

**SECRET**

Any person other than the authorized holder upon obtaining possession of this document by finding or otherwise should forward it, together with his name and address, in a closed envelope, to **THE UNDER-SECRETARY OF STATE, AIR MINISTRY, KINGSWAY, LONDON, W.C.2.** Letter postage need not be prepaid ; other postage will be refunded.

All persons are hereby warned that the unauthorized retention or destruction of this document is an offence against the Official Secrets Acts, 1911-1920.

# **COASTAL COMMAND REVIEW**

**September, 1942**

---

**No. 5**

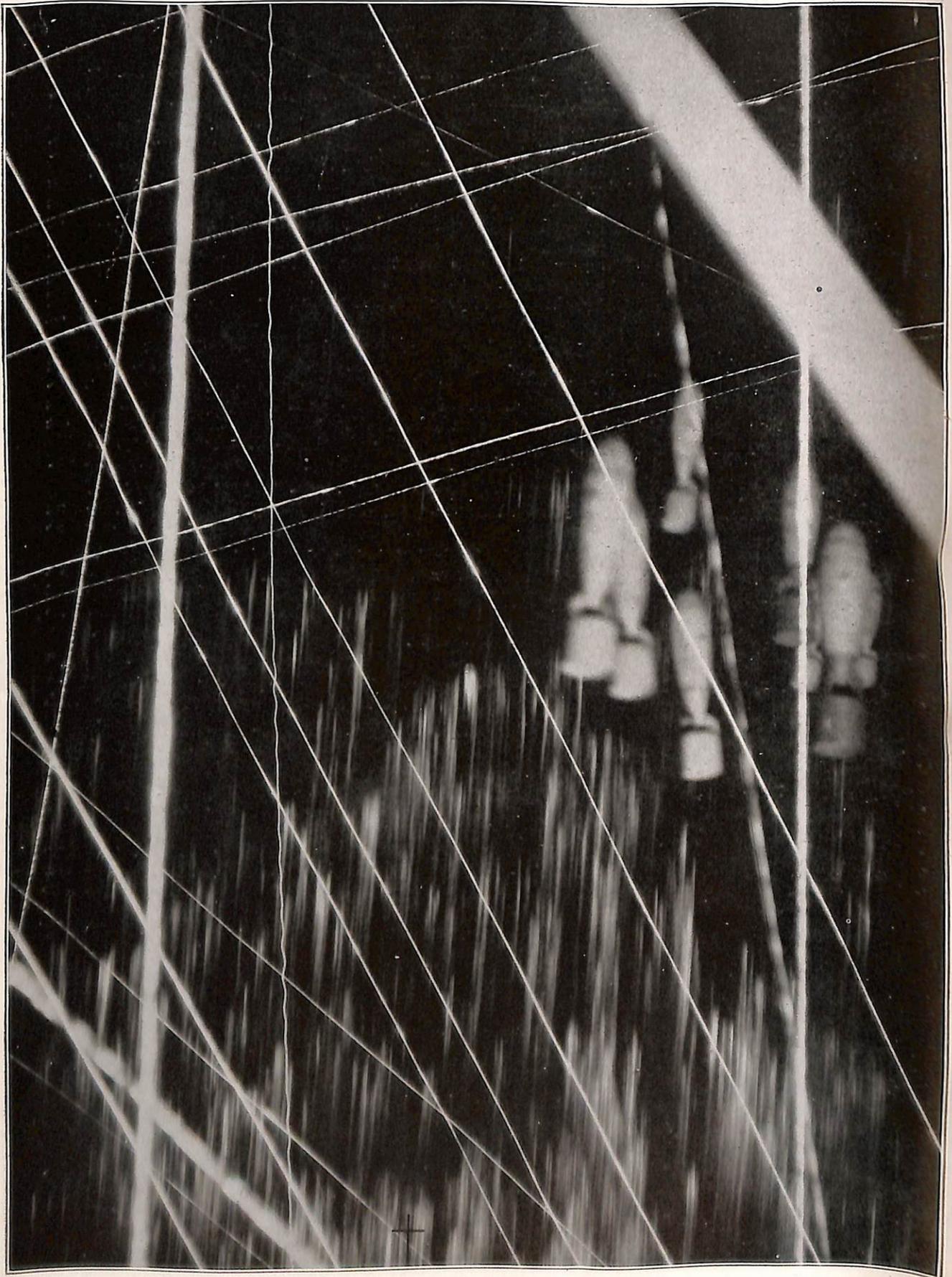
---

**HEADQUARTERS,  
COASTAL COMMAND  
ROYAL AIR FORCE**

**This book is secret. No quotations may be made without the authority of the Chief Intelligence Officer, Headquarters, Coastal Command.**

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

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



Shipping Strike : Bombs, searchlight, flak and tracer (these supply the only illuminant). Photograph by 320 or 407 Squadron.

# COASTAL COMMAND REVIEW

No. 5—September, 1942

## CONTENTS

	<i>Page</i>
Coastal Command, September, 1942 .. .. .	2
<b>I.—Anti-Submarine Activities</b>	
Anti-Submarine Operations, September .. .. .	3
September Attacks on Submarines .. .. .	3
Additional August Attacks on Submarines .. .. .	6
Cloud Tactics .. .. .	7
An Echo from the Past .. .. .	7
Anti-Submarine Bombsights .. .. .	8
<b>II.—Anti-Shipping Activities</b>	
Anti-Shipping Operations, September .. .. .	11
The Offensive Against German Coastal Shipping .. .. .	11
<b>III.—Combats</b>	
A Compliment .. .. .	13
Some Combats of September .. .. .	13
<b>IV.—Other Matters</b>	
A Guide to Frequencies .. .. .	16
How to Fly a Whitley on One Engine .. .. .	17
Six Days Adrift .. .. .	17
Why Publicity? .. .. .	18

## ILLUSTRATIONS

<i>Plate</i>	<i>Facing page</i>
1 ( <i>Frontispiece</i> ). Shipping strike .. .. .	1
2 Submarines attacked .. .. .	4
3 Crew of sunk submarine .. .. .	5
4 The explosion of a T.N.T. depth-charge .. .. .	8
5,6 Attack on a U-Boat: torpex explosions .. .. .	8-9
7 The residue of torpex explosions .. .. .	9
8 { Sperrbrechers .. .. .	} 12
Attack on enemy tanker .. .. .	
9 { Torpedo hits on enemy convoy .. .. .	} 13
British convoy .. .. .	

## CHART

Coastal Command Anti-Submarine Activities, September .. .. .	at end
--	--------

# COASTAL COMMAND,

## September, 1942

The month of September has made many calls upon the resources of Coastal Command, most particularly in the spheres of convoy protection and anti-submarine warfare.

The passage of the outgoing and incoming Russian convoys has occasioned the need for long-range and photographic reconnaissance on a scale unprecedented in this area, as well as strike aircraft to intercept enemy naval units which might move out to threaten our ships. Accordingly, a force made up of three types of aircraft was based in North Russia. This served to provide anti-submarine patrols as well as long-range reconnaissance in areas outside the range of home-based aircraft and contributed to the protection which the escort ships of the Royal Navy and the fighters of the Fleet Air Arm maintained throughout. As has been officially announced, these voyages were not made without some loss, but the ratio of ships sunk was low, and essential cargoes of large bulk and varied composition came safely into Allied ports. A full summary of the total operational flying is not yet available, but its volume may be gauged from the statement that 13 aircraft from one squadron flew 909 hours 30 minutes on this duty.

U-Boat sightings exceeded in number those of any previous month. In all, 120 sightings were made, or, excluding civil and other unarmed aircraft, 108. Sixty-seven U-Boats were attacked (62 per cent.) The majority of these attacks await assessment and include some of considerable promise, but already the bag contains one U-Boat unquestionably sunk (crew duly photographed after abandoning ship) and two assessed as probably sunk. There have been notable incidents, of which the attack on a U-Boat by a Liberator 850 nautical miles from base is one example. The U.S.N. Catalinas based in Iceland have given most valuable co-operation in this work.

Fighter opposition in the Bay of Biscay has, if anything, been intensified, a tribute to the effectiveness of anti-submarine patrols. In the many combats there, 10 enemy aircraft are known to have been destroyed and 15 damaged.

Weather and tactical consideration limited shipping attacks, but nevertheless pressure on enemy convoys was maintained. In all 79 sorties were made, resulting in attacks against 68 enemy ships. This includes an attack by a section of torpedo bombers who obtained 100 per cent. hits and sank at least one medium-sized merchant vessel.

P.R.U. activity, though slightly below the normal in flying time, included rather more than the usual number of outstanding sorties.

Meteorological Flights operated throughout the month with regularity. One of their Hudsons damaged an F.W. 200 in a combat off the coast of Norway.

Air/Sea Rescue saved 99 lives in home waters in September, bringing the total for the quarter to 314. This compares very favourably with the 405 rescued during the first six months of the year. In July and August, respectively, three-quarters and two-thirds were saved of all those known to have been in distress, who may conceivably have ditched successfully (excluding about 20 who were too near a hostile coast).

The flying hours of the Command may be of interest. August (operational 15,576 hours, non-operational 31,785) showed a decrease over July (operational 16,774, non-operational 36,919); the weather was much worse at practically all bases. The September figures are not available at the time of going to press.

# I.—ANTI-SUBMARINE ACTIVITIES

## Anti-Submarine Operations, September

The month has shown a further rise in the number of U-Boats sighted and attacked by aircraft of Coastal Command. Besides a dozen sightings made by aircraft on passage and by P.R.U., armed aircraft made 108 sightings and 67 attacks compared with 88 sightings and 62 attacks in August.

One attack by R/202 of Gibraltar in September led to an obvious sinking, and several more look promising—the results of official assessments will eventually be given in the Admiralty Red Book, the *Monthly Anti-Submarine Report* (C.B. 04050). Descriptions of some of the more instructive attacks follow in the next few pages, together with some of the previous month, details of which arrived late.

These sightings and attacks have been mainly on three fronts against U-Boats on passage, either in the Bay of Biscay and its approaches (39 sightings, 27 attacks, compare August's 41 sightings and 32 attacks) or in the area Iceland-Scotland-Norway (25 sightings, 17 attacks), and by aircraft defending three convoys—SC.97, HX.206, SC.100—to the south and south-west of Iceland (23 sightings, eight attacks). The chart opposite the last page shows the distribution of activity by both aircraft and U-Boats in the Western Atlantic during the month.

### Convoys

In September, 52 convoys and 16 independently routed ships were given protection, involving a total of 364 sorties; of the 279 aircraft sent as close escort, two-thirds succeeded in meeting their convoy, and 11 out of 15 their independents.

Again large numbers of sightings have been made on convoys attacked by packs of U-Boats, and almost all at long range south of Iceland. On 1st September the inward convoy SC.97, then in 58° N., 27° W., was escorted by four U.S.N. Catalinas, and a protective sweep laid on by three Hudsons of 269 Squadron; ten U-Boats were sighted and two attacked, the others diving too soon. The convoy was escorted the next day from 0700 to 2200, but no more U-Boats were sighted and no ships attacked. On the 14th, HX.206, near 57° N., 25° W., was protected by three Catalinas of 73 Squadron, two Hudsons of 269 Squadron, and a Liberator of 120 Squadron; six U-Boats were sighted and three attacked. On the 22nd SC.100 was attacked at about 59° N., 35° W., and two stragglers were sunk in the late evening. Two Liberators of 120 Squadron (one of which did not meet) and four Catalinas of 73 Squadron (none of which met) were sent as escort; two U-Boats were sighted and one attacked. The convoy was escorted the next day from 0900 to 1800 by aircraft of 120 and 73 Squadrons, but nothing was sighted. On the 24th

a Liberator, K/120, was engaged on a protective sweep round the convoy for eight hours and made five sightings and two attacks—the second with the one A/S bomb it had left over. U.S.N. Catalinas were also sent; they failed to sight the convoy, but found two U-Boats and attacked both of them. This convoy was not troubled again.

These attacks show clearly that aircraft are capable of breaking up pack attacks—other successes were obtained on the convoy PQ.14 from Russia to the United Kingdom, of which full details are not yet available.

Sightings of U-Boats obviously on passage in the Scotland-Iceland area have been made of 11 probably going north of the Faroes (nine attacks) and nine going south (six attacks). It looks as if they are trying to spread the danger by using both channels.

### Sightings and Attacks by Squadrons, September

	Sightings.	Attacks.
<b>19 Group.</b>		
10 (R.A.A.F.) Sunderlands, Mount Batten.	6	5
51 Whitleys, Chivenor .. ..	2	2
77 Whitleys, Chivenor .. ..	4	2
172 Searchlight Wellingtons, Chivenor and Wick.	2	2
235 Beaufighters, Chivenor ..	1	0
304 (Polish) Wellingtons, Dale ..	1	1
311 (Czech) Wellingtons, Talbenny	3	3
461 Sunderlands, Hamworthy ..	3	3
500 Hudsons, St. Eval and Stornoway.	4	2
502 Whitleys, St. Eval .. ..	6	4
10 O.T.U. Whitleys, St. Eval ..	8	6
<b>15 Group.</b>		
58 Whitleys, Stornoway .. ..	3	3
120 Liberators, Ballykelly and Iceland.	10	3
<b>18 Group.</b>		
48 Hudsons, Sumburgh .. ..	11	8
179 Searchlight Wellingtons, Wick.	1	0
210 Catalinas, Sullom Voe and Russia.	1	1
404 Blenheims, Dyce .. ..	1	0
612 Whitleys, Wick .. ..	3	2
1406 Met. Hudsons, Wick .. ..	1	1
<b>Iceland.</b>		
73 (U.S.N.) Catalinas .. ..	26	11
269 Hudsons .. ..	6	4
330 (Norwegian) Catalinas ..	1	1
<b>Gibraltar.</b>		
202 Sunderlands and Catalinas ..	2	1
233 Hudsons .. ..	2	2
<b>Miscellaneous.</b>		
P.R.U. .. ..	4	0
Chance sightings by transit aircraft	8	0
	<b>120</b>	<b>67</b>

## September Attacks on Submarines

### Harrying "Giuliana"

On the morning of 1st September, Sunderlands R/10, U/10 and A/461 were engaged on an anti-shiping patrol in the Bay of Biscay. While proceeding to the patrol area U/10 got a Special Equipment contact, 12 miles on the port beam, and on homing

sighted, at a range of five miles, a vessel that was emitting so much smoke that it was thought to be a merchantman. Approaching up sun and making use of cloud cover, the aircraft finally identified it as an Italian submarine, travelling at six knots. The submarine opened fire with

light flak from the after end of the bridge, but at 1028 hours the aircraft pressed home the attack from the port quarter, releasing a stick of four 250 lb. S.A.P. bombs while the submarine was still fully surfaced. Only one bomb was seen to explode, and this about 30 yards to port of the submarine, but yellow smoke immediately issued from its port quarter and continued for about half a minute.

At this point R/10 came on the scene, having obtained simultaneous Special Equipment and visual contacts at 10 miles range, and carried out two machine-gun attacks on the submarine from stern to bow, diving from 1,500 to 500 ft. and firing from nose and tail guns. The submarine replied from all gun positions, the cannon fire being intense. A few minutes later R/10 sighted A/461 one mile away.

Meanwhile, U/10 had turned to port in a wide sweep, and now attacked again from the starboard bow but, owing to an error, the bomb did not release. Eight minutes later R/10 attacked from the submarine's starboard beam with two 250 lb. S.A.P. bombs, turning to repeat the same manoeuvre with one more bomb. None of the bombs fell sufficiently near the submarine to do appreciable damage. After R/10's second bomb attack the submarine ceased fire and did not fire again owing to casualties caused by the aircraft's tail guns. R/10 sustained several hits but suffered no casualties. Throughout the action a large volume of bluish-brown smoke came from the submarine's diesel exhausts, clouds of it trailed astern for half a mile.

The three aircraft on the scene (R/10, U/10, A/461) then contacted each other by R/T, and from 1035 to 1125 circled the position, arranging a concerted attack, but before this could be put into effect orders were received from base to continue with the anti-shipping patrol. The submarine could consider itself lucky that the aircraft were all carrying anti-shipping armament and had a major objective which precluded the use of every bomb. (44° 40' N., 06° 05' W.)

At 1140 on the following day **Wellington A/304** came across what was probably the same submarine, travelling at 8 knots, some 80 miles to the westward. An attack was made up track, and four out of the six depth charges fell alongside the submarine, which was completely obliterated by the spray. On the run up, the aircraft machine-gunned the U-Boat and several of the crew collapsed on the deck. The submarine did not reply, except by firing two five-star red cartridges. Immediately after the explosions, an oil-patch 400 ft. across appeared, and the submarine soon lost way and came to a standstill. The aircraft circled again and made two bomb attacks, releasing one 250 lb. A/S bomb on each occasion, but missed by 10 and 20 yards respectively. The **Wellington** circled again and made five machine-gun attacks, expending 2,500 rounds. As a result, ten men in bathing costumes dived off the submarine, and three or four more collapsed on the deck and fell into the sea. The submarine now had a heavy list to port and was well down at the bows; part of the starboard forward hydroplane showed. When the aircraft had to return to base at 1230 hours, the submarine was still stopped and down by the bows, and the oil-patch had grown to about 500 yards across. This attack evidently inflicted severe internal damage on the

submarine and temporarily crippled it. Photographs reveal that the fore hydroplanes were turned out and presumably jammed in a "Hard to Rise" position. Subsequent information shows that this submarine was the *Giuliana*, which arrived in Santander in a damaged condition the next day. (See Plate 2.) (44° 30' N., 04° 42' W.)

#### A Searchlight Attack

**Wellington E/172**, flying north of the Shetlands on the night of 2nd-3rd September, obtained Special Equipment contacts at 2341 hours and 0036 hours, but lost them both after four or five minutes. At 0100 hours it was decided to approach the position of the previous contacts up moon. Two minutes later another contact was received 7 miles ahead and at 0105 hours a U-Boat was sighted by moonlight 3-4 miles ahead travelling at 10 knots. As the aircraft approached the searchlight was switched on, and an unidentified object, possibly a smaller U-Boat, was caught in the beam before it was directed over to the U-Boat, which was actually attacked. The attack was made from the port bow, with four torpex depth-charges, while the whole U-Boat was still on the surface. At the same time about 300 rounds were fired by the gunner at point-blank range. The depth-charges straddled the target abaft the conning tower, all in a group, because the aircraft was not flying level. The U-Boat was covered with spray and foam, but no positive evidence of damage was obtained. (64° 17' N., 00° 30' W.)

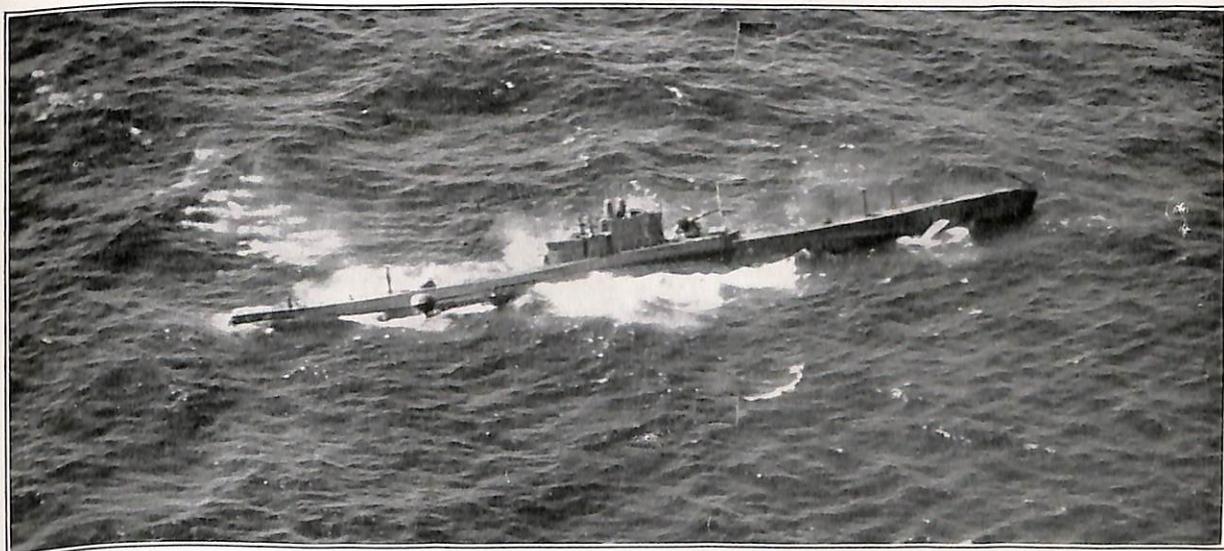
#### A Complete Surprise

While flying at 4,000 ft. at mid-day on 7th September, **Wellington Q/311** sighted a German-type U-Boat on the surface 4-5 miles dead ahead, travelling westwards at 8 knots. The aircraft made for a patch of cloud to starboard, and achieved a complete surprise, diving out of the cloud on the fully surfaced U-Boat from its port bow, and dropping six torpex depth-charges. During the run up the **Wellington** machine-gunned the U-Boat, which replied from a cannon manned by three men, mounted at the after end of the bridge. The last three depth-charges in the stick straddled the U-Boat's bows. While the aircraft was circling to port to gain height for a bomb attack, the U-Boat turned through 180° leaving a trail of oil. Then the bows went under, but almost immediately re-appeared, and shortly afterwards the whole boat broke surface and remained stationary. The second attack with A/S bombs, was carried out from 500 ft., with only the conning tower and stern showing above water, the bows once more below the surface. Both bombs burst close together about 20 yards from the estimated position of the U-Boat's port quarter. The stern disappeared leaving the conning tower surrounded by an oil-patch 100 ft. across, with large air bubbles coming up in bursts every now and then in addition to a continuous stream of small bubbles. One minute later the conning tower slowly disappeared but the patch of oil and bubbles was still there ten minutes after this, when the aircraft had to return to base. This attack was probably not lethal because of insufficient depth, but the U-Boat was undoubtedly most seriously damaged. (46° 55' N., 08° 55' W.)

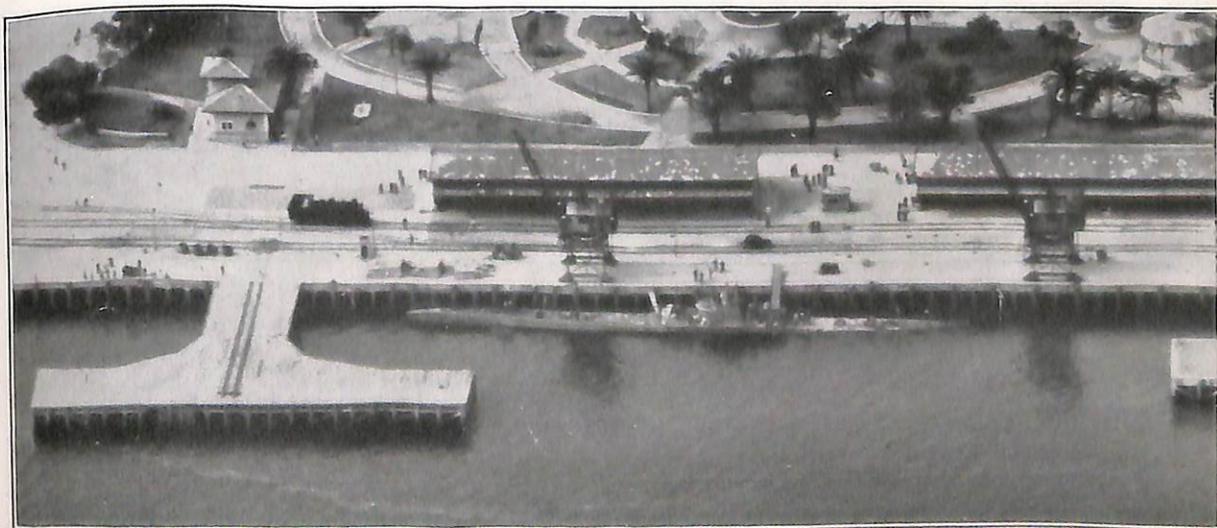
On the way home the **Wellington** encountered a **Ju.88** about 130 miles off Ushant. The **Ju.** climbed to 1,000 ft. above the **Wellington** and



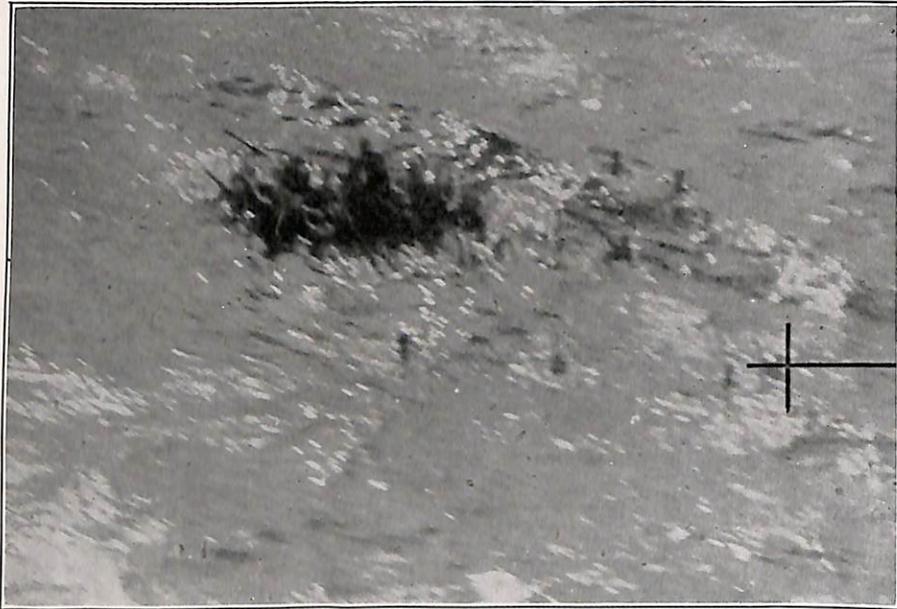
**Japanese Submarine Attacked by B/202** off the north-west corner of Spain, 1st August. The high gallows, thick aerial wires, and vertical rudder, can belong to no other Axis submarine than a Japanese. The Japanese have boasted that they would use submarines to take important people between Asia and Europe, and some of their craft are known to have the necessary endurance. The visit of a Japanese submarine to a German port (presumably in France) has now been announced by the enemy.



**Italian submarine "Giuliana"** being machine-gunned by A/304 after depth charge attack, 2nd September (see page 4.)



**Italian Submarine "Giuliana,"** damaged, at Santander.



Crew of Submarine Sunk by R/202, 14th September : Men in life jackets in the water and in a dinghy, amid diesel oil. The swirl left by the foundering submarine can be seen in the top picture. (See page 5.)

dived to attack, but Q/311 dived for cloud cover, and then turned hard to starboard; the Ju. was not seen again. (48° 08' N., 08° 18' W.)

#### A U-Boat on Fire

At 0315 hours on 8th September, **Wellington E/172**, in the Bay of Biscay, flying at 1,500 ft., in good night visibility, received a Special Equipment contact at a range of 10 miles. At 6½ miles range the blip became steady and the aircraft homed. The searchlight was switched on at ¾ mile and a U-Boat was illuminated half a mile ahead, making 8 knots. The U-Boat was in the act of diving, and an attack was made when only the periscope was visible; four torpex depth-charges were dropped from 40 ft. The conning tower re-appeared in the spray of the explosions. The aircraft then turned back towards the position of attack, and picked up the U-Boat again in the searchlight beam. Flames and smoke were coming from the conning-tower. The rear gunner fired 150 rounds as the aircraft passed over. The pilot turned again and made a third run at about 600 ft. Flames were still coming steadily from the conning tower. Again the rear gunner fired 150 rounds. At 0339 the flames spluttered and went out, and the pilot decided to adopt baiting procedure. As the aircraft flew away the flames burst out again, but when the aircraft returned at 0355, no further sign of the U-Boat could be found.

It would appear that the depth-charges must have shattered part, or all, of the batteries and the resultant short circuits and blow outs set fire to splintered woodwork inside the boat, making such a blaze that it sent flames out of the conning tower. Whether the fire was put out, or whether it burned itself out, with the crew included, cannot be established, but as the Special Equipment did not pick the U-Boat up again, in spite of a long search, she was presumably no longer on the surface, yet can hardly have been in a fit condition to dive normally, and so probably had foundered. (47° 17' N., 07° 50' W.)

#### A Model Attack

On 9th September, eight days after its inconclusive encounter with the Italian submarine that was subsequently forced into Santander as a result of an attack by a Polish **Wellington, Sunderland R/10** was again flying in the Bay, at a height of 3,500 ft., when a weak Special Equipment blip was received at 18 miles on the port bow. At 10 miles the contact grew strong. R/10 continued to home just above the thin layer of cloud at 2,000 ft., and at five miles range descended through it to sight a dark grey U-Boat right ahead. The pilot climbed back into cloud, and again broke through at 3 miles range, then dived at 195 knots, turning slightly through the 3/10ths cloud. Finally breaking cloud at 400 ft., the U-Boat was seen 1½ miles away on the surface, travelling at 8 knots. The aircraft turned slightly to starboard, observing men on the bridge and one man running along the upper deck, and circled astern at a range of 1 mile, where it climbed to 900 ft., waiting for the U-Boat to submerge. When the Sunderland was 1 mile on the starboard beam the U-Boat began to dive, and the aircraft turned and attacked from its starboard bow, releasing six torpex depth-charges with spoiler nose and tails (set to 25 ft., spaced at 21 ft.) from 50 ft. while the top of the conning

tower and the stern were still above water. The stick straddled the U-Boat's bow abaft the stem, three depth charges on either side; they should have exploded just before the conning tower. The explosions were particularly heavy, and two minutes later, large air bubbles effervesced for five minutes over an area 50 ft. across, 50 yards from the inside edge of the explosion mark. Large oil bubbles also appeared over the whole explosion mark and continued for a quarter of an hour, when the aircraft left to adopt baiting tactics. Nothing new was observed when it returned 40 minutes later. This model attack undoubtedly inflicted severe damage to the U-Boat. (46° 08' N., 08° 43' W.)

#### A Very Good Unorthodox Attack

At 1411 hours on 10th September, **Whitley N/10 O.T.U.**, flying in the the Bay of Biscay at 1,500 ft., sighted a U-Boat at a distance of 1½ miles. It was making 10 knots. The aircraft dived steeply, attacked from the starboard quarter and released four 250-lb. depth charges from 30 ft. while part of the conning tower was still visible. They dropped in a salvo, exploding 12-15 ft. ahead of the swirl, and as spray subsided, 10-12 ft. of the bow came out of the water at a very steep angle; this appeared to hang for a moment and then gradually sank, still at a steep angle, and finally disappeared quickly. A stream of air bubbles lasted for 2-3 minutes. The depth charges probably exploded close under the bottom of the U-Boat and blew the bows upwards, but as no photographs are available, a claim to a kill cannot be pressed. (44° 13' N., 11° 32' W.)

#### Hudson P/48 on 13th September

At 1212 hours this aircraft, flying near the Faroes at 700 ft. at cloud base, sighted a U-Boat 2 miles away. The aircraft dived and attacked from the U-Boat's starboard quarter across the line of its advance, and released four torpex depth-charges from 400 ft. while the conning tower was just disappearing. A yellow-jacketed body was left in the water; perhaps the last of the bridge look-outs could not get down the conning tower in time. The centre of the stick fell about 20 yards ahead of the swirl. There were two explosions on either side of the line of advance. Number 2 depth-charge did not appear to explode with such force as the other three, but caused greater turbulence over a larger area. After the explosion had settled a series of large bubbles appeared, closely followed by dirty brownish oil which spread in an oval shape to about 100 yards in length and 60 yards across. Twelve pieces of debris, roughly a foot long, were seen floating in the oil patch. The U-Boat must have been seriously damaged, if not destroyed. (63° 18' N., 04° 03' W.)

#### A Definite Kill

(No)

On 14th September, **Sunderland R/202**, was off the coast of Algeria, flying at 800 ft., when at 1430 hours an object was sighted 5 miles away. At 2 miles distance this was identified as a submarine painted grey and green. The aircraft approached from astern so that the enemy's main gun could not be brought to bear, but there was some light flak, which ceased when the aircraft's front gun opened up. An attack was made from 50 ft. and five torpex depth-charges were released while the submarine was still fully surfaced. One hung up, and of those which

dropped, one took the fusing link with it. Two depth-charges fell on the starboard side just forward of the conning tower, and the other two alongside the port bow. Immediately the submarine lost all way, and oil gushed out all round it. It then steamed slowly round in circles, keeping the gun trained and firing at the aircraft, until 35 minutes after the attack, when it gradually sank bow first. About 40 survivors were left floating in the water of on their dinghy. (Plate 3). (37° 28' N., 04° 34' E.)

#### A Whitley's Probable Kill

At 1501 hours on 15th September, **Whitley Q/58**, flying at 6,700 ft., sighted a U-Boat at a distance of 7 miles. It was making 10 knots. The aircraft turned and broke cloud at 3,000 ft., then attacked from the U-Boat's port quarter with five torpex depth-charges released from 20 ft., while the U-Boat was fully surfaced. The depth-charges straddled it; three fell short to port, one made a direct hit on the bridge, and one fell beyond to starboard. As the explosions subsided the bows

were seen sticking out of the water at an angle of about 15°. The aircraft turned to make another attack. The bows of the U-Boat slid under just before the release of the remaining depth-charge, leaving on the surface an oil-patch, about 90 yards long and 25 yards wide, in the centre of which were many bits of wood, which looked like broken up duckboard, a black object shaped like a drum, and pieces of orange-coloured stuff, a foot or two across, irregular in shape and curled up at the edges like scraps of orange peel (painted plywood?). The remaining torpex depth-charge exploded in the centre of this oil and debris, 5 seconds after the bows had gone out of sight, but no further results were seen. The aircraft dropped a submarine marker, and flew away northward, returning to the scene 20 minutes later, and then making a square search until 1545 hours, without results. The wreckage and debris seen after the main depth-charge attack, together with the quantity of oil, indicate that total destruction is more than likely. (59° 49' N., 09° 28' W.)

## Additional August Attacks on Submarines

### Gun Duels with Italians

When **Hudson A/233** was flying at 3,500 ft. over the western Mediterranean at 1850 on 8th August, an object, at first thought to be a destroyer, was seen 4 miles away on the starboard bow. It turned out to be a submarine making 15 knots; it was thought to be of the Italian Argonaut class. The Hudson attacked from the submarine's starboard quarter, releasing four torpex depth-charges from 200 ft., 5 seconds after it disappeared. At least one depth-charge exploded near enough to the submarine to shake it up, but probably no damage was done. As the aircraft came round in a steep climbing turn to the left, however, the submarine surfaced, with its bow steeply out of the water. The Hudson's front guns opened fire and the submarine replied with heavy and light flak; this dual continued for half an hour until the aircraft reached P.L.E., while the submarine made off on the surface towards Sardinia. Possibly the Italians had preferred to fight it out on the surface, assuming that the aircraft had no more depth-charges left; on the other hand, the concussion may have jammed the after hydroplanes and made the submarine unmanageable under water. (38° 26' N., 02° 00' E.)

On 12th August **Hudson R/233** was flying at 2,000 ft. in the western Mediterranean, when a stationary submarine was sighted 3 miles away at 0950 hours. It was still on the surface when the aircraft released four torpex depth-charges, which straddled it between the conning tower and the stern, with No. 3 very close to the port side. By the time the aircraft had done a steep turn to the left, the submarine had dived, but four minutes later it reappeared. The Hudson opened fire, and 6-10 men who appeared on the conning tower replied with flak from light guns on the bridge and the main gun forward of the conning tower. This duel continued for 40 minutes until the Hudson reached P.L.E. and had to return to base. The tactics employed by this submarine of preferring to engage the aircraft on the surface when reasonably certain that no depth-charges remained, bear a strong resemblance to those of

the submarine attacked by A/233 on 8th August. (37° 23' N., 01° 02' E.)

At 1331 hours on the same day, **Hudson C/233** on a strike against the submarine already attacked by R/233, got a Special Equipment contact dead ahead at a range of 25 miles. The aircraft homed to 6 miles before sighting a submarine, making 9 knots. From its description it was evidently the submarine already sighted and attacked by R/233. The submarine opened fire at the aircraft at a range of 1½-2 miles. At 1331 hours the pilot attacked from the port quarter, releasing one torpex depth-charge, which exploded harmlessly on the starboard bow. The pilot attacked again from the starboard bow, when, in spite of the aircraft being hit in the port engine and severely damaged, another depth-charge was dropped directly under the bows. As the Hudson passed over, it raked the decks with machine-gun fire. The forward hydroplanes were seen to be bent and one-half blown off (this may explain why it had resurfaced when attacked by R/233). The damage to the port engine compelled the pilot to leave immediately after the second attack. While the pilot's decision to persevere with single depth-charge attacks in the face of accurate flak was most praiseworthy, it would have been better to use the whole stick in an up-the-track attack. Even though the existing depth-charge armament is known to be not fully lethal to a fully-surfaced submarine, a stick may produce a cumulative effective that is unlikely to be obtained by a succession of single depth-charges. (37° 45' N., 00° 58' E.)

### Liberator F/120 on 18th August

This aircraft was flying at 2,500 ft. on convoy escort duty in the Atlantic when it sighted, at 1846 hours, a U-Boat 6 miles away, travelling at 10 knots. A down-sun attack achieved complete surprise, six torpex depth-charges being released from the starboard quarter while five men were plainly visible on the bridge gazing up at the aircraft. The stick straddled the U-Boat, but from past experience it is known that torpex depth-charges, unless fitted with special devices,

are not lethal to a U-Boat on the surface. However, during the explosions the U-Boat appeared to rise bodily in the water, and a large black object, about 6-8 ft. long and slightly curved, rose to a height of 60 ft. in the air; this was probably one of the hydroplane guards. When the spray subsided, the U-Boat was seen almost stationary on the surface, submerging slowly until only the top half of the conning tower remained in view; it then completely surfaced again. There was a large patch of oil in the middle of the explosion marks, and a trail of oil was issuing from the U-Boat. As the U-Boat turned slowly to starboard, the Liberator attacked with cannon and machine-gun fire, then climbed to 850 ft. and attacked down-wind with A/S bombs. One burst 25 yards to starboard of the conning tower, and the other, released on a second attack, in the swirl of the U-Boat, which had again submerged slowly. Six minutes later the U-Boat was found to be moving slowly round in a circle with the periscope visible. At this point the aircraft unfortunately had to return to base, owing to the approach of bad weather. This attack undoubtedly led to severe damage to the U-Boat concerned. (41° 46' N., 19° 40' W.)

### Two U-Boats in Two Hours

**Liberator H/120** on convoy escort duty in the Atlantic, was flying at 2,000 ft. at 0725 on 19th August, when a 750-ton U-Boat was seen at extreme range of visibility, 3 miles on the port bow, and 11 miles from the convoy. The U-Boat was making 12 knots. The aircraft opened fire with cannon as it approached the U-Boat's starboard bow, and dropped six depth-charges from 75 ft. on the fully surfaced U-Boat. All the depth-charges exploded, the last two right against the hull at the stern. Five seconds after the explosion the U-Boat went down very quickly bow first;

the stern stood out of the water very steeply for about 20 seconds before disappearing. Three-quarters of a minute after the attack, an uprush of water was seen. (43° 13' N., 17° 47' W.)

Two hours later the same aircraft, flying at 3,000 ft., sighted another U-Boat making 10 knots, 5 miles on the port bow. This was 21 miles from the convoy. The Liberator attacked from the port bow with cannon fire, but the U-Boat very slowly dived, being only half-submerged 50 seconds after the first cannon attack. An oil streak marked the course of the U-Boat after it submerged. A surface vessel, summoned to the spot by R/T, could get no contacts, though the aircraft had dropped smoke-floats, flame-floats and sea markers to help it. (43° 21' N., 17° 40' W.)

### Hudson A/500 on 24th August

At 1700, the aircraft was flying at 5,000 ft. between Iceland and the Faroes, when it sighted a U-Boat moving west at 10 knots, 10 miles on the port bow. The aircraft immediately dived to sea level, flattening out about 2 miles away from the U-Boat which at that moment began to dive. The Hudson attacked from the U-Boat's port quarter, releasing four torpex depth-charges (two with nose and tail fittings) from 100 ft. No. 2 fell 20 ft. right ahead of the still visible conning tower, and immediately afterwards the U-Boat's stern came out of the water at an angle of 50°. This depth-charge was correct for range and line, and should have been lethal for depth. As the aircraft turned to port, the U-Boat disappeared, but a minute afterwards an oil-patch appeared around the site of this partial re-surfacing. At first it was 70 yards across, but it increased enormously, so that it could be seen from 20 miles. This oil indicates a distinct probability of damage having been caused. (63° 15' N., 11° 28' W.)

## Cloud Tactics

Extract from a recent Form Orange:—

- 1744 hours. U-Boat sighted on surface 12 miles distant.  
 Cloud 5/10 Cu. at **3,500 ft.**  
 Height of aircraft, **3,000 ft.**  
 Aircraft turned towards U-Boat losing height.  
 When 3 miles distant U-Boat was completely submerged.
- 1751 hours. Aircraft set course — to employ baiting procedure.
- 1844 hours. Aircraft whilst returning to U-Boat position sighted U-Boat once again, 15 miles dead ahead.  
 Cloud 5/10 Cu. at **3,500 ft.**  
 Height of aircraft, **4,000 ft.**  
 Aircraft approached in cloud at 4,000 ft., commenced diving when 2 miles distant, and passed 50 ft. over U-Boat whilst stern was still visible.  
 Depth-charges were released and straddled U-Boat between conning tower and stern.

The first is an example of a thoughtless and badly carried out attack. The pilot wasted his height advantage by diving at once towards the U-Boat. He should have remained as high as he could for as long as he could, so that he could maintain to the last possible moment the advantage of surprise. After this experience, he made his second approach so as to get the maximum advantage from surprise, and this time made a well thought out and well carried out attack. The whole episode is a perfect example of the soundness of baiting tactics.

The patrol heights laid down in Coastal Command Instructions have been questioned, but their soundness is evident from the increase in the number of U-Boats sighted. Good attacks will follow such sightings only if pilots have practised and know exactly how long it takes them to get down from their operational height, and how close they can get to a submarine before losing height.

## An Echo from the Past

It seems inevitable that the experiences of one generation should be largely lost or disregarded by those which follow, with the result that much information already gathered together has to be laboriously and painfully acquired again.

(C46776)

Yet another example of this has come to light recently. In April, 1918, the Admiralty published a book entitled *Notes on Aids to Submarine Hunting*, which summarised the conclusions of nearly four years of anti-submarine warfare

waged by the Airship Department. It would have been valuable for its photographs alone: it is remarkable, however, for its up-to-dateness and application to current problems. If both the book and its author, Major J. G. Struthers, D.S.C., Royal Air Force, had been used in the early days of the war, much experimentation would have been avoided, and the present stage of anti-submarine efficiency would have been reached earlier and would have been by now surpassed. As it was, the book was only discovered through a chance contact with the author within the last few weeks.

To-day the book is largely of historical interest because most of the points made have been re-discovered. We have learnt once more the relation between oil streaks and submarines: and from long observation that the swirl is made by the conning tower and, from trials with the *U 570* (H.M.S. *Graph*), its position in relation to the swirl. After a period of costly disregard for tactics, we have found out that clouds provide cover and a cloak of invisibility: and we have prided ourselves on our ingenuity in developing baiting tactics. Yet these, and many other now accepted usages, were commonplace at the end of the last war.

Major Struthers raises one point, however, which is still as important as it ever has been—and perhaps even now is not sufficiently realised.

"It must be continually borne in mind that although the work is one of the most interesting duties of the war, it is at the

same time one of the most difficult, and that the great success (*i.e.*, destroying a submarine) only comes to that officer who is content to spend countless hours efficiently working his patrol and waiting his chance. It is of the utmost importance that the junior pilot should realize to what a very great extent success depends upon paying attention to detail. It is rather a mistake to have a too optimistic view of the work at the commencement, and each pilot should realize that he has a most difficult job in front of him. Submarine hunting is a serious sport in which the fish are very wary and not at all keen to rise to the fly. Great patience must be displayed and a constant and continual watch kept.

As Captain of the patrol airship it is the business of the pilot to keep his crew interested in the work. . . ."

Leadership and team work are as vital to success to-day as they were then. Enthusiasm, intimate knowledge of every aspect of the work and crew discipline are as important as ever they were. Basically, the responsibility for inculcating these qualities still rests with the Captain of the aircraft—more than any other it is up to him to train his aircrew to the high standard necessary. At the same time others share this responsibility with him—his Flight Commander, Squadron Commander and, indeed, his Station Commander, all have a part to play in this. Leadership is the concern of all.

## Anti-Submarine Bombsights

The U-Boat differs from most targets in two important respects. In the first place it does not usually defend itself, preferring to dive rather than shoot back at its attackers, and secondly, when once it has dived it presents an unseen but moving target whose position can only be estimated in relation to the swirl left where it dived. It is also very small, and since the lethal area of the weapons which an aircraft can carry is also small, it follows that an exceptionally high degree of accuracy is required for a kill. But this is made easier to some extent by the ability of the aircraft to make its attack from a very low height without undue risk.

The tactics then of a U-Boat attack present a very special problem, and if a bombsight is to be used it must be designed accordingly. For this reason none of the half-dozen or so existing bombsights has been found to be of any use, since all of these were designed for bombing static targets from high or medium altitudes. The only possible exception is the Hand-Held sight, but even that is more suitable for static targets such as the gas-works depicted in the official publication about it. The lack of any suitable sight has resulted in many pilots becoming resigned to bombing by eye, but during the past few months attention has been drawn to the need for a proper sight by the many suggestions put forward by flying men themselves. It is therefore considered that a brief outline of the problem and a description of some of the suggestions which have been made may help to clarify the situation. Some more complicated proposals, now under consideration, are not dealt with in this article, which is only concerned with the not-so-distant future.

### Outline of the Problem

What the pilot wants to know, ideally, is the course that will bring the aircraft over the U-Boat and the right moment at which to release the first depth-charge of his stick. The former is determined by the course and speed of the U-Boat, its bearing from the aircraft, and the direction and speed of the wind. After the U-Boat has submerged its position is unknown, but may be estimated by the swirl left when it dives and the time for which it has been under, on the assumption that its course remains unaltered. This assumption is valid only for U-Boats which have been submerged less than 30 seconds: those which have been under for a longer time must be ignored from the point of view of a bombsight, since the uncertainty in their position will be greater than the bombing error.

The correct moment of release depends on the ground-speed and height of the aircraft, the stick length and ballistics of the depth-charge or bombs, and also on whether the attack is delivered in a dive or when flying level.

The ideal sight would not only take all these factors into account, but would also be ready to give the answer at once without the necessity for a long run-up to the U-Boat. Needless to say, a sight which does *all* this is not likely to appear for some considerable time, and the only practical thing that can be done is to find out which of the factors above can be treated as non-variable or insignificant without limiting the tactics of the attack to an impossible degree, and to design a sight which takes account of the rest. In fact the value of an A/S bombsight at this stage of the war must be measured in terms of its simplicity of manufacture and use, its accuracy, and the degree of tactical freedom which it will allow.



1. The splash of entry.



2. Spray of the splash subsiding.



3. Spray still subsiding.



4. Spray practically subsided.



5. Explosion disturbance beginning.



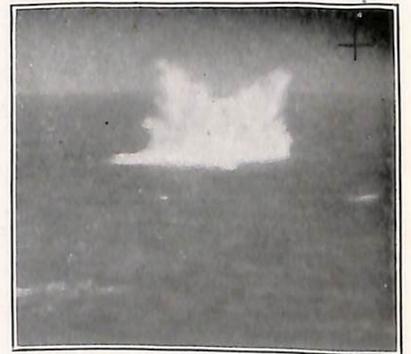
6. Disturbance expanding.



7. Disturbance further extended.



8. Disturbance reaching its peak.



9. Peak of disturbance.



10. Disturbance beginning to subside.

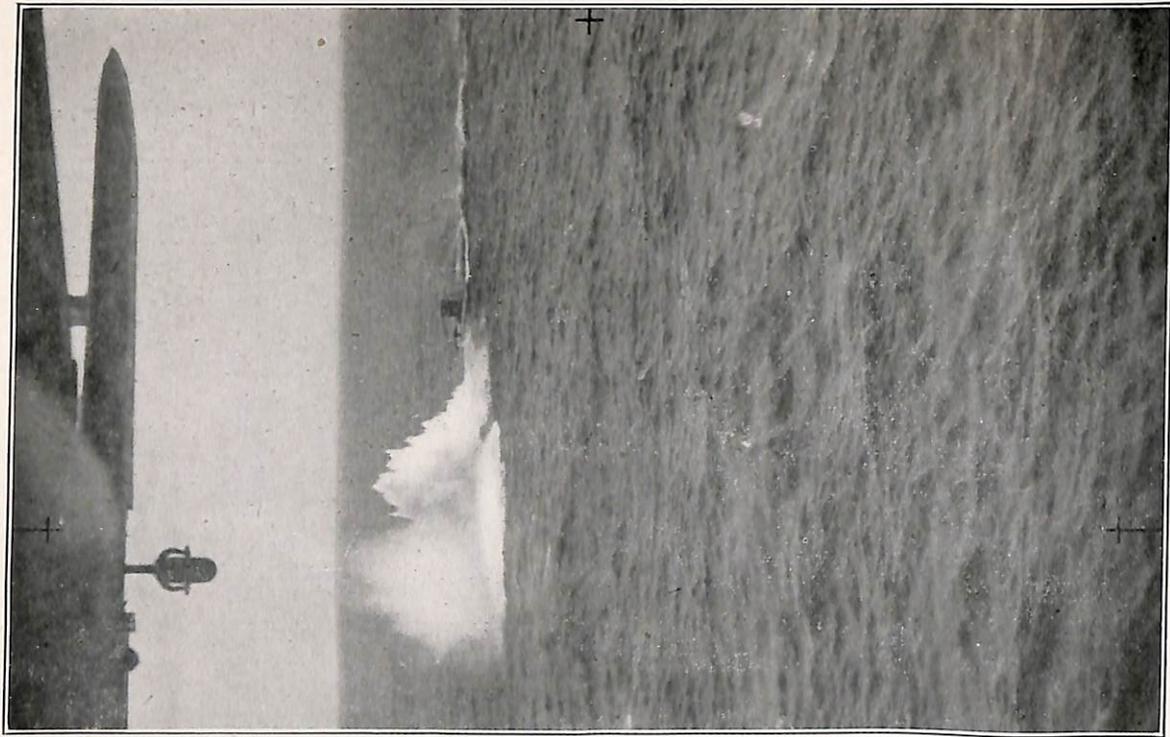
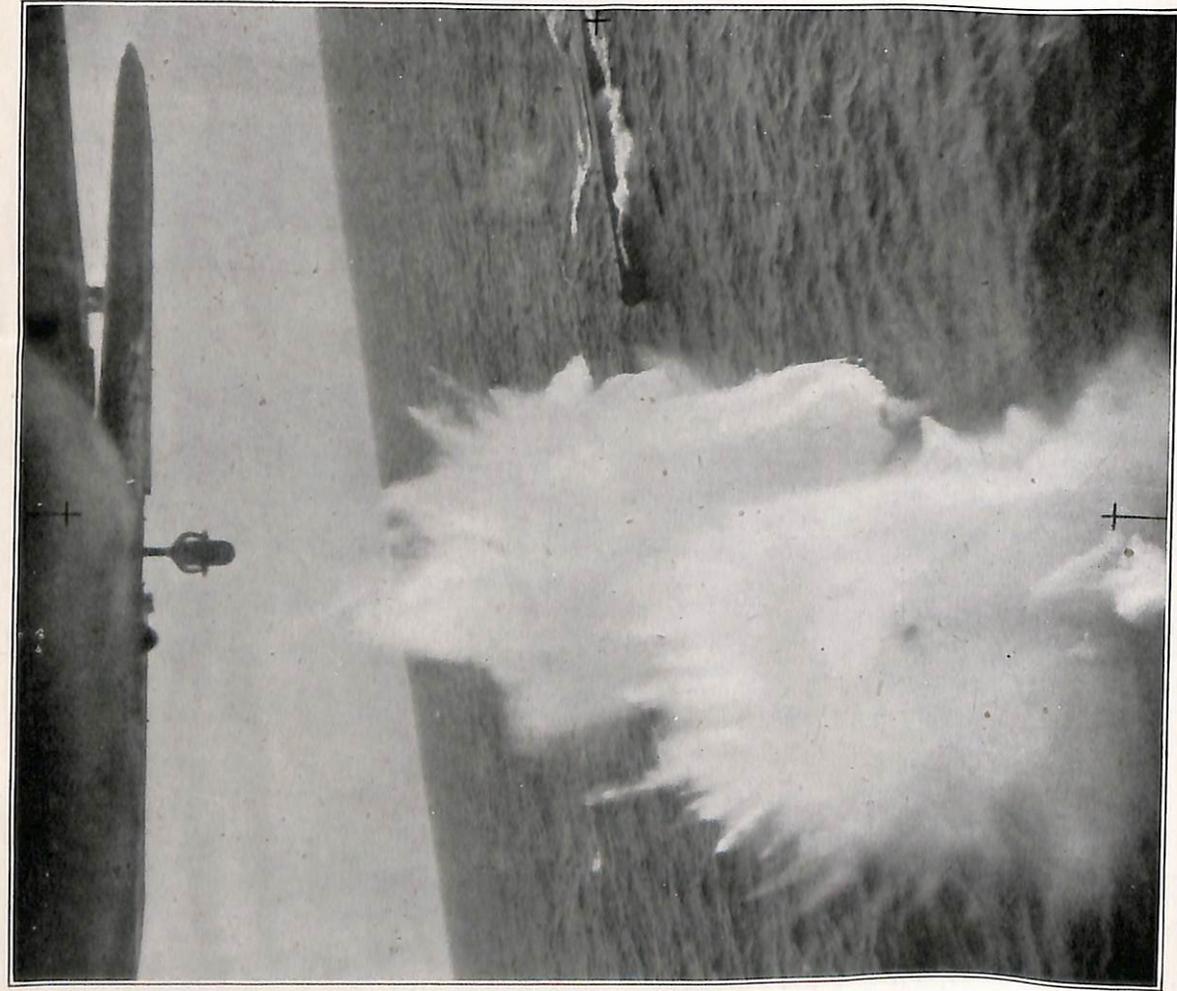
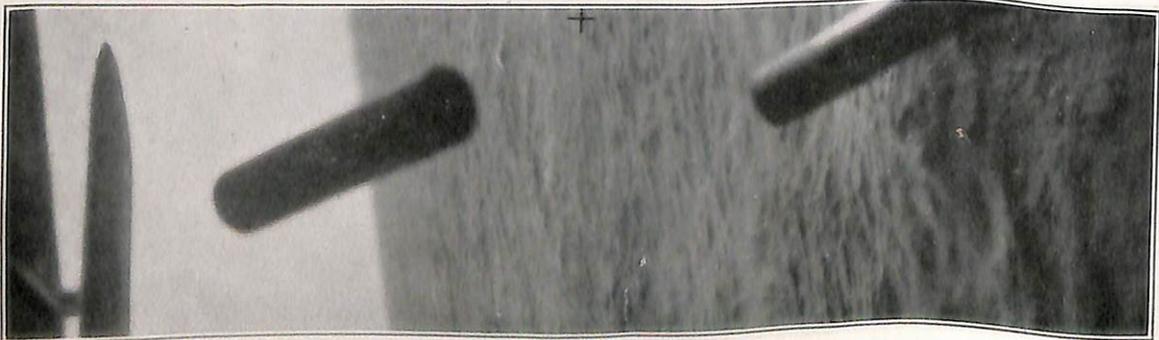


11. Disturbance subsiding.



12. Disturbance almost subsided.

The Explosion of a T.N.T. Depth-charge : Photographed at intervals of 7/10ths of a second. Smoke float in foreground. (5 O.T.U.)

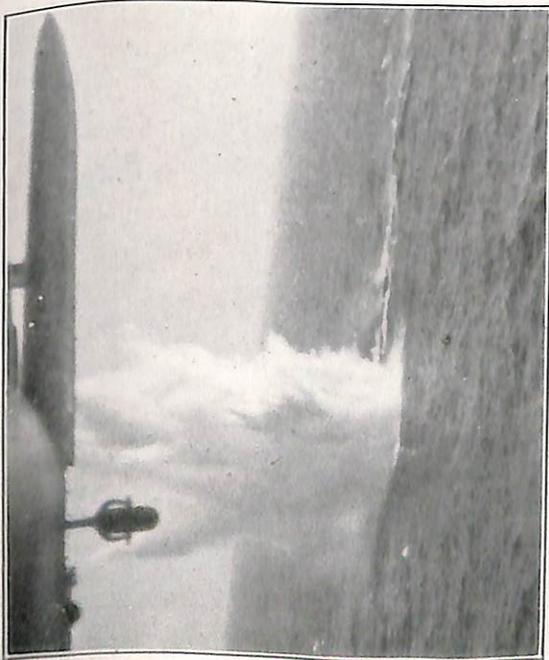


P 77's Attack on a U-Boat, 3rd September : **Torpex Explosions** : The crew of P 77 which made the attack, believed the depth-charges had straddled the line of advance, until they saw their photographs developed.  
In actual fact the stick overshoot and all but one fell to port.

1. The depth-charges falling.

2. The splashes of entry.

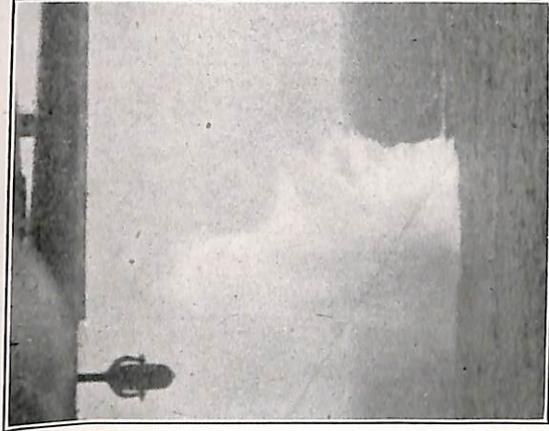
3. The splashes subsiding and the explosion disturbance beginning.



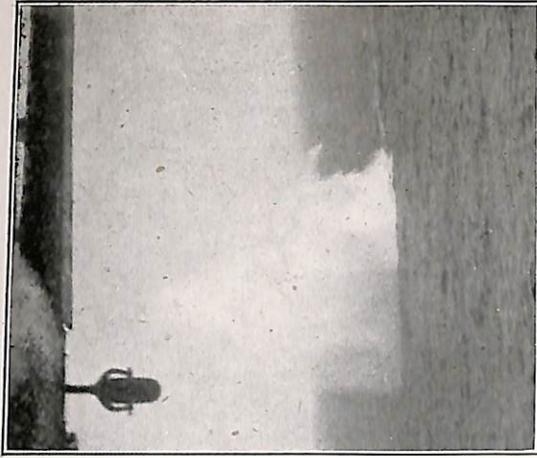
4



5



6



7



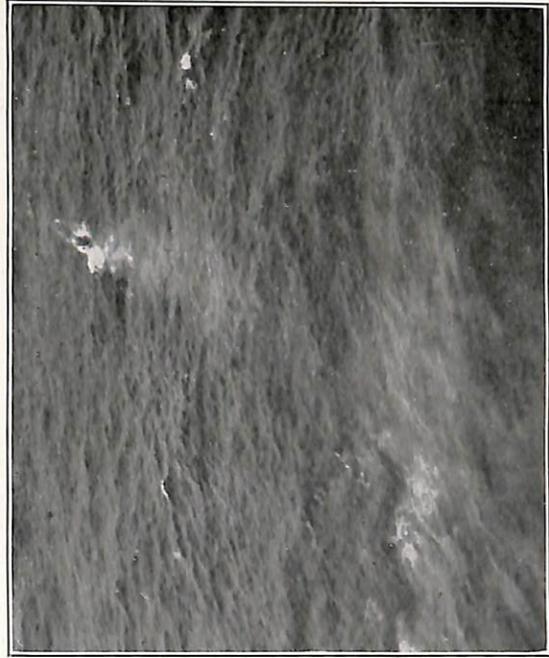
8



9

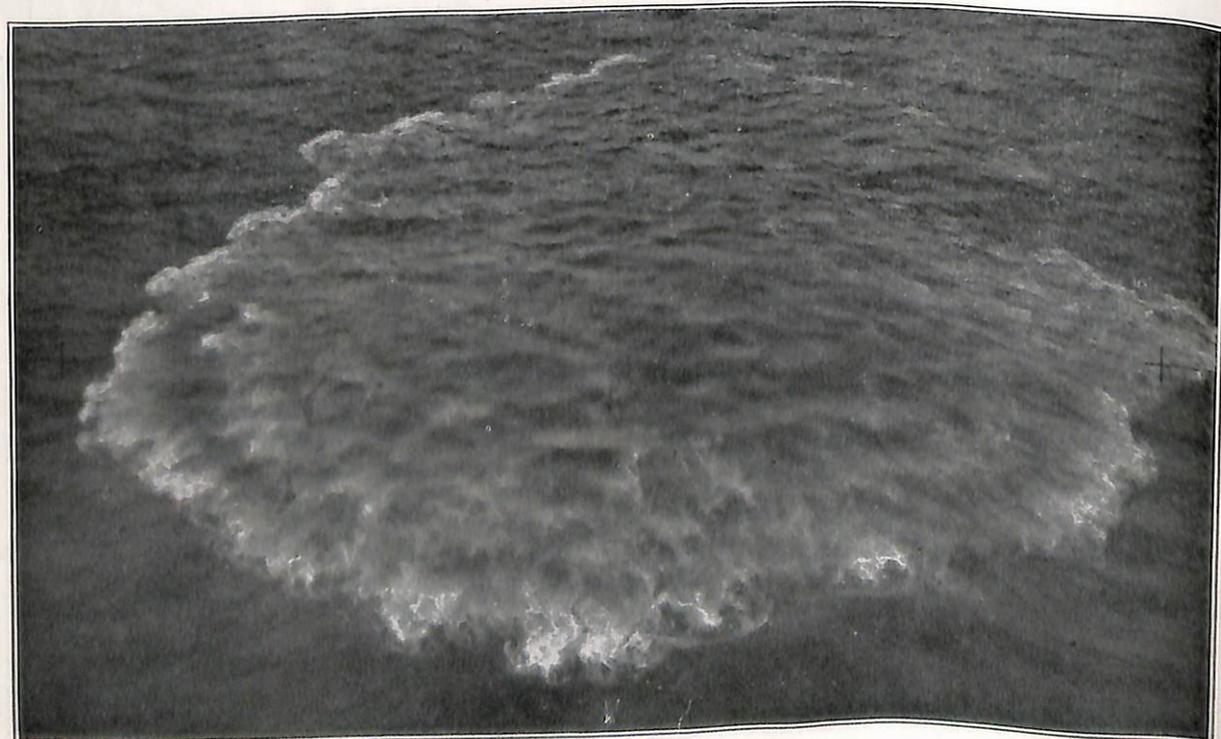
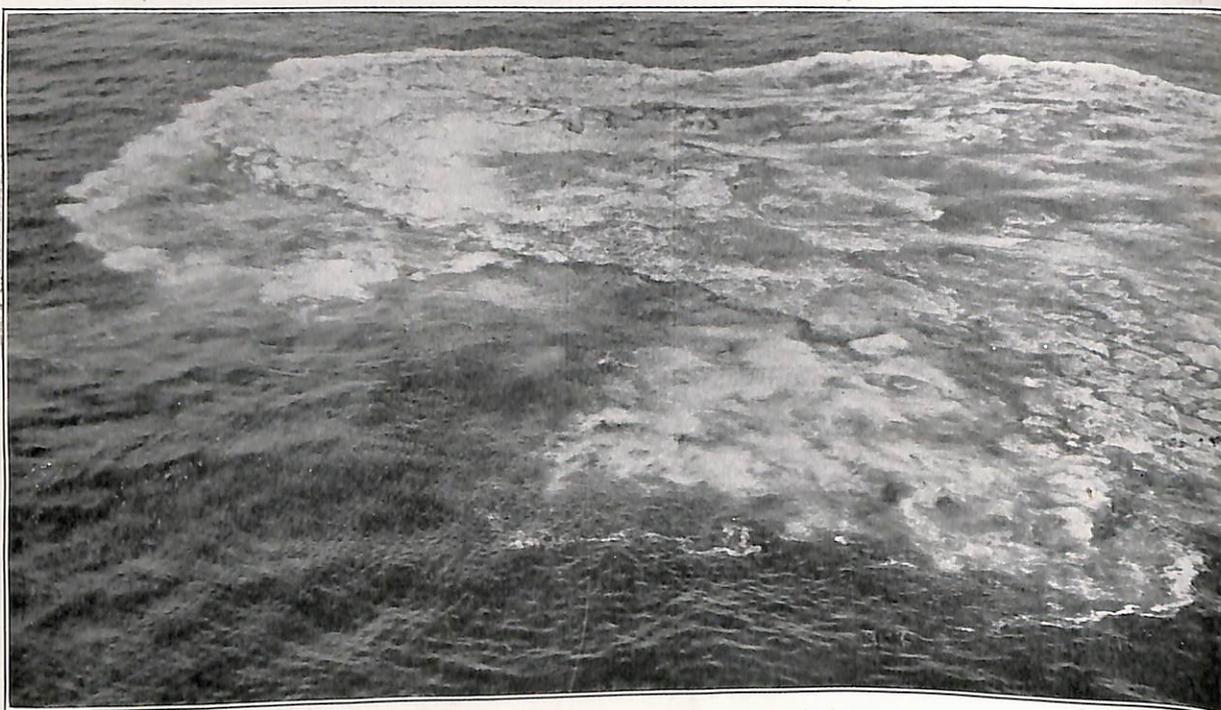
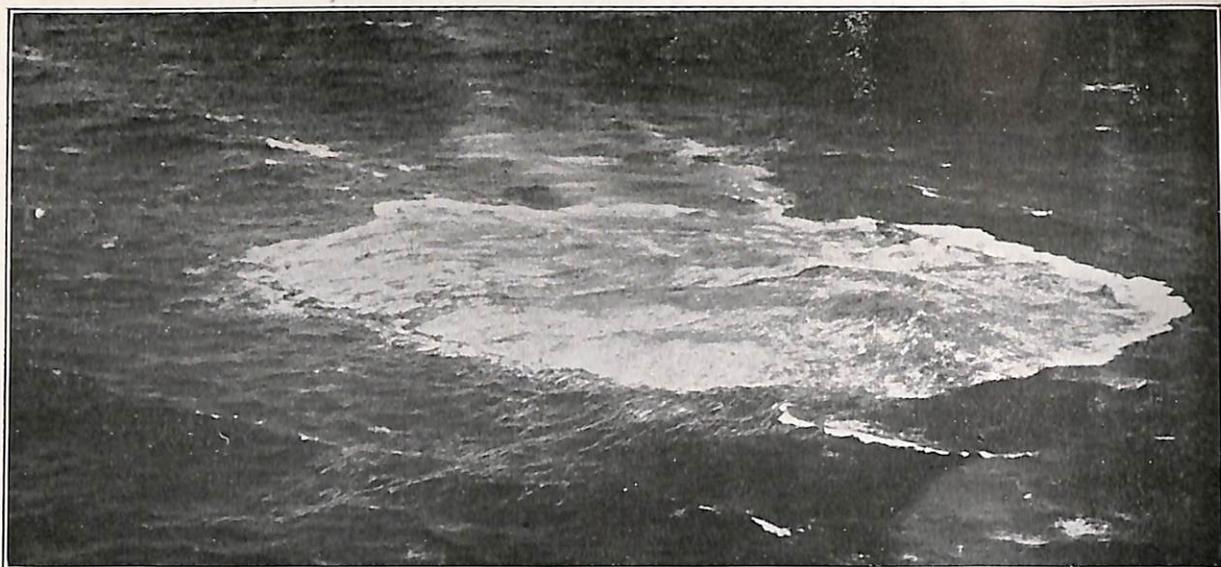


10



11

P 77's Attack on a U-Boat, 3rd September : **Torpex Explosions** : The peak and subsidence of the explosion disturbance ; the U Boat again revealed, diving among oil. (Photographs mostly at 2-second intervals.)



The Residue of Torpex Explosions : Showing the boiling effect of new scum and the later quietening. (Attacks by R/48, T/10, A and B/10).

## Pilot Bombing

Owing to the lack of any suitable bomb-sight in the past, pilots have been obliged to drop their depth-charges by eye, and some of those who have had sufficient practice in this have established the legend that pilot bombing is the only way to attack U-Boats. With such poor rivals as the Mark IX and the Hand-Held sight this is not surprising, but the fact remains that to ask an experienced pilot to try a new bomb-sight now is like recommending a safety razor to one who has always used a cut-throat.

In point of fact accurate bombing by eye has serious limitations. It is almost entirely confined to bombing from heights of 100 ft. or less and this may not always be possible. The most serious objection, however, is the enormous amount of practice which is required to obtain reasonably good results. This practice must be kept up continually, and in many cases sufficient time and facilities are not available.

Quite apart from the question of bombing by eye, there is also a very general feeling that the pilot is the only member of the crew who should be trusted to drop the depth-charges, because he has the best general view of the proceedings and, if a U-Boat is sighted at short notice, may be the only one who knows what is going on. This argument does not count for much in the case of a crew who know their respective jobs, and against it there is a lot to be said for a "division of labour," especially in a large aircraft when the pilot has his work cut out in tracking over the target and possibly cannot even see the U-Boat at the moment of release.

## Sights for Surfaced U-Boats

The simplest form of A/S sight is one which gives range control for surfaced U-Boats only, leaving it entirely to the pilot to track over the target and estimate the position of the U-Boat if submerged. The bombing angle is calculated in terms of height, ground speed and stick length, and the release point shown by a sighting line which is depressed to the bombing angle from the horizontal. Ballistics may be ignored if the height of release is less than 300 ft. Several forms of this type of sight have been produced, which differ mainly in the way in which the horizontal is determined.

In the simplest case the bombing angle is measured from the horizon itself. A sight of this type has been put forward by F/O. Secord, in which the fore-sight consists of a plate of transparent material on which are drawn release points for different heights, and the back-sight is a ring aperture. The bomb-aimer holds the sight by hand so that the top of the fore-sight plate is on the horizon, and chooses the appropriate mark on the fore-sight corresponding to his height and speed. This sight has the advantage of very simple construction, but suffers from the fact that it cannot be used in poor visibility or at night. It is limited tactically to the few heights and speeds which can be marked on the fore-sight without confusion, and except for low heights it is difficult to keep an eye on the horizon and the release point at the same time.

In the Hand-Held sight (Low Level Bomb-sight, Mark I) the horizontal is found by means of a spirit level. On looking through the sight, which is held by the bomb-aimer in both hands, a reflected image of the bubble is seen on one side

of the field of view, and the sighting line at the moment of release is given by the coincidence of target and bubble. The sight has been found difficult to use in rough weather or when the aircraft makes an irregular approach, and the values of true height and ground speed which are set on the instrument cannot be altered quickly. Hence an attack at pre-determined height and speed is necessary. There is, furthermore, a limitation to heights of not less than 200 ft., though this could easily be altered. Stick length is not taken into account.

The Low Level Bombsight, Mark II, unlike the two preceding sights, is fixed in the aircraft and the horizontal is determined from the known attitude of the aircraft when flying level. The sighting head consists of a reflector gun-sight to give the sighting line, and this is remotely depressed to the correct bombing angle by means of a flexible cable leading to a computer box. The latter is operated by another member of the crew who can see the altimeter and airspeed indicator. He feeds the values of these into the computer box (together with the difference between ground speed and airspeed, if there is any) which thereby sets the sighting head to the correct angle of depression. The computer box scale has a range of 50-600 ft. in height and 60 knots in airspeed (actual values depending on the type of aircraft), and the indicated values of these are put on direct as the correction for position error is already allowed for in the design of the scale. Scales as issued at present are for dropping a 40-yard stick of depth-charges, for which the ballistics are taken into account.

The sighting head can also be rotated in azimuth so that if the drift is set on, the bomb-aimer can, if required, assist the pilot in tracking over the target. Two versions of this sighting head have been designed, one to be mounted in the nose of the aircraft and used by the bomb-aimer, the other to be mounted on a retractable bracket for use by the pilot. Trials are now being carried out to determine which type is the more satisfactory in each type of aircraft.

The advantage of this sight is that it allows considerable tactical freedom in the speed and height of the attack. The pilot simply has to track over the target (with the assistance of the sight if he wishes), and to fly level at the moment of release. He is not tied down to any pre-determined height or speed as the values of these are fed into the computer up to the last minute. The chief disadvantage lies in the fact that the aircraft must be flying level at the moment of release. Furthermore, until the radio altimeter comes into general use the height is not usually known with sufficient accuracy to warrant bombing from a height greater than can be estimated by eye, unless the Kolsman altimeter is periodically re-set.

## Sights for Submerged U-Boats

In bombing a submerged U-Boat, there are really two problems involved, first, to estimate the position of the U-Boat relative to the swirl, and, secondly, to drop the depth-charges across this estimated position. The sights already described deal with the second part of the problem, and it remains to discover how the probable position of the U-Boat can be determined mechanically.

The distance from the U-Boat's position to the swirl is obtained directly from the time for which it has been under, since its under-water speed directly after submerging is roughly known, but to judge this distance accurately by eye is generally agreed to be a most difficult matter.

The course of the U-Boat after submerging will for a short time be the same as its course before diving, so that if the aircraft makes an approach either along the track of the U-Boat while on the surface or on a constant bearing to it, then it will pass over the U-Boat whether it is submerged or not. Since, however, the average distance between aircraft and U-Boat at the moment of submergence is about  $3\frac{1}{2}$  miles, it will not usually be possible to get on to a course of constant bearing with sufficient accuracy. Hence, as regards tracking over a submerged U-Boat, a sight must either indicate the probable position of the U-Boat at all ranges and for all directions of approach, or else it must be confined to use in attacks along the track of the U-Boat only. The latter possibility is the only one that can be considered at present.

A simple mechanical sight which has been proposed by F/O Cave takes account of the under-water travel of the U-Boat by means of a movable foresight. The sight is designed for bombing along the track of the U-Boat only, at a predetermined height and speed. The sight is fixed in the aircraft and operated by the bomb-aimer who adjusts the position of the foresight according to the time that the U-Boat has been under. This time is measured with a stop-watch, but the operation could be made automatic by the addition of a small constant-speed motor.

In the case of the low level bombsight, Mark II, two possible alternatives to deal with an attack along the track of a submerged U-Boat are being investigated. In the first a time delay is incorporated in the bomb-release circuit, so that if the bomb-aimer presses the release button when the sight is on the swirl, the depth-charges will be

carried forward a distance equal to the under-water travel of the U-Boat before dropping. This method is only applicable to attacks down the track of the U-Boat. The second method is to alter the depression of the sighting-head by the correct angle, which will vary with both height and speed. This is more complicated mechanically, but would work for attacks in either direction.

An entirely novel method of sighting, applicable to attacks from all directions *except* along the track, has been proposed by G/C Williamson. The method depends upon the aircraft making its approach on a course of constant bearing. The instant of release is determined not by the angle the line of sight makes with the horizontal but by the azimuth angle between the swirl and the aircraft's heading. The disadvantage of this method is that it is usually impossible, as explained above, to get on to an accurate course of constant bearing before the U-Boat dives, and unless this is done the very fact of the aircraft being off course will not only mean an error in line but will also introduce a substantial range error. A further disadvantage to this type of sight is that it *only* deals with the submerged U-Boat so that some other sight must be carried for surface attacks.

### Conclusion

No mention has been made of the more complicated sights which have been proposed, as these are not of immediate interest. Of the simple sights described above, however, it is considered that the low level bombsight, Mark II, incorporates most of the advantages of the others and allows greater tactical freedom in the attack, except that it does not in its present form deal with the submerged U-Boat. With the modifications proposed here, this problem should be overcome, and it is thought that a pilot using this sight would then obtain at least as good results as an experienced pilot bombing by eye, and with the important difference that far less training is required.

## II.—ANTI-SHIPPING ACTIVITIES

### Anti-Shipping Operations, September

During the month 66 aircraft made bombing attacks and 13 made torpedo attacks on enemy ships. Direct hits are estimated, with bombs on ten ships and with torpedoes on three. (The most interesting torpedo attack is described below.) There were near misses or possible hits by bomb on 13 ships. In the case of 33 ships attacked by bomb and nine by torpedo the results were not observed, largely owing to the bad weather.

Shipping along the Norwegian coast may soon have greater importance. The amount of iron ore shipped from Narvik has increased to a spectacular extent in the past two months. Besides, work has been consistently in progress on the iron ore quays at Narvik, an indication that the Germans have decided to make more use of the port. In addition, several vessels associated with the iron ore trade in the Bay of Biscay have lately been seen in North Sea and Norwegian ports, a fact which shows that the enemy is short of this specialized type of vessel in northern waters, and has increased cargoes in view for them there.

Traffic along the North German and Dutch coasts moved in the expected quantity and manner. A number of strikes have taken place at night with little ascertainable result, though several hits were recorded. At least one vessel appears to have been sufficiently damaged to force it to return to Rotterdam. The relatively meagre results at present being obtained in the attacks in this area are due to the substitution of the medium-level attack for the low level, and to the various tactical experiments at present being carried out in connection with attacks on heavily defended convoys.

In the Bay, **Whitley N/77** hit and damaged the tanker *Sandefjord* lying off St. Nazaire (Plate 8), and Polish **Wellington J/304** attacked an *Altmark* tanker at sea. A concerted attack on shipping at Bordeaux was also carried out by **Wellingtons** of 311 and 304 Squadrons and damage was later seen to have been inflicted on

loading sheds (at Bassens Nord). Blockade-running, to and from the East, is likely to increase in both directions in the immediate future, thus keeping the Biscay area in the limelight.

#### A Torpedo Attack

Three **Hampdens** of 489 Squadron were on patrol off the Norwegian coast on the morning of 17th September. North of Egersund they saw a convoy consisting of a ship of some 4,800 tons and another of 2,000, with three escort vessels ahead and one on either side. It was steaming at 8-10 knots. As the convoy was sailing close in to the coast, an attack on both sides was impossible, and it was decided to attack from the beam rather than ahead, where flak opposition would have been considerably stronger. The formation, still close together, turned towards the larger ship and deployed at 6,000 yards range. All three aircraft continued flying at sea level and therefore were not sighted until they came within 3,000 yards. The two wing aircraft opened out to form a crescent, to split up flak fire; A/489 passed ahead of the nearest flak ship and the others astern of her. All the ships were firing concentrated light flak, but it was very inaccurate, though G was hit at 1,500 yards by light shell fire, which blew a hole in the exhaust ring of the port motor and peppered the side of the fuselage without hurting anyone. The three **Hampdens** pulled up to dropping height and released their torpedoes at approximately 1,000 yards range. The beam and rear gunners poured several hundred rounds into the nearest ship, while A's navigator, whose nose gun was supplementing the midships armament, emptied his revolver into the nearest escort vessel.

During the getaway, two violent explosions took place within 10 seconds interval on the largest ship, just abaft the funnel, and a cloud of chocolate-brown smoke rose and covered all her rear part (Plate 8). The third torpedo had run across her bows and headed for the smaller ship, and one of the rear gunners saw that she was on fire.

### The Offensive against German Coastal Shipping

Coastal shipping is assuming an ever increasing importance in Germany's economic and strategic plans. In peace-time, coasters normally carry trade for which low freightage rates are a consideration and slow speed can be accepted. War conditions, however, have brought about a change in its value and have enhanced its importance as a means of distribution of commodities essential to the continued existence of the German effort.

During the period leading up to the war, Germany concentrated on re-armament, and, anticipating a relatively short war, neglected the maintenance of her railway system and the replacement of her rolling stock. The eastern advance and the reconstruction of the Russian railways to the German gauge has meant that calls have had to be made upon the basic stocks of equipment in the Reich. The Russian winter has played havoc with locomotives diverted to

these areas and has occasioned a further drain upon the available resources. In the other occupied countries there have been, consequent upon the war, losses of rolling stock, so that what remains falls far below actual domestic needs, let alone those of the German invader. In addition, the activities of Bomber and Fighter Commands directed against rolling stock and railway workshops in Germany and France have added to the shortage and have interfered to no mean extent with the manufacture of replacements.

#### Traffic Routes from Norway

Thus, from this one point of view alone, it is to the enemy advantage to employ the sea routes as fully as possible. There is another cause which makes the extended use of shipping inescapable. The occupation of Norway has proved in many

ways an asset, but it has at the same time given rise to new and large commitments. It has denied to the Allies a foothold in Europe, but it has meant the provision of large garrisons which must be supplied. Harbours and aerodromes have been gained, flanking the North Sea and in a position to threaten access by sea to Russia from the Western Hemisphere; but the ships and aircraft based there must be fuelled and maintained. The products of Norway are at the disposal of the enemy, but they have to be transferred to the industrial areas of Germany if they are to be turned to a useful purpose.

The Germans are, therefore, faced with a serious problem of transportation—an outward one of supply to their army, navy and air force, and an inward one of bringing back safely the goods essential to their war effort. These, consisting mainly of fish products, pulp and iron ore, are by no means inconsiderable. The iron ore alone amounts to some one and a half million tons yearly, drawn from mines north of Trondheim and from Swedish mines which find their outlet through Narvik.

This traffic is destined partly for the Baltic ports and partly for the North German and Dutch ports. Throughout the greater part of its journey up and down the Norwegian coast it can take shelter in the "Inner Leads," fjords and narrow waterways which make location and attack by air virtually impossible on a large scale. Only at Stadlandet and when rounding the Naze is it accessible to air attack; and even there, by skilful use of unfavourable weather conditions and the hours of darkness, as well as the distance from Coastal Command bases, evasion is too often practised with marked success. Traffic routed for the Baltic ports is lost to attack, other than by mining, once it clears the south of Norway; but the shipping sailing for the North Sea ports emerges again after passing through the Kiel Canal and comes within range on the journey to the main distributive ports, notably Hamburg, Emden and Rotterdam. Its numbers are increased by a proportion of the great flow of traffic from the Baltic and Gulf of Bothnia and this, with the local traffic, goes to make up the numerous convoys which pass up and down the North German and Dutch coasts.

It is clear from the foregoing that the use of coastal shipping is a vital necessity and that any dislocation will have far-reaching effects which will be felt deep down in the life of the nation. On the other hand, the difficulties attendant on convoy attack are only too well known to those directly concerned with such operations. The target is relatively small; it is a moving one and therefore must be located by search, often at

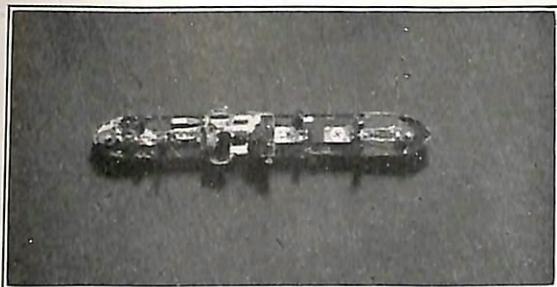
several hundred miles distance. It is well armed and escorted, and often under the protection of shore-based defences and both day and night fighters.

### The Offensive Bears Results

It is perhaps significant that for some time past the Germans have ignored convoys passing up and down the East Coast of Britain. It is a tacit admission of the difficulties of the problem, but not necessarily an argument that their lead should be followed. Our internal communications form a comprehensive network and are in good running repair; theirs are highly stressed and incapable of carrying the load. Nor has the problem proved altogether intractable in our hands, as evidenced by the success of the joint efforts of Coastal, Bomber and Fighter Commands to date. For the 17 months from March, 1941, to July, 1942, during which the Admiralty and Air Ministry Assessment Committee has sat, over 140,000 tons of shipping has been adjudged as sunk by Coastal Command alone, some 135,000 tons seriously damaged and 450,000 tons as damaged.

Nor is this the only consequence. The rising scale of arming of merchant ships by the enemy and the high allotment of escort vessels to convoys (which at times amount to one escort vessel per ship) while proving beyond doubt the effectiveness of our attacks, also adds a burden in its provision and diverts ships, weapons and man-power which might be better used elsewhere. Damaged ships—and there is every reason to believe on the authority of our own experience that these are more than aircraft can observe—mean busy dockyards and congestion in harbours, and reduce the effort available for new construction. Timetables and sailing schedules are disturbed and distribution becomes irregular. And not least an air of apprehension and unwillingness to go to sea is created, most particularly amongst non-German sailors, who at best are unwilling collaborators with the enemy.

Sufficient has been said to show the importance of sinking shipping or at least of keeping up such pressure as will ensure that the precautions now forced upon the enemy cannot be relaxed. Such action is not separated from the general offensive against the enemy system, but is complementary to it and as such must be maintained. More likely than not old tactics must give ground to new: there are chinks in every armour to be found by thought and experiment. One thing, however, is certain—coastal convoys constitute a soft spot of the tenderness of which the Germans are well aware. And as such it must be continued to be exploited.

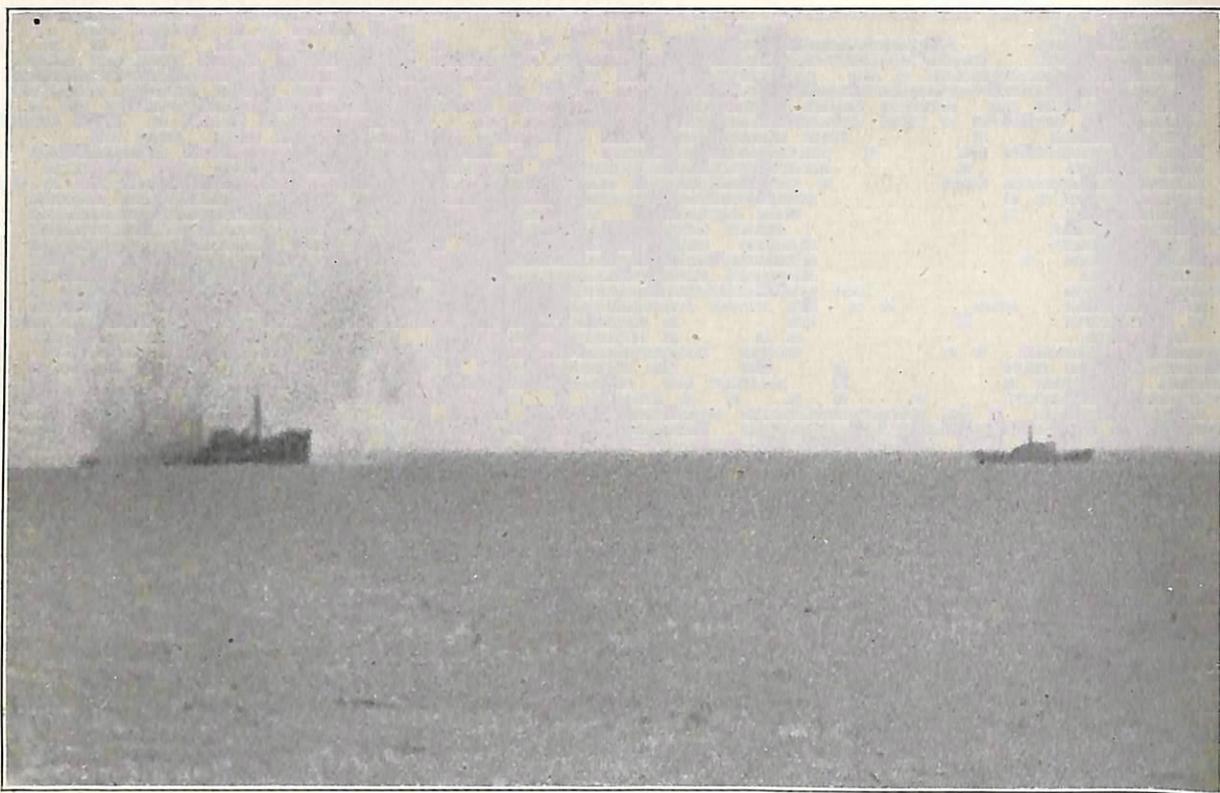


**Sperrbrechers :** These vessels are converted merchantmen, whose dual purpose in convoy escort is to serve as an anti-aircraft vessel, and also as a mine bumber. They carry a heavy armament of guns, and are specially strengthened internally so that they may not sink if they set off a mine. They also carry some device on the bows which is reputed to explode mines at some distance. The left oblique photograph shows a sperrbrecher seen by an aircraft of 236 Squadron off Vlieland on 19th September. She has several times been seen on escort duties to convoys moving along the Frisian Islands. She is typical of her class, and was probably converted from a Belgrano type merchant vessel. She probably carries these guns :—On forecastle, two 37 mm. ; on platform between foremast and bridge, one (?) 3·5 in. ; on bridge, one 20 mm. on each wing ; on after end of central castle, abaft the funnel, two (?) 77-mm. to port and starboard ; on the platform on mainmast, a heavy machine-gun or Oerlikon ; on poop, one of 3·5-in. or 4·1-in., and a 37-mm. on the raised platform.

The sperrbrecher on the right, shown in a vertical view by P.R.U., was lying off Royan on 8th September. She is some 430 ft. long, and her armament appears to consist of these guns :—On the forecastle, one (?) 3·5-in. or 4·1-in. ; between foremast and bridge, one each to starboard and port, 37-mm. ; bridge, one heavy machine-gun or Oerlikon on each wing. Aft the funnel on the platform, two (?) 37-mm. or 20-mm. ; between the mainmast and poop, one each to port and starboard, (?) 37-mm. ; on poop, one 4·1-in., and on the platform, one 37-mm.



The run up to and direct hit upon an Enemy Tanker at St. Nazaire, early morning of 2nd September. (77 Squadron).



Torpedo Hits by 489 Squadron, 17th September (see page 11).



British Convoy in mid-Atlantic (120 Squadron).

## III.—COMBATS

### A Compliment

It is not often that the enemy pay a compliment to the work of Coastal Command, but their recent action in transferring aircraft from other fronts at a time when they are so badly needed elsewhere, is a tacit admission of the embarrassment which anti-submarine patrols in the Bay of Biscay are causing them.

At the beginning of May, 1942, the only enemy unit operating in that area was one staffel of He.115s stationed near Brest and employed almost entirely upon reconnaissance duties. Today, there are at least two staffels of Ju.88s and one of Arados employed solely on fighter duties.

Anti-submarine patrols ranging over the Bay are faced now with opposition on an increased scale and the number of combats has been steadily mounting. These have been by no means to the advantage of the enemy. In the months of July,

August and September, there have been 75 encounters, in which 20 enemy aircraft have been destroyed and 31 damaged. Of this total, of 51, 32 were destroyed or damaged in defensive actions by patrolling aircraft.

The remainder were accounted for by Beau-fighters of No. 235 Squadron, which, during the month of September, destroyed seven enemy aircraft and damaged two in 11 combats. It is not the general policy of this Review to record the achievement of individual squadrons; but in this case perhaps an exception is justified. This squadron, recently returned to the line, has already earned the gratitude of those whose work lies over the Bay. Their success reflects great credit on their determination and skill, and, above all, on the thoroughness of their training during the working-up period.

### Some Combats of September

#### A Mosquito v. two F.W. 190s

On 4th September, an unarmed **Mosquito** crossed the Dutch coast at 28,500 ft. and was climbing at 160 miles an hour (i.a.s.), when the crew sighted two Focke-Wulf 190s, at 2,000 yards, flying at the same height on a reciprocal course. The pilot took evasive action until the enemy aircraft, climbing slightly, had almost come in position for simultaneous quarter attack. The pilot then went into a vertical aileron turn, diving under the starboard F.W.

Only one of the enemy was now in a position to carry out an astern attack, and on directions by the observer the Mosquito pilot did a steep turn to port, causing it to overshoot.

The observer knelt on his seat, to keep watch to the rear, and informed the pilot of every manoeuvre carried out by the enemy. The pilot opened up to full revolutions and boost, but not an emergency boost, in order to nurse his engines.

Each enemy aircraft attacked in succession, whilst the other climbed for position. In one attack the F.W. fired on the outside of the Mosquito's turn, giving the impression that he was hoping to catch him on the reverse. The Mosquito pilot was careful to avoid this. His evasive action consisted of vertical turns towards the enemy, until high speed stalls at 260 to 280 m.p.h. were experienced, causing the aircraft to whip over upside down, while the controls "juddered." By dropping the nose and increasing speed, control was regained and the aircraft turned, so that it headed in the direction of home. This high speed stall was found successful and used six times. The centrifugal force it exerted compelled the observer to fold up on the floor, and he suffered considerably from bruises, strains and vomiting.

After five minutes of the combat, one enemy aircraft which had been successfully out-turned was seen to dive vertically out of sight. It is thought that its pilot may have blacked out.

The other F.W. followed the Mosquito for the next 25 minutes down to 9,000 ft., where attacks

became more frequent and evasion less satisfactory. When the Mosquito went down to 2,000 ft., the enemy turned for home.

The only damage sustained by the Mosquito was one bullet hole in the starboard tailplane and a perspex wing tip broken by air pressure.

#### A Wellington v. four Ju. 88s

At 1335 hours on 11th September, **Wellington U/311** was on an anti-submarine patrol in the Bay of Biscay, flying at sea-level, when four Ju. 88s were sighted. All the enemy aircraft were at 1,000 ft.; one of them was circling 700 yards from U's starboard bow, and the other three were 200 yards further on, flying at right angles to U's course. The first Ju. turned towards the Wellington, which also turned slightly to starboard. The two aircraft exchanged fire from 400 yards without hitting each other. Meanwhile, the other three Ju.s had broken formation, two taking up position to port of the Wellington and one to starboard. The two port aircraft came round astern of U and opened fire, but missed as it turned hard to port. By this time the fourth Ju. had got into position dead astern and slightly above, and opened fire from 400 yards. While U's rear gunner replied with short bursts, the Ju. passed overhead and its bullets pierced the hydraulics of his turret, which had afterwards to be turned by hand. The Wellington now turned to starboard. The other three Ju.s then took up positions, on both quarters and dead ahead, and all attacked simultaneously. The aircraft on each quarter passed overhead. The third opened fire at 300 yards as it approached from dead ahead and continued till about 25 yards ahead of U, when it climbed steeply to avoid colliding. While its nose was pointing upwards, the Wellington's front gunner put a long burst into the belly; the Ju. peeled off to port with smoke coming from both engines, and after flying level for a few seconds, crashed into the sea. The remaining three Ju.s then formed and repeated the manoeuvre, except that the third aircraft attacked from astern. These tactics were repeated three

more times by the enemy aircraft, while the Wellington took evasive action by climbing from sea level to about 300 ft. and back to sea level, and turning from port to starboard. Then one of the Ju.s made off for the French coast, leaving a thin trail of black smoke from the port engine. The two remaining Ju.s made two more attacks from the quarters, but came no closer than 600 yards. Finally, they took up position above and to starboard, and shadowed for three minutes, till the Wellington ran into a patch of sea fog. The Wellington sustained many hits, but no member of the crew was hurt. It was noticed that some of the Ju.s had two cannon in the nose, and that all machine-gun fire came from four guns, mounted two in each wing outside the airscrew arc.

#### **A Wellington v. six Ju. 88s**

On the afternoon of 16th September, Wellington E/304 was flying at 1,500 ft. when a Ju. 88 passed to starboard on the reciprocal; then immediately after, another approached from astern and well to port, followed by two others a couple of miles behind it. Then two more appeared, a further five miles behind. The first enemy aircraft turned and shadowed the Wellington from two miles astern. It continued doing so, without attacking, all through the action which followed. The Wellington's captain jettisoned the depth-charges and bombs, and dived to 50 ft., since there were no clouds near by. The second Ju. overtook and then came in from the port side. The Wellington turned and climbed to meet its attack. The front gunner gave it two short bursts; some of his tracer entered its belly below the cockpit as it levelled out of its dive, above the Wellington and 50 yards to the side. When it passed astern, the rear gunner put a long burst through the upper part of the fuselage. The third and fourth Ju.s attacked in turn using the same tactics, to which the Wellington replied as before, scoring hits each time without being hit. The third's port-engine propeller stopped, and it force-landed on the sea. The fifth and sixth Ju.s had now arrived on the port side, but instead of attacking immediately while the Wellington was busy, they turned to starboard, passed well behind his stern, and came up on a parallel track. As the starboard midships gunner began to fire at the sixth, the gun jammed. The fifth came in to attack, at an angle of 80° to the Wellington's track, sooner than the Captain expected, so that he could not turn immediately to meet it. This enemy's cannon fire hit the starboard wing, piercing the petrol tank and ripping off two square yards of fabric. But the Wellington's fire entered the Ju.s belly and knocked large pieces off the tail plane, and as it passed astern the rear gunner gave it a few short bursts; he saw thick black smoke coming from it, apparently from one of the engines. The sixth enemy then attacked from dead ahead. The Wellington's front gunner put two short bursts into its belly below the cockpit, and it came under the rear gunner's fire as it passed astern. Then the second and fourth Ju.s made consecutive attacks from astern to which the rear gunner replied. These last attacks caused no apparent injury to any aircraft. The Wellington now entered cloud and shook off its pursuers. The action had lasted nearly a quarter of an hour; the Wellington's front and rear guns fired 1,500 rounds apiece, mostly at about 50 yards

range. Besides the damage to the wing, the starboard engine and nacelle suffered slight injuries, the pipe from the auxiliary oil tank was holed and the astro-hatch hit.

#### **Eight Beaufighters v. a Focke-Wulf 200 and three Ju. 88s**

At 1755 hours on 17th September, eight Beaufighters of 235 Squadron on interceptor patrol were flying at 200 ft. in loose formation in the Bay of Biscay, when a Focke-Wulf 200 was sighted. It was flying one mile to starboard on a reciprocal course over an armed 300-ton trawler. The three leading Beaufighters (E, P, N) attacked the F.W. on the port side, while O/235 dived from 2,000 ft. to make a head-on attack, and the remainder attacked from the starboard quarter. The attack tactics given out at briefing were carried out perfectly by all aircrews. The trawler immediately opened fire and shot down C/235 into the sea. Beaufighter J/235 attacked the F.W. again from the port quarter, and E/235 delivered a third attack from starboard, broke away and attacked again from the port beam. The F.W. now burst into flames and dived into the sea with a series of explosions. A dinghy was released and seen in the sea half-inflated, with one man trying to climb in and three floating in the water. The Beaufighters re-formed and resumed their patrol at 1810 hours.

Ten minutes later the seven Beaufighters were flying in various positions, with six miles between the first and last aircraft, when three Ju. 88's were seen ahead, circling at 1,000 ft. above a fishing vessel with a French flag. The Beaufighters climbed to 1,000 ft. and attacked simultaneously from various directions. One Ju. was hit in the port engine and tail, and dived nose down into the sea. N, O, and E attacked a second Ju.; flames appeared in the cockpit and a large piece of cowling flew off. This Ju. also dived into the sea, enveloped in flames. Meanwhile, A/235 followed the third Ju. and attacked, but it took evasive action and disappeared in a cloud. A flew through the cloud and re-sighted the Ju., delivering a second attack, but lost it again in cloud. When the Beaufighters left the scene of the action the tailplanes of two Ju. 88's were still projecting from the water.

#### **Two Beaufighters v. four Ju. 88s**

At 1035 hours on 24th September, Beaufighter P/235 was flying at 300 ft. on an interceptor patrol in the Bay of Biscay, when two Ju. 88s were seen on the starboard beam, flying at 600 ft. P promptly engaged the enemy aircraft. Both the Ju.s pulled up, but a third Ju. was seen diving from above. P made a tight turn, side-slipped, and attacked one of the first two Ju.'s, which had dived to sea level. P made a stern attack, opening fire from about 200 yards, after which, with smoke pouring from both engines, the Ju. plunged into the sea. As P reached the outer edge of the mêlée, O/235, which had sighted the Ju.s independently, arrived to help. The Ju.s were then at about 1,000 ft., and one dived to attack O, which took evasive action. At the same instant, O spotted a fourth Ju. at 200 ft., and dived from 800 ft. to make a quarter attack at 400 ft., opening fire at 150 yards with two short bursts. O overshot the enemy aircraft, pulled out of the dive and made a tight turn. Three seconds later the port airscrew of the Ju. stopped;

the aircraft continued for two seconds, then crashed, port wing down, into the sea, disappearing in a sheet of flame. O sustained no damage. The two remaining enemy aircraft were not seen any more.

#### **A Wellington v. Two Ju. 88's**

On the afternoon of 24th September, **Wellington H/304** was flying at 500 ft. when the front gunner saw two Ju. 88's together, two points on the port bow and about 1,000 yards off, just above sea level. They at once began to climb, while the Wellington dived to 10 ft., turning to port, and began weaving tactics. After climbing to 1,000 ft., the Ju's turned to approach the Wellington from the stern, split up and attacked, one from each quarter. The Wellington jettisoned its depth-charges and bombs. The first Ju. dived to attack from astern, opening with a long burst of cannon fire from 700 yards. The Wellington immediately turned to port and tracer was seen to pass under its tail. The Wellington's rear gunner held his fire until the Ju. was within 300-400 yards, but no hits were seen. At the same moment the second Ju. came in to attack from the starboard beam, and the Wellington turned to meet it. The enemy aircraft opened fire with a long burst of cannon

fire from 700-800 yards, and tracer passed under the Wellington's front turret. The Wellington's front gunner held his fire till the Ju. was within 250 yards, when he gave a long burst. As the Ju. passed astern and the rear gunner opened fire from 100 yards with a long burst, smoke poured from the port engine, and the aircraft gradually losing height, suddenly turned over and dived into the sea. Three minutes later, the first Ju., having circled to astern, dived from 1,000 ft. to attack the Wellington, which was now weaving and zigzagging. Coming in from the starboard quarter, the Ju. opened with a long burst from 500 yards and tracer passed below the Wellington's fuselage. The Wellington's rear gunner opened fire at 400 yards, the front gunner gave a long burst, and as the Ju. passed to port and astern the rear gunner fired three more bursts, all without apparent success. The Ju. then gave up attacking, but continued to shadow the Wellington for about a quarter of an hour longer. The whole combat lasted 20 minutes. The Wellington was damaged in the tail and starboard wing by machine-gun fire, but the crew were untouched. The fire from both Ju's seemed to come from near the cockpit, and certainly not outboard of the engines.

## IV.—OTHER MATTERS

### A Guide to Frequencies

All wireless communication, between transmitting and receiving aerials, is carried by waves in space which differ from waves of light only in frequency. The frequency is the number of oscillations or cycles in one second in the wave. Light waves oscillate at something like 500 million million cycles per second. Wireless waves are much slower and are measured in millions of cycles per second (megacycles per second or Mc/s) or even thousands of cycles per second (kilocycles per second or kc/s). Of course, one megacycle per second is the same as a thousand kilocycles per second.

Wireless frequencies are divided for the purposes of nomenclature (see *e.g.* A.P. 1083) into various bands from "very low frequencies" through "low," "medium," and "high frequencies" to "very high frequencies". The ranges which are given these names are:—

Band.	Official Abbreviation.	Frequency Range.
Very low frequencies	V.L/F	Below 30 kc/s.
Low frequencies	L/F	30–300 kc/s.
Medium frequencies	M/F	300–3,000 kc/s ( <i>i.e.</i> 3 Mc/s).
High frequencies	H/F	3–30 Mc/s.
Very high frequencies	V.H/F	30–300 Mc/s.

In practice these limits are not very strictly adhered to, and rightly so. No one, for example, would talk of getting a fix on L/F just because the frequency of his M/F direction-finding section was 250 kc/s.

#### High Frequencies

But the classification is not just for convenience in naming. The different classes represent, though roughly, important differences in the way in which the waves are propagated. V.H/F (broadly speaking) are those frequencies which are too high ever to be reflected by the reflecting region in the upper atmosphere, but instead penetrate right through them. You can send V.H/F signals only as far as you can see and as much farther as you can persuade the waves to bend round the earth's surface. Very high frequencies are therefore the best to use when you want your signals to be confined to a small area of the earth's surface—an area bounded by the horizon, more or less, according to the power used. This is one reason, though perhaps a minor one, why a frequency in this range is suitable for such uses as Special Equipment.

Ordinary high frequencies (H/F), on the other hand, are reflected in the upper atmosphere, so that they get round the bend of the earth as easily as a submarine commander can see round the bend of a periscope, and on the whole they can do this day or night. This band carries the great bulk of long-distance traffic, commercial, Service or amateur, from England to Australia, or from an aircraft to its base some hundreds of miles away. The "short wave" band of the domestic wireless set falls entirely in the H/F range.

There is, perhaps unfortunately, no sharp and constant distinction between frequencies which

are reflected back and those which are not—between a typical high frequency and a typical very high frequency. At any time and distance there is always a highest frequency which will get through—the "skip" frequency at that time and distance. Higher frequencies than that will "skip" the receiver though they may be reflected where they meet the reflecting regions at a flatter angle. If they do they will come down at a greater distance from the transmitter. However great the fluctuations, the frequency of 30 Mc/s is practically the upper limit of frequency that is ever useful for very long distance communications.

#### Medium Frequencies

The next band of frequencies is the M/F band. Officially this is 300 to 3,000 kc/s, but the upper part of this range, say 2,000 kc/s to 3,000 kc/s, would be better described as H/F, whereas 100 kc/s to 300 kc/s has really the properties of medium frequencies. For practical purposes the M/F band is thus roughly from 100 kc/s to 2,000 kc/s. The fundamental property of medium frequencies is that during the day there is no reflection from the upper atmosphere. Below the reflecting region there is, during the day, another region which, because of the combination of ionization and a suitable air density, acts as an absorbing region. Waves of the higher frequencies can go through it without much loss, but towards the lower end of the high frequency band they begin to be attenuated on passing through this region.

By the time one has reached medium frequencies it is like trying to make ripples in treacle. During the day then M/F is to this extent like V.H/F, that you can use it only as far as it will naturally bend round the curve of the earth. But it is better than V.H/F at getting round the curve, especially when it is travelling over sea, so that during the day you can hear an aircraft's M/F transmissions up to about 500 miles over sea, but no further. The official instructions give 300 miles as the range of M/F, but this is on the safe side, as many wireless operators know. At night the absorbing layer dissolves—it is continually being maintained by the sun in the daytime—and there is then not the fundamental distinction between H/F and M/F that there is during the day. At night M/F goes everywhere—speaking roughly—and you can hear American commercial broadcasts in England. At night also the enemy's listening watch can hear transmissions on M/F from our aircraft which may be operating 1,000 miles away.

Medium frequencies are best used where you do not want a day and night service at great distances, but do want as good a cover as possible in the neighbourhood of the transmitter. Most public broadcasting stations are in this band. The "long wave" and "medium wave" bands of the ordinary wireless set both lie in the M/F range.

Perhaps the most important use of medium frequencies in the Royal Air Force is for direction-finding by radio.

## Low Frequencies

The last frequency range consists of all frequencies below about 100 kc/s and can be called "low frequencies." It covers the whole of the official V.L/F band and part of the official L/F. At these low frequencies, long-distance day signals are once more heard. They are not absorbed like medium frequencies because they do not penetrate as deep, or rather fly as high as the "treacly" region but are reflected back before they get to it. There is a consistency about the reception of signals on these frequencies that is not found in either M/F or H/F. Night or day, summer or winter, magnetic storm or calm have relatively little effect on them. They are not used in R.A.F. flying, but they had a boom in the early nineteen-twenties when they were beginning to be used for long-distance traffic, just before it was

discovered that short waves (H/F) had as good and better ranges for less power.

## The TR9

There is one frequency used in Coastal Command which is on the boundary between high and medium frequencies—that used for radio-telephonic communication with convoys. One often finds an impression that this is a very short-range frequency, either because it is R/T or because of something inherent in the frequency. The truth of the matter is that many aircraft use TR9 as the transmitter for R/T and this, as the wireless operators say, is a flea-power transmitter on that frequency, with a range that is no more than a few miles. But other aircraft use big American transmitters of some power, and when you talk on one of them you are probably talking to Hitler as well as to the Senior Naval Officer.

## How to Fly a Whitley on One Engine

An engineer whose name is well known to many in the Command was asked for an article. He produced this letter he had written to his brother, a pilot in a Coastal Squadron:

"I heard from X, who was at your station the other day, that you were having some qualms about the old Whitley, and that if you lost the power of one engine you had little chance of returning home.

Now you have much more chance of getting home safely than before, as we plumbers have been at work with all our friends, but we cannot get you back unless you are prepared to take a bit of advice from us.

If one engine cuts on you and you are flying reasonably high, say, 4,000 ft., it should be possible for you to get along like this. First of all keep up a good speed by keeping your nose well down. Then try to get as much as you can out of the failing engine and do not over-tax the good one more than you must.

I know that you cannot jettison your petrol, but if you are well on your patrol you will have consumed a lot and you can throw away your bombs quickly. Don't go drooling about the sky with your bomb doors left open for a second longer than you need to, or with any of your windows or clear vision panels open. You must make the old bus as clean in the air as you can so that the drag is reduced to the minimum. Tell that rear gunner of yours to do his bit by getting the turret central, and get the crew to trim the ship so that you can fly with the least amount of trimming tab on to get a decent angle for your planes, elevators and rudders. Your dud

engine may be able to help you quite a lot, but if it has gone beyond being anything but a drag and source of serious vibration, feather the prop. and keep your prominent eyeballs on your instruments.

Even if you have got very little height, sacrifice a lot of it to get up a decent speed which will enable you to climb and fly comparatively easily. Like the Giant Racer at the fun fair, do a bit of dipping as it will enable you to get the climb up the other side *and* to keep going.

Another thing, old man, do you really need all the gubbins and mud and drag which you take about with you? The last time you came here you thought that you looked mighty trim in your white Whitley, but I can tell you that I was shocked. Your crumpled engine cowlings, badly fitting bomb doors, soggy, trailing edges behind your flaps and the various unnecessary slots and openings in your fuselage were awful, and meant that you were spending a lot of horsepower on them to keep yourself in the air. Again, does your Squadron Commander allow your controllers to send you out on short sorties with full tanks when they are not necessary? They probably do not know what they are asking, if they do. Again, I saw some very odd things in your kite which could not possibly have been of use to you. Get your Squadron Commander to have a look and don't feel sore if he drops on your machine as the worst in this respect, as he is only helping you. It will probably result in getting Sigs. Nav. Arm. and even us to remove a lot of 'Aids' to safety which are quite unnecessary now."

## Six Days Adrift

A Wellington was carrying out an anti-submarine patrol in the Bay of Biscay one night, when the starboard engine seized. The other began to overheat and the aircraft had to ditch. The bump was less severe than in a belly-landing on a runway, though the flaps were left up; had they been 30° forward the speed of impact would have been cut by 10 knots. The crew had braced themselves firmly against the shock and, therefore, escaped injury, and the intercommunication was kept in use, enabling the Captain to give them instructions. But carelessness lost

them the Verey pistol—the butterfly nuts securing it were too tight to be undone in a hurry, and no attempt to loosen them was made till after ditching—and almost cost them all their supplies, for the navigator handed the packages through the astro-hatch, but not till the crew boarded the dinghy did anyone remember to remove them from the fuselage.

During the course of the next six days, until they were eventually rescued, the crew in the dinghy went through many adventures. They were sighted by searching aircraft on no less than

nine occasions. They were circled by a shark which threatened to burst their fragile craft. They had the mortification of witnessing a Whitley that had located them, shot down. A Sunderland which attempted to land to pick them up in a heavy sea, crashed with the loss of all but one of its crew, who managed to swim 500 yards to a spare dinghy, which had been dropped by a Whitley for the Wellington crew, but up wind, so that they had been unable to reach it.

The crew found they had only two distress signals instead of the four which their box should have contained. But for this oversight at the last inspection, searching aircraft would probably have sighted them early on the day of ditching. As it was, they were first seen that afternoon by a Whitley, which dropped them a Thornaby bag containing supplies. On two days bad weather at the bases prevented any attempt at rescue. On the fifth day Hudsons of an Air/Sea Rescue Squadron dropped Lindholme apparatus, which the dinghy crew at first took for depth charges, but instead of eruptions, a large inflated dinghy shot to the surface with four containers attached, in which were dry and warm clothing, towels, sustenance, pyrotechnics, cigarettes; in fact, everything to alleviate their discomfort until they were picked up.

During the six days they were adrift they were in constant fear of witnessing further attacks on our own searching aircraft. There were in the vicinity Arados, Focke-Wulf 190s and Ju. 88s. On one occasion four F.W. 190s flew past them at 50 ft., climbed to 500 ft. and then dived straight at them; just as they thought the enemy aircraft were going to open fire, the leader turned slightly away, flew past, and all four waved, waggled their wings and departed. Although they saw a Beaufighter and Sunderland that evening, they did not dare to signal as they

suspected the presence of other enemy aircraft. In the meantime, they had managed to paddle to the dinghy containing the sole Sunderland survivor. It took about five hours to reach him about 1,000 yards away. He was in a rather weak state, but after a good rub down, being encased in dry and warm clothing, and given sustenance, he soon revived.

At dawn on the sixth day, three Air/Sea Rescue Hudsons and two Beaufighters flew right over them, and one of them signalled "It won't be long now." Within a very short time four M.L.s hove in sight, one of which picked them up. Although the Wellington crew were not aware of it, there was a German launch within 5 miles of their position steaming towards them. Only two of the dinghy crew had to be helped on board the M.L.s. Hot tea and blankets were served out. The M.L.s got into diamond formation as two F.W. 190s dived from the east. The guns were manned and the captain and observer of the Wellington asked the captain of the M.L. if he had a gun which they could man. They were asked if they could manage a three-pounder. The Wellington captain, having been in the Artillery, knew the gun, so he and his observer loaded it. After a while all the crew except the captain and the observer went to bed.

They were all landed at Newlyn at 1740 hours on Monday, 17th August, little the worse for their adventure.

In all, during their six days the crew had sighted 77 aircraft, 20 of which were German.

Whilst there are faults to be found in this ditching, the crew, and particularly the captain, are to be congratulated on their subsequent action. The moral to be learned is, "Never despair." Although you may not be picked up immediately, you may rest assured that everything possible is being done to effect your rescue.

## Why Publicity?

*The Times* and the *News Chronicle* started the ball rolling. The air correspondents of these two papers were the first to be given places in aircraft of the Command since the ban on press flights was lifted recently. *The Times* saw in the distance a submarine which crash-dived and for once in its career *The Times* missed the boat. *The News Chronicle* weathered some storms, but had an otherwise uneventful trip. Despite, or perhaps because of the passenger's political associations, the Sunderland maintained its usual even balance between port and starboard wings.

In recent weeks, Fleet Street has visited the front line in the Battle of the Bay of Biscay with increasing frequency. *The Daily Telegraph* and Allied Newspapers followed the pioneers; and the *Evening Standard*, the *Yorkshire Post*, the *Chicago Daily News*, the *New York Sun*, and others, have also been out on patrol. The result has been a number of articles in the national press of this and other countries giving as broad a picture as the censor will permit of the Command's anti-submarine work. By experiencing at first hand typical patrols over the Bay, the correspondents were able to take their readers into the aircraft—"our pigeons started to fidget in their boxes"—and to convey something of what it means to carry out hours of humdrum patrol. Most of the flights so made took place from Mount Batten

in Sunderlands of No. 10 R.A.A.F. Squadron, and the press and public generally owe a big debt of gratitude to the Station and Squadron for the facilities and hospitality they accorded to these visitors.

There may be a tendency in some quarters to question the wisdom of allowing the press to make operational flights, or even to visit R.A.A.F. stations at all. Why (it may be said) should we be bothered with these people? We don't want publicity. Let's get on with the war!

That is an attitude less common now than it used to be, but still persisting in some individuals. It is a relic of the mind which looks at war from the purely military point of view, ignoring its "total" aspect, and would maintain complete silence until, perhaps, after the cessation of hostilities the veil might be lifted by some such official communiqué as: "The war is over. It has been  $\frac{\text{won}}{\text{lost}}$ " (deleting whichever is inapplicable). That attitude is extreme, but by no means non-existent.

The fact is that we have a natural dislike of line-shooting about ourselves and what we are doing, quite apart from questions of security. That is why we are a long way behind the Nazi methods of propaganda. Most people will say:

Thank God! But we have learnt in this war, more than in the last, the paramount importance of telling the world as much of what is happening as is consistent with security. That means giving *facts*, not fabricating stories on the Goebbels system. There is nothing much wrong with the morale of a country which can tell the truth about itself. If democracy is to mean anything in war-time, it connotes the right of the people to know how the war is going. It implies the right of Parliament to help in the prosecution of the war by stimulating the Government, and, where necessary, criticising. There is a wealth of significance in the recent words of the Prime Minister, as he stood at the despatch box in the House of Commons and said: "I am the servant of this House." Parliament, the people and the press are inter-related. In war-time their privileges are necessarily curtailed. But they can never, while we are a democracy, be extinguished on the Goebbels plan!

At the beginning of the war, the Air Ministry brought into operation a Public Relations organisation, the nucleus of which was a body of experienced journalists recruited from national and provincial papers of repute. It is their task to gather news about the activities of the R.A.F., much as though they were special war correspondents. That news is filtered through Command Headquarters Air Staff and security channels at Air Ministry, and issued to the papers for publication. The organisation is now a Directorate—the Directorate of Public Relations—and the officers are known as P.R.O.s. They are attached to all operational Commands at home and overseas, and it is largely through them that the public are kept informed of the work of the R.A.F. The reports they write are objective, they eschew "blurb" and special pleading, but they provide *facts* in the form of "hot" news, amplifications of official communiqués, background articles, broadcast scripts, etc. They are also concerned with official photographs and cinematograph films which may be suitable for publication.

What more, it may be asked, can the press want? There is something more, and it is symbolic

of the independence of the British press. It arises out of a dislike on the part of the press to be spoon-fed, even in war-time. Undoubtedly, the papers are grateful for the supply of news received through the Air Ministry News Service. Without it their own resources would never enable them to inform the public adequately of the progress of the air war. But the editors and their expert writers still like to do their own thinking. (To think for oneself is, after all, one of the things for which we are fighting). And, to do that, they must "see for themselves." Moreover, too much official news clogs the palate of Fleet Street—and, in the long run, of the reader.

So the Air Ministry allows press representatives—usually the air correspondents, who are a compact and well-informed body of writers—to visit its stations and to see the R.A.F. at work. In Coastal Command, owing to a recent relaxation of restrictions on press facilities, flights on operational patrols are now authorised as well. This does not yet obtain to the same extent in either Fighter or Bomber Command, though it may some day be possible to accede to long-standing requests from Fleet Street to be allowed to participate in Bomber Command raids.

The results, since the first flights by the air correspondents were made at the beginning of September, have been encouraging. Well-written and well-informed articles have been given considerable prominence in the papers, and it is no exaggeration to say that the general public have a better understanding now than they ever had before of the place which Coastal Command fills in our war strategy. That knowledge will be implemented with the impending release of the film "Coastal Command" and the concurrent publication of official and private books about the Command. The public have a right to know what we are doing to help win the war. The enemy (so many as are allowed to) read of our achievements with increasing dismay. And—of great importance inside the Command—the squadrons who are doing the job are encouraged by public reference to their work.

