

SECRET

Nº 778

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

August 1944

Vol. III, No. 8

**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.*

COASTAL COMMAND REVIEW

Vol. III, No. 8—August 1944

CONTENTS

	Page
The Month's Work: August	2
Coastal Command's Third Victoria Cross	3
 I.—ANTI U-BOAT	
Summary of Anti U-Boat Operations: August	4
Assessments	5
Analysis of U-Boats sighted during August	5
Squadron Results	5
Recent Attacks on U-Boats	6
 II.—ANTI-SHIPPING	
Summary of Anti-Shipping Operations: August	12
Final Assessments for July	13
Results Claimed for August	13
Enemy Shipping in August	14
Shipping Strikes in August	14
 III.—OTHER OPERATIONAL FLYING	
Combats with Enemy Aircraft	16
Photographic Reconnaissance	16
Air/Sea Rescue	18
 IV.—SPECIALIST AND GENERAL ARTICLES	
Shark Sense	19
Some Uses of the A.S.V. Log	22
The Luftwaffe in the Bay	24
The Renaissance of Met. Flying	26
 PLATES	
<i>Plate</i>	<i>Opp. page</i>
1 & 2. The Destruction of two Sperrbrechers by 236 and 404 Squadrons	2 and 3
3. { U-Boat attacked by Mosquito E/333 off Norway on August 2 } { A U-Boat sunk in 1940 }	8
4. A German Escort Vessel attacked by Beaufighters on August 6	9
5 & 6. Enemy Destroyers attacked and sunk by Beaufighters on August 24	14 and 15
7. Brest after attacks by Allied Heavy Bombers	16
8. { H.M.C.S. <i>Chaudière</i> off the Îles de Clenan } { An Airborne Lifeboat containing the crew of Fortress Z/220 }	17
9. Enemy Minesweepers attacked by Mosquitos off Benodet on August 9	18
10. The Sperrbrecher <i>Sauerland</i> attacked by Beaufighters on August 12	19
11. Four Enemy Minesweepers sunk by Beaufighters on August 8	20
12. Enemy shipping attacked by Mosquitos off Royan on August 12	21
13. Units of a prefabricated port being towed across the Channel	24
14. { A Waterspout photographed near Nassau } { A practice attack with runner torpedoes }	25
 CHART	
Anti U-Boat Activities: August	6

The Month's Work : August 1944

The Anti U-Boat Effort

During August the U-Boats have given up the idea of making their passages on the surface and deliberately shooting it out with our aircraft. In the Inner Bay a few U-Boats have remained on the surface both by day and by night, and have defended themselves with intense flak. These boats, however, have been either escorted or about to meet their escorts. Others have been found in comparatively shallow water, where they do not care to crash dive for fear of hitting the bottom or bumping on ground mines.

2. The general rule, however, is for the boats to submerge by day and to proceed at schnörkel depth by night. There are of course likely to be exceptions to this rule. Some may seek relief from the unpleasantness of continuous underwater existence and may risk surfacing for short periods. Aircraft of the Command will ensure that such boats get little comfort. Others will have to surface when the schnörkel (never a very robust gadget at the best) develops defects, or when sea conditions preclude its use. It now seems fairly certain that the schnörkel cannot be used in seas of Force 3 (Beaufort Scale) or over.

3. Since the enemy has been forced to adopt these cautious tactics, our aircraft in the north have had a lean time. Only six U-Boats were sighted in August, of which four were attacked. One of these, which was attacked by F and K/162 and P/59, seems to have been damaged, judging by the long trail of oil she left behind.

4. On the other hand aircraft in the south have had better sport. It would appear that the Allied advance in western France caused the enemy to transfer his U-Boats from the threatened ports in north-west France to the safety of the southern end of the Bay. When this area also became highly unsafe, the U-Boats seem to have begun clearing out altogether, presumably on the long trek round to Norway. In the Bay area there were during August 23 sightings and 16 attacks, which resulted in six U-Boats being probably sunk and five more damaged. Two or three of these successes were achieved in co-operation with our naval forces, which have been exceedingly active and successful in these waters.

5. Two of these attacks deserve special mention. On August 18 Sunderland W/201 attacked a periscope with the result that violent bubbles, wreckage and oil came to the surface—all confirmed by photographs. This attack shows that accurately placed depth charges are fully lethal to a U-Boat at periscope depth and will provide ample evidence in the shape of bits and pieces. The other outstanding attack was by Wellington B/172 in the Inner Bay on the night of August 27. On the run in the enemy's flak set the port engine on fire at half a mile and smashed the starboard engine at a quarter of a mile. The captain gallantly pressed home his attack and released six depth charges, but the aircraft crashed into the sea half a mile further on. Four of the crew survived the crash and two of these, who were injured, were put into a "K" type dinghy while the other two clung on. One of the latter died during the night, but the injured captain hung on to him until dawn. The other three were finally rescued by Sunderland P/10, which landed on the sea and picked them up.

6. In the Channel area there were eight sightings and three attacks during the month. All these were of the periscope and schnörkel or the vanishing conning tower variety. They are naturally extremely difficult to attack, and when attacked they seldom produce tangible results.

7. During the last week in August the number of sightings fell away to practically nothing. This indicates that the anti-invasion phase is over and that the withdrawal to the north has begun. While on passage these retreating U-Boats will take every precaution against being caught on the surface. We may therefore survey our score since D-day; we have sunk or probably sunk 25 U-Boats, not counting four others which we shared with surface forces, and we have damaged 26 more. When our own successes are combined with the equally outstanding lack of success on the enemy's part, these results are most impressive.

8. From now on it is probable that the operational U-Boats will be based on the Norwegian ports. Their working-up areas in the Baltic will be seriously threatened by the Russian advance. It seems likely that the Battle of the Atlantic will be renewed and that the U-Boats will try to maintain their nuisance value in the Channel, and perhaps elsewhere along our coasts, as long as they can. The schnörkel will give them some advantage in this respect. The snake is scotched, not killed. It can be kept down only if we maintain our all-out pressure.

Anti-Shipping

9. August was a spectacular month for the anti-shipping squadrons of the Command. The nightly harassing of E-Boats in the Channel has been kept up, and five major Beaufighter attacks have been made in Norwegian and Dutch waters. But the highlights were in the Bay. Even in July the enemy was running a few small coastal convoys in that area to relieve his hard-pressed land communications, but the rapid development of the land fighting in August has put sea communication at a premium in western France. Beaufighters, Mosquitos and Halifaxes have combined with the surface forces of the Royal Navy to play havoc with German shipping.

10. In the early part of the month it seemed that the enemy might try to supply Brest from St. Nazaire. In the latter port he concentrated a torpedo boat, two *Sans Souci* class escort vessels, 14 minesweepers and four sperrbrechers. Possibly events moved too fast for the Germans to carry out their plan; certainly our surface craft and aircraft made things very difficult for them. On the 6th a *Sans Souci* escort vessel was attacked by Beaufighters off Les Sables d'Olonne and heavily



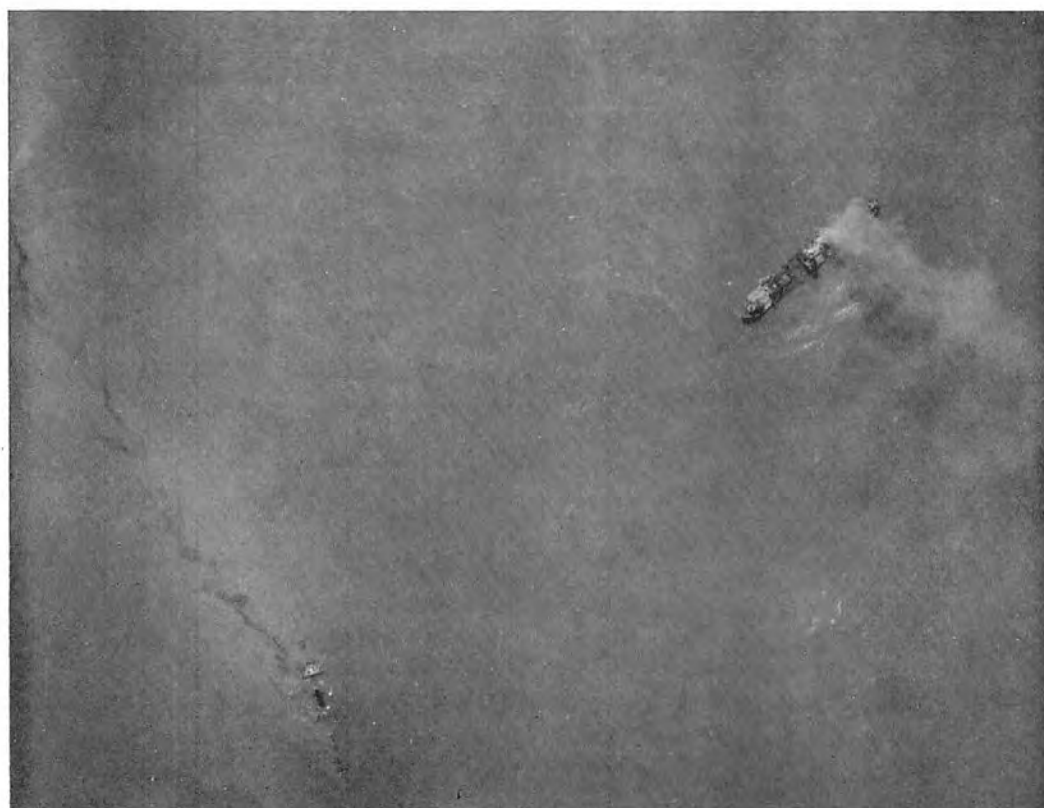
PLATE 1

The photographs on this and the following plate show the destruction of two sperrbrechers by 236 and 404 Squadrons off Royan on August 13. On this page the *Magdeburg*, 6,128 tons, is seen under heavy attack.





The upper photograph shows the *Schwannheim*, 5,339 tons, being attacked by R.P. and cannon. In the lower picture, which was taken on the following day, the *Schwannheim* is seen still burning and with her decks awash, while the *Magdeburg* is already resting on the bottom. Later photographs have confirmed that both these ships were sunk.



damaged. On the 8th Beaufighters set four minesweepers on fire in Bourgneuf Bay, while Halifaxes attacked sperrbrechers on the 8th and 9th off the Ile de Groix and on the 12th off Royan. At least one of these was probably seriously damaged. Mosquitos made successful incursions into the Gironde estuary and to Benodet, in the course of which they blew up one trawler-type auxiliary and damaged several more.

11. In the middle of the month the enemy seemed to be withdrawing southwards. The torpedo boat at St. Nazaire moved to Royan and a destroyer, after being damaged by Mosquitos off Le Verdon, sailed to Bordeaux, doubtless for repairs. A second destroyer, which had been under repair at La Pallice for a long time, prepared to leave, although she lacked some of her armament. The concentration of minesweepers and sperrbrechers remained at St. Nazaire. On the 13th Beaufighters sank two big sperrbrechers off Royan, and it was seen that six more of these vessels, which lay in Brest, were being stripped of their armament. Later this policy spread to St. Nazaire, where four sperrbrechers and two escort vessels were disarmed.

12. Aircraft attack was of considerable help to the Germans in getting rid of the ships. On the 20th Beaufighters seriously damaged two auxiliaries off Les Sables d'Olonne, left two coasters burning in Audierne Bay on the 26th and left a merchantman enveloped in smoke off Royan on the same day. Their outstanding success was against the enemy's only serviceable destroyer and torpedo boat, which were attacked off Le Verdon on the evening of the 24th. (See page 16 and plates 5 and 6.) A direct hit on the torpedo boat produced a big explosion and waterline hits were scored on the destroyer. The next morning only two large oil streaks were found at the scene of the action, and it has since been concluded that both these vessels sank shortly after the attack. Incidentally torpedo boats of the *Elbing* class, to which the smaller of the two ships belonged, are sometimes referred to as destroyers.

13. These actions have a direct and immediate effect on military and naval operations, but they should not be allowed to obscure the fine work which was continued during August by the 16 Group Strike Wings off the Dutch and Norwegian coasts. In spite of their other commitments, the Beaufighters delivered five major strikes in these areas. The results have not yet been assessed, but the claims are impressive and even the Germans have seen fit to acknowledge that a large merchant ship was heavily hit in an attack near Wangeroo. Such admissions are usually a sign of disaster.

14. Far more significant is the announcement that Swedish ships sailing to German ports can no longer be insured. Swedish seamen have long been reluctant to face the dangers of the European trade routes, but this latest move amounts to a virtual ban on Swedish ships trading with Germany. The full significance of this ban and the general effect of the August shipping offensive are discussed in the article on page 14.

15. Although it is not yet possible to give the final assessments for the month, our successes have been considerable. The Command claims to have sunk six ships, including a destroyer and a torpedo boat, seriously damaged 26, including three merchantmen of 5,000, 2,500 and 2,000 tons, and damaged 47 more. No fewer than 670 aircraft delivered attacks during the month. This figure is higher than that for either July or June, which themselves were record months.

Coastal Command's Third Victoria Cross

On July 17 *Catalina Y/210* was on anti U-Boat patrol in northern waters when the Radar operator picked up a contact 15 miles on the starboard beam. The visibility was some three miles but there was a good deal of fog and 9/10th cloud at 1,000 feet. The *Catalina*, which had been flying at 1,800 feet, homed on to the contact and lost height. At 1,000 feet the crew sighted a vessel six miles away. At first they thought that she was a friendly destroyer and made recognition signals. When the vessel replied with a barrage of flak astern of the aircraft, she was identified as a U-Boat making violent "S" turns. Her position was 68° 35' N., 06° 00' E. Despite intense fire the *Catalina* pressed home an attack up the U-Boat's track from astern, but all the depth charges failed to release. Disregarding the enemy's fire the captain began another run in from astern. Hits on the forward part of the aircraft killed the navigator and seriously wounded the captain and three other members of the crew. The captain pressed on despite no less than 72 wounds and from 50 feet released six depth charges spaced at 60 feet. Fog prevented the explosions being seen, but the front gunner saw the subsidence rings of six explosions all along the line of the U-Boat's wake, the first two being on either side of her stern. About one minute after the explosions he saw a violent white explosion somewhere on

the U-Boat. Meanwhile the second pilot had taken over the controls from the wounded captain and he flew the damaged *Catalina* into fog. In view of the casualties and the state of the aircraft it was impossible to remain in the area. The aircraft therefore left for base and nothing more was seen of the enemy. The second pilot flew safely back to base and six hours after the attack he successfully beached his aircraft, the captain assisting in spite of his wounds and weakness.

Comments

His Majesty the King has awarded the Victoria Cross to Flying Officer J. A. Cruickshank, the captain of this aircraft. Any further comment would be superfluous.

Remarks by Admiralty Assessment Committee

The depth charges hung up in the first run in, after a good Radar location. In spite of severe flak, which killed the navigator, seriously wounded the captain and others of the crew, a very accurate attack was pressed home.

From the evidence of a violent explosion occurring in the U-Boat together with photographic and tracking evidence, the latter indicating that a U-Boat is missing from this area following the period of this attack, the encounter is assessed "U-Boat probably sunk."

I.-ANTI U-BOAT

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

AUGUST 1944

Duty and Base of Area.	Total Sorties.	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per Sighting.		Number of Sorties.		Sorties with U-Boat Flak.
		Base to Base.	On Patrol.	Day.	Night.	Day.	Night.	Base to Base.	On Patrol.	When U-Boat Sighted.	When U-Boat Attacked.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Convoy Cover</i>												
United Kingdom	36	426	251	—	—	—	—	—	—	—	—	—
Iceland	7	81	49	—	—	—	—	—	—	—	—	—
Gibraltar and Moroccan Sea Frontier	45	454	278	—	—	—	—	—	—	—	—	—
Azores	16	205	97	—	—	—	—	—	—	—	—	—
<i>Channel Convoy Screen</i>												
United Kingdom	43	417	348	1	—	—	—	417	348	1	—	—
TOTAL CONVOY EFFORT	147	1,583	1,023	1	—	—	—	1,583	1,023	1	—	—
<i>A/U Patrols</i>												
<i>Northern Transit</i>												
United Kingdom	626	6,230	3,543	6	—	4	—	1,038	590	6	4	2
Iceland	68	818	455	1	—	1	—	818	455	1	2*	1
<i>Northern Convoy</i>												
United Kingdom	104	1,035	566	—	—	—	—	—	—	—	—	—
Iceland	25	216	166	—	—	—	—	—	—	—	—	—
Azores	62	773	435	—	—	—	—	—	—	—	—	—
<i>Bay of Biscay (excluding Channel and Approaches)</i>												
United Kingdom	989	9,798	6,208	10	13	8	8	426	270	22	16	13
Gibraltar and Moroccan Sea Frontier	8	94	32	—	—	—	—	—	—	—	—	—
<i>Channel and Approaches</i>												
United Kingdom	1,265	10,062	7,999	4	3	2	1	1,437	1,143	7	3	1
<i>Central Convoy</i>												
Gibraltar and Moroccan Sea Frontier	286	2,408	1,441	—	1	—	1	2,408	1,441	1	1	—
Azores	41	485	258	—	—	—	—	—	—	—	—	—
TOTAL A/U PATROLS	3,474	31,919	21,103	21	17	15	10	840	555	37	26	17
ADD CONVOY EFFORT	147	1,583	1,023	1	—	—	—	—	—	1	—	—
TOTAL A/U EFFORT	3,621	33,502	22,126	22	17	15	10	859	567	38	26	17
				39 U-Boats sighted.	25 U-Boats' attacked.							

Notes.— (i) *An Iceland aircraft attacked an oil slick left by a U-Boat, after being homed to the position by another aircraft which had sighted and attacked the U-Boat.
(ii) In addition to the above there were 7 chance sightings (1 by a Coastal aircraft).
(iii) The figures for sightings and attacks are subject to revision when assessments by the Admiralty have been completed.

Assessments
(Received up to September 11)

Month.	Known Sunk.	Probably Sunk.	Damaged A.	Damaged B.	Slight Damage.	In-sufficient Evidence of Damage.	No Damage.	In-sufficient Evidence of U-Boat.	Target not Sub-Marine.	Un-assessed.
June	9*	7*	—	5	8	16	17	4	5	1
July	2	4	—	3	5	18	7	6	1	1
August	2*	—	—	2	2	4	—	—	—	15

Note.—* In June one of the attacks assessed as Known Sunk and one assessed as Probably Sunk are shared with surface craft; one attack in August assessed as known sunk is similarly shared.

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

Particulars of Incidents.	U-Boats.		Sorties when Aircraft.	
	Sighted.	Attacked.	Sighted.	Attacked.
On 26 occasions 1 U-Boat was sighted by 1 aircraft—17 aircraft attacked.	26	17	26	17
On 3 occasions 1 U-Boat was sighted by 2 aircraft—each U-Boat was attacked by 1 aircraft.	3	3	6	3
On 1 occasion 2 U-Boats were sighted by 2 aircraft—each U-Boat was attacked by 1 aircraft.	2	2	2	2
On 1 occasion 2 U-Boats were sighted by 1 aircraft—1 U-Boat was attacked.	2	1	1	1
On 1 occasion 3 U-Boats were sighted by 1 aircraft—none of the U-Boats were attacked.	3	—	1	—
On 1 occasion 3 U-Boats were sighted by 2 aircraft—each aircraft attacked a U-Boat.	3	2	2	2
1 attack on an oil slick—see Note *below	—	—	—	1
TOTALS	39	25	38	26

Squadron Results—August

Squadron Results

August

				No. of Sorties when U-Boat Sighted.	No. of Sorties When U-Boat Attacked.
162 (R.C.A.F.)	Canso	Reykjavik	.. ..	1	2*
202	Catalina	{ Sullom Voe	.. ..	1	1
		{ New Camp	.. ..	1	1
333 (Norwegian)	{ Catalina	Sullom Voe	.. ..	1	0
	{ Mosquito.	Sumburgh	.. ..	2	2
58	Halifax	St. Davids	.. ..	2	1
502	Halifax	St. Davids	.. ..	4	3
53	Liberator L.L.	St. Eval ..	.. ..	2	2
59	Liberator	Ballykelly	.. ..	1	1
224	Liberator L.L.	St. Eval ..	.. ..	1	—
547	Liberator L.L.	St. Eval ..	.. ..	1	—
110 (U.S.N.)	Liberator	Dunkeswell	.. ..	3	2
201	Sunderland	Pembroke Dock..	.. ..	2	2
228	Sunderland	Pembroke Dock..	.. ..	2	2
422 (R.C.A.F.)	Sunderland	Sullom Voe	.. ..	1	—
423 (R.C.A.F.)	Sunderland	Castle Archdale	.. ..	2	—
461 (R.A.A.F.)	Sunderland	Pembroke Dock..	.. ..	5	3
172	Wellington L.L.	Chivenor	.. ..	3	3
179	Wellington L.L.	Predannack	.. ..	2	1
407 (R.C.A.F.)	Wellington L.L.	Chivenor	.. ..	1	—
				38	26

Chance Sightings by Coastal Aircraft on Other Duties

		U-Boat Sighted	U-Boat Attacked
6 (O.T.U.)	Silloth	1	(No weapons)

Note.—* An aircraft of 162 Squadron, after homing, attacked the oil slick left by a U-Boat previously attacked by another aircraft; the U-Boat was not actually sighted in this second attack.

Recent Attacks on U-Boats

At midday on July 18, **Mosquito K/333** (Norwegian) was patrolling at 50 feet off the coast of Norway when the pilot sighted a U-Boat 1,000 yards away, fine on the port bow in position 57° 59' N., 06° 50' E. The U-Boat was very broad in the beam and carried at least two 20 mm. guns in the conning tower besides several of smaller calibre. There were no guns on deck but the conning tower had two bandstands. The boat was steering due east at 12 knots. As the Mosquito went in to attack, the enemy opened fire. At 400 yards the Mosquito pilot, his aim doubtless inspired by the sight of several of the U-Boat's company in the conning tower, replied with his cannon, which immediately discouraged the German gunners from attempting to oppose his run. He attacked from the U-Boat's starboard beam and released two depth charges in salvo from about 30 feet. The explosions straddled the U-Boat's stern. She began to slow down appreciably and turned to port with a lot of brown smoke coming from the conning tower. As soon as the Mosquito's cannon ceased to be pointing in their direction, the U-Boat's gunners returned to their pieces and fired

continuously as long as the Mosquito was in the area. After eight minutes the pilot set course for base as it was not advisable to stay so near the enemy coast when ammunition was low.

Comments

An excellent snap attack on a sudden sighting when the aircraft was coming out of fog. A very good run in against flak with accurate return fire which smothered the U-Boat's guns. On the evidence, the depth charges straddled the U-Boat's tail. The slowing down indicates trouble in the engine room and the smoke seen tends to confirm this. The cannon fire would undoubtedly cause many casualties on the bridge and round the guns.

Remarks by Admiralty Assessment Committee

A very good run in against flak, which was smothered by return fire. On the evidence the attack was a straddle across the after end of the U-Boat. The loss of way and the smoke indicate damage, which is consistent with tracking evidence.

The encounter is assessed "U-Boat probably seriously damaged—Had to return to base at once."

A Gallant Attack: Crew picked up by a Catalina

In the evening of July 18, **Liberator F/86** was patrolling about 100 miles west of the Lofoten Islands when a U-Boat was sighted turning in tight circles six miles away. At the moment of sighting, the Liberator was making a big alteration of course, and the U-Boat was seen dead astern. She was a 740-tonner with two bandstands and she appeared to mount a second 37-mm. gun in addition to the normal armament. She was blowing out a considerable quantity of what looked like diesel smoke, particularly after the first attack. The aircraft approached from dead astern, and from 50 feet released six depth charges spaced at 55 feet while the U-Boat was circling. The low level bomb sight was used. It is stated that the first depth charge entered the water on the U-Boat's port side near the stern, and the second on the starboard side along the vessel's original heading. It was difficult to estimate the distance of the points of entry from the U-Boat, but the captain is of the opinion that the first depth charge was about 30 feet away. A violent last-minute change of course on the part of the U-Boat caused the depth charges to fall in a line across her stern from port to starboard. After the attack the Liberator climbed above the cloud level in order to evade the flak and make use of the cloud cover. The captain then decided to attack again and circled in an attempt to run in over the bows. The U-Boat, however, turned stern on and opened intense fire. The Liberator took no evasive action and during the last 150 yards it was badly damaged. There was a big explosion on the starboard side, and fire broke out in No. 3 engine, in the starboard mainplane and in the rear compartment. The captain continued his attack and from 40 feet released two depth charges spaced at 80 feet. The low level bomb sight was used. Only the U-Boat's fore deck and conning tower were visible at the time of attack as the after deck

was under water. Moreover the bows seemed to be higher out of the water than during the first attack. There is no evidence to show where the depth charges fell as those of the crew who saw them were subsequently killed. Meanwhile the captain had feathered No. 3 engine and the second pilot put out the engine fire. The flight engineer put out the fire in the rear compartment. However, the fire in the mainplane continued to blaze furiously and was burning through the structure into the bomb bay. Two tanks had evidently been hit by explosive shells. As it was probable either that the wing would burn off or that the petrol tanks would explode the captain decided to ditch. All the crew except the front gunner escaped from the ditched aircraft, which broke up and sank within 30 seconds. The survivors remained in their dinghies until they were picked up by **Catalina X/210** on July 22, but two members of the crew were lost after the ditching. (See page 18.)

Comments

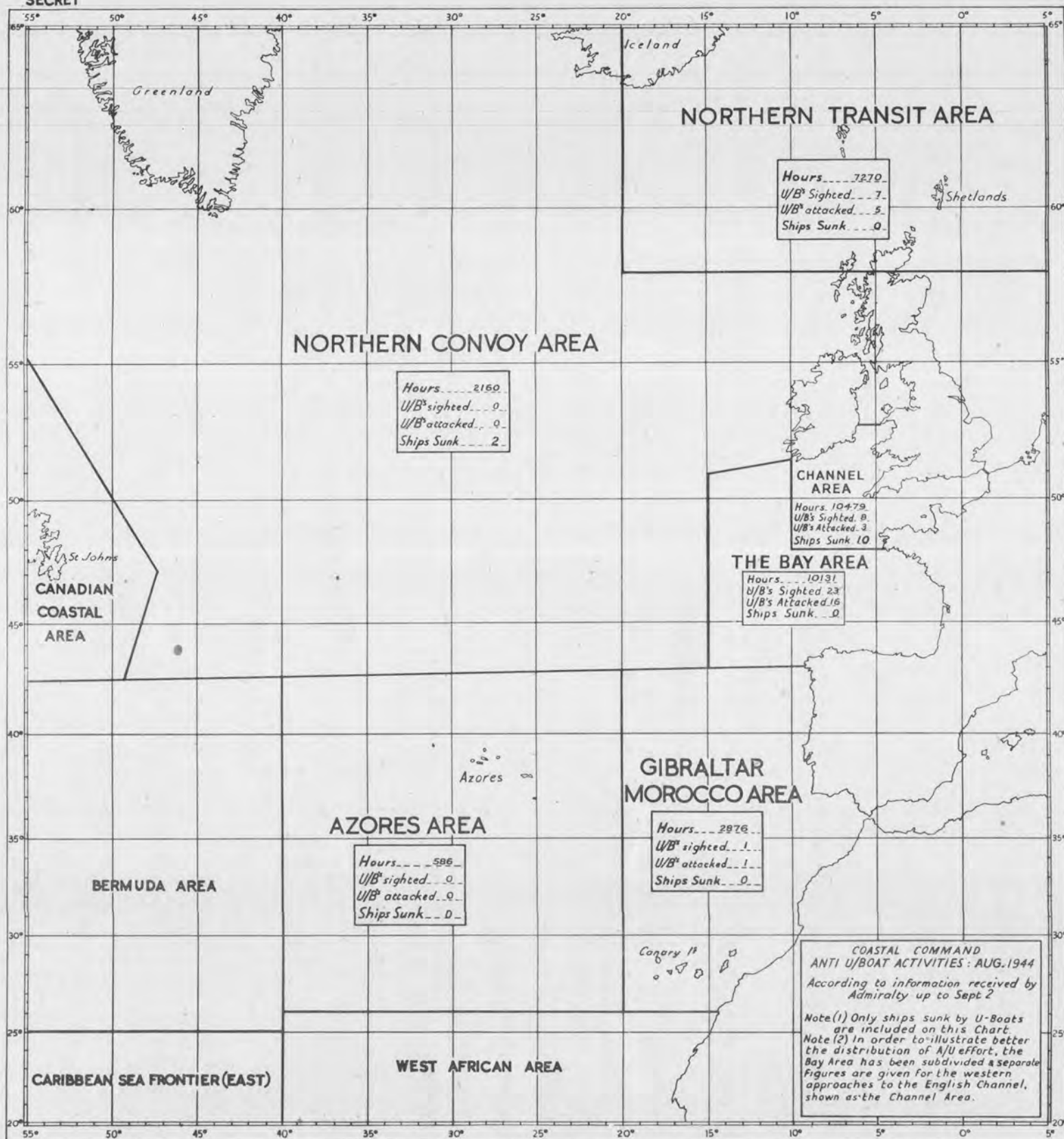
Two very determined attacks on a violently jinking U-Boat, the second attack particularly being pressed home in a gallant manner after the aircraft had been severely hit. It is not possible to assess the results as insufficient details are available and the aircraft was in no condition to stay and see what happened to the target. The whole crew is congratulated on their gallant conduct.

Remarks by Admiralty Assessment Committee

Two very determined and gallant attacks, in the face of intense flak with the U-Boat taking violent evasive action. As the aircraft was severely damaged and unable to observe results, it is not possible to assess damage.

The encounter is accordingly assessed "Insufficient evidence of damage."

SECRET



A Kill by a Catalina

In the afternoon of July 18 **Catalina Z/210** was patrolling in excellent visibility when a U-Boat was sighted 15 miles away fine on the starboard bow in position 68° 24' N., 09° 51' E. The U-Boat, which was a 517-tonner, was steering 120° at about 15 knots. The Catalina went in to attack, weaving violently to avoid intense and accurate flak. In spite of these tactics the hull was damaged, the starboard engine put out of action and two members of the crew were wounded. The air-gunners returned the enemy's fire with 200 rounds from the front gun and 50 rounds from the starboard blister. In spite of the damage to his aircraft the captain pressed home his attack over the U-Boat's port bow and from 50 feet he released six depth charges spaced at 60 feet. Those of the crew who should have seen the points of entry and the explosions of the depth charges were wounded, but it appears that the target was straddled. When the Catalina turned to port after the attack the crew saw the U-Boat disappearing, but she went down so quickly that it was impossible to tell whether

the disappearing part of the hull was the bow or the stern. It was, however, soon apparent that the question was one of academic interest only, for a very big oil patch began to form with 35-40 survivors in the middle. There were also a number of small yellow dinghies. The Catalina's crew were able to count the survivors, but could not photograph them as the camera operator was wounded and the rest of the crew were too occupied with saving their severely damaged aircraft. After jettisoning everything possible, the captain was able to gain height on one engine and fly safely back to his base 500 miles away. After alighting he succeeded in beaching the Catalina without further damage.

Comments

A determined and gallant run in against intense and accurate flak followed by an excellent attack which undoubtedly destroyed the U-Boat. Great skill was shown in bringing the severely damaged aircraft back on one engine for 6½ hours, a distance of 500 miles, and finally beaching it.

A Co-ordinated Attack by two Mosquitos

On July 25 **Mosquitos E** and **F/333** (Norwegian) were patrolling at 50 feet off the coast of Norway when they sighted a U-Boat, escorted by an armed coaster, in position 57° 55' N., 07° 35' E. The enemy vessels were steering due south at 10 knots and were about 300 yards apart. The U-Boat had one bandstand aft of the conning tower and did not mount a forward gun. As the aircraft approached, both sides opened fire and "E" scored hits which produced a red explosion in the U-Boat's conning tower and a white explosion forward of the escort vessel's bridge. "E" attacked first, and went in from the U-Boat's port quarter, releasing two depth charges in salvo from 50 feet. One of the fusing hooks fractured, and as a result only one depth charge detonated. The explosion was seen on the U-Boat's starboard side between the conning tower and the stern, but the glare from the sea prevented an accurate estimate of the distance of the plumes from the U-Boat. "F" attacked ten seconds after "E," tracking over the target

from Red 160° and releasing two depth charges in salvo. The explosions were seen to starboard of the U-Boat, but again it was impossible to estimate their distance from the target. Both Mosquitos circled after the attacks, and the crews saw the U-Boat and her escort turn on to 090° and proceed eastwards at a very slow speed. As "E" went in to attack the pilot saw a big splash ahead of him, which covered his wind-screen with spray. He believes that this was caused by flak from the shore batteries.

Comments

An excellent show. A well thought-out run-in at very low altitude, which kept the U-Boat in front of the escort vessel. Very accurate cannon and M.G. fire, which seems to have caused damage to both U-Boat and escort vessel. From the description both depth charge attacks appear to have overshot; this is understandable, as it was the crews' first effort at dropping depth charges.

An Instructive Attack

Just before 0200 hours on July 28 **Fortress U/220** was patrolling at 1,500 feet when the Radar operator picked up a contact bearing Green 70° at a range of 18 miles. The wind velocity at the time was 225° at 12 knots. The navigator gave an alteration of course and the aircraft began to home. At 12 miles the target was brought 10° to port. This bearing changed gradually until at 2 miles the target was 5° to starboard. The pilot, although he bore the relative drift in mind, did not consider that it was sufficiently great to warrant an alteration of course. He therefore steered 179° throughout.

(C53542)

During the homing the Radar operator gave the bearings and range. The height of the aircraft was 1,500 feet at 16 miles, 900 feet at 10 miles, 400 feet at 7 miles and 400 feet at 1½ miles. In losing height gradually to 400 feet and remaining there, the pilot's intention was to keep underneath the U-Boat's Radar as much as possible. At 1½ miles and from 400 feet the aircraft released flares, which illuminated a U-Boat 1½ miles away bearing Green 40°. The position was 42° 47' N., 24° 42' W., and the enemy was steering 225° at 6 knots. The U-Boat, which appeared to be a large type, fired from one pair of twin guns

B4

and one or possibly two single guns. Otherwise no details could be seen. During the first run in the U-Boat opened inaccurate fire, apparently from only one gun. The mid-upper turret replied. Before levelling out for the attack the Fortress made a sharp turn to starboard and tracked over the U-Boat from her starboard quarter, releasing from 50 feet six depth charges spaced at 55 feet. The low-level bombsight was used. The points of entry were not seen, but there were two blue flashes on either side of the hull, and the rear gunner is certain that the depth charges straddled. After the attack the U-Boat did not fire at the retiring aircraft and appeared, from the Radar contacts, to have remained stationary in roughly the same position. As the aircraft passed over the conning tower after dropping the depth charges, the crew felt a violent bump, and it was later found that the port elevator was damaged. When the flares died down the target was lost to sight. No marine marker could be dropped, as the flare chute was being used for dropping flares by hand. However, contact was made on the five-mile scale, but such close range prevented an accurate second attack. Therefore a Mark II marine marker only was dropped close to the U-Boat's position. The Fortress captain then tried to position himself for another attack, but after three runs he found that the contact was still on the five-mile scale. The scale was then changed to 20 miles and when the aircraft was at 400 feet the contact was picked up bearing Red 170° at a range of 10 miles. The captain turned to get the blip dead ahead at nine miles and climbed to 1,000 feet. The blip remained dead ahead and there did not appear to be any relative drift. The Radar operator again gave the bearings and range. The heights and distances were 700 feet at 7 miles, 400 feet at 4 miles, 400 feet at 1½ miles and 300 feet when the aircraft tracked over. No alteration of course was needed. At 400 feet flares were released and they illuminated the U-Boat dead ahead, lying stationary in about the same position as before. She was still heading 225°. The Fortress attacked from the U-Boat's port beam and from 300 feet released two depth charges spaced at 80 feet. The low-level bombsight was again used. The points of entry were not seen, but again there were two blue flashes, though this time their position relative to the U-Boat is not known. The enemy opened fire during the run in and the Fortress gunners replied. After the attack the U-Boat was not picked up by Radar. "U" homed K/220 to the scene and remained in the area for another five hours.

Comments

Well done. This was an excellent attack, and although the crew was not fully trained it is

considered that their drill must have been very good indeed.

The Form U/Bat was well compiled and has enabled a full analysis to be made. This analysis points to the interesting conclusion that the Radar bearings were consistently wrong by some 7°. The Radar appears to have indicated that the target was to the left of its actual position. As this error was apparently present during both attacks, it would seem that the equipment was out of line. It is considered improbable that an inexperienced crew would have obtained consistent errors throughout both attacks.

It is always possible for the equipment to be out of line and it is therefore essential that crews should form the habit of checking their Radar bearings by some accurate visual means whenever a target is available.

Although the first Radar homing was not absolutely accurate (almost certainly because of the bearing error), the visual sighting was made at a good range, which enabled the pilot to turn and track accurately over the target. The bomb release appears to have been accurate despite the last-minute turn, but it is impossible from the evidence to assess the seriousness of the damage.

For those who are interested in the theoretical side of the problem, points from the homing analysis are given below:—

- (i) From the wind and U-Boat's speed given in the Form U/Bat the relative drift on the first approach appears to have been about 6° port.*
- (ii) The first approach was begun with the target bearing 10° port. If that bearing had been accurate, the target would have gone further out to port as the approach progressed. In actual fact the target moved to starboard.*
- (iii) The above points, and the Radar and visual bearings at the later stages of the approach, are in agreement with the bearing error suggested above.*
- (iv) In the second approach, the relative drift appears to have been 4° starboard. But the whole approach was made on a steady course with the target apparently dead ahead. If the target had been dead ahead at the start of the approach, there would have been a change of target bearing of about 15° by the time the range had closed to about one mile. There was, however, no bearing change during the approach. This strengthens the suspicion that the bearing error did in fact exist.*

A U-Boat Sighted and Attacked while below the Surface

In the afternoon of August 9 **Liberator C/53** was flying at 4,000 feet when the crew sighted an oil slick. The captain turned to investigate and saw that the slick was over a mile long and about 30 feet wide. It was heading 060°. The **Liberator** approached on the same heading and when it was almost immediately above the apex of the

trace some of the crew saw the shape of a U-Boat below the surface just ahead of the oil. The position was 46° 30' N., 03° 08' W. The captain immediately lost height in a turn and dropped a marker which fell 150 yards in front of the head of the oil. He then attacked from astern up the oil slick and from 100 feet dropped six depth



The upper photograph shows an attack by Mosquito E/333 (Norwegian) on an escorted U-Boat on August 2. The action took place off the south coast of Norway. The photograph below is of considerable historic interest as it shows the significant development which has occurred in anti-U-Boat warfare during the last four and a half years. The U-Boat is a 500-tonner which was successfully attacked by a Bomber Command aircraft in Schilling Roads on March 11, 1940. Her complete lack of anti-aircraft armament shows that the menace of air attack, which three years later was to break the power of the U-Boat arm, was not seriously considered by the Germans in 1940.





On the evening of August 6 Beaufighters attacked a *Sans Souci* class escort vessel lying off Les Sables d'Olonne, in the Bay of Biscay. The ship was sunk after attacks by R.P. and cannon. The photographs above are consecutive shots taken by Q/236. The Germans had four vessels of this class, which were taken from the French and modified as fast escorts.

charges spaced at 55 feet. The low-level bomb-sight was used and both the oil and the marker were visible. The depth charges entered the water between the apex of the oil and the marker dead in line. When the explosion plumes subsided the apex of the oil was in the residue of the explosions. As the plumes subsided the rear gunner saw big green bubbles in the middle of the disturbance, and a few seconds later other members of the crew also saw a profusion of bubbles in the same spot. Ten minutes later oil came to the surface and began to spread out. Half an hour after the attack, when the *Liberator* flew away to fetch ships of an Escort Group, the bubbles and oil still persisted. When the ships, as well as two *Sunderlands*, had reached the area, the *Liberator* resumed patrol. When it returned to the scene some three hours after the attack, the crew saw quantities of heavy orange-coloured grease amongst the oil, which was still triangular in shape but had grown very much bigger. The ships were still there and they told the *Liberator* captain that the oil was increasing and that they had found some wood which was believed to be U-Boat planking.

Comments

A most unusual and interesting occurrence. This U-Boat was leaking oil and was proceeding at periscope depth, but apparently did not put her periscope up between the time of sighting oil and the attack. The captain of the aircraft and two members of the crew saw the U-Boat proceeding at a very shallow depth just ahead of where the oil slick

was breaking surface. A very good attack was made, which inflicted damage on the U-Boat, confirmed by a large increase in oil, and the report by E.G.2 of the finding of "apparent U-Boat planking."

Prisoner of War Evidence

At 2130 hours on August 7 this U-Boat, which was *U 608*, left Lorient with two other boats. She carried supplies for 14 weeks. When four miles from Port Louis she dived and proceeded submerged on the 8th and 9th. At about 1400 hours on the 9th *Liberator C/53* attacked her. A depth charge exploded forward of the conning tower and caused damage. She therefore bottomed. Some eight hours later H.M. Ships *Wren* and *Loch Killin* obtained an echo sounder trace and H.M.S. *Wren* dropped a bottom pattern of depth charges. The ships had been guided to the spot by *C/53* and were able to identify the position by the oil and wreckage which *C's* attack had produced. The explosion of the ship's depth charges was very close to the U-Boat. Water entered aft and by the forward torpedo tubes, and the lights went out. Everything in the W/T cabin was smashed and the diesels were torn from their foundations. Eventually the order was given to blow tanks and *U 608* surfaced. No ships were in sight, but the batteries were finished and the boat was full of water. Ten minutes later the ship's company abandoned their U-Boat, which sank in three minutes. The whole complement of 51 was picked up at about 0300 hours on August 10.

Promising Evidence

On the morning of August 9 *Sunderland M/228* was flying at 1,000 feet over a flat calm sea when the mid-upper gunner sighted something disturbing the water two and a half miles away. The object was immediately identified as the conning tower of a U-Boat in the act of surfacing in position 47° 57' N., 05° 27' W. The enemy's course was 140°. The *Sunderland* immediately turned to attack but the U-Boat began to submerge and had completely disappeared 45 seconds before the aircraft reached her. The captain nevertheless attacked the swirl, dropping two depth charges spaced at 50 feet. Both depth charges overshot slightly and did no visible damage. About ten minutes later, when the aircraft was circling the marker, the second pilot sighted a feather and a periscope sticking two feet out of the water almost directly under the port wing. The captain immediately turned to port through 360° and from 80 feet released six depth charges spaced at 60 feet while the periscope was still visible. The crew did not see the points of entry in relation to the periscope, but the front gunner was able to watch it pass directly beneath his turret. About 20 seconds after the depth charges had exploded, when the aircraft was about three quarters of a mile away, the rear gunner saw large spherical globules of heavy black oil welling up to the surface near the eastern edge of the depth charge scum. After about ten seconds the separate globules merged into one black rectangular patch about 75 yards long and half as wide. The patch, which was very clearly defined, was between 50 and 100 yards away from the eastern edge of

the depth charge scum. The aircraft was ordered to home an Escort Group which reached the area about an hour and a half after the attack. Meanwhile, however, the *Sunderland's* crew had sighted a violent disturbance of foaming water a mile and a half from the position of the attack. The disturbance went on for about seven minutes with violent bubbles covering an area about 100 feet in diameter. As they died down streaks of light filmy oil appeared round the spot. When the escort vessels arrived they were told of the disturbance and one of them investigated the position. Up to the time the *Sunderland* left the ships had made no attack.

Comments

1st Attack.—The two depth charges would explode to starboard and well astern of the U-Boat which had disappeared 45-50 seconds earlier. They would inflict no damage.

2nd Attack.—The U-Boat was rash enough to remain at periscope depth in an oily calm and was accurately attacked while still showing her periscope. The oil extending to a patch 100 by 50 yards indicates damage and the upheaval of bubbling air 1 hour 17 minutes later lasting 5 or 6 minutes indicates probable trouble. There is not sufficient information or intelligence to say how serious was the trouble or what was the ultimate result.

Thus this excellent attack cannot at present be rewarded with definite news. It is hoped that the Admiralty Assessment Committee will be able to fill this gap.

A Moonlight Attack

At 0235 hours on August 11 **Sunderland P/461** (R.A.A.F.) was flying at 1,000 feet in calm weather and bright moonlight when the Radar operator picked up a contact at 10 miles, fine on the port bow. The captain held his course until he sighted a fully surfaced U-Boat in the moonpath 5 miles away bearing Red 70°. Her position was 46° 09' N., 03° 10' W., and she was proceeding south-westwards at eight knots. She appeared to be a normal 500-tonner mounting a big gun forward of the conning tower. The Sunderland captain turned away until the range had opened to eight miles and then turned back towards the target, which had been held all the time by Radar. He made a series of "S" turns to get the U-Boat in the moonpath, eventually sighting her again at a range of six miles. At four miles he lost height to 500 feet and at two miles he dived to attack, releasing from 100 feet six depth charges spaced at 55 feet. He used no illuminant, as he could see the target up moon in perfect visibility. The depth charges were dropped across the U-Boat's beam, and are stated to have straddled her amidships, four entering the water to starboard and two to port. The explosion plumes completely obliterated the target. Immediately before the attack the U-Boat fired a few shots and what may have been a red recognition cartridge. At the moment of the depth charge explosions a bluish-white flash was seen on the U-Boat. After the plumes had subsided she was still on the surface, but was stationary. The Sunderland turned to port after the attack and flew past the enemy's stern at a range of 1,000 yards. The German gunners opened up with about six guns, but their fire, though fairly heavy, was most inaccurate. At two miles range the U-Boat disappeared from view, and two minutes later the blip also disappeared. The Sunderland flew off to make contact with an Escort Group, which was then nine miles south-east of the position of the attack, and led the ships back to the area. On returning to the marker the crew found a patch of oil 100 feet wide. Later they picked up a Radar contact at three miles on the U-Boat's original track about two miles ahead of her last position. After three attempts this was illuminated with flares and identified as a Radar decoy balloon. The Sunderland reported the position to the ships and continued to stand by. About two and a half hours after the attack the Radar operator picked up another contact, but it disappeared when the aircraft was a mile away. This was also reported to the ships, which began

to sweep towards the new contact. After about an hour they reported having found an empty dinghy. After having stayed in the area for three and a half hours the Sunderland reached P.L.E. and set course for base.

At 0636 hours on August 12 the U-Boat surfaced 3,000 yards ahead of H.M.S. *Starling*, and was heavily engaged and hit by gunfire. She sank five minutes later.

Comments

An exceedingly well executed stalk, aided by good Radar work, which enabled a surprise attack to be delivered. On the evidence the attack was very accurate and the U-Boat was mortally wounded. The co-operation with the Escort Group was excellent. The whole operation demonstrates efficiency and good crew drill.

Prisoner of War Evidence

This U-Boat, *U 385*, left St. Nazaire on August 9 to try to make La Pallice. On the 11th, after proceeding submerged for about 20 hours the Commanding Officer decided to use the schnorkel. According to the prisoners it had never worked, and on this occasion, as usual, the boat began to fill with exhaust fumes. The ship's company stuck it as long as they could, but after the Commanding Officer had passed out, the boat surfaced to ventilate. While she was doing this, Sunderland P/461 attacked. Most of the depth charges overshot on the starboard quarter, but two did a great deal of damage. The starboard after hydroplane and the rudder were torn off and the starboard screw was put out of action. In addition, the outer cap of No. 5 torpedo tube was blown in and the washer on the inside of the cap was blown off; this caused a serious leak. The boat dived, but the air was by no means pure. It was necessary to pump a great deal, and the batteries were very low as it had not been possible to put in a charge during the time the schnorkel was being used.

By 0600 hours on the 12th the air in the boat was so foul that something had to be done. The Commanding Officer wished to make a run for port, but steering had become almost impossible. He therefore had to surface, although he knew that there were two ships hunting him. To his surprise there were five. These ships opened fire and scored hits forward and aft of the conning tower, which caused a further entry of water and a short on the armature of the only serviceable motor. The order was therefore given to abandon ship.

A Night Sinking with the Aid of Flares

Soon after midnight on August 13 **Sunderland A/461** (R.A.A.F.) was patrolling at 1,150 feet in hazy conditions when the Radar operator picked up a contact 6½ miles away bearing Red 72°. The aircraft continued on course and after one minute the contact bore Red 120° at seven miles. The Sunderland captain then turned to investigate. At four miles range he was still at 800 feet, but he then lost height as quickly

as possible, ran out the bomb racks and ordered the crew to action stations. At three quarters of a mile he released flares which illuminated a surfaced U-Boat dead ahead in position 46° 19' N., 02° 56' W. The U-Boat, which was steering 110° at 15 knots, looked very big and had a high conning tower with two bandstands aft. About ten men were seen in the conning tower or manning the guns aft of it. These gunners promptly

opened fire with light and medium tracer which came up in four streams from points abaft the conning tower. The Sunderland replied with 120 rounds from the nose gun and 380 from the fixed guns. This fire discouraged the U-Boat's gunners so effectively that the last 400 yards of the Sunderland's approach was unopposed. The aircraft attacked from abaft the U-Boat's starboard beam and from 300 feet released six depth charges spaced at 55 feet. The low level bomb-sight was used. The aircrew did not see the points of entry of the depth charges and saw only two of the explosions, the nearer being about 15 feet from the port side of the conning tower. As the aircraft passed over the target the midships and rear gunners got in bursts of about 100 rounds each. At two miles range the contact disappeared and when the Sunderland returned to the position ten minutes later, intending to attack again, the crew neither saw the U-Boat nor picked up any contact. However, about an hour after the attack, they saw many small lights in the water, two of which were flashing S.O.S. About 0130 hours some escort vessels arrived in response to the Sunderland's homing signals and twenty minutes later the S.N.O. reported by R/T that the U-Boat had been sunk and survivors rescued.

Comments

The crew is congratulated on their excellent drill which resulted in the certain destruction of the U-Boat.

Prisoner of War Evidence

U 270 had been lying in dock temporarily out of commission when it was decided that she was to try to sail to safety in the south. The boat was not fitted with schnörkel. A scratch crew was formed, which included even Admin. people who thought that the U-Boat was a means of escape.

The boat slipped at about 2100 hours on August 10. She was escorted by three "M" class minesweepers until 2315 hours when they were suddenly recalled. Several aircraft warnings were received and the boat dived at 2345 hours.

On the 11th at 1400 hours it was decided to bottom as the batteries, which were old and in bad condition, were only partially charged. At 2300 hours U 270 surfaced again but once more there were many aircraft alarms. The Commanding Officer tried to keep these G.S.R. contacts astern of the boat, but there were so many that it proved too difficult and he submerged again after 20 minutes.

At 0200 hours on the 12th he surfaced once more and proceeded at 15 knots, again getting many contacts. He carried on until 0330 hours

when he once again gave up the struggle and submerged, running on one motor. At 0700 hours the boat again had to bottom to save the batteries. At 1230 hours she went up to periscope depth but a warning was received to the effect that there were enemy surface craft between her and La Pallice and she therefore bottomed again. The batteries and available high pressure air were then very low. At 1700 hours a number of surface craft were heard and between then and 2200 hours they seemed to be hunting. Distant depth charge explosions were also heard. U 270 waited until 2300 hours before attempting to surface and then did so very gradually. At 2340 hours she was on the surface and about two hours out from La Pallice. Once again there were many G.S.R. contacts and the U-Boat steered a zigzag course. The contacts seemed to be all round.

At 0010 hours on the 13th the Sunderland approached from Green 80°. The U-Boat opened up with her full armament at 2,000 yards range. The aircraft returned the fire and dropped depth charges. None of these hit but all fell very close and the pressure hull was damaged right forward near No. 5 diving tank. The U-Boat attempted to dive but it was impossible to open the vents for No. 5 tank so the other tanks had to be blown to avoid stern heaviness. She then continued at 17 knots on the surface but water was entering and she seemed liable to sink. The diesels were stopped and all hands mustered on deck ready to abandon ship if necessary.

The Commanding Officer and the Engineer Officer went below and managed to blow No. 5 tank and they reconsidered the possibilities of making port after all. Some of the engine room ratings were ordered below and U 270 set off again at top speed. At this stage one man, who was standing right aft, was caught on the wrong leg and swept overboard complete with his one-man dinghy. He was picked up by Allied ships off the Gironde some days later.

Later on the boat again became bow heavy and the Commanding Officer ordered the diesels to be stopped and the bow hatch to be opened to accelerate the sinking in case he was attacked again. An aircraft again flew over but it did not open fire. The effect of its presence was enough, however, and most of the men on the upper deck jumped overboard. The aircraft, which was Wellington X/179, had not opened fire because the Captain saw that the U-Boat was being abandoned.

In the boat the lights had gone out and chlorine was developing from the batteries. The Commanding Officer gave the order to abandon ship. At 0145 hours the boat sank and 10 minutes later the survivors were picked up by a destroyer.

II.—ANTI-SHIPING

SUMMARY OF ANTI-SHIPING OPERATIONS BY COASTAL COMMAND AIRCRAFT

AUGUST, 1944

Weapon Carried. (1)	Number of Sorties.			Number of Aircraft to Attack.			Target.	
	On Reconnaissance. (2)	On Strike. (3)	Total. (4)	On Reconnaissance. (5)	On Strike. (6)	Total. (7)	M/V. (8)	Naval. (9)
DAY OPERATIONS								
Torpedo	82	—	82	40	—	40	40	—
R.P.	303	56	359	129	39	168	69	99
Bomb	206 (2)	3	209 (2)	42 (2)	3	45 (2)	6 (1)	39 (1)
Depth Charge	42	—	42	19	—	19	2	17
Tsetse	17	—	17	10	—	10	—	10
Cannon and M.G. only	311	—	311	148	—	148	92	56
TOTAL DAY	961 (2)	59	1,020 (2)	388 (2)	42	430 (2)	210 (1)	221 (1)
NIGHT OPERATIONS								
Torpedo	19	—	19	—	—	—	—	—
R.P.	12	—	12	—	—	—	—	—
Bomb	636 (8)	2	638 (8)	225 (8)	2	227 (8)	8 (2)	219 (6)
Tsetse	—	—	—	—	—	—	—	—
Cannon and M.G. only	48	—	48	3	—	3	—	3
TOTAL NIGHT	715 (8)	2	717 (8)	228 (8)	2	230 (8)	8 (2)	222 (6)
ALL OPERATIONS								
Torpedo	101	—	101	40	—	40	40	—
R.P.	315	56	371	129	39	168	69	99
Bomb	842 (10)	5	847 (10)	267 (10)	5	272 (10)	14 (3)	258 (7)
Depth Charge	42	—	42	19	—	19	2	17
Tsetse	17	—	17	10	—	10	—	10
Cannon and M.G. only	359	—	359	151	—	151	92	59
GRAND TOTAL	1,676 (10)	61	1,737 (10)	616 (10)	44	660 (10)	217 (3)	443 (7)

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

FINAL ASSESSMENTS FOR JULY, 1944

Day :—

Torpedo

- 5 M/V.s (totalling 10,580 tons) sunk.
- 1 R-Boat sunk.
- 2 T.T.A. sunk.
- 1 Minesweeper sunk.
- 3 M/V.s (totalling 5,749 tons) damaged.

Cannon

- 1 "M" class minesweeper seriously damaged.
- 2 T.T.A. seriously damaged.
- 1 M.V. (3,000 tons) damaged.
- 2 "M" class minesweepers damaged.
- 8 T.T.A. damaged.

R.P.

- 1 Coaster Type Auxiliary sunk.
- 1 T.T.A. sunk.
- 1 M/V. (2,000 tons) seriously damaged.
- 1 R-Boat seriously damaged.
- 4 T.T.A. seriously damaged.
- 1 Small sperrbrecher seriously damaged.
- 1 "M" class minesweeper seriously damaged.

Day :—contd.

R.P.—contd.

- 1 M/V. (2,000 tons) damaged.
- 3 R-Boats damaged.
- 2 T.T.A. damaged.

Cannon and R.P.

- 5 T.T.A. damaged.

Bombs

- 2 T.T.A. sunk.
- 1 Landing craft sunk.

Night :—

Bombs

- 2 E/R-Boats sunk.
- 1 R-Boat sunk.
- 1 Minesweeper sunk.
- 1 T.T.A. sunk.
- 2 E/R-Boats seriously damaged.
- 1 Coaster seriously damaged.
- 1 Unidentified vessel seriously damaged.
- 3 E/R-Boats damaged.
- 1 T.L.C. damaged.
- 3 Unidentified vessels damaged.

RESULTS CLAIMED FOR AUGUST

(Subject to Assessment)

*Torpedo :—**Day*

- 1 M/V (5,000 tons) seriously damaged.
- 1 M/V (2,500 tons) seriously damaged.
- 1 M/V (2,000 tons) seriously damaged.
- 1 E/V seriously damaged.
- 1 M/V damaged.
- 1 E/V damaged.

*R.P. :—**Day*

- 1 D.R. (*Seetier*) sunk.
- 1 T.B. (*Elbing*) sunk.
- 2 Sperrbrechers sunk.
- 1 Sperrbrecher seriously damaged.
- 10 E/V.s seriously damaged.
- 1 M/V (1,500 tons) damaged.
- 1 E/V damaged.
- 1 Floating dock damaged.

*R.P. and Cannon :—**Day*

- 3 M/V.s damaged.
- 11 E/V.s damaged.
- 1 Unidentified vessel damaged.

*Bombs :—**Day*

- 1 E/V sunk.
- 1 E/V seriously damaged.
- 2 Sperrbrechers damaged.

*Bombs :—**Night*

- 1 Unidentified vessel sunk.
- 5 Unidentified vessels seriously damaged.
- 1 E/V seriously damaged.
- 1 E/R-Boat seriously damaged.
- 2 M/V.s damaged.
- 4 Unidentified vessels damaged.
- 1 E/V damaged.
- 5 E/R-Boats damaged.

*Tsetse :—**Day*

- 2 E/V.s seriously damaged.
- 1 Tanker (3,371 tons) damaged.
- 1 D.D. damaged.
- 1 Sperrbrecher damaged.
- 3 E/V.s damaged.

*Cannon :—**Day*

- 1 E/V seriously damaged.
- 2 M/V.s damaged.
- 5 E/V.s damaged.

Enemy Shipping in August

The development of the Allied-land operations during August not unnaturally affected the work of the anti-shipping squadrons. While the offensive against German ships in the Channel and North Sea has been carried on as heavily as before, the rapid overrunning of Western France increased the importance of operations in the Bay of Biscay. There is no doubt that the contribution of the strike squadrons to the defeat of the enemy in that area has been substantial.

The capture of Cherbourg and fall of St. Malo finally separated the German surface forces in the Channel from those in the Bay of Biscay. Those in the Channel were still able to operate offensively against our invasion shipping, but the Biscay ships were forced on to the defensive. The German surface forces in the Biscay area at the beginning of August consisted of three *Sectier* destroyers (of which two were under repair), one *Elbing* torpedo boat, four *Sans Souci* escort vessels, about 20 sperrbrechers, 30 "M" class minesweepers, some anti-submarine and minesweeping trawlers, and the usual miscellany of small auxiliaries. Their chief task was to maintain supplies for the isolated garrisons of Brest, Lorient and St. Nazaire, and many of smaller anchorages and harbours, so that the enemy might continue to operate his U-Boat bases, even though they were entirely cut off from the landward side.

To ensure and protect an even flow of supply ships from Bordeaux and other ports in the south, the Germans needed their destroyers, torpedo boats and fast escort vessels. To keep their channels clear, they needed their sperrbrechers and minesweepers. The presence of the ships of the Royal Navy close in to the Breton coast made fighting ships vital, while the constant minelaying of Bomber Command off the U-Boat bases and in the mouths of the Gironde and Loire estuaries, made the task of the sweepers and auxiliaries more urgent than ever before.

We cannot tell at this stage how much easier it would have been for the enemy to resist in this area, had he been able to sail his ships without hindrance, but his final dissolution will have been substantially hastened by the damage inflicted by our Beaufighter and Mosquito squadrons. The plates in this issue of the *Review* illustrate far better than words many of their

principal achievements, in which, incidentally, R.P. seems to have been vindicated as a primary weapon. Three large sperrbrechers, a *Sans Souci* escort vessel and at least five "M" class minesweepers are known to have been sunk, and finally, off Le Verdon, there seems no doubt that the enemy's last serviceable *Sectier* destroyer and only remaining *Elbing* torpedo boat, were disposed of. In addition, a considerable number of others were heavily damaged, some of which have probably had to be abandoned. It is not suggested that air attack alone was responsible for precipitating the enemy's defeat in this area, for Allied naval forces close in to the Brest Peninsula scored smashing successes. Nevertheless, the contribution of our aircraft towards this victory was more than usually tangible and direct.

It is unfortunate that almost all operations in the Channel area should of necessity be at night, for we are thereby denied those photographs which have been invaluable elsewhere in recording and confirming successes. However, our patrols, which were flown in great numbers on every fine night, have undoubtedly harried the enemy's coastal supply traffic, and made his E-Boat operations hazardous and possibly costly.

In the North Sea the outstanding event has been the Swedish Government's announcement that it will no longer insure Swedish ships trading with German ports. This imposes a virtual ban on Swedish trade with Germany and deprives the latter of between 25 per cent. and 30 per cent. of the shipping that has hitherto been available for her importing services through the North Sea ports. Germany was already short of shipping before this development, so that losing the use of Swedish ships, which must curtail her import programme, will be particularly distasteful. It must be considered as a major success in the long-term economic strategy of the war. There is no doubt that this victory is due to the long and patient hammering of the convoys by direct attack, and to the continuous mining of the routes themselves. But this will not mean an end to attacks on shipping in the North Sea. Rather will they become even more important, since every ship remaining to the enemy will have assumed an enhanced value. The several attacks that have been carried out in the Heligoland Bight during August are an earnest of what is to come.

Shipping Strikes in August

On August 6 ten **Beaufighters** of **236 Squadron** attacked an enemy escort vessel in the harbour at Les Sables D'Olonne. The aircraft, which were armed with 25-lb. R.P. and cannon, scored a great many hits with both weapons. Two big explosions were seen on the target and, when the attacking force left the area, the vessel was blazing fiercely, giving off dense black smoke (see plate 4). Despite heavy and light flak from the escort vessel and shore defences all the Beaufighters returned to base.

On August 8 thirty-nine **Beaufighters** from **254, 455 and 489 Squadrons** made a reconnaissance in force off Norway. The Beaufighters, which were escorted by **Mustangs** of the **U.S.A.A.F.**, sighted a

convoy of five to seven merchantmen with about six escorts south of Egersund. The aircraft attacked with torpedoes, 25-lb. R.P. and cannon. A merchant ship was hit by two torpedoes and an escort was also torpedoed; another merchantman probably received a torpedo hit. A sperrbrecher and a minesweeper were hit by R.P. The cannon aircraft scored many hits on all the vessels and started fires in four merchant ships and six escorts. Flak opposition was intense. Three Beaufighters and three Mustangs failed to return.

Twenty-three R.P. **Beaufighters** of **236 and 404 Squadrons** made a successful attack on four minesweepers in Bourgneuf Bay on August 8. Many



On August 24 the enemy had only one serviceable *Seizler* class destroyer and one *Ebbw* torpedo boat in Western Europe. On that date 236 and 404 Squadrons, in a fitting climax to a series of successful strikes, inflicted very heavy damage on both these ships, which displace 2,400 and 1,200 tons respectively. The attack, which was made off Le Verdon with R.P. and cannon, is illustrated on this page. The first two photographs are consecutive shots by E/236 and the third was taken by H/404. The plate on the following page shows the results of the strike.



The day after the attack on the enemy's warships off le Verdon, an aircraft of 542 Squadron took the above photograph which shows the two big oil streaks which testify to the heavy damage inflicted by the Beaufighters. Further widespread reconnaissance has failed to find either of these vessels and it is assumed that they were sunk.

R.P. and cannon strikes were seen on all four vessels. Three of them were set on fire and left burning, and the fourth was emitting great clouds of black smoke (see plate 11). One Beaufighter did not return, and another flew home on one engine after being damaged by flak.

Off Benodet on August 9 ten **Mosquitos** of **248 Squadron** attacked three "M" class minesweepers and one T.L.C. with bombs, tse-tse and cannon. The crews claim several near misses with bombs but no direct hits. One of the minesweepers was hit by five rounds of tse-tse, which caused an explosion followed by fire and a column of smoke 300 feet high. The other two minesweepers were raked with cannon, one of them being set on fire and the other left smoking (see plate 9). All the Mosquitos returned safely and only one of them was damaged.

On August 10 twenty-one **Beaufighters** of the **Langham Wing** sighted a convoy of five merchant ships and 10 escort vessels near Heligoland. Nine aircraft attacked with torpedoes, four with 25-lb. R.P. and the rest with cannon. A merchant ship of 4,000-5,000 tons was hit by two torpedoes and left burning furiously, and a probable torpedo hit was scored on another merchantman, which was also set on fire. As a result of the R.P. and cannon attacks, four "M" class minesweepers were left burning, one of them in a sinking condition, and an escort vessel blew up. These satisfactory results were marred by the loss of four Beaufighters.

On August 11 twelve **Mosquitos** of **235 Squadron** sighted three trawler-type auxiliaries in the Gironde Estuary. The aircraft attacked with bombs and cannon, but the results of the bombing were not seen. After the attack, however, all three ships were seen to be damaged, one being on fire and another smoking. The shore batteries as well as a sperrbrecher about two miles away put up intense flak but all our aircraft returned.

On August 12 twenty-five **Mosquitos** of **235** and **248 Squadrons** made another attack against enemy ships in the Gironde Estuary. The target consisted of one "M" class minesweeper and two trawler-type auxiliaries off Royan, and a 3,000-ton sperrbrecher and another trawler-type auxiliary off Le Verdon. Five aircraft dropped bombs, four dropped depth charges, two were armed with tse-tse and the rest with cannon. The minesweeper blew up after a direct hit with a bomb and the two auxiliaries off Royan were successfully strafed with cannon (see plate 12). The sperrbrecher was also repeatedly hit with cannon fire and the auxiliary in company with her was set on fire. Two Mosquitos were hit by flak and ditched successfully.

Also on August 12 twenty-one **Beaufighters** of **236** and **404 Squadrons** made R.P. and cannon attacks on a 4,000-5,000-ton merchant ship and a small escort vessel west of La Rochelle. R.P. hits were seen on the merchantman, which caught fire, and the escort vessel was damaged by cannon hits. When the aircraft left, both ships were enveloped in smoke. Two Beaufighters failed to return, but the crew of one of them was picked up uninjured by our surface forces.

On August 13 thirty-two **Beaufighters** of **254 Squadron** and the **Langham Wing** attacked a convoy off Heligoland. Five merchant vessels of

1,500-2,000 tons were escorted by three "M" class minesweepers, four trawler-type auxiliaries and two other escorts. The cannon aircraft attacked first and scored hits on all the escort vessels. They were followed by the R.P. aircraft, which also scored hits on the escorts. The Torbeaus attacked last and hit at least one merchant ship. When our aircraft left the convoy two merchant ships, two minesweepers and three auxiliaries were on fire. All our aircraft returned, although six of them were damaged, including one which crash-landed at base.

On August 13 twenty-three **Beaufighters** of **236** and **404 Squadrons** sighted two sperrbrechers off Royan. The Beaufighters attacked with 25-lb. R.P. and cannons, scoring many hits on both ships, which were left enveloped in smoke. One Beaufighter crashed into the sea during the attack, but both sperrbrechers, one of 5,339 tons and the other of 6,128 tons, were sunk. (See plates 1 and 2.)

On August 14 twenty-six **Mosquitos** of **235** and **248 Squadrons** sighted an enemy naval force stationary off the jetty at Le Verdon. The force consisted of a *Seetier* class destroyer, a sperrbrecher of 4,000 tons and two trawler-type auxiliaries. The destroyer was attacked with bombs, depth charges and tse-tse. The bombs and depth charges fell close to the ship, and tse-tse hits caused an explosion on board. The sperrbrecher was similarly attacked and was also set on fire by the 6-pdr. cannon shells. Many cannon strikes were seen on both the trawlers. The enemy ships put up such an intense flak barrage that four Mosquitos failed to return and five others were damaged. One of the missing aircraft ditched off Coubre Point and the crew got into their dinghy. Another, D/248, was last seen making for Vannes on one engine. The crew of this aircraft baled out safely over Brittany, made contact with Allied ground forces and eventually returned to England. The crew of V/248, another missing aircraft, were captured by the enemy and subsequently liberated by the Maquis. They too have returned to England.

A few minutes after the above attack, six **Beaufighters** of **236 Squadron** and seven of **404 Squadron** entered Arcachon Bay on an anti-shipping sweep. They sighted a floating dock, six trawler-type auxiliaries and two tugs off the east bank of the river, and attacked all the vessels with 25-lb. R.P. and cannon. The floating dock was hit by 22 R.P., and one of the auxiliaries by four. The rest of the auxiliaries and the two tugs were damaged by cannon fire. Flak was intense and, owing to the need for violent evasive action, no further results were seen. Three Beaufighters were damaged, one of them having an aileron shot away.

On August 20 a force of twenty-one **Beaufighters** of **236** and **404 Squadrons** attacked two trawler-type auxiliaries in the harbour of Les Sables D'Olonne. Both vessels were hit by R.P. and cannon fire which caused explosions. Debris from the ships was thrown 200 feet in the air. When the aircraft left, the trawlers were on fire and covered in smoke. All the Beaufighters returned safely.

On August 21 two "M" class minesweepers and a trawler-type auxiliary were attacked near Le Verdon by a force of 19 **Mosquitos** from **235** and **248 Squadrons**. Seven of the aircraft dropped

depth charges which exploded close to all three ships. Tse-tse and cannon hits were also scored on all the vessels. The auxiliary was set on fire and explosions were seen on both the minesweepers. At the end of the attack clouds of heavy smoke were pouring from the targets. All the Mosquitos got back but four were damaged. One landed on an airfield in Brittany and another crash-landed at a home aerodrome. All the crews are safe.

On the night of August 23/24 **Avenger T/854** (F.A.A.) bombed an unidentified vessel off Dieppe. A direct hit amidships caused a big explosion followed by fire. Another vessel nearby lowered boats to pick up survivors from the bombed ship, whose destruction was witnessed by other aircraft in the vicinity.

On August 24 18 **Beaufighters** of **236** and **404 Squadrons** made a very fine attack on enemy warships off Le Verdon (*see* plates 5 and 6). The formation sighted a *Seetier* class destroyer and an *Elbing* torpedo boat lying stationary in line astern. However, as soon as the Beaufighters circled to attack, the ships got under way. The aircraft attacked with 25 lb. R.P. and cannons, and scored many hits on both ships, causing fire and explosions. Severe flak from the ships and the shore batteries damaged all but three of the aircraft. One Beaufighter, W/236, was forced to ditch, but the crew were picked up later by surface craft.

On August 25 an enemy convoy off Borkum was attacked by 44 **Beaufighters** of **144, 254, 455** and **489 Squadrons**. The convoy consisted of

six or eight merchant ships and ten escorts. The aircraft were armed with torpedoes, R.P. and cannon. No torpedo hits were seen but many cannon and R.P. strikes were scored. One escort is claimed as seriously damaged and two others as damaged. All our aircraft returned.

During the early hours of August 26 **Beaufighter T/143** attacked four unidentified vessels south-west of Boulogne. The pilot dropped four M.C. bombs from 2,000 feet and saw flashes near one of the vessels. A Swordfish which was in the area witnessed this attack and saw a direct hit on one of the vessels, which caught fire and exploded ten minutes later.

On the night of August 27/28 **Swordfish X/819** (F.A.A.) sighted two unidentified vessels near Dieppe. The pilot attacked the larger of the two ships with 250 lb. G.P. bombs and scored direct hits amidships. Fragments were thrown 200 feet in the air and the vessel was left glowing from stem to stern.

On August 29 an enemy convoy was attacked near Heligoland by 46 **Beaufighters** of **144, 254, 455** and **489 Squadrons**. The aircraft scored torpedo hits on two merchant ships and one escort vessel, and R.P. and cannon hits on the two merchant ships as well as on two escorts. The flak was intense and two Beaufighters failed to return. Six others were damaged. In this action it is claimed that two merchantmen, one of 5,000 tons and the other of 2,000 tons, were seriously damaged by torpedoes, and that two escort vessels were damaged by R.P. and cannon.

III.—OTHER OPERATIONAL FLYING

Combats with enemy aircraft

On July 31 **Mosquitos J** and **Q/248** sighted a Ju.188 off Penmarch Point. As the enemy aircraft turned seawards, "Q" got astern of it and attacked. At the same time "J" attacked from the port quarter. The enemy then turned towards the coast and was again attacked by "J" who scored hits and set fire to the port wing root. "Q" followed up and, closing to 250 yards, saw strikes on the port engine and fuel tanks. Pieces flew off the Ju.188 and it crashed into the sea, a mass of flame and smoke. Excellent photographs taken

by the Mosquito navigators confirm the enemy's destruction.

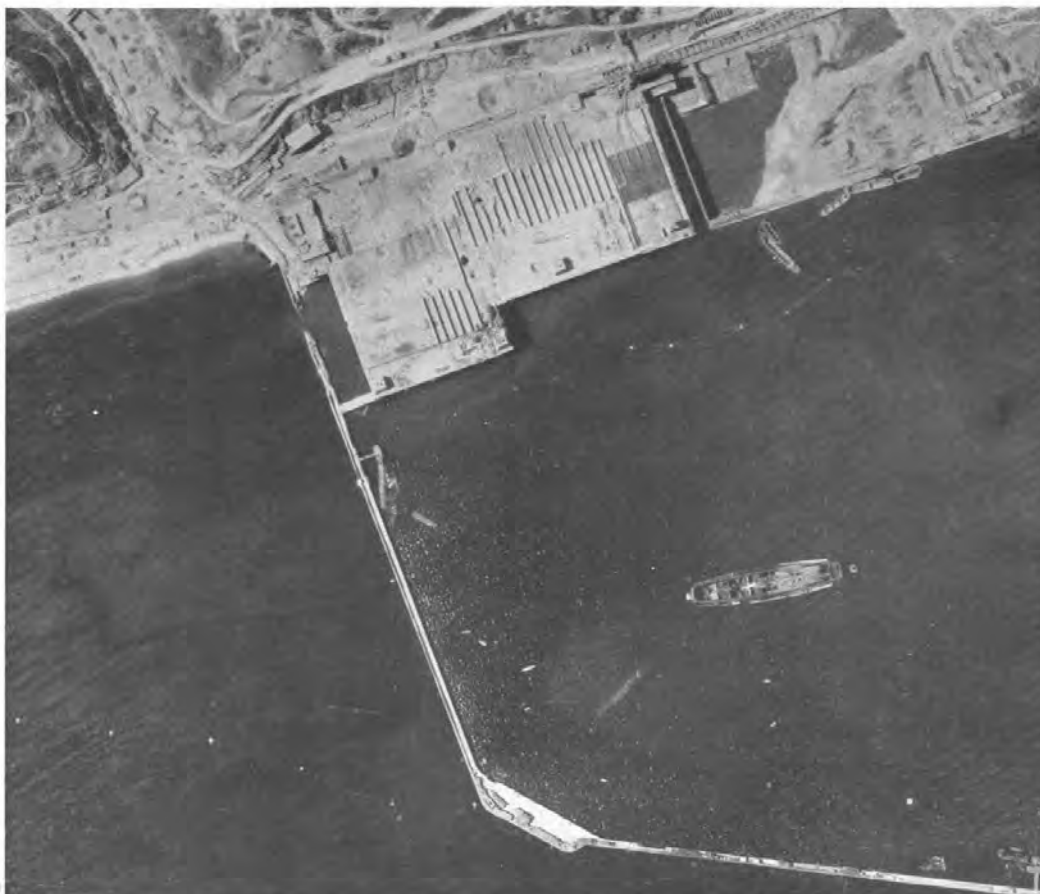
On August 9 eleven **Mosquitos** of **235 Squadron** on anti-shipping patrol near the Gironde Estuary, sighted four Do.217s at 500 feet and immediately attacked. Two of the enemy aircraft crashed into the sea and two dinghies were seen with one survivor in each. Hits were scored on the other two Do.217s, which moved rapidly away from the danger area. All the enemy aircraft jettisoned their bombs, which are believed to have been of the glider type.

Photographic Reconnaissance

During the first 14 days of August, No. 106 (P.R.) Group almost managed to complete their flying programme of routine cover of enemy ports, airfields and flying bomb sites, in addition to all the special tasks involving damage assessment targets for Bomber Command and numerous other targets for special intelligence information. Work during the latter part of the month was hampered by bad weather, but the Group obtained much useful information regarding the enemy's attempts to block ports and rivers in the west of France by scuttling their now surplus merchant shipping in that area.



The Germans cut off in Brest, Lorient and St. Nazaire have resisted as long as possible, partly to allow all serviceable U-Boats to be evacuated, and partly to deny the use of these ports to the Allies. Heavy bombers of both the R.A.F. and the U.S.A.A.F. have made many attacks on gun positions, shipping and, above all, on the U-Boat shelters in Brest. These two photographs of Brest, which were taken by 542 Squadron, show *(above)* fires burning after an attack, and *(below)* holes in the reinforced concrete roofs of the U-Boat shelters. It will also be seen that part of the breakwater to the west of the shelters has been demolished.





Above. H.M.C.S. *Chaudière* photographed by Liberator X/53 off the Iles de Clenan on August 8.

Below. An airbourne lifeboat with the crew of Fortress Z/220. The photograph was taken by K/220 in position 37° 48'N., 24° 03'W.



The following reports were written by members of the aircrews concerned:—

540 Squadron. Mosquito

On August 7 we were briefed to cover Königsberg and other targets in that area. The weather was unfit for refuelling at the coast so we took off from base at 0930 hours. There was a fairly thick ground fog but we cleared this at 1,500 feet and set course for Heligoland. At 25,000 feet over the North Sea the engines cut and I had to descend to 19,000 feet. Over Heligoland at 27,500 feet we set course for Peenemünde. A smoke screen was operating at Kiel and we took a few oblique photographs. I then found that the last forty gallons in the drop tanks would not feed, so I released the tanks hoping that they would create some disturbance below. We photographed Peenemünde and the coast to Zempin at 27,000 feet and set course for Marienburg. Heavy smoke screens were in operation at Stettin and Swinemünde, and well to the south we saw two or three fighter trails climbing in circles. We photographed Marienburg and the airfield on a west to east run and then turned north across Elbing airfield and the port and canal to Frisches Haven. In the southern end of Frisches Haven there were few ships which we photographed. We made single runs over Heiligenbeil, Steibek and Königsberg airfields and another across the port of Königsberg along the Königsberg Canal, over Pillau and Neutief flying boat base. We then photographed all shipping between Pillau and Hel in Danzig Bay and made a run south-west across Hel and another north-west across Gdynia and some shipping. This took us to Rahmel airfield which was partly obscured by cloud. We next covered Lauenburg airfield from east to west as well as a small area near Stolp before setting course for Sylt. On passing north of Stettin we saw that the trails which we had seen on the outward journey were turning into cloud form and also that cumulus was building up to the south of our track. We saw no further targets on the way to Denmark and set course for home, making short bursts of trail down to 24,000 feet across the North Sea. The east of England was covered with cloud but we made landfall near Coltishall and landed at base at 1555 hours with 105 gallons of fuel left.

541 Squadron. Two Mustangs

We were airborne together at 1315 hours on August 25 to take low level oblique photographs of a new type of Radar installation situated just south of Den Helder and near De Kooy airfield. We flew in formation at 1,500 feet from base to Langham, where we refuelled. We were airborne again half an hour later and crossed the English coast at Cromer at 1,000 feet. We immediately descended to 500 feet and set course for the southern tip of Texel. Visibility was nil in the haze and sea fog, and the cloud base was down to 800 feet. We flew at 500 feet until we made a landfall over what we thought was the mainland. We did one photographic run over a lighthouse and a small bay which we knew were near our target, but then discovered that we were in fact over the island of Texel and not over the mainland at all. Having made this abortive run we pulled up to 1,000 feet in cloud and immediately picked up Radar noises on our R.T. This led us to believe that our target must be somewhere in the neighbourhood. We flew around until the noise was at its loudest so that we had an approximate position of what we presumed to be the target. We then

broke cloud. We found ourselves between Texel Island and Den Helder, so we flew down the coast and picked up the target straight ahead. We both switched on our cameras and immediately Bofors and machine-gun fire opened up on us from emplacements all along the coast. No. 1 was flying about half a mile inland and No. 2 over the foreshore. No. 1 opened fire on the batteries nearest us, giving No. 2 the opportunity to photograph the target which we had both identified. The light flak was so intense that we were able to make only one run, after which we turned out to sea and flew home at 100 feet.

We found the wreck of one small ship in the entrance to Texel anchorage and another about two miles off Den Helder, but there was no sign of activity around either.

540 Squadron. Mosquito

We took off from Benson at 0630 hours on August 27 to photograph Königsberg which had been attacked by aircraft of Bomber Command a few hours before. Owing to doubtful landing conditions on the east coast and a particularly favourable upper wind, we intended to land in Italy and return with our photographs the same day.

After flying through frontal conditions for some time, we emerged from cloud 50 miles east of Flensburg. Ahead there was not a cloud in the sky and the visibility was exceptionally good. Halfway between the island of Bornholm and Gdynia we saw on the horizon a long plume of smoke which we realised came from the fires still burning in Königsberg. We did a run over Gdynia and its airfield, two runs over Danzig and then altered course for the main target. After photographing the port of Pillau we made three runs over Königsberg. Fortunately a fresh south-westerly wind was carrying the smoke away from the town, and we were fairly confident that the photographs would be satisfactory. After a run over an aerodrome 10 miles to the south-east we set course for Bydgoszcz and covered the town and an area nearby. Our next target was Blechhammer. Owing to an unpredicted headwind we took longer to reach it than we had calculated, but we photographed our target as well as two others nearby. By then we were becoming a little anxious about our petrol supply, so we decided to omit a target in the Alps, which lay 150 miles to the west of our track. By the time we crossed the Danube the southerly wind had dropped. We photographed Bratislava and its aerodrome and finished up with a run over Zara on the Dalmatian coast. We landed at San Severo after 6 hours 10 minutes in the air.

While the aircraft was being refuelled we drove into the town and had lunch. At 1500 hours we took off again, climbing on a northerly course. We turned on the cameras over Pola and Trieste, and then carried on northward to photograph the target which we had missed on the way down. The rest of the trip home was uneventful apart from an encounter with one of our own Spitfires over France. We crossed the coast at Le Havre, which we photographed on the way, and landed at base at 1900 hours.

Our Mosquito behaved perfectly throughout. The day before it had been to Stettin and back, and on the next day it was again flying on an operation.

Air/Sea Rescue

During August 231 airmen were picked up by the Air/Sea Rescue service. The following are accounts of recent outstanding rescues.

During an attack on a U-Boat on July 18 Liberator F/86 was set on fire and forced to ditch about 100 miles west of the Lofoten Islands. One of the crew was killed in the ditching but the other eight took to the dinghies. Subsequently two men drifted away and were lost. The remaining six survivors tied their "K" type dinghies together. On July 27 these dinghies were sighted well outside the patrol area by a Liberator, which dropped supplies. There was, at the time, some doubt whether the survivors were in fact the crew of F/86 or survivors from the U-Boat which had been attacked. During the day the dinghies were sighted several more times and a Catalina operating in the area reported that the sea was fit for alighting.

As the position was well outside the range of Air/Sea Rescue aircraft and surface craft it was decided to despatch a specially lightened Catalina. Accordingly X/210 was prepared and at 0130 hours on the 21st this aircraft took off from Sullom Voe. After a very fine piece of navigation the crew sighted the three dinghies tied together in position 68° 40' N., 09° 53' E. The time was about 0730 hours. The Catalina flew low over the spot dropping markers and examining the sea. The Captain then sent a signal to base reporting that he was over the survivors and that he intended to land. Before doing so he reduced the weight of the aircraft by jettisoning all the fuel except 500 gallons, and all excess gear, including flame floats and markers.

At 0817 hours the aircraft alighted successfully and taxied up to the survivors. The dinghies were hauled alongside with a rope, and after some trouble caused by their exhausted condition, the survivors were taken on board. The engines were then restarted and the aircraft was taxied at medium speed into wind until it reached a patch of water which was comparatively swell-free for 100 yards or so. The pilot then opened the throttles rapidly and made a successful take off. Once in the air he sent a signal to base to the effect that he was airborne with six survivors.

In the aircraft the survivors were given hot drinks and were made as comfortable as possible. At 1410 hours they reached Sullom Voe.

On August 5 a report was received from returning American bombers that an aircraft had ditched, and at 1300 hours Warwicks M and J/280 took off from Strubby to search. At 1618 hours J/280 altered course to investigate reports of pyrotechnics. These proved to be from two American dinghies, with four occupants each, in position 54° 28' N., 06° 55' E. At 1630 hours an airborne lifeboat was dropped and all the survivors boarded it. However, it was seen that they made no effort to set sail or start the engine. At 1700 hours a Danish fishing vessel approached the airborne lifeboat, and when the aircraft left the area some of the survivors were on board

this vessel. No further search could be made immediately owing to bad weather, but during the next two days aircraft searched for either the Danish fishing vessel or the airborne lifeboat. On August 7 an automatic SOS signal was heard and aircraft of 280 Squadron were sent out. At 1202 hours one of the crews sighted a red Verrey light and later an airborne lifeboat with two occupants, in position 54° 46' N., 00° 15' E. A H.S.L. was homed and she rescued the lifeboat's crew. Another aircraft of 280 Squadron sighted the Danish fishing vessel with the word "YANK" spelt out on deck in large white letters. The aircraft dropped a Lindholme dinghy which was retrieved by the Americans on board. The vessel was asked to proceed on a course indicated by smoke floats, but soon afterwards an H.S.L. arrived and took off the Americans.

On August 9 Bircham Newton M/F Station received a distress message from an American aircraft about to ditch. No fixes could be obtained but it was thought that the message might tie up with a faded plot, reported by 12 Group, in position 52° 40' N., 01° 11' E. Four Hudsons of 279 Squadron made a search which was unsuccessful, and later two more Hudsons, L and K/279, escorted by four Mustangs from Saffron Walden, searched along the track of the missing aircraft. At 2009 hours the aircraft sighted pyrotechnics and then two dinghies with nine occupants, in position 52° 35' N., 02° 38' E. Marine markers were dropped and K/279 climbed to home a rescue launch. A Lindholme dinghy was dropped and the survivors boarded it immediately. H.S.L. 2679 was sailed from Yarmouth and was homed to the position by K/279. L/279 remained orbiting until the rescue was completed.

Aircraft returning from operations on August 27 reported distress signals in position 54° 10' N., 04° 02' E. A search was made by a Hudson of 279 Squadron which sighted a dinghy containing seven aircrew in position 54° 20' N., 04° 10' E. An airborne lifeboat was dropped but it floated away down wind. Later a Lindholme dinghy was dropped and four of the survivors were transferred to it. The same evening Hudson V/279 successfully dropped an airborne lifeboat but lost contact owing to low cloud. The following morning the lifeboat was sighted again with two dinghies tied to it. At 1000 hours on the 28th W/279, was still circling when it sighted a Danish fishing vessel which took the survivors on board. Contact was again lost due to bad weather, but at 2000 hours the fishing vessel was resighted. After this, contact was lost until 0830 hours on the 29th when the vessel was found in position 53° 56' N., 02° 08' E. H.S.L. 2574, covered by Beaufighters, was homed to the position, and she took off the seven survivors.

The Danish captain then asked to be escorted to Grimsby. This was done and his vessel was handed over to the authorities.



In the attack shown in these photographs, Mosquitos of 248 Squadron flew up the River Odet to strike at "M" class minesweepers off Benodet on August 9. Attacking with bombs, six-pounder guns and 20mm. cannon, our aircraft damaged at least two of the enemy ships.





PLATE 10

The necessity of keeping open the swept channels in the Bay of Biscay to allow free movement for U-Boats and, latterly, for supply traffic, has made the enemy more than usually dependent on his sperrbrechers. About twenty of these ships, which are specially adapted and strengthened for detonating magnetic mines at a distance, were in the Biscay area on D-day. Aircraft of Coastal Command have destroyed several of them in August. These photographs show the *Sauerland*, 7,087 tons, under attack by 236 and 404 Squadrons on August 12 off La Rochelle. She was heavily hit by R.P. and cannon fire, and was eventually finished off by surface ships of the Royal Navy.



IV.—SPECIALIST AND GENERAL ARTICLES

Shark Sense

(The following article is condensed from the pamphlet issued by the Aviation Training Division of the United States Navy.)

Men who know most about sharks are the men who fear them the least. On the other hand land-lubbers will believe any shark story they hear, provided it is gory enough. It is true that, if you get forced down in any tropical waters, you may come in contact with sharks. However, the more you know about them and the fewer legends about them you believe, the happier you will be. Calm, intelligent conduct will enhance your chances of survival more than anything else known to date.

It should be said at the outset that there are a few authenticated cases of sharks attacking and killing human beings, but there is ample reason to believe that the legendary shark is little more than a myth.

This article represents a digest of the known pertinent data, and the considered opinions of commercial shark fishermen and sponge fishermen whose daily work brings them in close contact with all kinds and sizes of sharks. *It is the opinion of these fishermen as well as of scientific writers, that there is practically no danger that an unwounded man floating in a life jacket will be attacked by a shark.*

Circumstances in which humans have been attacked by sharks, when the details were known, indicate that the attacks were made because of unusual conditions. In at least one case of attack the shark was trapped in shallow water, and like any cornered animal was fighting his way out in the only way he knew. In another case a bather had cut his foot on a shell and was bleeding profusely.

All shark men agree that fresh blood attracts sharks more readily than anything else, but there is no agreement about why this should be so. The general belief is that the sharks have a very keen sense of smell. Another theory is that sharks are sensitive to vibrations in the water. There is a report—not authenticated—that a Marine Corps major in Guam frightened and drove off sharks by beating two small stones together under water. Whether the water vibrations caused by pounding the stones together frightened the sharks is not known. It is known with certainty, however, that sharks are easily frightened. It is possible that the mere presence of the officer frightened them off.

Sharks are wild animals, and their conduct is not unlike that of the shore-based wild animals. Their whole purpose in life centres around survival, eating and procreating.

In eating habits the shark is a scavenger. He lives on meats—preferably dead and rotting meats. His mouth is big and his teeth are sharp. Having cartilage instead of bones, his teeth are set in pliable bases. He can adjust them for cutting or chewing by pitching the points forward or backward—in fact he has variable pitch teeth. His jaws are powerfully muscled, and apparently he can digest almost anything that he can swallow.

His hunting habits display both caution and cowardice. He circles a prospective meal and looks it over carefully before attacking. If it is

dead, or wounded, or smaller than he is, and if victory appears certain, he launches his blitzkrieg with boldness and ferocity. If it appears there is likely to be some tough opposition, he withdraws to a previously prepared position and finds business on another front.

His choice of food follows the pattern of the struggle for life among practically all the wild animals, whether ashore or afloat. The weaker ones constantly fall prey to the bigger ones.

The main hurdle to take concerning sharks—should you be adrift in a life jacket or rubber boat in shark infested waters—is the mental hazard. Nearly everybody, at one time or another, has heard horrible tales about sharks. Oddly enough, the farther inland one goes, the more horrendous the tales become. These stories—usually cited as absolutely true, because the narrator knew a man who was a cousin of a witness—are the legitimate descendants of the tales the ancient sailors told of sea monsters, sea serpents and seagoing dragons. Time and travel have tamed them down. Sharks do not devour entire ships at one gulp, as did the old sea dragon, nor do they cave in the ship's side with a swish of their tail, as did the sea serpent. But push a fourteenth century sailor overboard, and he'll land in the mouth of a monstrously big shark every time. Later, when ships began year-long cruises under sail, about the only excitement the lads had was watching sharks swim about, and imagining what would happen if a man fell overboard. On top of that, a shark is a fish, and no fish story ever allowed itself to be handicapped by statistics.

A shark, like Satan, is a completely unloved and disreputable thing. Nobody ever undertook to refute any story about either of them. The result was that lore and legend, born in the imaginations of lonely sailors, became accepted as fact. Some of these tales, doubtless, had a grain of truth in them, but in repeated tellings they improved so that by the beginning of the nineteenth century, shark tales took place alongside stories of pirates and buried treasure in the imagination of the willingly credulous people.

Here are two of these legends traced through the ages for you. The two selected perhaps had more to do with creating an unreasonable fear in the minds of modern people than any of the others. They have been quoted and requoted for more than a hundred years.

A chronicler for Captain James Cook, the navigator who explored the South Pacific and Indian Oceans in the eighteenth century, relates how a shark buried his teeth in the anchor chain. "An enraged monstrous shark swam desperately about our ship hunting a victim for his hungry belly. When none was forthcoming, he did savagely attack the anchor chain with his death-dealing jaws, and leave there deep scars from saw-like teeth."

The other story is credited to a "Mr. Hughes, the well-known and esteemed author of the History of Barbados."

"In the reign of Queen Anne a merchant ship arrived at that island from England; some of the crew, ignorant of the danger of the recreation, were bathing in the sea, when a large shark appeared and swam directly towards them; being warned of their danger, however, they all hurried aboard, where they arrived safe, except one poor fellow, who was bit in two by the shark, almost within reach of the oars. A comrade and intimate friend of the unfortunate victim, when he observed the severed trunk of his companion, vowed vengeance."

The story goes on to relate how the friend leaped overboard, killed the shark with his knife, towed him ashore and buried him on the beach with the uneaten half of his friend, which in the meantime had been floating in the water.

Before continuing with these two legends, let's pick them apart. Common sense and a little knowledge of the strength of materials would disprove the anchor chain biting one. Shark teeth are hard and sharp and shark jaws are powerful, but they are set in cartilage. A wrought iron anchor chain is harder than cartilage. The teeth would give way before the chain.

Knowledge of the habits of sharks, and especially of their feeding habits, blows up the second story. A shark does not "swim directly at" a group of bathers. He exercises extreme caution. It is only after he decides there is no danger to himself that he screws up his courage enough to attack.

Another point was overlooked by the narrator. If the shark had bitten the hapless swimmer in two, unquestionably there would have been blood flowing. All the sharks in adjacent waters would have come plunging in for food. In no time a dozen or more sharks would have been milling around snapping at anything, including each other.

Jack London used the chain-biting episode early in this century, in one of his short stories, to emphasize the ferocity of the particular shark that was about to devour a villainous mutineer. Almost contemporaneously, Morgan Robertson wrote a short story based on the Barbados incident, in which the victim and the avenger were brothers. Then followed an epidemic of stories dealing with the horrors of sharks.

In the meantime the moving picture industry did not overlook the dramatic effect of killing a villain with sharks. But that was in the days of silent movies, and the best they could do was show a panorama of a shark swimming on the surface, then screen the frightened face of the victim as he was being chucked overboard. The idea of using a real shark was too horrible even to consider. Then suddenly some genius invented a mechanical shark that could look—and act—ferocious, and was perfectly safe.

A major studio bought the mechanical shark for \$30,000, and assigned Mr. X, the master of horror, to direct a picture. Mr. X felt he needed a story, but such a story as he wanted had never been written. Shakespeare was dead but there was Mr. Y. He not only was a Broadway playwright, but he was a dramatic critic on a New York newspaper. He couldn't miss. He was hired.

Mr. Y went to work and in due time he came up with a combination of the chain-biting episode from Captain Cook, and the avenging friend yarn from Barbados. The shark's victim was not a swimming sailor, but the female menace—a trollop with a heart of gold.

Then came the story conference.

"We got thirty grand in this shark," explained Mr. X. "He's got to do something real dramatic."

"Instead of biting the anchor chain, and leaving his teeth marks," said Mr. Y with some sarcasm, "he could bite the chain in two and eat the anchor."

"That's the idea," agreed the director, "only it would be more dramatic for him to tow the ship to sea—say to Singapore, maybe?"

"Zanzibar," insisted Mr. Y.

The picture was made. Instead of being a super-colossal epic, it merely turned out to be colossal. But it inaugurated a whole series of shark pictures.

And so, through fiction reading and movie going, the world became conscious of shark horrors. It now is as natural for the average person to be horrified with the idea of getting in the same ocean with a shark as it is frightening to come in sudden contact with a snake.

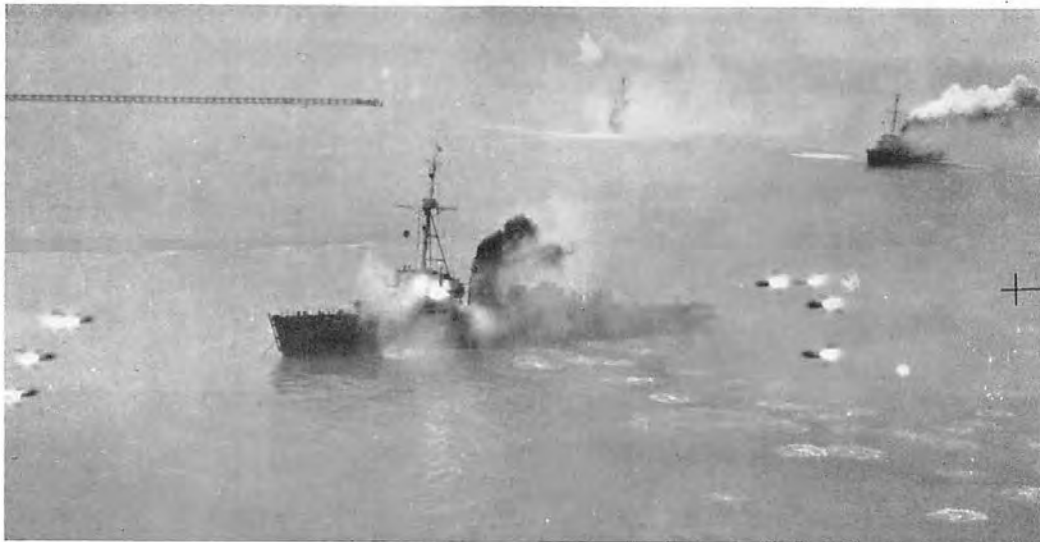
There are almost as many different kinds of sharks as there are shark stories. The one that gets the most play in horror tales is the *galeocerdo arcticus* or tiger shark. He is billed in fiction and pseudo-scientific articles as the "man-eater." He sometimes attains a length of 30 feet or more, and is a native of the West Indian waters and of the Indian Ocean. He has black spots or stripes on his back—as if that would interest a man floating around one in a life jacket. Pound for pound this shark is no more and no less ferocious than many of the other sharks.

The following, prepared by the Bureau of Medicine and Surgery, ought to put to rest whatever latent fears you may have for sharks:—

"All sharks are either scavenging or fish-eating in habit, although individuals may show departure from species characteristics. The sharks which may on occasion attack a man—the 'great white' and the 'tiger'—are relatively few in number. Consequently very few authentic cases of shark bite are recorded.

"Navy statistics compiled since 1923 show one case (in 1924), followed by recovery. No authenticating details are available. The *Navy Medical Bulletin*, established in 1907, contains reports of two cases (one in 1917, in the Philippines; one in 1921 in Haiti), in one of which the victim died. Further, the Public Health (Merchant Marine) Service has no record of any instance in the merchant marine. Thus a survey of available navy records covering a number of years reveals only two, or perhaps three, authentic instances of shark bite, and none in the past 18 years—notwithstanding the extent of swimming from dock or ship in the tropics.

"The shark is a wary fish, suspicious of noise, movement and unfamiliar forms. Probably that trait alone would restrain a shark from attacking a swimming person. Another consideration is that, at the time when a number of men are thrown into the sea, there nearly always occur explosions and escape of fuel oil. The constituents of fuel oil, with or without flames, would probably



On August 8, 404 and 236 Squadrons made one of their most successful attacks of the month. The targets were four "M" class minesweepers lying in Bourgeneuf Bay. Of the above photographs, the centre one shows strikes by incendiary cannon shells, while eight rocket projectiles are on their way to the target. The lower picture shows the four ships after the strike. It is now known that all four vessels were destroyed.

(C53542)



These photographs show an attack by Mosquitos of 235 and 248 Squadrons on 'M' class minesweepers and trawler-type auxiliaries off Royan on August 12. The aircraft carried depth charges, bombs, six pounder guns and 20mm. cannon. As a result of the attack, one minesweeper was sunk and one auxiliary seriously damaged.

serve as a repellant; and violent explosions, as of bombs, torpedoes, or depth charges, would stun, kill or drive away all fish."

There are numerous superstitions about sharks. Some seem to have a little basis in fact; others are pure hogwash. Among them are:—

Superstition No. 1.—A shark can't bite you unless he turns over on his back. A shark can bite from any position, if he can get you between his jaws. His mouth is situated somewhat under his nose, but when he opens his mouth and speeds forward for a strike, he arrives mouth first. It is true that he can roll easily in water. He can bank and turn as easily as a Hellcat. Except that he propels himself with his tail instead of with an engine in his nose, he manoeuvres pretty much like an airplane. His dorsal fin is his stabilizer; his two pectoral fins act as elevators, ailerons, and brakes. But he attacks head first, with his mouth open, and when he opens his mouth, the whole front end of him is mouth.

Superstition No. 2.—A shark can't see any dark object. There is some support for this legend, although it is not conclusive. There has long been a legend, often repeated by sailors returning from slave-running trips, that sharks will not attack a negro. Dr. Louis Fuguier, in the *Ocean World* (published 1868), writes, "They (sharks) dearly love man. When several varieties of human food comes their way, they prefer Europeans to Asiatics, and both to the negro."

Wallace Caswell, Jr., a professional shark killer, believes sharks cannot see dark objects. He points out that West Indian negroes, about to swim in shark-infested waters, take the precaution of blackening the palms of their hands and soles of their feet, which are lighter than the rest of their bodies. He has also heard of a large shark knocking himself out by swimming head on into a freshly installed piling.

Second-generation Greek sponge divers invariably thrust their hands under their armpits when a shark approaches them. Being in a black diving suit, their hands are the only parts of their bodies not covered. They believe that the whiteness of their hands will encourage the sharks to bite them. On the other hand, sponge divers of Anglo-Saxon extraction scorn the idea of hiding their hands when a shark comes upon them. "Superstition," they say. "Little fish and shrimp do come up and nibble at your fingers, sometimes, but never anything except very small ones."

Just to play safe about sharks not seeing dark objects, if you do go down, keep your socks and breeches on.

Superstition No. 3.—Big sharks are all blind, and are steered through the water by pilot fish. One hundred per cent. wrong. In the first place a blind shark would not last very long in the constant battle for life in the sea. All marine animals are equipped by nature for survival. When they lose one of their defensive faculties, some other animal is quick to take advantage of their misfortune, to get a meal. The pilot fish does not, as is popularly supposed, pilot the shark. He merely attaches himself to the shark for rations. He feeds on the crumbs left by the shark. Nor is there any love or affection between the two. A shark will eat a pilot fish as quickly as he will any other kind of fish if he can get his jaws on him.

Thus, according to the preponderance of accumulated data and actual experience with sharks, a man forced down in tropical waters is justified in feeling reasonably safe from shark attacks. You may expect something like the following to happen:—

The commotion caused by dropping in the water and freeing your parachute, very likely, will scare all fish away for the time being. Presently, perhaps within an hour or so, a shark may show himself. He probably will circle you a few times, at a distance of 50 yards or more. He will be close to the surface, and doubtless his dorsal fin will break water. And he won't be a pretty thing to look at.

Then he will approach closer. He may come up and stare at you from a distance of a few feet. The experts say you are to take no action; merely remain calm, and continue riding in your life jacket or rubber boat as though no shark were near you. Keep moving, however, don't let the shark mistake you for a corpse. Presently, they say, he will go away.

If you have your pistol and can do so, a shot may be fired—but not into the shark. The noise of the explosion will frighten the shark away. If you shoot the shark, even though you may kill him, there will be blood in the water, and blood always attracts all the sharks in the vicinity.

Needless to say, if you should be wounded, all shark men agree the safest thing to do is to staunch the flow of blood as soon as you disengage the parachute. That action will be your best protection.

The idea of hitting a shark on the nose with your fist or whatever weapon you may have, has been tried—according to some sources with success. In the one case reported, the shark swam away, immediately. However, sponge fishermen, who carry a metal hook for removing sponges from their moorings on the bottom, purposely avoid striking sharks. "The shark is liable to wheel about and slap you with his tail," they point out. This is not a case of the shark fighting back; it merely is the case of a rapid exit.

If a big shark should attack you, you are not altogether helpless. Your most important defensive weapon in this case, is your human intelligence. Keep your wits about you, and think—and act—fast. By using his brain, man has devised ways to conquer every animal. This does not mean that he can beat every animal at its own game. No man can out-scratch a wildcat, out-wrestle a gorilla or out-bite a shark. But by using his mental processes, man has been able to avoid the wildcat's claws,* the gorilla's embrace, and the shark's teeth, and then counter in some other department of combat in which the animal is helpless.

In case of a shark attack if you have no gun.—Now, this is a pretty desperate counter-measure, but remember that your life insurance company was not happy about you when you fell into the water. To repeat, in case of a shark attack in the water, swim out of the line of his charge, grab a pectoral fin as he goes by, and ride with him as long as you can hold your breath.

If you are fortunate enough to be armed with any kind of a knife, and can get to it, cut the shark's belly open. A shark's hide is tough and it will be hard cutting, no matter how good your

knife is, but the belly is the tenderest part of it. And, too, by opening the belly you let water inside which will kill him almost instantly.

Killing the shark, naturally, will get blood in the water, and probably will attract other sharks to that spot. Get away from it as quickly as you can.

Admittedly your chances of whipping an excited shark in the water—unless you are properly armed and trained for just that—may not be 100 per cent. But it has been done, and your chances of doing it and surviving are greater than they would be if you did not try it. Remember that the shark strikes with his mouth opened wide, and his vision blocked. If you can avoid his mouth by moving a foot or so out of his path, it is a miss for the shark, and a temporary reprieve for you.

If you can attach yourself to him by grabbing a fin, when he turns for another attack, you aren't there; you are riding with him, behind his mouth and out of danger from his teeth. Hold tight and hang on as long as you can without drowning yourself. In the meantime, after missing his target, the shark may lose his viciousness and become his usual cowardly self again.

Another fish that is getting a reputation among the fiction writers is the barracuda. He is a native of tropical and sub-tropical waters. He sometimes attains a length of 8 feet, is swift in the water, and reputedly vicious. A few years ago it became very stylish to blame all the man-killing tales on the barracuda instead of the shark. His reputation became one of evil, almost overnight. There are authenticated instances of a barracuda's slashing a swimmer, but these, like the shark attacks, are not nearly as numerous as they are sensational.

If it makes any difference after the biting is done, it is easy to tell whether a man was bitten by a shark or a barracuda by the shape of the wound. A shark leaves a semi-circular jagged wound, whereas the barracuda bite is said to be as straight as a surgeon's incision.

The thing to keep in mind is this:—

- (1) There is very little danger from sharks.
- (2) People suffer more from shark fright than from shark bite.
- (3) Staunch a bleeding wound as soon as you are free from your parachute. This not only may prevent sharks from being attracted to you, but it may keep you from bleeding to death.
- (4) Keep your head while waiting to be picked up by rescue plane or boat. You can't win from a shark in a biting match, but you can win in a thinking match.
- (5) Don't believe anybody's shark stories, even if he can show you the ocean in which it happened. A shark is a fish, and a fish story quickly gets out of hand.
- (6) If you are on a life raft instead of in a life jacket, don't dangle your bare feet overboard. A fish, and not necessarily a shark, may mistake your toe for a feather spinner and chew it off.
- (7) And above all, don't be frightened just because a shark happens to be in the same ocean with you. If the truth were known, the shark probably is more frightened of you than you possibly can be of him.

Some Uses of the A.S.V. Log

The part that A.S.V. has played in Coastal Command's successful war against the U-Boat is no doubt well known to all aircrew. What is probably not so well known is the contribution to our knowledge of A.S.V. performance and of the enemy's countermeasures which has been obtained from the logs made out by the A.S.V. operators. This information has been found invaluable in planning the various tactical measures for searches and attacks on U-Boats.

Whenever a new A.S.V. installation is introduced, trials are made by the design establishments and by C.C.D.U., and the results are compared with previous trials. Similarly, tactical countermeasures are tried out against possible listening receivers and Radar in U-Boats. Unfortunately, however realistically a trial is laid on, the result may on occasions be misleading from an operational point of view. It is important to find out as soon as possible the real performance of the new equipment against U-Boats, though it may be a long time before sufficient contacts have been obtained on actual U-Boats to enable a true estimate to be made. On the other hand quite a number of contacts are made in a relatively short time on fishing vessels, ships, convoys, etc. In the past, fishing vessels have been found very useful as a yardstick in estimating the performance against U-Boats as the average ranges of pick up are roughly the same.

As an instance of this, in the early days of A.S.V., Mark II, there was considerable doubt as to the best height to fly when searching for U-Boats. Theory and trials indicated that the greater the height the better, though squadrons were opposed to this. Analysis of the very considerable amount of data on fishing vessel ranges confirmed that the range of pick up did not in fact increase above 4,000 feet, and that when allowance was made for the increased sea returns at this height, the optimum height from purely an A.S.V. point of view was of the order of 1,000-3,000 feet depending on the state of the sea. This conclusion could not have been obtained without the information available from the logs. With recent marks of A.S.V. there is very little difference in the average range of pick up on small targets above 1,000 feet so that the optimum height to fly depends by day mainly on visual considerations and by night on the effect of the enemy's countermeasures.

The effect of logging contacts on fishing vessels was also instrumental in the Command obtaining permission in 1943 to shoot up fishing vessels in the Bay of Biscay. From the number of fishing vessel contacts and the ranges of pick up it was possible to calculate how much the presence of these vessels would reduce the effectiveness of our Bay offensive which was about to be considerably intensified. The probable reduction was proved to be so great that we were able to

persuade the authorities to allow us to remove the fishing vessels.

Analysis of the A.S.V. logs and, in a similar way, of data on visual ranges of pick-up, has enabled us to get a far truer perspective of the chances of contacting U-Boats. It was at one time thought that if a mark of A.S.V. with all-round looking equipment, such as Marks III, V and VI, gave an average range in operations of x miles on U-Boats, then on the average all U-Boats within x miles of the track of the aircraft would be picked up. This is not correct for the following reasons. With all marks of A.S.V. there is a very considerable spread in the range of pick-up and this applies to all classes of targets. This spread is such that leaving out the 10 per cent. highest ranges and 10 per cent. lowest ranges there is still a spread in range of nearly 3 to 1, *i.e.*, in the case of an A.S.V. with an average range on U-Boats of seven miles this spread will be from about $3\frac{1}{2}$ to 10 miles. The effect of this large spread is to reduce the true average operational range of a unit such as a squadron to about three quarters of x . The explanation of this is that the value of x is biased by the fact that the better operators and sets sweep a greater area of sea and consequently pick up not only more targets but also at greater ranges, while the less skilled operators and poorer sets get less good results.

This spread in performance is of course due to many causes, some of them inevitable such as size and aspect of the target, height of the target, and extent of sea returns. On the other hand it is probable that the main reasons are due to the variation in skill of the operators and differences in the sets. These two causes are difficult to separate, since part of the skill of the operator depends on getting the best out of a given set, while some of the differences between sets are due to manufacture and others to different standards of the maintenance.

It can be seen from the above that the chances of making a contact are reduced as the distance of the target from the track of the aircraft is increased. On a medium-sized surface target, such as a ship, the chances of any aircraft making a contact are roughly as follows:—

<i>Distance from Track of Aircraft.</i>	<i>Chance of Contact.</i>
At half the average range ..	75 per cent.
At the average range ..	30 per cent.
At $1\frac{1}{2}$ times the average range ..	10 per cent.

In the case of U-Boats the chances of making a contact are less than the above, apart from any question of counter-measures on their part, whether by visual or instrumental means. One reason for this is that in rough weather the sea returns are frequently of a similar order to the average range of pick-up on the U-Boat, particularly when the vessel is end on to the aircraft. In these circumstances it is quite possible at night to fly right over the U-Boat without spotting it as the blip first appears on the screen within the sea returns. The sea return eliminator was introduced, not only to assist in homing on to the target, but also to reduce the number of contacts being lost.

A further point which was not at first realized, but which was brought out by operational results, is the value of all-round looking equipment

such as Marks III, V and VI A.S.V. The P.P.I. was introduced, among other reasons, to combine the advantages of the forward and beam aerials of A.S.V., Mark II, without the necessity of any switching. It was not appreciated that the backward sweep of the scanner would produce an appreciable number of sightings.

There are, of course, occasions when a U-Boat will surface shortly after an aircraft has passed and be within range of the A.S.V.: these occasions are only rare and do not account for the number of contacts, 10 per cent. of all U-Boat contacts, abaft the beam of the aircraft. The reason is due to the difference in range of pick-up of the beam and end-on aspects of the U-Boat. An example will explain it. If an aircraft is approaching a U-Boat which is end on to the port bow of the aircraft and five miles from its track, it is unlikely that it will be picked up at this stage. When, however, the aircraft has passed the U-Boat and the latter is on the port quarter of the aircraft, the U-Boat will present its beam aspect and thus be within likely A.S.V. range. A further point arising from this example is that a good operator with a good set might have picked up the U-Boat end on while a less efficient operator and set would have only picked it up on the beam. In general U-Boats contacted end on are usually only picked up by good sets and operators. Thus the average range of pick-up of U-Boats end on is not significantly different from the average beam ranges, though there is no doubt whatever that it is possible to pick up U-Boats at greater ranges on the beam.

Apart from the actual performance of A.S.V. in picking up targets, a considerable amount of data has been obtained from A.S.V. operators' logs as to the extent of the enemy's counter-measures and the actual performance of their equipment. It is well known that the enemy introduced a listening receiver to counter A.S.V., Mark II, in the autumn and winter of 1942.

Apart from the falling off in the number of U-Boat sightings, analysis of the A.S.V. logs showed a corresponding increase in the number of disappearing contacts. From the ranges of pick up of these contacts at different heights it seemed probable that many of them were from U-Boats that had dived. Analysis of the ranges of disappearance suggested that the U-Boats were attempting to dive at a constant signal strength, which tended to confirm that their counter device was a listening receiver rather than any apparatus giving range, such as a Radar set. This operational evidence, together with intelligence information, suggested that the coming introduction of new Marks of A.S.V. on a different frequency would restore our ability to contact and attack U-Boats at night. Mark III, A.S.V., was introduced in March 1943, and met with immediate and gratifying success.

Analysis of the disappearing contacts with Marks III, V and VI, A.S.V., has been much more complicated. The majority of these disappearing contacts are not from U-Boats at all, many of them being caused by fleeting contacts on other aircraft. This difficulty did not arise to such an extent with Mark II, A.S.V., owing to the restricted angle of search—only about 60° in the forward direction. Aircraft in this sector of search are generally readily identified by the speed of the blip across the screen. Thus,

analysis of the operational data showed the necessity of devising means to enable the operator to distinguish rapidly contacts on aircraft from other contacts. That is why navigators are instructed to plot the ranges and bearings of contacts. In this connection the more accurately the operator reads the ranges and bearings of contacts the sooner it will be possible to decide what the contact is on. In many cases it is, of course, at once apparent whether the contact is from another aircraft.

However, although many of the disappearing contacts are certainly from surface vessels, when a contact is lost in a turn or through faulty homing, it is, of course, impossible to say whether it was caused by a surface vessel or a U-Boat. But it is equally sure that some disappearing contacts are due to U-Boats having dived on the approach of the aircraft. Any contact which is held and homed on for a considerable time is certainly not caused by another aircraft. An

analysis of the numbers of these, their range of pick up and disappearance has enabled some conclusions to be made of the extent of the enemy's counter-measures. The conclusions are that, at any rate until very recently, the enemy's counter-measures against our Marks III, V and VI, A.S.V., have been far from as successful as against our Mark II, A.S.V. Not only is their equipment not so reliable as before, but also the ranges at which our aircraft are picked up, whether by listening receivers or Radar, are not very good.

It is hoped that this general review has given some idea how the logging of what, to the operators, may seem irrelevant detail, has been used to influence policy with regard to new types of equipment and tactical instructions. This is, of course, only part of the story. All this data is also invaluable to the station or squadron Radar officer in keeping a check on the maintenance of the individual equipments and assessing the amount of training required.

The Luftwaffe in the Bay

At a time when German Air Force activity in the Bay of Biscay has completely closed down, it may be of interest to tell the story of the section of the G.A.F. which most directly concerned Coastal Command—the long-range fighters. There is no doubt that the enemy made an intensive effort against our anti U-Boat aircraft and it is greatly to the credit of our crews that they carried on their patrols in the face of all that the Germans could do to make the Biscay skies unhealthy. At one time indeed the long-range fighters were not only a hindrance but a serious menace to our anti U-Boat offensive.

During the spring and summer of 1942 the activities and the strength of Coastal Command in the Bay area were being stepped up. U-Boats and blockade runners on passage through the Bay ran an increasing risk of attack. Therefore the German naval chiefs in the west were faced with the necessity of providing some form of long range fighter cover. The G.A.F. chief on the western seaboard was known then as Fliegerführer Atlantik and he was virtually the opposite number of the A.O.C. 19 Group. In the autumn of 1942 the Germans made arrangements through the Fliegerführer Atlantik to transfer the heavy fighter Gruppe of the Sixth Bomber Geschwader (Kampf-Geschwader 6 or K.G. 6) to Bordeaux-Mérignac. The Gruppe was equipped with Ju. 88s and it was placed under the operational control of K.G. 40, a long range bomber-reconnaissance Geschwader which for some time had been operating from Mérignac against our shipping.

Enemy long range fighter units operating over sea can be used either defensively for giving close escort to U-Boats or surface vessels, or offensively for making fighter sweeps to intercept our anti U-Boat aircraft, preferably before they reach the U-Boat transit area. The Germans evidently decided that this latter type of operation was the more effective way of dealing with the Allied offensive in the Bay, and the Gruppe began its activity with free-lance patrols flown by small formations of about two or four Ju. 88s. Defensive operations were also flown, though not regularly. Sometimes the Gruppe was called to give protection to iron ore ships sailing from Spain to Bayonne or

Bordeaux or to cover U-Boats proceeding along the swept channels to or from their bases. It seems fairly certain that, as a general rule, U-Boats were not escorted at any great distance from the coast, except in the case of those which had been damaged. Meanwhile the Gruppe had been given the designation V/K.G. 40, that is the Fifth Gruppe of Kampfgeschwader (heavy bomber unit) No. 40, and had the normal composition of three Staffeln, numbered 13th, 14th and 15th Staffel. Each Staffel presumably had the normal establishment of nine aircraft. Later on, exactly when is not known, the 16th Staffel was added. It was probably about this time that some of the Staffeln were moved north to Kerlin-Bastard airfield, near Lorient, which was nearer to their operational area. Except for a period when U-Boats were being routed along the north coast of Spain, the patrol area of V/K.G. 40 remained more or less constant, roughly between 44° 30' N., and 47° 30' N., and between 8° W. and 11° W. The strength of the formations however, varied, four, five, six, seven or eight aircraft being encountered at one time, and occasionally even more. On one occasion a Sunderland was attacked by 16 Ju. 88s but succeeded in returning to base.

An accurate assessment of the effort made by the Gruppe in terms of the number of sorties flown is of course impossible, and can, in the main, be judged only by the number of sightings of Ju. 88s made by our aircraft. This in turn depends upon the strength of our own effort. In the months immediately after the Gruppe began operating, the peak months were September and November, 1942, with 95 and 76 sightings respectively. Activity during the winter months was of course restricted on both sides through weather, and the average number of sightings per month during the first four months of 1943 dropped to 27. In May, June and July, the number of U-Boat attacks and kills was a record and the activity of V/K.G. 40 naturally increased also. But our own fighter opposition had been strengthened with the result that Beaufighters of Coastal Command and Mosquitos of Fighter Command made things very dangerous for the Ju. 88s.



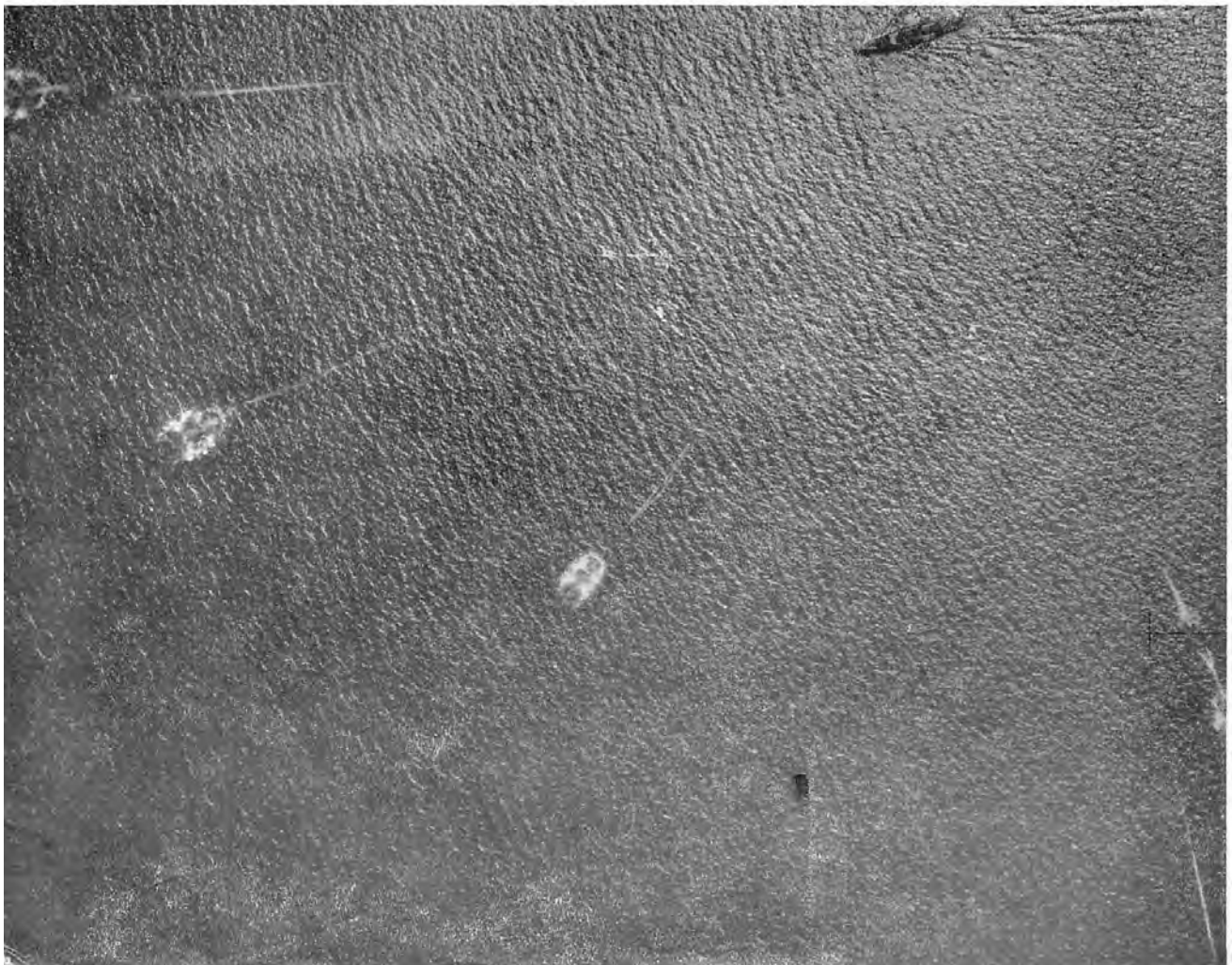
During the invasion the problem of providing port facilities before a major harbour had been captured was partially solved by towing pre-fabricated parts across the Channel and creating an artificial port off the beaches. The photographs on this page were taken by a Swordfish of 819 Squadron (F.A.A.) in June. The upper pictures show concrete caissons for forming breakwaters, and the lower ones show pier-heads for use at the end of floating roadways.



PLATE 14

Above. An aerial photograph of a waterspout taken on June 26 a few miles north-east of Nassau, Bahamas. It is estimated that the waterspout was about 2,000 feet high.

Below. A vertical photograph of a practice attack with runner torpedoes. This photograph, which was taken at Turnberry, shows the points of entry and the beginning of the run of four of the five torpedoes dropped. The beginning of the fifth torpedo's run can also be seen. The attack was considered good and all the torpedoes were put into the water at about the same time. Unfortunately in each case the aim-off angle was too small, so that only one hit was assessed. However, the ship in the photograph is only 226 feet long.



In view of this new development the Fliegerführer Atlantik decided that he needed a faster type of twin-engined fighter. Accordingly at the beginning of August, 1943, II/Z.G. 1, equipped with Me. 110s, was transferred from Southern Italy to Brest/Lanveoc Poulmic airfield. The Gruppe then had a complement of about 45 aircraft. Their patrols were designed to supplement those of the Ju. 88s of K.G. 40, and sweeps were laid on in a similar manner when U-Boats were passing in or out of the Bay. There was, however, no co-operation between the two Gruppen. The operational area of the Me. 110s lay to the southwest of the Scillies, between 48° and 51° N., and patrols were usually flown simultaneously by two sections of four aircraft in widely separated areas. Sometimes eight or twelve aircraft would operate as a single patrol. The Messerschmidts, however, did not solve the Fliegerführer's problem. In fact their successes were as small as their losses were great. During September alone Beaufighters and Mosquitos together with Spitfires of Fighter Command destroyed some 10 to 12 of these aircraft. Eventually after spending only three months in France the Gruppe returned to the Fatherland.

But the Fliegerführer was not beaten. He stuck to his policy of expanding the heavy fighter force in the Bay. In December, 1943, V/K.G. 40 was made an independent fighter Geschwader and renamed Z.G. 1, that is Zerstörergeschwader (heavy fighter unit, or literally, "Destroyer" Geschwader). The 13th, 14th and 15th Staffeln of V/K.G. 40 became the 1st, 2nd and 3rd Staffeln of the first Gruppe of Z.G. 1. The old second Gruppe, the one which had lost so many Messerschmidts earlier in the year, was taken over to form the second Gruppe of the new Geschwader, but it has always remained in Germany or on the Russian front. The 16th Staffel of K.G. 40 was made the 7th Staffel of Z.G. 1, that is the first Staffel of a third Gruppe. The new Geschwader was also made responsible for training its own crews. Z.G. 1 continued to keep the greater part of the Staffeln at Kerlin-Bastard with Bordeaux as secondary base, though it is possible that a few aircraft were based at Vannes, Cazaux and Cognac for short periods. It is known that a Staffel was transferred to Istres in S. France in order to provide escort cover for torpedo operations in the Mediterranean, but this was probably only a temporary move.

Although before its original transfer to K.G. 40 the Gruppe had possibly been trained in night flying, no indication of night activity was noted until about the end of 1943, when a detachment of about nine night-fighter Ju. 88s was set up at Nantes. It was named the Kunkel Kommando after its C.O., Hauptmann Kunkel. Details of their activity are very scanty; a prisoner of war stated in February, 1944, that Kunkel had achieved no success whatever although he personally made over 40 night patrols. Though many Allied crews operating over the Bay at night reported being

shadowed by supposed enemy aircraft, the number of actual attacks reported during hours of darkness was very few. It is believed that this night-fighter Staffel has now been disbanded.

Meanwhile the day fighters continued to operate more or less daily during fine weather, but their patrols were made less profitable by the new tactics of Allied anti U-Boat aircraft. Moreover the partial re-equipping of Coastal Command fighter squadrons with Mosquitos was not appreciated by the crews of Z.G. 1, who, according to a prisoner, consider that Mosquitos are the most dangerous of British aircraft.

Once more the Fliegerführer Atlantik had to do something about it. Evidently still looking for speed he formed a Staffel of F.W. 190s which was given the designation of 10th Staffel Z.G. 1. It began operating from Brest sometime in February, 1944. This unit achieved some success at the beginning of its activity, but it was limited to short range patrols, and could offer no serious threat to our anti U-Boat aircraft. It was probably intended chiefly to protect the Ju. 88s against Allied interception while they were on passage to their patrol areas. Whatever the plan, it was apparently given only a short trial, and the Staffel is thought to have been disbanded after about two months.

By that time a second Staffel, and probably part of a third, had been added to the Third Gruppe, so that the two Gruppen, the First and the Third, constituted a force of some 60 twin-engined day fighters available for operations. Many reports were received of engagements with formations of up to six or seven Ju. 88s in which the leader alone showed knowledge of good fighter tactics, while timid and ineffective attacks were made by the remaining enemy aircraft. It seemed, therefore, that the old fighting power of Z.G. 1 had been worn down, and that the many new and inexperienced crews which had to be put on operations did not really help to maintain an effective fighter force.

Then came June 6, 1944—D-Day. Z.G. 1 was immediately switched from the Bay and used for attacking Allied shipping off the beaches and for strafing landing parties. Since the Geschwader had neither the training nor the experience for this kind of work, it inevitably suffered very considerable losses. How long the two Gruppen operated as part of the anti-invasion force is not known as their recent history is obscure. But we do know from G.A.F. prisoners captured recently that the depleted and disintegrated remnants were withdrawn from the beach-head and transferred, some to Central France, some back to the Biscay coast. There they presumably did any odd jobs of which they were capable in their weak state.

Since the collapse of the German armies in the west not only the remnants of Z.G. 1, but the whole German Air Force has been chased from the soil and the air of France.

The Renaissance of Met. Flying

Some time ago the Met. Flights of Coastal Command were re-equipped and reformed into squadrons. Since then there has been still more improvement in their position and this branch of our activities is no longer the Cinderella. In the days when not only Coastal Command, but the whole Royal Air Force, was short of aircraft and crews, it was perhaps inevitable that the Met. Reconnaissance Flights should suffer severely. Now that the position is better the new Met. Squadrons are reaping their reward for years of very fine work.

It is perhaps not always realized how skilful and difficult this work is. Briefly, a Met. reconnaissance (as opposed to a vertical ascent) consists of a level flight at the same time each day on a standard track and at a pressure height of 950 millibars—usually between 1,700 and 2,000 feet. At set intervals sea-level pressure, humidity and temperature are found from the special instruments carried. At the end of the track the aircraft climbs to 500 millibars, or about 19,000 feet. The return trip is flown either in a gradual descent or at 500 millibars for a set distance. The observations are coded and signalled back to base, some of these signals containing as many as 80 groups. The navigation can be very tricky as the upper winds are liable to be strong, and at the best they are only forecast winds. Moreover, the pilot is obliged to fly at a set height so that he cannot climb above cloud when he wants an astro sight, nor descend below it when he wants a drift. As often as not he is in cloud for very long periods.

Anyone who has served on a station from which Met. aircraft are operating knows that their sorties are very rarely cancelled because of bad weather. Pilots are expected to, and do, take off when even operational aircraft are grounded. Apart from the difficulties and dangers of flying in very bad weather, Met. crews have little excitement to relieve the monotony. Sometimes, of course, things do happen. Last year, for instance, a crew began operating in a Hampden and in their first four sorties they were intercepted by a Ju. 88, temporarily lost both engines and nearly had to ditch, sighted and bombed a U-Boat, and finally had a propeller sheer off at the outer limit of their patrol.

Everybody understands the importance of the weather in all military operations, but few may realize that it is largely from the Met. Squadrons that the vital information is obtained. In November, 1942, these squadrons (they were still flights then) played an important part in the operations which ended in the landing of Allied armies in North Africa. They were given the highest priority in aircraft and equipment and a detachment of Fortresses was called in to help. After the landing was made the Met. Flights reverted to their old equipment—to the great disappointment of the crews.

The period following the North African landing was one of great difficulty. The widening scope of

Allied operations, particularly the increasing offensive of Bomber Command, made accurate knowledge of the weather more important than ever. But the increase of our activities also meant that aircraft and equipment were needed everywhere in greater quantities. The Met. Flights therefore had to be content with their Hampdens. The work they did on these obsolete aircraft was prodigious. Ground crews and air crews did wonders to fulfil their commitments and to combat the rising tide of unserviceability. There were still a few Hudsons left in the Flights, and one of these flew 15 sorties in 16 days, finishing with a fight against a Ju. 88, from which it returned damaged.

These interceptions by Ju. 88's in the Bay became a growing menace to the poorly-armed Hampdens, and the Met. aircraft did not always get through. However, they carried on, coping with sudden calls for special sorties which were needed for the planning of bombing raids, and giving timely warning of bad weather in the areas of our anti-U-Boat offensive. On one occasion the whole of 19 Group's proposed operations were cancelled on receipt of a message from a Met. aircraft.

In the middle of 1943 there were signs of new equipment and Met. Air Observers began to form part of the crews. They undertook all the observations and the coding, thereby allowing the navigators to devote their whole time to their proper job. The navigators had formerly done two full-time jobs, which speaks well for their efficiency and keenness. It was also at this time that the Flights were made into Squadrons. Finally, four United States Fortresses complete with crews arrived at St. Eval and the new era of four-engined Met. reconnaissance began.

The American crews stepped easily into the tradition of the Met. squadrons. Their navigators were enthusiastic and they adopted our methods wholeheartedly. In September they took over from a Hampden squadron and have been operating ever since.

In October the change-over to Halifaxes began. The crews converted quickly but there was still some delay before the Halifax squadrons became operational. However, fully modified aircraft with all the most modern navigational equipment are now in action.

Great strides have been made since the days when the Hampdens took off in foul weather with a crew of four, and with a wireless set as their only navigational aid. Now the crew of eight works in comparative comfort on reliable, well-armed aircraft, and above all they have the range and the accuracy which are so important to this work. With their new equipment the Met. crews will be able to carry on the fine record which the old Met. flights have maintained throughout their history.