 (R.A.A.F.) in position $47^{\circ} 06' N.$, $06^{\circ} 40' W.$ K/10 and T/105 (U.S.N.) also took part in the action. The upper picture was taken by H/10 during the attack and the lower, which shows the German survivors in the water, was taken by T/105.



Victoria Cross

On June 24 **Canso P/162** (R.C.A.F.) on anti U-Boat patrol in northern waters sighted a U-Boat five miles on the port bow in position 63° 00' N., 00° 50' W. She was steering 040° at about 16 knots, leaving a very pronounced wake. At a range of three-quarters of a mile the enemy opened fire and as the aircraft closed the shooting became very accurate. At 800 yards the aircraft was hit in the wings and at 500 yards the starboard engine began pouring oil. Immediately afterwards fire broke out on the trailing edge of the starboard wing and on the de-icer boots. The captain opened up to full boost but the aircraft vibrated badly and 300 yards from the target the starboard propeller had to be feathered. The captain had great difficulty in controlling his aircraft but pressed home his attack and from 50 feet released four depth charges spaced at 100 feet. The depth charges straddled, two on either side, and No. 2 was seen to explode between the enemy's conning tower and bow. After the attack the pilots were able to gain some height but the fire on the starboard side was still burning and

eventually the starboard engine fell right out of the wing. As it was impossible to remain airborne the captain decided to ditch. This was done so successfully that no member of the crew was injured. The aircraft sank 20 minutes later leaving a huge column of black smoke.

The account of the rescue of this crew appeared in the *Coastal Command Review*, Volume III, No. 6, June, 1944.

On June 25 **Catalina D/333** (Norwegian) sighted a big patch of oil on the scene of P's attack and on closer investigation the Catalina crew identified about forty bodies dead and alive floating amid the oil. These were the survivors of the U-Boat which P had attacked. D/333 had already sighted the survivors of P/162 and played an important part in their rescue.

Comments

For his very gallant conduct during the action and afterwards in the dinghy the captain of this aircraft was awarded the Victoria Cross. He died soon after he was taken aboard the rescue craft.

A Kill on the Second Run

On June 26 **Liberator N/86** was on anti U-Boat patrol at about 500 feet when a U-Boat was sighted five miles on the starboard bow in position 62° 03' N., 01° 45' E. The sighting was confirmed by binoculars and it was seen that the U-Boat was a 517-tonner, greyish-black in colour, with about six guns in or aft of the conning tower. No schnörkel was visible but the Liberator crew believed that there was a G.S.R. aerial on the starboard side of the conning tower. The aircraft immediately altered course to starboard and approached the target in cloud. At two miles range the captain broke cloud and dived steeply to attack, taking evasive action by undulating. The U-Boat opened fire at once and began to turn hard to port. At 900 yards the navigator opened fire with his front gun and hit the enemy in and around the conning tower. The Liberator attacked over the enemy's starboard bow and from 50 feet released five depth charges spaced at 55 feet. The depth charges undershot, the nearest being No. 5 which entered the water 10 yards astern of the U-Boat and exploded 17 yards dead astern. As the aircraft tracked over the U-Boat black puffs appeared all round. Two minutes after the attack the U-Boat seemed slightly down by the stern, and the aircraft manoeuvred to deliver a second attack over the bow. The U-Boat, however,

kept her stern on to the aircraft, and the Liberator captain decided to attack from dead astern. Four minutes after the first attack he went in again and released three depth charges from 50 feet with the same settings as before. On the run-in he met intense flak and No. 3 engine was hit. The front gunner replied to the enemy's fire at 800 yards so effectively that the U-Boat's flak ceased at 300 yards. As the aircraft approached some of the German crew could be seen coming out of the conning tower. The depth charges were seen to enter the water close alongside the hull on the starboard beam, and when they exploded a big piece of metal from the conning tower was blown 50 feet into the air. The U-Boat heeled right over to port and had completely disappeared from view when the plumes subsided. A minute and a half later, when the aircraft returned to the spot, the crew saw a big patch of oil with 15 survivors in the middle.

Comments

A very determined second run in the face of intense flak which was eventually smothered by the fine shooting of the front gunner. An excellent set of photographs confirms that all the depth charges fell close alongside the U-Boat after a perfect attack up track.

A Model Action

On June 30 **Liberator E/86** was on anti U-Boat patrol in northern waters when the wireless operator intercepted a sighting report from **Canso A/162** (R.C.A.F.). The two aircraft established R/T contact and the Canso began to home the Liberator. Some time later, in position 63° 27' N., 00° 50' W., the Liberator sighted a surfaced

U-Boat eight miles away almost dead ahead. The vessel was a 500-tonner, painted dark green, and she carried no guns forward of the conning tower. The Liberator captain immediately dived to attack and took evasive action by undulating. The U-Boat's gunners opened fire and at 700 yards range the nose gunner of the Liberator replied.

The aircraft attacked from abaft the U-Boat's port beam and from 150 feet released six depth charges spaced at 50 to 60 feet. The Mark III bombsight was used. The depth charges are stated to have straddled the U-Boat slightly ahead of the conning tower, three falling to port and three to starboard. The explosions were seen on either side of the target. During the run-in the Liberator's starboard outer engine was hit and put out of action. After the attack the aircraft held its course and then circled to port. The crew were able to see the U-Boat's bow rise right out of the water while clouds of steam poured from the conning tower as it disappeared under the surface. A minute and a half after the explosion of the depth charges the

bows were vertical. As the Liberator began a second run the U-Boat's crew began to abandon ship. Just before the Liberator passed over the target the U-Boat sank leaving a big patch of oil and about 30 survivors in dinghies.

Comments

This action showed excellent co-operation between the two aircraft, and perfect handling of the W/T, R/T and homing procedure. The crew are to be congratulated on a model attack in which their coolness under fire, their crew drill and their determination to collect evidence in spite of damage to the aircraft, brought them a well-deserved kill.

The End of "U 243": Both Sides of the Story

On July 8 **Sunderland H/10** (R.A.A.F.) was flying at 1,500 feet in good weather when a U-Boat was sighted six miles away on the starboard bow in position 47° 06' N., 06° 40' W. She was steering due west at 15 knots. Later in the action one of the Sunderland gunners saw something on the U-Boat's bow which he believed was either a swastika or the letter "K." The aircraft immediately went in to attack taking evasive action. The enemy opened fire but the shells fell short. At 2,000 yards the Sunderland opened fire with the fixed guns and at 1,200 yards with the nose turret. The U-Boat continued to fire until the aircraft was within 200 yards and then ceased. The Sunderland attacked from the enemy's port quarter and from 50 feet released six depth charges spaced at 60 feet. No. 5 depth charge was believed to have fallen about 20 feet short of the target and No. 6 (which did not straddle) may have hit the port side of the hull about 20 feet abaft the conning tower. The enemy's stern lifted slightly and the U-Boat immediately lost all way. Her stern was well down and did not appear again. After the attack the enemy's gunners opened up again but their fire was less intense, though it continued spasmodically until the **Sunderland K/10** delivered its attack. "H" circled out of range and the U-Boat was seen to be listing to port. White smoke was coming from the conning tower and about ten men climbed out. Ten minutes later **Liberator T/105** (U.S.N.) attacked with guns only, though the bomb doors were open. While the Liberator was circling the U-Boat's crew launched two big yellow dinghies and climbed into them. The Liberator made a second attack with guns but again dropped no bombs. The enemy's deck and the water around were by then covered with small yellow dinghies. Sunderland K/10 then arrived and dropped six depth charges which fell just forward of the enemy's bows. Four minutes later the Liberator dropped eight depth charges along the starboard side of the U-Boat and immediately afterwards the U-Boat sank leaving about 40 survivors in dinghies. "H" then dropped a dinghy, a Bircham barrel and a food pack.

Comments

The crew of H/10 are to be congratulated on a determined and completely successful action. T/105 showed great determination to attack in spite of difficulties with the bombing gear and in face of fierce fire which repeatedly hit the aircraft on its

three runs. K/10's depth charges missed, but the aircraft's gunnery did great execution among the enemy and is said to have killed the commanding officer.

The survivors from this U-Boat (she was **U 243**) have given the following account of the action.

'We were a reasonably happy ship. We had faith in our guns' crews too, because in the early hours of June 11 an aircraft which came too close was shot down. Unfortunately the survivors spoke German and it turned out to be a Ju. 88.

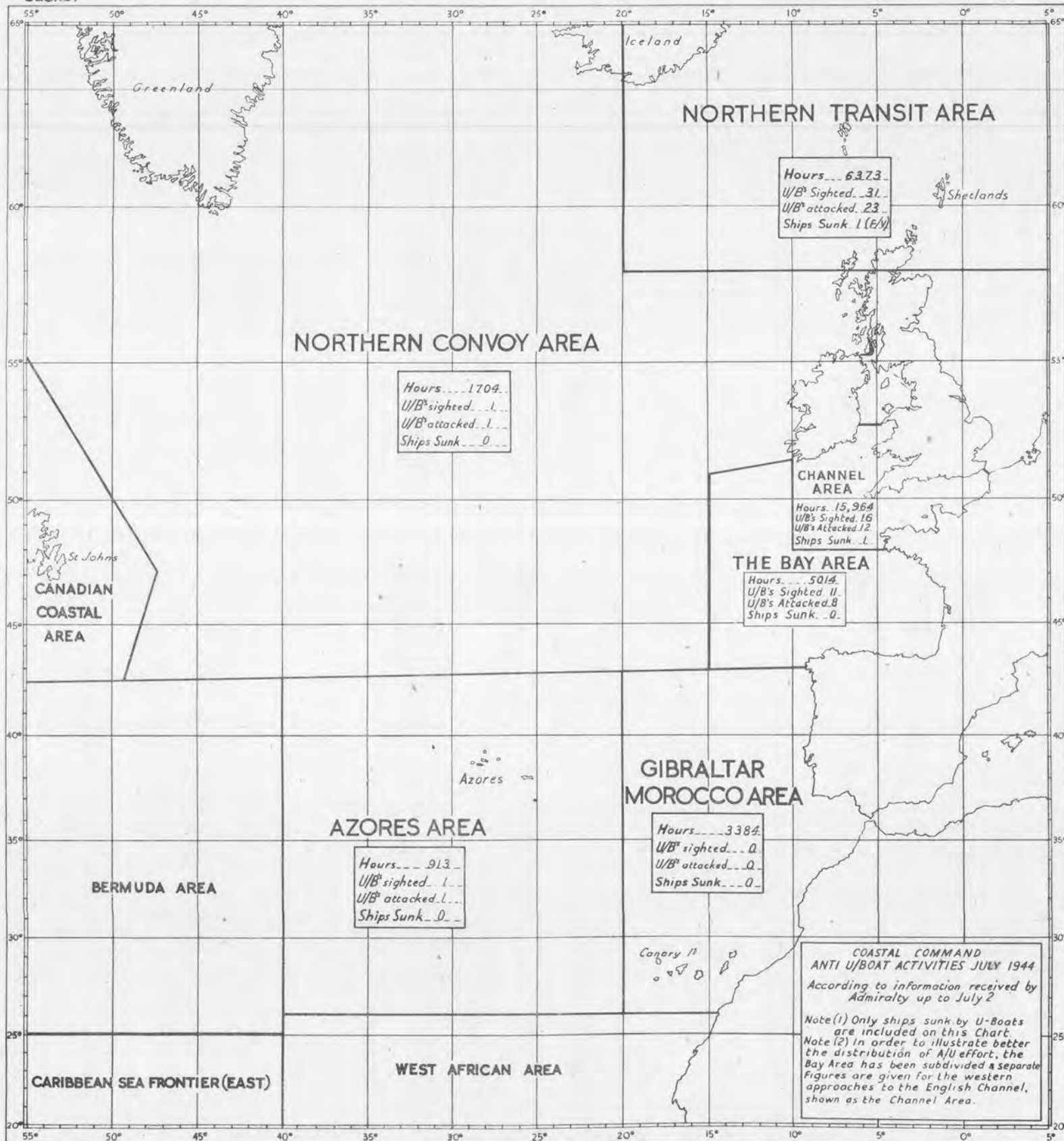
We were making for Brest when at about 1420 hours on July 8 we came to the surface to fix our position. Immediately we surfaced we sighted two Sunderlands. The commanding officer decided to fight it out and we opened fire with the 37-mm. gun. One of the Sunderlands came in to attack from the starboard bow with cannon fire and dropped six depth charges. The last of these was a direct hit on the after part of the boat. As the aircraft flew off the rear gunner fired at us and put both the 37-mm. and the port twin 20-mm. guns out of action.

The second Sunderland ran in from the port beam straight over the bridge, circled round the bows and came in again from the port bow firing cannon. Everyone on the bridge, including the commanding officer, was killed, except one petty officer and the second lieutenant, who was wounded. Others told me that this Sunderland dropped depth charges but everything was in such confusion that nobody knew just where they exploded.

In the meantime the direct hit from the first aircraft had caused chaos below. The motors were on fire, the propeller shafts, propellers, hydroplanes and rudders were smashed, the diesels were torn from their mountings and everything in the engine rooms was badly knocked about. A diving tank was damaged and the W/T transformer put out of action. The galley hatch was also forced open. Moreover, we had used up all the flak ammunition and it was therefore decided to abandon ship. Two seven-man rubber boats were cleared for taking off the ship's company but one was hit before it could be used.

At this stage another four-engined aircraft, which we did not identify but which someone thought was a Liberator, made an attack with depth charges, evidently not realising that we

SECRET



were abandoning ship. The depth charges fell fairly close but did no further damage.

Meanwhile the boat was not making water, so the engineer officer and control room petty officer remained to flood her. They went down with her. The aircraft threw us dinghies and supplies and later two Mosquitos circled us until the arrival

of the rescuing ships some seven hours after we were sunk.

A good many of us blame the commanding officer for opening fire with the 37-mm. We think that had this not been done, the Sunderland would not have seen us. We had not used our radar or G.S.R. and we had no warning.'

Photographs Prove a Kill

On July 11 **Sunderland P/201** was on anti U-Boat patrol in good weather when the second pilot sighted a wake about 8½ miles away on the starboard bow. No initial radar contact was made and the set was switched off 30 seconds later. The aircraft dived towards the wake and the crew clearly identified the periscope and raised schnörkel of the U-Boat in position 46° 31' N., 05° 29' W. The enemy's course was 080° at three or four knots. This sighting was first made with the aid of binoculars. The U-Boat held her course until the aircraft was about three-quarters of a mile away and then she seemed to stop. The aircraft was at a height of 100 feet and the captain could then clearly see the protruding stern of the U-Boat, which was apparently beginning to dive. Twenty-five feet of her stern, the periscope and six feet of the raised schnörkel were clearly visible, the periscope being about a foot higher than the schnörkel. A blast of spray or water vapour seemed to shoot out of the top part of the stern. The Sunderland attacked from the enemy's port quarter and from 50 feet released five depth charges spaced at 60 feet while the schnörkel, periscope and disappearing stern of the target was still visible. The depth charges straddled, the first two falling to port and the other three to

starboard. Several members of the crew saw the explosion plumes and also saw the stern of the U-Boat lift momentarily out of the water. When the Sunderland returned to the scene of the attack the crew saw nothing but a few pieces of wood and whitish froth on the surface of the sea.

About four hours later another Sunderland (G/461) sighted at the scene of the attack a fresh bright red patch on the surface of the sea, about 50 yards in diameter. After another four hours the patch was still there and had increased in size.

Comments

This crew must have been keeping an exceptionally good look-out to spot the wake of a schnörkel at 8½ miles, even with binoculars. This attack confirms that U-Boats "at schnörkel depth" always have their periscopes up as well as the schnörkel. In this case the U-Boat evidently sighted the aircraft and began to dive. In doing so her stern broke surface and the aircraft delivered an excellent attack. The accuracy of the attack is confirmed by photographs which show that No. 2 depth charge was lethal. But for the photographs the attack would necessarily have been assessed as "insufficient evidence of damage." This is one of the few cases where a U-Boat has been sunk without leaving unmistakable evidence of her destruction.

An Attack by an Avenger of the Fleet Air Arm

On July 12 **Avenger Q/848** (Fleet Air Arm) was patrolling at 1,500 feet when a wake was sighted two miles away bearing Red 170°. The aircraft turned and dived towards the area and the wake was identified as a schnörkel proceeding due east at five knots. The position was 50° 12' N., 01° 10' W. The Avenger attacked from Green 90° to the enemy's course, releasing from 150 feet four depth charges spaced at 100 feet while the schnörkel was still visible. The depth charges were aimed 60 feet ahead of the U-Boat and it is considered that they may have straddled, though the splashes of entry and the explosions obscured

the schnörkel. A few minutes after the attack an oil patch began to form and after 15 minutes it was 40 feet wide and lay on the surface in black streaks. The crew of the Avenger also saw yellow and brown objects in and around the area. When strike aircraft arrived the Avenger set course for base.

Comments

A very good attack on a U-Boat sighted almost dead astern. The depth charges were correctly aimed and if they entered the water where the pilot intended, the attack should have been lethal.

An Attack from Cloud Cover

On the evening of July 17 **Liberator U/86** was flying at 400 feet on anti U-Boat patrol in northern waters. The visibility was 20 miles but otherwise the weather was not good. At 2048 hours the captain sighted a U-Boat 12 miles dead ahead in position 68° 36' N., 08° 33' E., steering 120° at 12 knots. The captain immediately climbed into cloud and maintained his course for about four miles. He then broke cloud to observe the target and when re-entering the cloud he saw a splash in the water ahead of the aircraft which he pre-

sumed was flak falling short. He stayed in cloud for a further four miles and when he again came out into the clear, black puffs appeared close to the aircraft. The captain quickly regained cloud cover, closed to within a mile and a half, broke cloud, and re-entered it until the range was down to 800 yards. He then dived steeply and took evasive action by undulating. At about 400 yards the front gunner began to reply to the enemy's fire. The U-Boat mounted a large calibre gun abaft the conning tower and twin Oerlikons on

the conning tower. She was probably a 500-tonner with one bandstand and was painted blue-grey. As the aircraft was running-in, the U-Boat began turning to port and the attack was delivered from line on the starboard bow. The Liberator dropped six depth charges spaced at 58 feet while the U-Boat was on the surface. The height of release was 185 feet. No one saw the points of entry of the depth charges but it is stated that the explosions straddled the target in line with the conning tower. The captain held his course for about 10 seconds and then turned sharply to port to see the results. The rear gunner saw the top of the conning tower disappearing with no forward movement in the centre of the subsiding plumes. A big circular black oil patch began forming with survivors and wreckage in the middle.

When the aircraft tracked over the scene the crew saw at least six survivors moving about in the water and also identified big yellow planks floating in the oil. The patch increased in size and when the aircraft left about an hour and a half later it had reached half a mile in diameter. The Liberator had been hit in the fuselage and the rear turret, and the loop aerial was half shot away, but the crew were not injured.

Comments

Excellent stalking, good use of cloud and a bold run-in against flak. Photographs confirm that the depth charges were accurate for line and that they brought up a great deal of oil. This together with the visual evidence of survivors and wreckage indicates that the U-Boat was probably destroyed.

The End of "U 715"

Survivors of "U 715" sunk by Canso T/162 (R.C.A.F.) on June 13 have given the following account of the action. The report of the sinking appeared in last month's "Coastal Command Review," Vol. III, No. 6, June, 1944.

'Our commanding officer had two complexes—one for radar decoy balloons, and the other that the 13th was a lucky day. We all think that the first one was largely responsible for our sinking, because we reckoned we had been followed for days. The second arose out of the commanding officer's experience in the Luftwaffe, when he was once shot down and subsequently rescued on the 13th of the month. However, this 13th was his last.

For several nights before we were sunk we had released radar decoy balloons and the commanding officer told us that we were being followed by aircraft. We all thought that the radar decoy balloons released at night were still floating by daylight and that they would indicate the approximate course of our boat to the aircraft.

We had been submerged for a considerable time when the commanding officer decided to come up to periscope and schnörkel depth. The engineer officer, however, brought us up to about six metres where we must have been sighted by an aircraft, which immediately attacked. The commanding officer had been told that the schnörkel was not up, but to his horror he saw that it was. At the same time he sighted the aircraft. He decided that the only thing to do was to hurry on to the bridge with the flak gunners and

man the guns. As the aircraft came in it opened fire on the boat and killed three of the gunners. Two depth charges exploded near our bow, causing a severe leak in the bow compartment and other leaks through the hydrophone lead glands. The torpedo hatch was forced open but one of us who was standing close by shut it again.

The boat, very bow heavy, plunged down to about 100 metres. Battery acid was spilled but fortunately no gas formed. We still had 150 kgs. of compressed air and managed to surface stern first. The commanding officer and the flak gunners were left swimming when the boat first submerged but got aboard again when she re-surfaced. The aircraft was circling around and we opened fire, scoring a hit on the aircraft's starboard engine with our 37-mm. It then plunged into the sea.

The leaks were considered to be so serious that the order was given to abandon ship. The commanding officer, who was generally unpopular, had by then completely lost control of himself and gave no orders whatsoever after the aircraft attack developed. The engineer officer virtually took control.

Everyone except the engineer officer and three others abandoned ship. The boat remained on the surface for five minutes and then sank. The commanding officer, first lieutenant and second lieutenant each had a one-man float and a life-saving jacket. They all gave up their life-saving gear and someone says he saw the commanding officer shoot himself. Another aircraft dropped floats and provisions, and aircraft stayed with us continually until we were picked up.'

II.—ANTI-SHIPING

SUMMARY OF ANTI-SHIPING OPERATIONS BY COASTAL COMMAND AIRCRAFT

JULY 1944

Weapon Carried. (1)	Number of Sorties.			Number of Aircraft to Attack.			Target.	
	On Reconnaissance. (2)	On Strike. (3)	Total. (4)	On Reconnaissance. (5)	On Strike. (6)	Total. (7)	M/V. (8)	Naval. (9)
DAY OPERATIONS								
Torpedo ..	159	—	159	52	—	52	46	6
R.P. ..	253	—	253	90	—	90	76	14
Bomb ..	356	9	365	19	7	26	12	14
Depth Charge ..	— (1)	—	— (1)	— (1)	—	— (1)	— (1)	—
Tsetse ..	7 (4)	—	7 (4)	2 (4)	—	2 (4)	2 (2)	— (2)
Cannon and M.G. only ..	373 (16)	25	398 (16)	107 (16)	21	128 (16)	108 (1)	20 (15)
TOTAL DAY ..	1,148 (21)	34	1,182 (21)	270 (21)	28	298 (21)	244 (4)	54 (17)
NIGHT OPERATIONS								
Torpedo ..	15	—	15	—	—	—	—	—
R.P. ..	31	—	31	—	—	—	—	—
Bomb ..	639 (8)	7	646 (8)	219 (8)	2	221 (8)	8	213 (8)
Depth Charge ..	— (3)	—	— (3)	— (3)	—	— (3)	—	— (3)
Cannon and M.G. only ..	23	—	23	—	—	—	—	—
TOTAL NIGHT ..	708 (11)	7	715 (13)	219 (11)	2	221 (11)	8	213 (11)
ALL OPERATIONS								
Torpedo ..	174	—	174	52	—	52	46	6
R.P. ..	284	—	284	90	—	90	76	14
Bomb ..	995 (8)	16	1,011 (8)	238 (8)	9	247 (8)	20	227 (8)
Depth Charge ..	— (4)	—	— (4)	— (4)	—	— (4)	— (1)	— (3)
Tsetse ..	7 (4)	—	7 (4)	2 (4)	—	2 (4)	2 (2)	— (2)
Cannon and M.G. only ..	396 (16)	25	421 (16)	107 (16)	21	128 (16)	108 (1)	20 (15)
GRAND TOTAL ..	1,856 (32)	41	1,897 (32)	489 (32)	30	519 (32)	252 (4)	267 (28)

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

RESULTS CLAIMED FOR JULY (Subject to Assessment)

Torpedo, Day :

1 M/V (3,000 tons) sunk.
1 M/V (2,000 tons) sunk.
1 E/V sunk.
1 M/V (4,000 tons) seriously damaged.
2 M/V.s (1,500-3,000 tons) seriously damaged.
2 M/V.s (3,000 tons each) seriously damaged.
1 E/V seriously damaged.
1 M/V (2/3,000 tons) damaged.
1 M/V (1,500 tons) damaged

R.P., Day :

2 E/V.s sunk.
1 M/V seriously damaged.
2 M/V.s (2/3,000 tons) damaged.
3 E/V.s damaged.

R.P. and Cannon, Day :

1 E/V sunk.
5 E/V.s seriously damaged.
1 M/V (3,000 tons) damaged.
1 M/V damaged.
9 E/V.s damaged.

Bombs, Day :

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

Bombs, Night :

1 E/V sunk.
2 E/R boats sunk.
2 E/V.s seriously damaged.
1 M/V (1,500 tons) damaged.
5 E/V.s damaged.
5 E/R boats damaged.

Tsetse, Day :

2 E/V.s seriously damaged.
1 M/V (1,500 tons) damaged.
1 E/V damaged.

Cannon, Day :

1 E/V seriously damaged.
1 Tanker (2,249 tons) damaged.
1 M/V (1,800 tons) damaged.
14 E/V.s damaged.
1 E/R boat damaged.

Cannon, Night :

1 E/R boat damaged.

ANALYSIS OF WEAPONS EXPENDED

Weapon.	No. of Aircraft to Attack.	Weapons Expended.	
		M/V.	Naval.
<i>Day Operations :—</i>			
Torpedo, 8 ft.	52	46	6
R.P.	90	601 × 25 lb.	108 × 25 lb.
Bombs	26	31 × 500 M.C.	13 × 500 M.C. 24 × 250 G.P.
Depth Charge	1	2 × 250 D.C.s.	
Tsetse	6	4 attacks.	2 attacks.
<i>Night Operations :—</i>			
Bombs	229	32 × 500 M.C.	336 × 500 M.C.
	—	—	160 × 250 M.C.
	—	6 × 250 G.P.	465 × 250 G.P.
	—	10 × 600 A/U.	24 × 600 A/U.
Depth Charge	3	—	9 × 250 D.C.s

FINAL ASSESSMENTS FOR JUNE 1944

*Night :—**Bombs*

1 E/R boat seriously damaged.
1 T.T.A. damaged.
1 E-Boat damaged.
2 E/R boats damaged.
1 M/S damaged.

*Day :—**Cannon*

1 M/L sunk.
3 T.T.A. seriously damaged.
4 M/S.s damaged.
2 E-Boats damaged.
2 T.T.A.s damaged.
1 M/V (1,000 tons) damaged.
1 u/i vessel damaged.

Day :—R.P.

1 E/R boat sunk.
1 D.R. damaged.
1 M/S.s damaged.
1 E-Boat damaged.

Cannon and R.P.

1 T.T.A. sunk.
2 "M" class M/S.s seriously damaged.
4 E/V.s damaged.

Bombs

1 E-Boat sunk.
2 E-Boats seriously damaged.
2 "M" class M/S.s seriously damaged.
1 E-Boat damaged.

Torpedo

2 M/V.s (13,900 tons) sunk.
1 "M" class M/S sunk.

Shipping Strikes in July

Soon after dawn on June 29 six **Beaufacturers** of **143 Squadron** and six of **236 Squadron** made a profitable attack on enemy shipping near Le Tréport. The target consisted of three "M" class minesweepers and five E- or R-Boats. The aircraft of **143 Squadron** attacked the minesweepers with bombs which caused big explosions and set two of the ships on fire. The aircraft of **236 Squadron** attacked the E- or R-Boats with 60-lb. R.P. and damaged two of them with direct hits. It is possible that one of these vessels was sunk outright, as the last aircraft to attack reports seeing only seven vessels in the area. The **Beaufacturers** suffered neither loss nor damage.

As a result of reconnaissance a striking force of **Mosquitos** was despatched to attack a small convoy off Penmarch Point on June 29. The convoy was composed of a small coastal tanker, a small coaster, five minesweepers and an auxiliary. Six **Mosquitos** of **235 Squadron** and six of **248 Squadron**, armed with cannon and machine-guns, formed the anti-flak force, while four aircraft of **248 Squadron** carried bombs and two others were armed with 6-pdr. guns. All the minesweepers were attacked with cannon and machine-guns, and their flak was well smothered while the main attack was made on the tanker and coaster. No direct bomb hits were scored although there were several near misses which may well have caused damage. The tanker was hit by 6-pdr. shells and left smoking. All the minesweepers were hit and one of them appeared to be on fire when the aircraft left. The **Mosquitos** all returned although several of them were damaged. This is hardly surprising considering the small number of aircraft employed.

On June 30 another shipping attack was made near the Brest Peninsula, this time off Concarneau. R.P. was the main weapon used. **404 Squadron** provided six **Beaufacturers** armed with 25-lb. heads and six more with 60-lb. heads. The anti-flak force comprised seven **Mosquitos** of **235 Squadron** and fourteen of **248 Squadron**. The targets were two "M" class minesweepers, one trawler-type vessel and one small auxiliary. All the ships were well beaten up and damaged. Some of the **Mosquitos** crossed the coast and attacked flak positions and a train. Z/248 was hit by flak and made a good ditching south of Penmarch; the crew were seen in the water alongside their dinghy with a small boat nearby.

During the night of July 4/5 twelve **Beaufacturers** of **143 Squadron** attacked enemy shipping off Boulogne. The target was a force of nine E- or R-Boats and one possible "M" class minesweeper. Each aircraft dropped two 250-lb. and two 500-lb. M.C. bombs, several of which scored direct hits. As a result one E- or R-Boat was seen to sink and another was set on fire; there was also a glow from two other boats which had been hit.

On July 5 **Albacore S/415** made a good night attack on a minesweeper near Gravelines. The pilot dropped six 250-lb. bombs and saw three of them explode on the target. Afterwards there was a glow from the boat for several seconds before it blew up. Debris was later seen all around.

Soon after dawn on July 5 the **North Coates Wing** attacked an enemy convoy off Terschelling. **254 Squadron** provided six Torbeaus and ten cannon **Beaufacturers**, and **236 Squadron** contributed 16 **Beaufacturers** armed with 25-lb. R.P. and cannon. The convoy consisted of a large merchant ship and nine or ten escort vessels. It was rather disorganized when the wing arrived, as it had been previously attacked by our M.T.B.s. The merchantman was already on fire in two places and an escort vessel was taking off the crew of another small vessel. The aircraft dropped five torpedoes and scored at least one hit on the merchant ship or a minesweeper. The R.P. aircraft scored at least 20 hits and all the ships were hit with cannon fire. When the aircraft left the area seven escort vessels were seen to be on fire. A great deal of flak was thrown up during the attack and one **Beaufacturer** failed to return; several others were damaged.

Early on July 6 **Beaufacturer D/143** sighted and attacked two E- or R-Boats off Le Tréport. The bombs fell close to the stern of one of the boats, and smoke poured from her. The pilot then attacked the same boat four times with cannon. The target began to burn fiercely and disappeared after the last attack.

On July 6 the **Langham** and **Strubby Wings** joined forces for a convoy strike near Norderney. Ten Torbeaus of **489 Squadron** were the main striking force supported by 31 anti-flak **Beaufacturers** drawn from **144**, **404**, **455** and **489 Squadrons**. The aircraft of **404 Squadron** carried 25-lb. R.P. in addition to cannon. The convoy consisted of eight merchant ships (an unusually high proportion) and eleven escort vessels. The merchant ships were between 2,000 and 3,000 tons. All ten torpedoes were dropped and they hit at least two of the merchantmen, one of which was seen to blow up. Another of them was hit by R.P. both above and below the water line and was left burning. As usual the cannon aircraft did fine work, setting one minesweeper on fire and leaving three other escorts smoking well. These successes were not achieved with impunity, however, for six **Beaufacturers** were damaged, and two others failed to return.

On July 8 the **North Coates** and **Langham Wings** combined in an attack on enemy shipping southwest of Heligoland. There were eleven Torbeaus of **254 Squadron**, six cannon **Beaufacturers** of **144 Squadron** and 22 R.P. **Beaufacturers** of **236** and **404 Squadrons**. The target was a convoy of six merchant ships of 1,500 to 3,000 tons each and ten escorts. The R.P. and cannon aircraft attacked first and severely damaged several of the escorts, one of which blew up. The Torbeaus followed and scored two hits on a 2,000 ton merchantman and one hit on each of two others. One of these ships was seen to heel over, and a big explosion was seen amidships on another. The flak was very concentrated but thanks to the excellent work of the flak-busters, only one torpedo aircraft was damaged. Seven anti-flak **Beaufacturers** were damaged although there were no injuries to their crews.

On July 10 five **Mosquitos** of **235 Squadron** and nine of **248 Squadron** on anti-shipping patrol near the Brest Peninsula sighted two armed trawlers south of Croisic Point and attacked them with cannon and machine guns. Three aircraft of **248 Squadron** also attacked with two 500-lb. bombs each. One bomb scored a near miss and both vessels were raked with cannon until they were on fire and smoking. On breaking away from this attack the **Mosquitos** sighted two more escort vessels north of Croisic Point and beat them up with cannon and machine-gun fire.

On July 11 **Mosquitos** of **235** and **248 Squadrons** again attacked enemy shipping off Brest. The formation sighted a 4,000-ton sperrbrecher and three "M" class minesweepers in an anchorage protected by booms. Five **Mosquitos** attacked the sperrbrecher with cannon and 12 more dealt with the minesweepers. Two aircraft of **248 Squadron** were armed with 6-pounder cannon and they scored five hits on the leading minesweeper. A great deal of flak was experienced from the ships and also from shore batteries, but all the **Mosquitos** returned safely to base. The leading minesweeper was left in flames, a small fire was seen on the rear one, and there was an explosion aboard the sperrbrecher.

Two 800-ton coastal freighters were badly damaged by **Mosquitos** off Belle Isle on July 15. The attacking force consisted of four **Mosquitos** of **248 Squadron** carrying 500-lb. bombs, four others armed with cannon and machine-guns, and six **Mosquitos** of **235 Squadron** similarly armed. One of the coasters was hit by a bomb which caused an explosion 200 feet high, and many cannon and machine-gun strikes were scored. When the aircraft left, both ships were on fire and covered in smoke and steam. Again, all aircraft returned to base despite intense flak from ships and shore batteries.

On July 15 **Beaughters** paid a surprise visit to the Norwegian coast. The northern shipping routes had been unmolested by our strike aircraft for a considerable time and it seems that the enemy were caught unprepared. The striking force consisted of the **Langham Wing** (12 cannon **Beaughters** of **455 Squadron** and 11 **Torbeaus** of **489 Squadron**) and 11 cannon **Beaughters** of **144 Squadron**. The force found a tanker and four merchant ships protected by five escort vessels off the Naze. The anti-flak aircraft led the attack and so effectively silenced the flak that the **Torbeaus** were able to drop their "fish" with little opposition. Eleven torpedoes were dropped, and although only two hits were seen, the amount of damage inflicted indicates that probably more than two torpedoes found their mark. All the vessels were raked with cannon fire and a great deal of damage was done. Photographs taken during the attack show the following results: a 3,000-ton tanker ablaze from bridge to bows; torpedo hits on a 5,000-ton cargo liner and a 3,000-ton merchantman; a 3,000-ton merchantman blowing up, probably as the result of exploding ammunition; a ship of between one and two thousand tons and three trawler-type auxiliaries on fire; a gun-coaster burning and sinking. All the **Beaughters** returned safely.

Late on July 18 the **North Coates** and **Strubby Wings** combined for a torpedo and R.P. attack on a heavily escorted convoy near Heligoland.

The convoy was made up of between four and six merchant ships and 10 escort vessels. Visibility was poor and only five of the 12 **Torbeaus** were able to drop their torpedoes. Nevertheless, much damage was inflicted on the enemy. One merchant ship was hit by a torpedo and set on fire, and another had her starboard side blown out by R.P. Of the escorts, one blew up, two were damaged by R.P. and two more were set on fire. Flak was intense and two **Beaughters** failed to return.

On July 21 **Beaughters** again attacked enemy shipping off Heligoland. The **Langham** and **Strubby Wings** were on offensive patrol when they sighted a convoy of nine merchant vessels and 18 escorts. Eight **Torbeaus** and 31 anti-flak **Beaughters** with R.P. and cannon delivered the attack. Despite intense flak the aircraft scored torpedo hits on two merchantmen as well as cannon and R.P. strikes on many other vessels. Photographs of the action show one ship of 4,000 tons and another slightly smaller merchant vessel on fire and sinking; 13 other vessels, including three merchantmen of between 2,000 and 3,000 tons, are shown to be on fire.

On July 22 the **North Coates Wing** made a very effective attack on two trawler type auxiliaries south-west of Heligoland. The wing, consisting of nine **Torbeaus** of **254 Squadron** and 14 **Beaughters** of **236 Squadron** armed with 25-lb. R.P. and cannons, had been briefed to attack a convoy reported by a reconnaissance aircraft. They failed to sight the convoy but the leader decided to beat up the two armed trawlers rather than return to base without having attacked. During the ensuing action one trawler blew up and sank with its balloon still flying above the water; the other was hit by a torpedo and was left on fire, listing badly. The crew abandoned ship and were seen struggling in the sea. One **Beaughters** which was hit by flak crashed into the sea near the target. One member of the crew was seen to get into a dinghy. All the other aircraft returned safely to base.

On the evening of July 24, five **Avengers** of **850 Squadron** (F.A.A.) were on anti-shipping patrol near the Channel Islands when they sighted three small merchant ships and three armed trawlers leaving the harbour at St. Peter Port. The aircraft attacked two of the merchantmen with 500-lb. M/C bombs and scored direct hits on the leading vessel. Bomb flashes were also seen on or near the second ship. The vessel which was hit, a merchant ship of 1,000 tons, was last seen covered with smoke and emitting flames 300 ft. high. About an hour and a quarter later another **Avenger** arrived on the scene and saw the vessel beached north of the harbour. This ship can be claimed as a total loss to the enemy, for it is safe to assume that our forces will have occupied the Channel Islands before the vessel can be refloated. During this attack one of the **Avengers** was hit by flak and was believed lost, but information came in the following day that it had landed damaged on an American airfield in Normandy. The crew were safe.

On July 25 eight **Mosquitos** of **248 Squadron** attacked three small auxiliaries with bombs, 6-pounder guns and cannon. The action was fought off Belle Isle. All three ships were raked with fire and several bombs were near misses.



These photographs, which were taken by 489 and 455 Squadrons, show incidents in an attack on an enemy convoy off the Naze, South Norway, on July 15. The aircraft were drawn from 489, 455 and 144 Squadrons. In the top photograph the tanker *Irania*, 2,249 tons, is seen on fire. Like so many other tankers, which are notoriously difficult to sink, *Irania* reached Oslo the following day. The middle photograph shows two merchant ships under attack. The further vessel has just fired some parachute projectiles. The lower picture is of a trawler-type auxiliary. It is unusual to see this type of vessel camouflaged with dazzle-painting.



On July 22, Beaufighters of the North Coates Wing attacked two enemy trawler-type auxiliaries south-west of Heligoland. One of the ships was hit by a torpedo and left blazing. The other blew up and sank, as can be seen in the centre photograph. A feature of the lower picture is the condensation trails from the wing-tips of the Beaufighters.

The Tse-Tse aircraft again did well, scoring six hits on one vessel and seven on another. One of the ships had her mast shot away by a 6-pounder cannon shell. A 500-ton coaster type auxiliary was so severely damaged that she probably sank, and a 400-ton trawler was also badly damaged.

In early morning of July 27 **Mosquitos** of **248 Squadron** attacked a small convoy south of Belle Isle. Two of the aircraft carried 500-lb. bombs, two carried 6-pounder guns and four others were armed with cannon and machine guns. The convoy comprised one 1,500-ton merchant ship and six or eight escort vessels. No bomb hits were seen, but three of the escorts were repeatedly hit by cannon fire. The merchant-

man was hit by seven 6-pounder shells and gave forth great clouds of smoke. One of the escorts was also covered in smoke, and both these ships are claimed as damaged. All the **Mosquitos** returned to base although three of them were damaged.

On July 28 six **Avengers** of **849 Squadron** (F.A.A.) sighted four enemy landing craft crowded with men, and three escort vessels off Cape Fréhel. The aircraft attacked with 500-lb. bombs and scored direct hits on one landing craft, which was seen to sink. One of the escort vessels was straddled and left with steam pouring from her. One **Avenger** was damaged by flak, and the navigator was killed.

III.—OTHER OPERATIONAL FLYING

Combats with Enemy Aircraft

On July 21 **Mosquitos D** and **J/235** were escorting a naval force south-west of Ushant when they sighted two **Dornier 217s** being attacked by another **Mosquito**. "D" and "J" turned to engage the enemy but the unknown **Mosquito** broke away and took no further part in the action. "J" attacked the second **Dornier** on the star-board beam, opening fire with cannon at 800 yards and closing to 200 yards. The enemy aircraft was hit repeatedly and the port engine burst into flames. The **Dornier** then stalled and crashed into the sea. Survivors were seen in dinghies. "J" then gave his attention to the remaining **Dornier**, again attacking on the beam. He closed to 100 yards and saw hits on the enemy's fuselage. Three of the German crew promptly baled out. "D" then took a hand and made a quarter attack with cannon and machine guns. He closed to 100 yards and saw pieces fly off the enemy's fuselage. Immediately afterwards the **Dornier** blew up in mid-air.

Shortly after this action **Mosquitos A** and **F/248**, which were also escorting the naval force, sighted another **Dornier 217** in the same area. The enemy aircraft was being chased by a **Beaufighter** and was corkscrewing in an attempt to get away.

"F" fired a long burst from cannons and machine guns at 500 yards range but the pilot did not see any hits. The pilot of "A" then found himself on the inside of the turn and, getting astern of the **Dornier**, fired several short bursts from 500 yards closing to 100 yards. Pieces of the enemy's fuselage flew past "A's" windscreen and the **Dornier** crashed in flames.

After photographing the wreckage the pilot of "F" was vectored by the ships on to another aircraft. He climbed through a thin layer of cloud and sighted his quarry about 10 miles away. On closing the range he identified it as another **Dornier 217**, which began first to corkscrew and then to dive for cloud cover. The **Mosquito** pilot fired two bursts of cannon from 600 yards dead astern and saw strikes on the enemy's fuselage. After this the **Mosquito's** cannons stopped but the pilot continued to attack with machine guns at close range. The **Dornier** pulled out of its dive, climbed about 300 feet and then dived steeply through the cloud as though out of control. It was not seen again and is claimed as probably destroyed.

These most successful actions illustrate once more the value of closing the range in air combat.

Photographic Reconnaissance

During July **106 Group** flew 622 sorties of which 57 were flown from Benson on July 6. On that day the Benson photographic section developed 20,309 negatives and made 53,780 prints in 18 hours 50 minutes. The average was 1,080 negatives and 2,860 prints an hour.

The outstanding sortie of the month was a flight lasting seven hours forty minutes during which the *Tirpitz* was photographed from a height of 8,500 feet (see Plate 5). Other notable flights have obtained low level photographs of the heavy "V2" rocket installations. For this purpose a variety of cameras have been used including the 36-in. F.52 moving film, the 36-in. F.52 oblique, and the 10-in. F.52 forward facing oblique. Routine reconnaissance of shipping in the channel, of ports and airfields, flying bomb sites, activity on rail lines (in some cases involving low level photography) and damage assessment has continued as usual and made up the bulk of the month's work.

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

540 Squadron. Mosquito IX

On June 19 we took off at 1610 hours and crossed the coast at Southwold at 28,000 feet. We passed over the enemy coast at Den Helder at 1713 hours, and found that big patches of strato-cumulus cloud at about 12,000 feet lay across our track. Both the Hanover area and Helmstedt were covered by this cloud, but Magdeburg was visible obliquely beneath cloud and there we got about 60 bursts of flak, accurate for height but slightly astern. We did two runs over the Burg area at about 1815 hours, then continued eastwards and photographed Zerst airfield. We did a run along the railway through the Coswig factory area before turning westward for Bernberg. Just before coming out of the turn we felt a jar, and the navigator told me that the starboard engine had been hit and was on fire. Almost simultaneously we were boxed by heavy flak bursts. Dense black smoke and flames were pouring from the starboard engine and streaming well back. I immediately closed the throttle, feathered, turned off the petrol to the damaged engine, pressed the Gravinier fire extinguisher and switched off. Everything worked and in a few moments the smoke died away. The navigator immediately gave me an approximate course for Den Helder, and I turned on to it. The sight of the smoke must have put the ack-ack gunners in great heart, because for the next 20 minutes or so we were surrounded by most consistent flak. We tried to weave as much as possible on one engine without sacrificing too much height, and continued running westwards. We had been at 29,000 feet when hit and naturally the aircraft would not maintain that height on one engine. We lost about 400 feet per minute at an I.A.S. of 140 m.p.h. which we found was the best speed to maintain. When the flak was coming up I opened the port engine to 2,800 r.p.m. and +8 lbs. boost, but after we had got clear of the ack-ack area I throttled back to 2,650 r.p.m. and +6 lbs. boost. To conserve the generator voltage all electrical services not required were switched off. We also dropped the empty jettison tanks with the fervent hope that they would each hit somebody on the head. An exceptionally close watch was kept for enemy aircraft. After about half an hour we were down to 18,000 feet where we found it possible to maintain height at 2,600 revs. and +4½ lbs. boost. At that time we were a little to the south-east of Brunswick, making a groundspeed of 190 to 200 m.p.h. Fairly big islands of strato-cumulus with wide clear lanes, lay at about 12,000 feet in this area and we made a detour to the south of our track with the intention of using this cloud in the event of interception. We also wished to be as inconspicuous as possible to ground observers. However, this cloud petered out about 170 miles from the coast and we turned to track directly to Den Helder. We thought that if the Hun was going to intercept us he would probably arrange to do so in the Den Helder region. Therefore, 10 miles east of Stavoren we altered course sharply northwards and asked a bit more from the willing port engine by pushing up the revs. and boost. We ran about 30 miles due north, switching on the cameras for the last 10, and crossed out north-north-west of Franeker. We then turned north-west and crossed the Frisian Islands midway

between Vlieland and Terschelling. After about 20 minutes we ventured to edge round on to a south-westerly course for Southwold and throttled back to 2,500 revs., and +4 lbs. boost. When approaching the English coast we found that the W/T, VHF and undercarriage and flap indicator lights were all "dead." We crossed the coast at Southwold at 14,000 feet, firing the colours of the period as we did so. As the port engine was running perfectly and height was steady, we decided to make for base where we landed at 2135 hours. About eight pieces of flak were found in the starboard engine, and both the starboard mainplane and tailplane had been holed.

The distance in a direct line from Coswig to Benson is 560 miles and as at one stage we were somewhat south of this direct line and later more than 100 miles north of it, our actual return track must have been between 650 and 700 miles. Throughout this trip the port engine gave not the slightest cause for anxiety. The radiator temperature never exceeded 100° and the oil temperature and pressure remained normal at 60° to 65° and 80 lbs. per square inch respectively.

544 Squadron. Mosquito IX

We took off at 1230 hours on June 26 to make a photographic reconnaissance of the railway between Lyons and Marseilles. When crossing the English coast at Littlehampton at 18,000 feet, we found that the port long-range drop tank would not feed. We passed over the French coast at 27,000 feet at Fécamp and set course for Lyons. At 1422 hours we began our photography at Lyons, running down the railway towards Marseilles and covering all the targets except the marshalling yards at Avignon which were under cloud. At Marseilles we decided to return via Avignon in the hope that the cloud would have drifted away. As we approached, still at 27,000 feet, we saw that the section was still covered, so we decided to dive under the cloud. At 1510 hours we were in a diving turn five miles south of Avignon, I.A.S. 380 m.p.h., height 7,000 feet, when six bursts of heavy flak surrounded the aircraft. In spite of the noise and the jolt we did not think that we had been hit. We photographed the marshalling yard from 6,000 feet but just as we were climbing away the starboard engine began to miss. The starboard engine temperature gauge showed 120° C., and the needle was steadily going off the clock. Immediately afterwards the engine caught fire. We therefore feathered the propeller and extinguished the fire with the Gravinier.

There was 7/10ths cloud to the south-east and Corsica was only 200 miles away, so we decided immediately to set course for there. From Avignon to within 15 miles of the French coast we made great use of cloud cover which by then was at 4,000 feet. Once out of cloud we dived straight for the coast, crossing out at nought feet at Cannes.

The aircraft was not maintaining a normal single-engined speed, which suggested that it had suffered more damage than we knew, and we had great difficulty in climbing to 2,000 feet before reaching the coast of Corsica. We got no answer



The German battleship *Tirpitz* photographed in Altenfjord by 544 Squadron. The aircraft took this picture from 8,500 feet and was in the air for nearly eight hours on this flight. The *Tirpitz* is seen lying inside a double boom, with a number of small craft alongside. The damage caused by the midget submarines and the Fleet Air Arm is no longer visible. Although the *Tirpitz* can hardly be called a fighting ship, she may well be seaworthy by now.



On July 6, Sunderland V/330 was on a transit flight when it was forced down into the sea near the Orkneys with engine trouble. H.S.L. 2725 rescued the passengers and crew, and took the aircraft in tow.



PLATE 6

Ever since small merchant ships began to run the enemy's blockade of Swedish waters, Coastal Command has given air cover for part of the voyage. The photograph above was taken by a Beaufighter of 236 Squadron at the end of 1943. It shows one of the special blockade runners homeward bound from Sweden with a valuable cargo, probably ball-bearings.

Below.—This excellent photograph by 333 Squadron shows the German aircraft reporting station at Fedje (60° 46' N., 04° 43' E.). The principal element is a "Chimney" of the cylinder type (centre) which can detect low flying aircraft at about 35-40 miles and high flying aircraft at much greater ranges. It cannot, however, measure height. There is also a "Freya" (left) which performs the same duties as the "Chimney" but is slightly less powerful.



to a MAYDAY call and as we had no maps of the area we did not know at what part of the coast we had made a landfall. At 1610 hours a Thunderbolt of the U.S. air force intercepted but recognised us as friendly aircraft in distress. The pilot must have realised our difficulty for he led us down the coast to the airfield of Calvi. After making V.H.F. contact with an aircraft on the ground, we prepared to land, but found that the hydraulic system was unserviceable. By then we needed full throttle to maintain height and we could not use the emergency hydraulic system owing to its slow manipulation and increased drag.

The strip parallel to the runway looked too short for a crash landing, so we made a right-hand circuit round the bay at 100 feet. We then came in across wind and made a belly landing across the runway. Unfortunately, while still travelling at about 70 m.p.h. we hit a big pile of stones. This broke the nose, fuselage and starboard engine before the aircraft came to a standstill, but the crew and cameras were unharmed.

544 Squadron. Mosquito XVI

We were airborne at 1655 hours on July 25 and set course for Stuttgart, climbing through cloud from 2,000 feet to 26,000 feet. Throughout the climb the artificial horizon and directional gyro behaved oddly and on coming out of cloud we found that they were unserviceable. We decided to carry on with the compass alone. At 1810 hours, on breaking cloud, we pin-pointed ourselves on the bend of the Rhine west of Mainz and found we were some 80 miles to port of track. We altered course south for Stuttgart, avoiding Mannheim and Karlsruhe, and reached Stuttgart at 1831 hours. We made three runs over the town, where fires were still burning, encountering some 30 bursts of flak towards the end of the third run. We then set course for our second target which was some 60 miles to the east. Here we did two runs without any opposition and set course for Munich. At 1915 hours we did one run over Munich airfield and continued to the south of the town to photograph the chemical plants. After completing the run we turned to port to obtain obliques of Munich, and the navigator came from the nose to resume his look-out. He immediately saw a twin-engine fighter 400 yards dead astern, closing rapidly. The pilot levelled out, at same time opening to full revs., and put the aircraft into a gentle dive from 30,000 feet to 28,000 feet to obtain maximum performance. The enemy aircraft pulled up to 500 feet above us and dropped his left wing as if he was inspecting us. He continued his turn to port while we turned to starboard to bring us on to the reciprocal. We were then heading due south and we jettisoned our drop tanks. The closing speed was immense and we thought we had gone for good, for by then we had identified the enemy aircraft as a twin-jet fighter, similar to a Me.262.

We held our course due south at 28,000 feet with full boost and revs. at an I.A.S. of 260 m.p.h. The navigator saw the enemy aircraft about 1,500-2,000 yards astern just completing a turn which brought him once more dead behind us. He began to overtake us at a great rate, closing to about 1,000 yards in 10 seconds. In order to commit the enemy to a definite line of attack, we went into a rate 1 turn to port. As the enemy aircraft closed in, firing from 800 yards onwards, we tightened up our turn. With an I.A.S. of 240 m.p.h. and climbing in the turn, we were able to turn inside the enemy aircraft, which broke off the attack. The next two attacks were similar but on the second of them we held the steep turn for three complete revolutions, which brought us almost on to the enemy's tail. We then broke off to the south leaving him some 2,500 yards behind. He came in again, however, and at about 1,000 yards he went into a slight dive which took him underneath the tail of our aircraft. We waited for about three seconds and then turned violently to port. We then heard two thuds on the underside of the fuselage and thought we had been hit. We again headed south and next saw the enemy aircraft further behind than ever before.

By that time—10 minutes after the first engagement—we were well over what we took to be the Alps, which were covered by 4/10 cloud at 16,000 feet. We went into a steep dive towards the nearest cumulus, weaving violently at 360 m.p.h. I.A.S., but we saw that he was following us down. The navigator then tried to remove the inside door in case we should have to bale out, but he could not open it at first as it seemed to be firmly held by suction. He eventually jettisoned it after much kicking. The outer door had already gone. By then we had reached the first cloud, which gave cover for a few moments. When we emerged we saw the enemy aircraft about 600 yards behind and still closing, though not as rapidly as before. Only a very short distance ahead was a long straggling line of cumulus clouds pointing south, and in a matter of seconds we were in them. They gave cover for a few minutes and when we finally emerged, we saw—to our indescribable relief—that the enemy aircraft had gone.

At 1950 hours, some three minutes later, we decided to make for Italy. We therefore held our southerly course and began to climb. When we were at 24,000 feet the pilot saw Venice about 30 miles away on port bow. We map read down the Adriatic coast towards Ancona and tried to get directions on the V.H.F. A great deal of conversation was going on and we got no reply until we called MAYDAY. Everyone then shut up and we homed on Fermo, an advanced airfield about 30-40 miles behind the lines. We touched down at 2025 hours on a bulldozed strip about 20 yards from the Adriatic shore.

CORRECTION

It is regretted that Nos. 330 and 333 (Norwegian) Squadrons were the victims of errors in the Coastal Command Review, Vol. III, No. 6 (June, 1944). It is stated that the lower photograph on Plate 5 was taken by "a Catalina of 330 Squadron." This should be "a Sunderland of 330 Squadron." On page 19, column 2, line 40, there is a reference to "Liberator D/333." This should read "Catalina D/333."

The Editor offers his apologies to the two squadrons and assures them that, despite appearances to the contrary, this Headquarters really does know what aircraft they fly.

IV.—SPECIALIST AND GENERAL ARTICLES

Some Uses of Shipping Attack Photographs

When Coastal Command squadrons take off to attack enemy shipping each aircraft carries at least one camera. After the attacks the photographic sections at the stations work very hard turning out the pictures. If the strike is an important one, probably as many as 2,000 prints are made. What is the use of it all?

Firstly, photographs reveal the composition of the convoy and whether the enemy used new tactics or new weapons. The aircrew are far too busy to try to remember all the details of the action. This side of the matter is looked after by the Central Interpretation Unit. The C.I.U. after examining the photographs is able to report on the composition and disposition of the convoy, and to issue a sketch plan to illustrate it. The unit may also identify some of the merchant ships by name, and from them it is possible to work out the size of the remainder. Moreover the damage claimed by the aircrews is checked. All this information is invaluable to the Enemy Shipping Losses Assessment Committee in arriving at a correct estimate of the damage we are inflicting on the German mercantile marine. Such information also contributes towards the study of the volume and habits of enemy coastwise traffic and so helps in planning future operations.

To give information about shipping attacked is, however, only one of the uses to which the pictures can be put. Torpedoes, R.P. and cannon are used in the strike. The camera can tell us whether they are used successfully and if not, it may suggest where the faults lie. To photograph cannon attacks, a cine-gun camera, fitted either in the nose or in the wings, is so wired that it takes pictures whenever the cannon button is pressed. By knowing how big the target is (the C.I.U. can tell us accurately) the opening and closing ranges can be calculated. Moreover, the accuracy of the fire can be readily estimated as the strikes are easily seen on the sea. Films of this kind are of great value in keeping a check on both tactics and training. For instance, about a year ago it was proved that pilots were taking avoiding action which did not bring them any appreciable distance out of the gunners' line of sight. Their evasive action was thus quite ineffective and merely disturbed their own aim.

The cine-gun has the disadvantage that to get full information from the film, it must be projected. Also, the field of view is very narrow, and sufficient contrast is not provided by sea targets in northern latitudes. However, a much bigger camera is now being installed in all non-torpedo Beaufighters which will give only about one picture a second but a much clearer one with a bigger field of view.

Torpedo attacks are undoubtedly more complicated than cannon attacks, but here again the camera can solve a great many problems. The torpedo pilot must fly straight and level between certain limits of height and speed and he must estimate the target's speed, range and bearing. He also has to use the correct aim-off angle provided by his sight. If he misses, he will want to know

which one of the many possible faults he has committed. The camera can tell him. By its help it is possible to make practice attacks and to assess the probable results without using a torpedo at all. As torpedoes are expensive toys this is most convenient. The camera concerned (the F.46) is carried in the nose, pointing straight ahead when the aircraft is in the normal flying attitude. The field of view is narrow vertically but wide horizontally and, as the aircraft flies close to the sea when attacking, the picture is virtually an "elevation" view of the target. To assess the picture (this is done from the negative) it is necessary to know the target's size and speed. In training this is known accurately but in operational drops the C.I.U. can normally provide some information. By means of a box of tricks called the De Mahe assessor the pilot can be told his range, bearing and height and also whether he was flying straight and level. The result of the drop can also be calculated, though this is subject to some uncertainty because the torpedo is liable to play tricks on entering the water: it may either run at an angle to its course in the air or transfer its run bodily sideways at the start. In the operational films the same assessments can be given, though they are slightly less accurate owing to ignorance of the target's speed. Nevertheless photographs do give some indication of the general success of the attack although the number of assessed hits is normally too high by about 60 per cent. because of these uncertainties. All this assessing is done by specially trained W.A.A.F. officers attached to the squadrons and O.T.U.s.

An idea of what might have happened if the torpedo had run correctly and so on, is not really sufficient. Under normal dropping conditions, torpedoes take about 30 seconds to hit and as the Torbeaus always attack last, the strike force is headed for home before anything blows up. However, the observers take photographs with hand-held cameras as they come away. The final decision as to whether a certain plume of water is a torpedo hit or not is left to the C.I.U.

A few months ago it was possible by means of these photographs to solve rather a knotty problem. On the basis of statistics collected over about two years as to hits claimed and ships known sunk, it seemed that when a British torpedo hit an enemy ship, there was only a 35 per cent. chance of it sinking. But it was known that the German torpedoes sank 75 per cent. of the Allied ships which they hit. It seemed possible therefore that our torpedo was inferior to the enemy's. But it was also possible that our claims were too high. This was checked by considering only those attacks where there was definite photographic evidence of a hit. It turned out that of the ships hit by one torpedo 72 per cent. sank. It was the claims which were faulty, not the torpedoes.

As a sinker of ships the torpedo is an old and trusted friend, whereas we are still learning how to use the R.P. It is in cases like this that photography is most necessary and useful. Problems arising from the tactics used, the provision of a sight, the development of similar weapons and



On July 8 the North Coates and Strubby Wings combined to attack an escorted convoy off Heligoland. Three merchant ships and an "M" class minesweeper were sunk and several other escort vessels damaged. These photographs show, top, a minesweeper on fire; centre, an R.P. attack on a merchantman; bottom, a cannon and R.P. attack on an "M" class minesweeper.

so on, can be solved only by complete information as to what happens under operational conditions. Photographs alone can provide accurate answers. With an unfamiliar weapon a pilot can keep on missing time and again, and until he knows why, he might as well not fire at all.

Here there was some difficulty in finding a camera to provide the answer. The cine-gun gave rather hazy pictures which needed projection, and the field of view was so small that in a normal R.P. attack, the target had moved out of the picture by the time the R.P.s had hit. However, the F.24 camera mounted in the nose seems to solve the problem, though it creates a few others of its own. It takes photographs every 1.5 seconds and the assessment is made from contact prints 5-in. by 5-in. Even the operational sets have given very clear pictures, several of which have already appeared in the *Coastal Command Review*.

The assessment is more complicated than in torpedo pictures because here we have a problem in three dimensions instead of two, an oblique view rather than an elevation. However, it is possible to extract from the pictures the firing range, the angle of dive, the angle of bank, the excess "G" loading if the pilot begins to pull out before firing, and lastly, the results of the shots. Only about fifteen sets of operational pictures have been taken so far, but even they have been of great help in assessing the value of the weapon. Eventually, every R.P. aircraft will be equipped with this camera. Obviously the camera will also be of great use in R.P. training but installation is only just beginning at O.T.U.s.

The types of question we hope to be able to answer when sufficient operational sets are available are:—

- (i) Sighting: what are the main errors in R.P. firing and which must be dealt with first?
- (ii) Development: what percentage of R.P.s can we expect to hit under given conditions? How good are the present R.P.s when they do hit?
- (iii) Tactics: is it best to fire in salvo or pairs; if the salvo is to be spaced, what is the best spacing?

As yet complete answers cannot be given but as more photographs come in so methods can gradually be altered. So far, it is of interest that one of the main causes of error in operations is one which does not occur at all in training, that is,

firing at the start of the pull-out. When operations began the range of firing was very great, but the most recent photographs show that range estimation has been very good. As these facts come to light, the pilots can be told what they are doing wrong and how to improve.

The main points in this article can best be summed up by considering the photographs taken during a shipping strike. On July 8 the North Coates and Strubby Wings attacked an enemy convoy south-west of Heligoland. An account of the action will be found on page 11. As usual the Beaufighters took a considerable number of pictures. These pictures first come to our notice in a supplementary Form Orange. In this case it is stated, among a great deal more information, that "photographs show a distant view of two possible torpedo hits. The total number of ships in the convoy is seen to be 16." About five days later the C.I.U. produced its considered interpretation. The number of ships was confirmed, the convoy's composition illustrated by a plot (see Plate 7), and a statement issued on the damage which the photographs reveal. Two ships were identified by name and the size of the others was calculated.

Then the torpedo assessment comes in. This shows that the average range was rather long, but assesses five torpedoes as hits. This probably means three, after allowing for torpedo vagaries and other uncontrollable factors. A typical picture taken with the F.46 camera was assessed as follows:—

Nose Up.	R.Wing.	Height.	Range.	Bearing.	Result.
3° 40'	13° 20'	240 ft.	1,350 yds.	103° Green.	Hit 225 ft. from bow.

Only three R.P. aircraft were carrying F.24 cameras. One, C/236, attacked a minesweeper, probably scoring two underwater hits. The photograph appears at the bottom of Plate 8 and the assessment was:—

Angle of Dive.	Angle of Bank.	Range	Excess "G" Loading.	Result.
10°	2° right wing up.	1st pair 580 yds.	zero.	Miss, 140 ft. short.
		2nd pair 440 yds.	0.10.	Underwater hit (estimated).

The photographs thus give a fairly complete picture, from the movements of German shipping to the range at which the R.P.s were fired. In planning the next strike, the information we have gained will be used to help us sink yet more ships.

How to Survive in a Dinghy

This is a difficult subject to discuss because the sea is so prolific of extraordinary occurrences. Just as we are beginning to think we know something of the conditions of survival, a crew is picked up alive when by all the known rules they should have died days before. Probably these unexpectedly long survivals are due to a great will to live, and to determination not to give up even if things appear hopeless. However, from the experiences of many people it is possible to work out a practicable routine and to outline what, from a medical point of view, ought to be

done. Obviously every instruction must be preceded by "if possible" because very often it will not be.

The Ditching

Assuming that the crew have properly adjusted their life-jackets and taken up ditching stations, the following points are most important.

Do not remove any clothing. Heavy clothing in the water does impede swimming and it does make it harder to climb out of the water into the dinghy, but it does not sink you. It becomes

saturated with water and therefore about as heavy as water. Its buoyancy is about neutral, although it takes some time to expel all the air so that at first heavy clothing actually buoys you up. In the dinghy the advantages of having all the clothing you can, even if it is wet, to serve as protection against cold, are so great that you should wear as much as possible and discard none.

If you can, take into the dinghy one or more parachutes and any spare clothing. Since this is additional to all the rest of the emergency equipment, it will often be impossible, but they are very useful if available.

Do not go in the water from the aircraft unless you must. That may sound foolish, but before now people have dived in to rescue some quite unimportant bit of equipment. When the emergency arises you should instinctively avoid going in if it can be helped. It makes a tremendous difference if you can avoid getting wet through at the start. If you must go in, slide or jump in as gently as possible, hold your nose and close your mouth tight. Diving boldly into a rough sea with a Mae West on is unpleasant and makes your chances of swallowing sea water much greater. Sea water in the stomach increases sea-sickness very markedly.

If you are in the sea do not swim aimlessly. You may become exhausted very quickly in those conditions and then there will be no more swimming. Float long enough to make sure of an objective and then go for it. Wearing a Mae West in rough water you will get along best on your back.

If you have an injured man in the water, it is difficult to get him into the dinghy by pulling first his head, then his body and finally his legs aboard. As he comes in he tends to push you away from the buoyancy chamber against which you are kneeling, so that both you and the dinghy are unbalanced. Float him horizontally against the dinghy first and then roll him, first on to the top of the buoyancy chamber and then on board.

In the Dinghy

Having got away from the aircraft there are three things you should do at once. It is very important to have these fixed firmly in mind so that you do them instinctively. They may seem very difficult at the time and the immediate results will certainly not seem worth while, but the effect of neglecting them is very great later on.

They are (a) bale the dinghy—probably the most important single means of preventing the effects of exposure; (b) fix the weather apron, and (c) make arrangements to collect rain.

Quite often men are picked up after many hours in a waterlogged dinghy, and they say they were "all in" and could not bale it at all. It is easy to understand how they felt and to sympathise, but if some instinctive urge to carry out a routine could have made them bale, they would have been in much better condition.

It is much the same with the weather apron. You are very cold. You fix it and probably do not seem much warmer; it is a nuisance and prevents moving around. It does not seem to help, but 12-18-24 hours later you will be in far better shape if you have used it.

Rain may fall in the first hour. You may be in the dinghy a long time, therefore you cannot

afford to waste any rain. Arrange to be able to use the apron to collect it, so that it runs down into a depression. Have something ready to store it in and use the sponge for transferring it from the apron to the container. Wash the salt off the apron with the first few drops and collect the rest.

Next, sit on something if you can. If you sit on the dinghy floor only a layer of macintosh intervenes between your nether regions and the cold Atlantic. This is very depressing. It is not safe to sit on the buoyancy chamber, so try to sit on an emergency container, a bit of crumpled up clothing, a parachute or part of it. It helps a lot.

Then assess your crew. You want to know who will be your right-hand man on whom you can rely in 6-10 days time if you should be there so long. All the evidence suggests that in survival at sea mental make-up is much more important than physical strength. Of two men who are of equal character, the physically fitter would probably do better. On the other hand, a quiet determined individual, particularly if he is well educated, will generally survive well even if he is of poor physique. A very fit, strong man, noisy and demonstrative, and perhaps a bit empty-headed, will often succumb quite easily.

Then establish a routine, giving everyone some duties to do. Dinghy and lifeboat crews who lie in the bottom and do nothing rarely survive long exposure. Those who keep active and attentive do much better. If you have an injured man do not, out of kindness, excuse him all duties and leave him to lie idle if you can help it. Try to find some job in the routine he can do and get him to do it. It is really kinder and helping him more.

If you are in good order, you should try to arrange some sleep rota. Often there is no room for this, but sometimes there is unfortunately not a full crew in the dinghy. Sleep in short watches of about two hours, and detail someone to watch over the sleeper so that he can relax without the fear of falling over the side. If you are really exhausted do not sleep, but try to stay awake. To help this energy tablets are provided in the emergency flying rations and they have full directions printed on the box.

Now you can give some attention to the refinements of protecting yourself against exposure. If you have ditched at night do not strip off your wet clothing in order to dry it until the day is a few hours old. You lose more heat by the exposure than you gain from the small amount of drying. When you do take things off to dry at high noon, do it in layers. If you have a relatively windproof garment, dry one layer from underneath it first, then replace that and dry another layer from underneath, retaining the wind-breaker meanwhile. Finally, when you have two (or more) layers of dryish clothing available to wear, remove and dry the wind-breaker.

Keep moving if possible. If you cannot move your limbs because of lack of space, tense and relax your muscles without moving the limbs.

Keep your flying boots on, provided they do not feel tight. They help to keep your feet warm. When the boots feel tight, however, it means that the feet are swelling and then boots hamper the circulation and do more harm than good.

Remove them and never replace them. Wrap your feet up loosely and keep them as dry as you can. Parachute silk is good if you have any. If your feet are numb and swollen do not rub them. Just the right amount of rubbing at just the right time and in just the right way may be a good thing, but you cannot hope to do that in a dinghy. Too much rubbing or wrong rubbing or ill-timed rubbing does a great deal of harm; therefore, do not rub.

Again, above all, keep the dinghy as dry as possible.

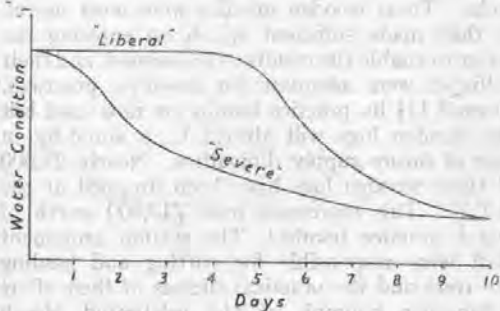
Sunburn can be very troublesome. At sea you can get sunburnt under a white sky, apparently because the salt spray continuously washes away the sweat which is a natural protective against sunburn. Improvised sun-hats are good if they can be made, and a rolled up handkerchief or bit of parachute tied round the head and over the bridge of the nose in a roll keeps off some of the upward glare of the sea. The burn jelly in the first aid kit is being made into a dual purpose job which will protect against sunburn too.

Water Rationing

Without any water at all a man can survive four to six days. In exceptional cases you may last longer but this cannot be expected. The position seems to be that the body requires a minimum of 18 oz. water a day to keep it in good order for long periods when resting. If about this amount cannot be obtained, it does not matter very much how much less is taken.

It is undoubtedly possible to ration water too strictly. There are many examples of men being picked up in very poor condition with considerable supplies of water available. They had instituted a very severe rationing scheme and might actually have died of thirst with water in hand. Again, the chances of rain within a few days are quite good in these latitudes, and it is a mistaken policy to allow yourself to get into a very bad condition and then to obtain rain water, only to find that you have gone too far to benefit much from it. Again, in Air Sea Rescue the majority of contacts and rescues are made in the first five days. After that the rescue becomes more difficult, so that it is important that the dinghy crew should be as fit as possible during the time when rescue prospects are best and their co-operation is more fruitful.

The state of affairs of severe and less severe rationing can be represented pictorially:—



The line marked "liberal" shows what might happen if generous rationing were begun at first and on the fifth day very small rations were introduced. At first all goes quite well and for

five days (the important period) the men are in good shape. Then rather a rapid decline occurs, but even so at the tenth day they would probably be better off than the men on severe rationing. Those men rationed their water very tightly and not only were they less fit through the first five days, but were no better on the tenth. Further, if rain occurred on or before the seventh day the liberally rationed men would make better use of it than the others, who would be much worse by then.

In a large dinghy there should be 56 oz. of water per man. It is suggested that it should be rationed as follows:—

1st day ..	No water unless exhausted or wounded.
2nd day ..	14 ozs. per man.
3rd day ..	14 ozs. per man.
4th day ..	14 ozs. per man.
5th day ..	2 ozs. per man.
	And the same thereafter.

Other Sources of Water

Rain has already been mentioned but sea water is no use. The effects of drinking it are always bad and it should be avoided. It is known that in the laboratory small quantities of salt water can be added to fresh water and drunk without harm. But this careful adjustment cannot possibly be made in a dinghy, and the effects of a draught of sea water on a man short of water are always disastrous within a day.

Of course when you have plenty of fresh water to drink you can take quite a lot of sea water as well (as we sometimes do when swimming), but the conditions are then quite different. It is also dangerous to wash out the mouth with sea water, because the risks of succumbing to the temptation to drink are too great.

In hot climates, provided that hostile fish are absent, bathing may be helpful as it cools the body and lessens the sweat.

Fish have been advocated as a source of water, but enthusiasm seems to have run ahead of fact. Twelve pounds of fish squeezed in a mechanical press, will yield about one pint of fluid. Other methods of extraction, such as chewing and squeezing the cut up material in a handkerchief, are even less effective. The resulting fluid, though it has less salt than sea water, contains a lot of protein and this is a bad thing to take when short of water. Despite newspaper reports this is also true of sea birds, flesh and blood. Both fish and sea birds can be used as food if the water situation is good, but both are bad if water is scarce.

W.P.R. desalination equipment is now going into production. Two tins, equivalent in space to two 14-oz. tins of water, produce about nine pints of water. The process is rather tedious but simple. Samples are available at the Air Sea Rescue School.

At sea food is not nearly so important as water. Man can survive quite long periods without food. A tin of emergency flying rations contains about as much nourishment as a man normally eats in a day, so that the rations question is not very important. The emergency rations should be used in accordance with a strict routine so that they break up the day and help to keep your

spirits up. The Horlicks tablets are sometimes criticised on the ground that they increase thirst. This may be true in normal circumstances, but when you are really short of water all dry foods tend to promote thirst and subtle differences disappear. The Horlicks tablets have an advantage (apart from their concentrated nourishment) in that they are not excessively palatable to most people and therefore they are fairly easy to ration.

Dinghy Diseases

Certain ailments are liable to arise in dinghies and lifeboats. The chief of these, of course, is seasickness. It does not usually last more than 48 hours, though this is cold comfort to the sufferer. He should be laid as flat as possible,

and should either close his eyes or look at a part of the dinghy which moves with him and not at the sea or the sky. The seasickness remedy in the first aid kit should be tried. It is not 100 per cent. successful but it may help. If it does not work in 24 hours, discontinue it.

Dry Mouth and Cracked Lips

Sucking metal objects like coins, etc., may help at first. Any greasy substance except fuel oil can be smeared on the lips.

Sore Eyes and Eyelids

Again apply any simple greasy material except fuel oil, and if they become very bad cover with a pad and bandage.

Bombing Training at No. 111 O.T.U.

No. 111 O.T.U., Nassau, is most fortunately situated for practice bombing. The island of New Providence is roughly 19 miles long by 7 miles wide and the sea is within a few minutes' flying from either of the two airfields. Except for the live bombing range, all the bombing areas are very close and easily accessible from either field. Even the live bombing range is only about 30 miles away. All the usual facilities are available in the way of fixed and towed targets, and the local weather is such that it is very seldom necessary to cancel a detail. The seas are rarely too rough to permit moving target bombing.

Probably the most interesting feature of the anti-submarine bombing training is the provision of a wooden dummy U-Boat, which has been erected in shallow water just off the south shore of the island. It is a full-scale outline of a U-Boat in plan view and it was made by building a kind of fence of stout wooden posts driven into the sea bed. The outline of the target is 210 feet long, and a dummy wooden conning tower rises from the centre to a height of about 25 feet. The whole thing is awash at all states of the tide, and if the water is choppy the outline gives quite a good impression of a U-Boat from a little distance. The tide also frequently produces the effect of a wash astern of the target. On days when the water is still, the target often looks from the air as if it is sitting on dry sand. This is caused by the reflection of light from the sea bed and by the great transparency of the water, which makes low flying very tricky in these parts.

The upper photograph on Plate 9 shows the general appearance of this U-Boat target with a circle of vertical posts around it marking the cardinal and quadrantal points. The marking circle has a radius of 190 feet centred on a point 75 feet ahead of the conning tower. This radius represents half the length of a stick of four depth charges spaced at 100 feet plus the underwater travel of 40 feet. A stick is therefore accurate if the first bomb strikes the water on the circumference of the circle, and the bomb representing the centre of the stick should hit the target just forward of the conning tower in the case of an attack from the stern. Assessments on this target

are made both visually and photographically and the circle of markers indicates the correctness of the tracking as well as range assessment. The mirror cameras take about ten successive pictures of each attack, and show the attitude of the aircraft at the moment of the release, its height above the water and the fall of the bombs.

Although in the photograph a Liberator is making the run over the U-Boat, in actual fact this practice is nearly always done in the Mitchells, in which crews are trained before they reach the Liberator stage. The bombing from the Liberators is almost exclusively on moving targets, both surface and submersible types. They also do high level bombing with the Mark XIV bomb sight. The Mitchell practices are all low level, either pilot or bomb-aimer releases. Low and high level exercises with bombsights are done at the Liberator stage, when the crew have acquired some knowledge of bombing by eye.

The O.T.U. also owns the wreck of a ship which lies in shallow water at a convenient distance from the island. This is subjected to simultaneous front gun and bombing attacks while the aircraft is taking evasive action. This exercise is quite useful but the bombing is difficult to assess.

For a long time after the O.T.U. started working, there was difficulty in obtaining practice bombs. The difficulty was surmounted by cutting supplies of small diameter poles in the local woods, and sawing off short lengths of convenient dimensions which were then provided with staples to enable the bombs to be hung on the aircraft racks. These wooden missiles were most useful, as they made sufficient splash on entering the water to enable the results to be assessed, and their ballistics were adequate for low-level practices. Normal 11½ lb. practice bombs are now used but the wooden logs will always be a stand-by in case of future supply difficulties. Nearly 27,000 of these wooden logs have been dropped at the O.T.U. This represents over £13,000 worth of metal practice bombs! The station armament staff were responsible for cutting and hauling the trees and the practical success of their effort is another triumph of the celebrated Heath Robinson system.



PLATE 9

Above.—The U-Boat bombing target at No. 111 O.T.U., Nassau.

Below.—A Mitchell making a practice low level attack on a towed target at Nassau.

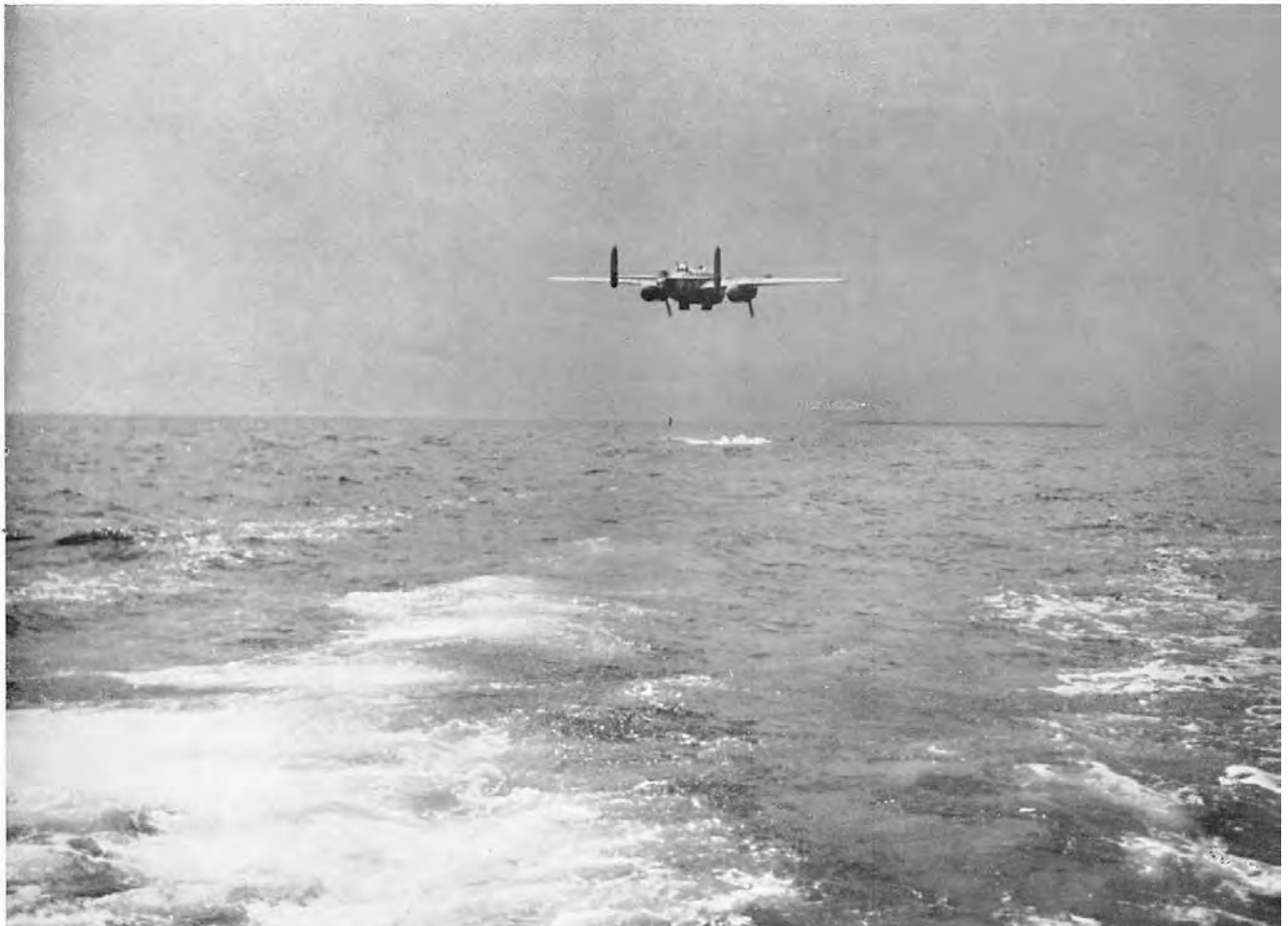
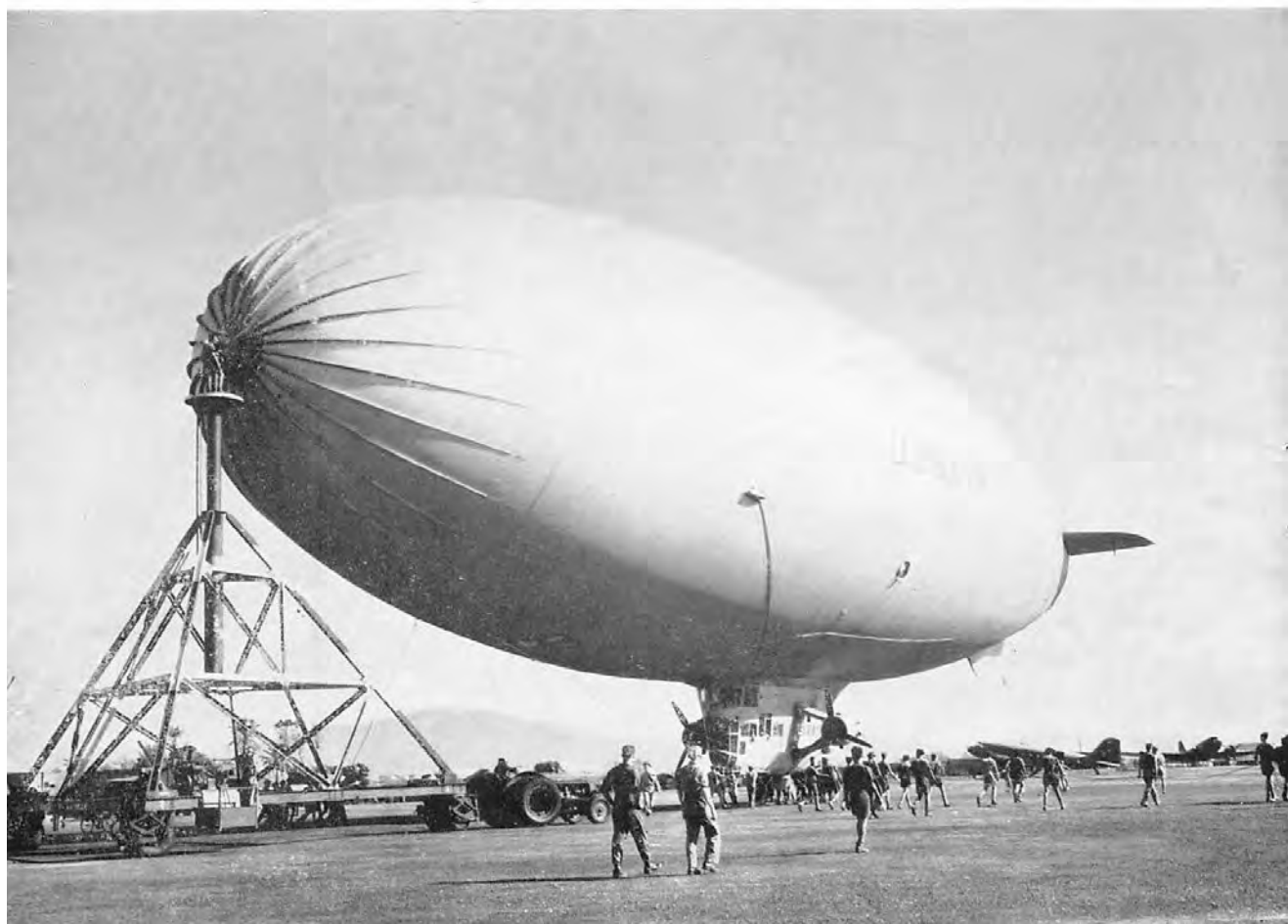




PLATE 10

The photographs on this page, which were taken in July, show a "K" type non-rigid blimp of the United States Navy at North Front, Gibraltar.



Engine Control Instructional Flight

After a few false starts the Engine Control Instructional Flight has begun its work at Angle. In Coastal Command it is vital that pilots get the very best out of their aircraft in range, speed and endurance. Sometimes one, sometimes all three of these factors have to be brought into play; it all depends on the type of sortie which is being flown. It is therefore essential that every pilot and engineer in the Command knows how to achieve maximum range, maximum endurance and maximum speed. At different times on the same sortie a pilot may have to adjust his controls in order to get each one of these maxima in turn. As aeroplane engines become more and more complex it becomes necessary to supplement pilots' basic knowledge with more detailed instruction. The E.C.I.F. exists to fill this need.

The three main types of flying in Coastal Command should first be appreciated. They are:—

- (a) *Range flying*, which is used where the object is to cover the largest possible area. Straight anti U-Boat patrols or passages to and from a convoy are flights which fall into this category.
- (b) *Loiter flying*, which is important when an aircraft has to remain in a given area for as long as possible, as, for instance, when it is giving close escort.
- (c) *Speed*, when it is essential to complete a task in the least possible time and when range can be neglected. An example of this is when our Beau-fighters have to catch an enemy convoy before it reaches port. This type of flying is usually the task of strike aircraft.

Most pilots in Coastal Command understand the problems and advantages of loiter flying. They do not, however, always appreciate the great difference between maximum endurance in the air and maximum range. As it is we who are looking for U-Boats and not the U-Boats who are looking for us, this point is vital. "Gallons per hour" is not the answer to range flying. One of the main objects of the E.C.I.F. is to bring this point home and—which is most important—to explain why.

The E.C.I.F. tackles this subject by splitting

it up into its component parts, taking each in turn and building them up on a foundation of sound principles. When the process is complete every pilot and engineer will understand not only how to find the answer to his problems, but also why the answer must be right—even when appearances are to the contrary.

The E.C.I.F. devotes a good deal of time to explaining the design and function of engines with special emphasis on the carburettor and supercharger, under all conditions of control setting and flight. This study is indispensable if pilots are fully to appreciate the economies they can achieve by following such golden rules as "high boost, low r.p.m.," and others. Many pilots know these rules, but not enough know why they apply.

Indeed, a sound knowledge of engine handling is not sufficient for good range flying. Such knowledge will suffice only to reduce fuel consumption for a given brake horsepower. This affects loiter flying, not range flying. What the E.C.I.F. demonstrates is the effect of the angle of attack on lift and drag, the way the wind can be made a friend instead of an enemy merely by your varying the aircraft's speed, and other essentials which may have as great an effect on your range as any number of tricks to save fuel.

The advantages and technique of range flying are the heart of the E.C.I.F. course. Experienced pilots have found that range flying has upset their "gallons per hour" theories, and they have come away enthusiastic converts. Besides learning how to get the best out of their aircraft, pilots will get that priceless asset, peace of mind. No longer need they worry whether they will "make it." They can know in good time exactly what range they can cover, and they will be surprised how much it turns out to be.

The course at Angle is very short and every point is explained and demonstrated in detail. At the end of the course the pupils take an examination. This is set not with the idea of "failing" them, but so that the instructors can clear up any points which may not have been grasped. The course is short but comprehensive, and no pilot in the Command can fail to learn a good deal which he did not know before.

The Security of Codes

On December 27, 1943, the German blockade runner *Alsterufer* was sunk by aircraft of Coastal Command. On the next day H.M. Cruisers *Glasgow* and *Enterprise* fought a most successful engagement with a force of enemy destroyers, and at the same time four F.W. 200's flew reconnaissances in the vicinity. An examination of these incidents proves that the German High Command was unable to discover the exact meaning of the signals sent by our aircraft. Briefly, the sequence of events, as reported in messages to A.C.Q.H., Plymouth, was as follows:—

First sighting report in "1 M/V in position Self Evident Code DXQL 4030." from a Sunderland.

Amplifying report in the Aircraft Reporting Code from the *Liberator* which delivered the decisive attack.

Further reports in the same code from a *Liberator* and a Halifax.

"Have attacked M/V with bombs 46° 30' N., 19° 10' W. Ship's stern on fire. Returning to base, engine trouble."

"Ship abandoned and on fire; 70 survivors in lifeboats."

"Objective reached. 1 M/V sinking, 46° 32' N., 18° 55' W. 70 survivors in 4 lifeboats."

There can be no doubt that the success of these operations was ensured firstly by the efficiency of

our communications, and secondly by the fact that the enemy got no information from our signals which would have led him to recall his destroyers. If anyone on the communications side had blundered, three German destroyers would not now be at the bottom of the Bay of Biscay. These facts should convince those who are sometimes heard to complain, "I don't see why we bother with all these codes; they waste a lot of time, the enemy can probably read them anyway, and I don't see that it helps him much if he can."

People who belong to this school of thought should also remember that if signal security were not worth while, no one would bother to spend time and infinite trouble in working it out. The production and distribution of a secure code is a considerable achievement in itself and maintaining its security calls for a careful watch on its use and its possible weaknesses. To attain the required degree of security for every one of the varied tasks of Coastal Command is a most complex business. It demands continual and delicate adjustment, for we must take into account the tactical and strategical situation of our own forces, as well as the requirements of the Air, Naval, Meteorological and Flying Control staffs. The enemy's tactics, intentions and intelligence, as far as we can discover them, must also be watched. For example, the normal procedure of sending all first sighting reports of the enemy in Self Evident Code is sound in principle because it ensures speed and accuracy in passing such information. As the enemy will normally be aware of the position, course and composition of his own forces, and will know that he has been sighted, there is no point in wasting time and jeopardizing

the security of a code by encoding such signals. On the other hand, there will be occasions when the enemy's knowledge of the position of his own units may be very imperfect. Or again, the enemy may be unwilling or unable to break W/T silence. In such cases a sighting report in Self-Evident Code might not be advisable, because if the enemy happened to dispose of forces superior to our own, or to be in a position to take action sooner than we could, then self-evident reports would certainly not bring us such victories as we won last December.

Another danger in sending plain language reports is that sometimes the units sighted are our own. No one would wish to inform the Germans of the exact position, course and speed of Allied forces, but such mistakes have actually occurred.

In the case of the *Alsterufer* operations, things worked out very well. The self-evident report of the blockade-runner drew the German destroyers out: the fact that the enemy did not understand the amplifying reports prevented them from being recalled. The result was a victory not only for the guns of our cruisers but also for signal security.

It should also be remembered that codes are only one part of the general battle for security communications. The complex organization of call signs and frequencies, and the use of D/F and R.C.M. by the enemy, are all major factors to be considered in signals work. Signals and their security play a vital part in all operations. The complexity of our methods is not designed as a sinister method of getting more work out of wireless operators and captains of aircraft. It is intended to deprive the Hun of information—and it does.

Fog and Low Cloud at Gibraltar in June

During the summer, fog is frequently experienced at Gibraltar when the wind is easterly and it may occur as often as twelve times in a single month. Such fogs are normally expected to affect Gibraltar at dawn or dusk, and rarely last for more than three hours on and near the Rock, although they may persist considerably longer at sea. They invariably come at the beginning of a period of easterly winds. A particularly interesting case occurred on June 12, 1944.

A very low layer of cloud with surface fog in places developed during the morning and persisted throughout the day until just after midnight. In the early morning the weather had been quite clear to the east, with no cloud and good visibility, although an aircraft reported that fog or very low stratus cloud could be seen in the valleys on the Spanish coast to the north-east of Gibraltar, and the wind in the vicinity had changed to north-east at 0800 hours.

Shortly before 0900 hours the fog appeared to develop rapidly in a south-westerly direction and a patrol vessel a few miles to the north-east of the Rock reported that visibility had dropped to zero. At the same time the crew of an aircraft east of the Rock saw that the cloud layer had developed with great speed, and had enveloped all the lower

part of Gibraltar except the area immediately down-wind, i.e., to the west. It was from this aircraft that the photographs on Plate 11 were taken.

Photograph "A," looking southwards, shows the upper side of the layer of stratus, and the breakwater effect of the Rock. Clear lines in the layer can be seen to the south and south-east. Some cloud in the centre is being pushed upwards and is flowing over the Rock between the north and south peaks.

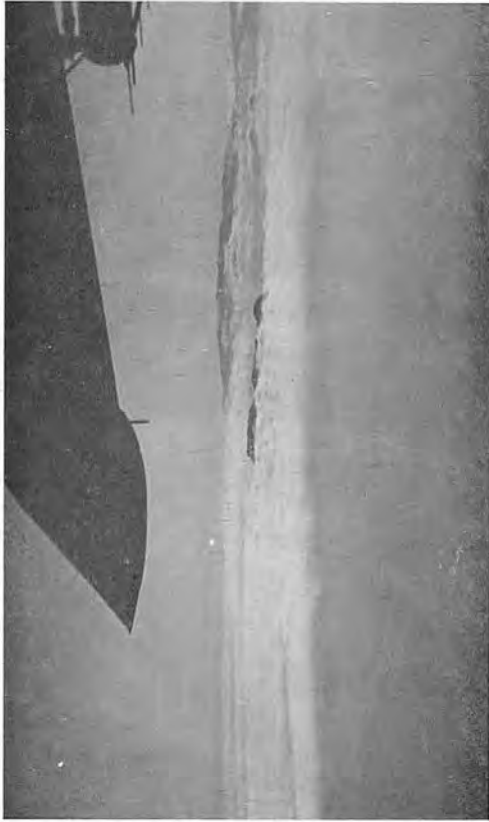
Photograph "B," taken from the east, shows the eastern extremity of the cloud bank, which was then about 300 feet above the sea, but was descending to sea level in places. The aircraft was able to get below the layer and the photograph was taken while it was coming in to land at New Camp.

Shortly after this cloud reached Gibraltar, the airport at North Front reported fog with a visibility of 800 yards. The time was 1000 hours. Soon afterwards, however, the cloud base lifted to 1,000 feet and remained at that height throughout the afternoon at North Front. The layer was then only 200-300 feet thick, and the highest peaks of the Rock emerged from the top. Fog

FOG AND LOW CLOUD AT GIBRALTAR ON JUNE 12, 1944



A. *Above*.—This photograph, looking southwards, shows the top of the cloud layer and the breakwater effect of the Rock.



B. *Above*.—This view, which was taken from the east, shows the eastern extremity of the cloudbank.



C.



D.

Photographs C and D show the cloud beginning to be lifted by the Rock.



Two photographs of Jan Mayen Island taken by Liberator A/86 in April, 1944. The buildings shown in the upper picture are at Austrian Station on the north coast of the island ($71^{\circ} 00' \text{ N.}$, $08^{\circ} 30' \text{ W.}$). The lower photograph was taken in the same area.

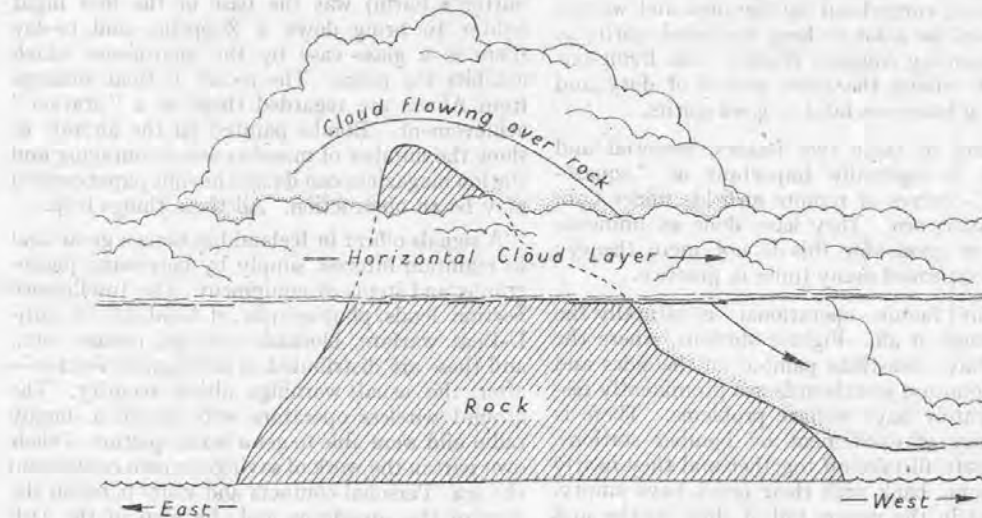


patches persisted in the harbour area, however, until the evening.

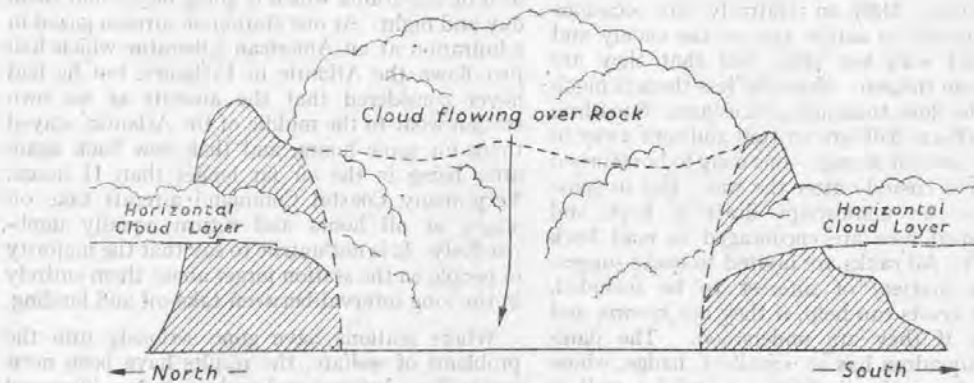
The diagrams illustrate the cross section of this cloud throughout most of the day. It will be seen that the cloud lifted over the Rock and flowed down the western face as an unbroken stream almost to sea level, breaking into patches just above the ground and forming a drifting fog in the harbour area. The layer flowing round the north and south ends of the Rock remained at heights between 500 and 1,000 feet. Unfortunately the only pictures available were taken before this phase was reached, but photographs C and D show the cloud beginning to be lifted up by the Rock.

Towards midnight the wind, which had been east, force 3, throughout the day, freshened a little, the air became much drier, and the cloud layer quickly dispersed.

Doubtless what happened was that the easterly air, which had picked up much moisture during its long passage over the Mediterranean, met the saturated katabatic flow down the valleys from the hills of Spain. This mixture was then chilled when it encountered the colder water around Gibraltar which had come from the Atlantic during the preceding spell of westerly winds. The result was the fog and low cloud.



A. North Face of Rock, looking South.



B. West Face of Rock, looking East.

Welfare

It is perhaps not generally realized that welfare is concerned with operations. This may seem a surprising statement, but it is a fact. The welfare organization in the R.A.F. seeks to improve the physical and mental well-being of everyone in the Service, in order that their *operational efficiency* may be kept at the highest possible level. The objectives of the welfare officers are to eliminate private worry in order that everyone can give his full attention to the job in hand

which, at the time of writing, is winning the war: secondly, to improve living and working conditions so that work can be carried on effectively; thirdly, to provide facilities for enjoying leisure (in case there should be any leisure) so that life may become neither boring nor monotonous; this also has the effect of re-creating strength for the next day's work.

The factors which affect the tone of a unit are chiefly personal, material and operational. Cynics

may be surprised to learn that material factors are, without any doubt, the least important. Furniture, radios, cinemas and the proximity of shops—all these are pleasant. But few people in the R.A.F. have not had the experience of being in a beastly place, miles from anywhere and almost bare of comfort, and yet of realizing that such a station is often far happier and more efficient than more luxurious establishments.

Personal factors are far more important. These factors include leadership and interest on the part of officers in resolving private worries and improving daily conditions. But officers, like God, can only help those who help themselves: gardening, decorating and improving messes and Nissen huts, carried out by the men and women themselves, do a lot to keep up jaded spirits as well as showing concrete results. The living-out mentality—doing the strict period of duty and then going home—is fatal to good spirits.

The care of these two factors, material and personal, is especially important at "square-bashing" centres or remote airfields under Care and Maintenance. They have done an immense amount of good—for this is not mere theory; it has been proved many times in practice.

The third factor—operational—is naturally the most potent of all. Fighter stations, where the aircraft have swastikas painted on the sides and where mounting scoreboards are prominently displayed, rarely have welfare problems. There is also plenty of excitement on bomber stations. The aircraft all take off together and they nearly always come back with their bomb-bays empty. Headlines in the papers tell of their battles and everyone on the station feels that all the hard work is producing some definite result. But on many Coastal Command stations, particularly those operating against U-Boats, the routine is unspectacular. Only on relatively rare occasions are the aircraft in action against the enemy and the ground staff too often feel that they are remote from the war. None the less there is much that can be done to arouse enthusiasm. Squadron histories (Form 540) are written and sent away in duplicate for cold storage—one copy to be returned to squadron custody after the war. But in some squadrons the manuscript draft is kept and newly joined men are encouraged to read back through it. All ranks are invited to make suggestions for matters of interest to be included. Squadron crests can help, if they are known, and especially if they are understood. The dam-busting squadron has an excellent badge, whose heraldic description is "On a roundel a wall in fesse fracted by three flashes of lighting in pile and issuant from the breach water proper," with the motto, "Après moi le Déluge". There is also in Coastal Command at least one example of a badge which commemorates past feats of arms:

this is the broken wheel of 59 Squadron. The wheel originated in Germany and was used on an enemy field gun in the last war. This particular gun came to the notice of 59 Squadron, who went out and broke it. Our advancing troops recovered the remains and presented the broken wheel to the squadron. It was adopted as the badge and the actual wheel goes everywhere with the unit. At the moment it is outside the squadron offices at Ballykelly.

Station team spirit, built on pride of past and present achievement, is more difficult to acquire than squadron spirit. But the whole station at Biggin Hill was enthusiastic over their thousandth Hun. Hornchurch (known in the last war as Sutton's Farm) was the base of the first night fighter to bring down a Zeppelin, and to-day there is a glass case by the guardroom which exhibits the relics. The recent U-Boat sinkings from Alness are regarded there as a "station" achievement. Bombs painted on the aircraft to show the number of missions are encouraging and station magazines can do much—but paper control may be an obstruction. All these things help.

A signals officer in Iceland has done a great deal to maintain interest simply by borrowing photographs and items of equipment. The Intelligence Section lends photographs of incidents of anti-U-Boat warfare, blockade runners, rescues, etc., and these are distributed in the Signals Section—after the usual warnings about security. The ground wireless operators were shown a dinghy radio and were able to get a better picture of their own part in the work of saving our own crews from the sea. Personal contacts and visits between the men of the squadrons and the men of the D/F stations are bound to result in better co-operation when an aircraft is coming in on a dirty night.

Many men and women in the R.A.F. have no idea of the drama which is going on around them day and night. At one station an airman gazed in admiration at an American Liberator which had just flown the Atlantic in 11 hours, but he had never considered that the aircraft at his own station went to the middle of the Atlantic, stayed there for some hours, and then flew back again after being in the air far longer than 11 hours. Very many Coastal Command aircraft take off singly at all hours and return equally unobtrusively. It is not untrue to say that the majority of people on the station forget about them entirely in the long interval between take-off and landing.

Where stations have gone seriously into the problems of welfare, the results have been most impressive. Interest and enthusiasm are increased and every man and woman on the station feels in the picture and in the war. Private worries will then fade into the background, listlessness gives way to enthusiasm, and even the inherent beastliness of a Nissen hut can be forgotten.