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COASTAL COMMAND REVIEW

January 1945

Vol. IV, No. 1

**HEADQUARTERS,
COASTAL COMMAND
ROYAL AIR FORCE**

COASTAL COMMAND REVIEW

Vol. IV, No. 1—January 1945

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

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

Summary of the Year's Work—1944

(Continued from Vol. III, No. 12.)

Photographic Reconnaissance

The year made far larger demands than previous years of the war on the services of the strategic photographic reconnaissance organisation in the Western Theatre. The large amount of valuable intelligence produced was only achieved by successfully applying the experience gained during the preceding four years.

In May, 1944, an important step forward was made in the organisation of strategic photographic reconnaissance in this theatre, when No. 106 (P.R.) Group was formed from No. 106 (P.R.) Wing. Before the formation of No. 106 Group, there had been a tendency to consider the reconnaissance and interpretation Units as separate entities, and in fact, they formed part of separate Commands. The formation of the Group assured full co-ordination of all phases of the service which produces photographic intelligence, and allowed the fullest collaboration with the corresponding American organisation.

At the same time, the variety of requests for photographic intelligence necessitated the formation of the Joint Photographic Reconnaissance Committee as a sub-committee of the Chiefs of Staffs Joint Intelligence Sub-committee. This body, located for convenience at Headquarters 106 Group, is fully representative of the American and British services, and is in a position to allocate priorities to all requests for photographic intelligence.

It was anticipated that, during the crucial periods of our cross-Channel operations, the need for information would be so vital that no effort should be spared in the development of new methods, and of camera installations to suit varying operational conditions. No less than seventeen different prototype camera installations were, accordingly, installed in aircraft of various types, and, after exhaustive tests, only eight of these were found to be completely satisfactory. One hundred and fifty Photographic Reconnaissance aircraft were modified to allow these new camera installations to be carried. Low level photography was developed. The two most important innovations were the moving film and forward facing oblique cameras.

The moving film camera is designed to compensate for image movement due to the forward velocity of the aircraft at low altitudes, and permits photographs to be obtained at much larger scales than is possible with standard cameras. Vertical stereoscopic cover can be obtained at altitudes as low as 100 feet and this camera was most successfully used in the photography of V-weapon sites.

The forward facing oblique cameras, mounted in the aircraft wings, provide stereoscopic oblique cover, which is of great value for the careful scrutiny of small targets, such as Radar and V-weapon installations. The Mosquitos which on several occasions flew into the Wizernes quarry to take photographs of the site located there, were equipped with these cameras.

Mustangs, Hellcats, Corsairs, Typhoons, Hudsons, Austers, Tempests and various Marks of Spitfires and Mosquitos were tested in all conditions. Owing to the desirability for standardisation, the major role for photographic reconnaissance still remained with the Spitfire and the Mosquito, a few Mustangs being utilised for special low level work.

The most important improvement in ground photographic equipment was the negative grader, which was evolved to deal with the large number of photographs produced by the multiple camera installations. This instrument, by measuring the negative density through a photo-electric cell, enables good quality prints to be made in great numbers on the multi-printer machine, thereby achieving considerable economy in photographic paper.

During 1944, the aircraft of 106 Group flew 5,553 sorties in the course of which 1,369,782 negatives were exposed over a vast area of Europe extending to Tromsø in the North, Königsberg in the East and as far South as targets in Yugoslavia.

The endurance of photographic reconnaissance aircraft was further increased by the use of drop tanks, and by frequent use of airfields in the Mediterranean area, so that photography of widely scattered targets became a frequent occurrence. One Intelligence Officer of Coastal Command may remember the day he queried a Form Orange because the pilot claimed to have photographed Danzig, Königsberg and targets in Silesia and Austria on the same sortie!

It is, of course, impossible to enumerate the purpose for which such a large number of sorties were flown. The effort made for certain purposes will, however, help to give an idea of the overall picture. In the early part of the year, requests for information on the subject of V-weapon sites demanded a considerable flying effort from 106 Group, amounting to as many as 35 sorties in one day and some 2,000 in all, for this purpose alone.

The movements of the battleship "Tirpitz" called for particular attention from reconnaissance aircraft. Early in 1944, a detachment of Spitfires was sent to North Russia to watch this vessel. When the battleship moved south during the period 16th to 18th October, photographic reconnaissance aircraft covered the whole Norwegian coast from Trondheim to Tromsø. On October 18 a Mosquito aircraft carried out an all-round flight of 2,300 miles, in spite of the failure of one of its long range tanks, and located the battleship in the anchorage near Tromsø, where it was ultimately destroyed by aircraft of Bomber Command.

For months before D-day, the Strategic Reconnaissance Forces, besides carrying out their normal commitments, were engaged on preparatory work, obtaining frequent cover of enemy defences, Radar stations, airfields, industrial installations and mapping beachheads.

When the area of the Tactical Air Forces was originally defined, it was agreed that the strategic organisation should continue to carry out reconnaissance of ports, flying bomb installations and all targets attacked by the Bomber forces. An agreement was also made before D-day whereby the strategic photographic reconnaissance forces should give aid to the tactical forces when required. From June 6 onwards, at the request of S.H.A.E.F., the aircraft of 106 Group have undertaken daily reconnaissance of the complete railway system feeding the enemy's forces in the forward areas. At times the task has involved covering some 2,500 miles of railway lines in one day, and has necessitated aircraft flying at all altitudes and in all weather conditions.

The total number of sorties received by A.C.I.U. in 1944 from the combined British and American Strategic Photographic Reconnaissance Forces was 9,346, a figure which would have been greatly increased, but for the deterioration of the weather in the later months of the year. As it was, over 1,000 sorties were received and interpreted in each of the five months from April to August. These photographs made it possible for a comprehensive picture of the enemy's military and industrial activity to be obtained. The working state of the rail transport system in France and the main movements of enemy traffic were studied in detail. Considerable importance was, as usual, attached to shipping movement, and the present identification system permitted a continuous watch being kept on more than 3,000,000 G.R.T. of enemy shipping in Northern waters. One important contribution of A.C.I.U. was the identification of the new German 250 feet and 110 feet prefabricated U-Boats and the 30 feet midget submarine.

The industries which received the closest attention during 1944 were those engaged on the production of oil and aircraft, especially the jet aircraft. The volume of the enemy's oil production, and its reduction following our attacks, were estimated from constant cover and interpretation. The aircraft industry became an increasingly large commitment, and photographic cover was obtained and examined, on a routine basis, of several hundred airfields, factory airfields and industrial plants. Later, it was seen on air photographs that the enemy was developing many underground factories, and reports are now issued on every evidence of such activity. A new and more detailed form of report has been evolved regarding such development, and the type and thickness of rock above the tunnelling, for purposes of attack, is investigated.

The study of flying bomb sites imposed a heavy commitment on the intelligence organisation. A special section was formed at A.C.I.U. to examine all cover of the Cherbourg Peninsula and the areas from Dunkirk to Le Havre within 150 miles of London. As a result of a very thorough search, ninety-six of the earlier type sites were found, of which eighty-eight were eventually rendered totally unserviceable by bombing and, as far as is known, only one operated. By the beginning of May, eleven sites of the modified type, very effectively camouflaged, the detection of which involved minute and painstaking search of the whole area, had been discovered. When the firing of the flying bomb started in the middle of June, sixty-eight sites had been found, and by the end of August, 133. The occupation of France by our ground forces revealed only eight of the modified type which had not been discovered on photographs.

Approximately thirty-five officers and forty other ranks were engaged in interpretation and production of target material in connection with the flying bomb sites. Some 500,000 prints were examined, 2,300 reports written and approximately 325,000 copies of reports and 340,000 target illustrations were sent out.

Target material was prepared of nearly 100 Radar navigational beam and Radar jamming stations along and within 20 miles of the Channel coast of France, in order to effect complete destruction of the enemy warning system in the two weeks immediately prior to D-day. This material consisted of target dossiers of 300 pages each, of which 253 copies were distributed.

Models were made of over 1,000 square miles of the Normandy beachhead to a scale of 1/5,000 and nearly 10,000 square miles to a scale of 1/25,000. Some 500,000 man hours went into the actual construction of the 339 model panels which were supplied. This work was only possible as a result of the large amount of research previously carried out by A.C.I.U.

In all, A.C.I.U. produced and distributed some 15,000 different reports during the year 1944. At the same time, other aspects of intelligence were met by the preparation of photographs and illustrations for over 2,500 targets, of 400 special plans, including 175 detailed town plans, and by the execution of 3,000 miscellaneous drawings, as well as a large number of photogrammetric and survey items.

To satisfy the photographic requirements involved in the preparation of this intelligence and in the meeting of 63,000 other photographic demands, the British organisation alone processed, in all, some 2,000,000 negatives and produced over 12,000,000 prints and 1,500,000 rotaprints. In addition, a large amount of photographic production was carried out on behalf of the British Strategic Forces by our American counterpart.

This article is confined, as far as possible, to the work of 106 Group. In order, however, to obtain an idea of the amount of photographic intelligence which was supplied to the various British and American services in 1944, it must be borne in mind that the output of the American Photographic Reconnaissance Organisation, working in complete co-ordination with the British, is approximately the same as our own. When considering the work of the A.C.I.U. it is impossible, therefore, to distinguish between the intelligence output of British and American personnel, since it is a fully integrated inter-allied unit in which over one hundred officers and a corresponding number of other ranks of the U.S.A.A.F. are incorporated.



These excellent photographs taken by Y/518 clearly illustrate the nature of the phenomena produced by a Schnorkelling U-Boat (see Letterpress, p. 6).

The Schnorkel cloud appears to be composed almost entirely of spray and steam, produced by the hot gases exhausted under pressure below the surface of the water.

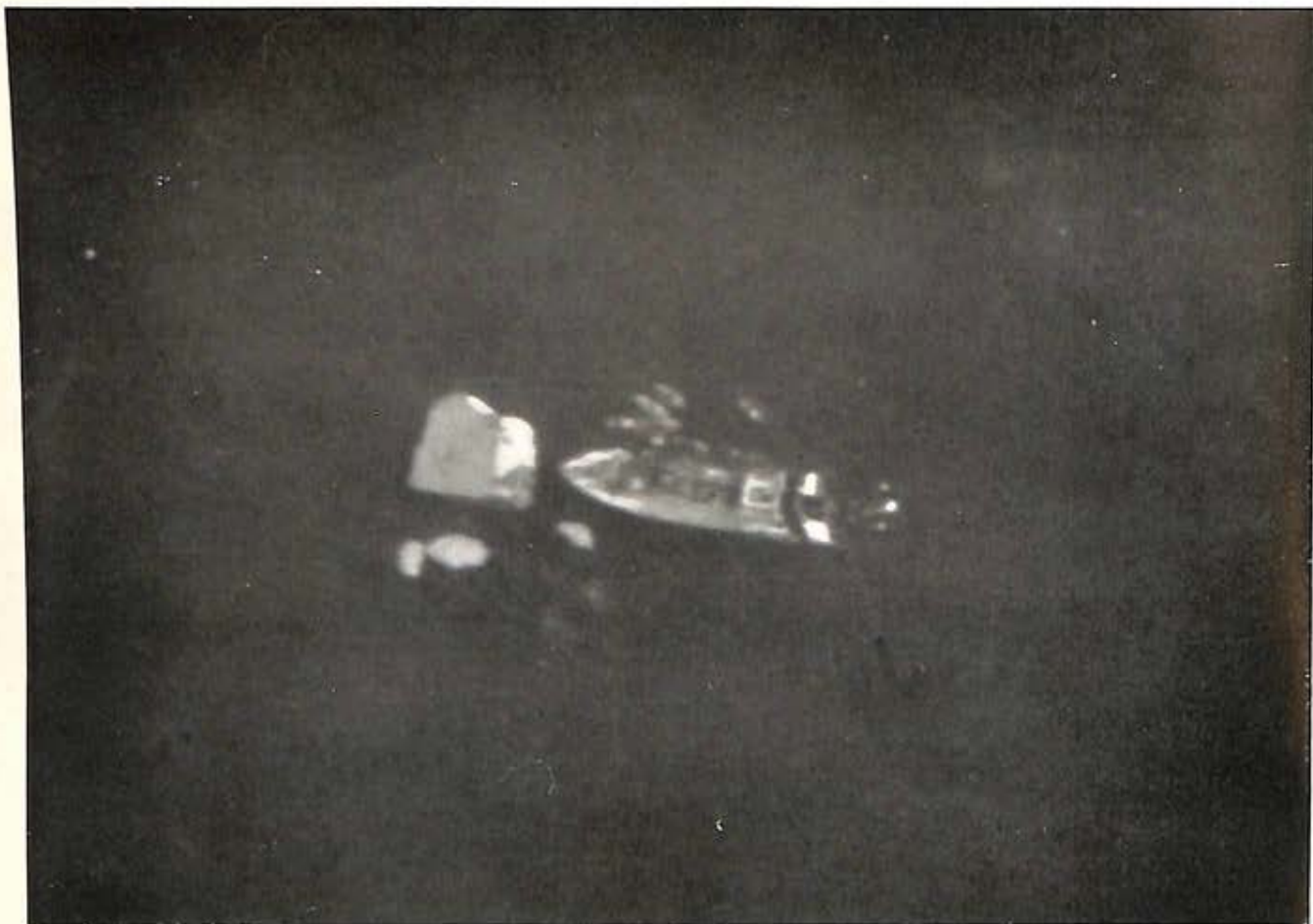
PLATE 1

In addition to revealing the presence of a U-Boat, it may also obscure the periscope lookout and thus have the valuable effect of masking the approach of an aircraft (as appears to have been the case with Y/518).

The wake is believed to be caused mainly by the exhaust rather than by the passage of the Schnorkel through the sea, and it does not therefore provide an indication of speed. In these photos the U-Boat is probably proceeding at a normal Schnorkelling speed of 4 to 6 knots.

The extent both of the wake and of the Schnorkel cloud will depend on the r.p.m. of the diesels, and the depth of the exhaust outlet. The influence of varying climatic conditions is still to be calculated.





The above photograph shows all that remains of the "Ferndale." The bows and forepart are jammed fast on a rock. The ship had been attacked by the Banff Wing in Kraakhellesund on December 16, 1944.

The night photograph below shows a low level practice attack by a Liberator of 1674 H.C.U. The two-second Delay Flash is being used and this photograph was taken three seconds after "Bombs Gone" by the Manual Method.



Meteorological Reconnaissance

By the end of 1943 a new outline of expanded meteorological reconnaissance had been drawn up. A start on this outline was made by the beginning of 1944. Priorities for the equipment of meteorological squadrons had been stepped up and an expanded programme provided for reconnaissance arms stretching from the Arctic to the Azores. Long-range Halifax squadrons and medium-range Ventura squadrons were allocated for the work.

Such a scheme was in keeping with the increasing importance of upper air observations, and in the general technique of meteorological analysis and forecasting. The excellent work of the Mildenhall and Aldergrove "vertical" ascents over a number of years was paying a handsome dividend. With accumulating data the meteorologist had been able to extend his scientific principles to the third dimension, and it was clear that these observations in the upper atmosphere were of a more fundamental nature than those made at surface level. They were free from the masking influences of topography, provided clearer labels for "air masses," and more faithful indications of atmospheric changes. They also provided the foundation for upper wind calculations, and generally pointed the way to a greater meteorological accuracy. The expanded programme, therefore, had as the basis of its design, a pattern of sorties combining horizontal investigation of the more important sea areas with a network of vertical soundings evenly spaced from mid-Atlantic to the Continent.

The Meteorological Conversion Units, formed for the training of Halifax and Ventura crews, did their work well. The Halifax Unit in particular, in spite of the servicing and flying difficulties of an isolated location in the Hebrides, produced 60 fully trained crews for meteorological reconnaissance in five months with the loss of only one crew. By the spring squadrons had been brought up to their established strength.

A standard of modification was established for meteorological aircraft which promised a degree of accuracy previously unknown in meteorological flying. Owing to the urgency of the task and reduced manpower available, it was necessary to accept a limited modification standard at first. The fully modified aircraft became available in the early summer. A well-equipped station in the aircraft gave the meteorological observer comparative comfort; radio altimeters enabled more accurate measurement of sea-level pressure to be made, both by day and by night; GEE (or LORAN) and A.P.I. increased the accuracy of observational positioning at the same time providing facilities for the measurement of high level winds above cloud; the B.3 drift-meter increased the accuracy of low level wind measurement, while Mark II A.S.V. added the much needed assistance for bad weather homing.

Unfortunately, complete fulfilment of the programme was hindered by two major engineering problems. The engines of the Halifax soon displayed a strong dislike for the long range meteorological sorties and though Merlin XXII's replaced the earlier XX's the result was the same. The medium range squadrons were also in difficulties with an aircraft that was not entirely suitable. Spares became unobtainable and eventually the Ventura squadrons welcomed the decision to re-arm with Fortresses.

The "vertical" flights were also involved in a change of aircraft. A faithful friend, the Gladiator, was rapidly approaching retiring age, and although one could hardly expect to "replace" the Gladiator for meteorological climbs, a substitute was found in the adaptable Hurricane.

Throughout these difficulties the standard of flying remained consistently high. 6,781 operational meteorological sorties were flown during the year, totalling 27,624 hours flying in all conditions of weather. On these sorties six crews were lost and two pilots of the single-engined aircraft, while four crews were rescued from successful ditchings. One Halifax squadron flew sorties on all except two days of the year. An outstanding achievement was that of No. 1402 Flight whose schedule of three Gladiator/Hurricane ascents to 24,000 feet, and one Spitfire ascent to 40,000 feet, was maintained on every day of the year. A record of twelve months and 2,182 hours flying by this flight was ended by minor damage to a Gladiator (and tree) in conditions of drizzle, 100 feet cloud base and darkness.

Of the 6,000 odd sorties, three deserve particular mention. Three aircraft, one from 517, one from 518 Squadron, and one from the American Weather Squadron, took off on their normal sorties on June 4. They had been briefed to meet an Atlantic "low," which had left Newfoundland close behind the previous depression, then off North-west Scotland. The 50 nautical mile "positions" were steadily marked off, tufted wisps of frontal cirrus came into view, but with each excursion to sea level, pressure continued to rise. The evidence was unmistakable. A new ridge of high pressure was developing. Eagerly, meteorologists decoded the W/T messages, plotted the vertical soundings and prepared their high level maps. At 18,000 feet the ridge became an extensive "high," covering most of the Atlantic.

Some hours later the Allied meteorological crews returned to their bases, unaware of the fact that their sorties had provided the date of D-Day.

The year has seen the establishment in each reconnaissance crew of a specialist meteorological air observer. These observers were drawn from volunteers with previous meteorological experience, and trained with other crew members at O.T.U. and H.C.U. The improvement in quality and completeness of observational detail has shown clearly that the value and efficiency of meteorological reconnaissance is dependent like other operational work, on the co-operation of the whole crew.

At the beginning of the year there were insufficient meteorological air observers to meet the expanded programme, and in consequence they tackled a job meant for fully twice their number. Enthusiasm and a conscientious application to their work gave results which deserved high praise.

Progress in the technique of meteorological flying has kept pace with the introduction of new equipment. In spite of a high percentage of bad weather and altitude flying, the standard of navigation has kept well up to the average in the Command. More use is made on the sortie itself of meteorological information obtained during flight. Estimation of sea-level pressure from measured winds and calculation of upper winds from temperature soundings is now a routine on each sortie, and the meteorological air observer's review of the weather situation is frequently of great value in a planned approach to base. The meteorological W/T operator has an unequalled practical opportunity in the regular transmission of lengthy meteorological messages and as a result is probably in a class of his own. Observational pauses on the "vertical" climbs and descents and flying in all weathers demand an exceptionally high standard of airmanship from the pilot.

Outside Coastal Command, the U.S.A.A.F. have, throughout the year, made a valuable contribution to meteorological reconnaissance. Operating with R.A.F. meteorological air observers for the first half of the year, they now have their own fully trained observers and carry out scheduled sorties daily as part of the general reconnaissance programme.

In addition to the standardised sorties the Mosquito Meteorological Flight of Bomber Command has continued to operate over enemy territory and provide meteorological information which the enemy would very much like to keep to himself.

Optimism regarding the prospects for meteorological reconnaissance in 1945 is fully justified. Until aviation becomes independent of weather, meteorological reconnaissance must remain a basic requirement for the efficient and economical direction of both military and civil flying. Improved equipment and the tradition of meteorological flying will ensure not only the day to day provision of upper air information, but also the further development of scientific meteorology.

Air/Sea Rescue

In 1944 the Air/Sea Rescue Service has rescued 2,364 aircrew and 846 members of other services in home waters alone. Of these, 205 were airborne troops rescued in September. They were part of the force which took off to attack Arnhem, but for various reasons were forced to ditch. This operation was backed up by all types of air and surface craft of the Air/Sea Rescue Service. Survivors were picked up by high speed launches, naval rescue motor launches, minesweepers, and Walrus aircraft belonging to Fighter Command, whilst Warwicks, Hudsons, Spitfires, and Thunderbolts belonging to Coastal Command, Fighter Command, and the 8th U.S.A.A.F. respectively, searched and homed the surface craft to the various incidents.

Such success has been made possible by the closest co-operation between the Air/Sea Rescue Service and the Royal Navy, and by a high standard of ditching drill among aircrews. Statistics have proved that in nearly every case in which correct W/T procedure was followed, the aircraft was ditched successfully, and most, if not all, of the crew were rescued.

A comparison of the Air/Sea Rescue operations for 1944 with preceding years will show the usual seasonal variations, namely, an increase of rescues during the spring and summer months.

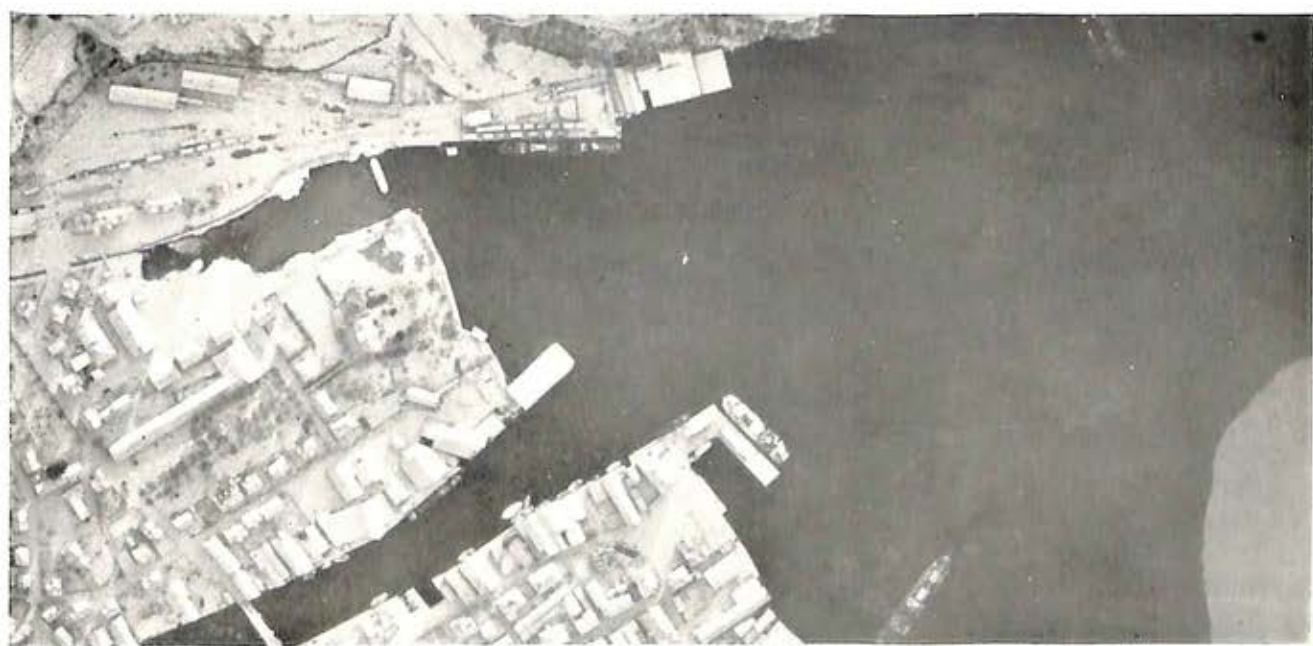
The monthly records of aircrew rescued in home waters during 1944 are :— January 94, February 80, March 232, April 189, May 240, June 390, July 222, August 232, September 330, and an additional 205 airborne troops, October 75, November 34, December 41, making a total of 2,364.

Since its formation on February 1, 1941, the numbers rescued by the Air/Sea Rescue Service up to December 31, 1944, are :—

Aircrew rescued in Home Waters	..	..	..	..	..	5,467
Aircrew rescued Overseas	..	..	..	..	..	2,491
Other Services rescued Home and Overseas	..	..	..	..	..	3,313
Enemy Aircrew rescued	..	..	..	..	..	283
						<hr/> 11,554

During the year the U.S.A.A.F. has assisted Air/Sea Rescue by providing 25 P.47's (Thunderbolts), based on an airfield in East Anglia to back up their operations on the Continent, and available to the R.A.F. when possible. These aircraft are used as V.H.F. relay stations and spotters for aircraft returning in trouble, and have many successes to their credit. They are controlled by the 65th Fighter Wing, 8th U.S.A.A.F., Saffron Walden, working in close liaison with the Area Combined Headquarters concerned. They have at their disposal an allotted number of high speed launches or rescue motor launches at rendezvous positions, and Air/Sea Rescue Warwicks patrolling certain areas of the North Sea. All these craft work on a common frequency, so that should incidents occur, both surface craft and aircraft can be called up either by the spotter aircraft or the ground station, and vectored or guided to the position. This has proved a fine team and will continue to do good work.

Towards the end of 1943 when plans for the invasion of the Continent were reaching an advanced stage, the areas of responsibility between Fighter and Coastal Command were changed, and from



On December 31, 1944, the Banff Wing attacked shipping in Flekkefjord harbour with R.P. and cannon. The top photograph gives a general view of the action. The centre photograph shows the attack on two ships alongside the town quay.

In the lower photograph the outer of the two ships of about 1,500 tons, is seen to have sunk, while the one alongside of some 2,500 tons, can be seen to have the stern awash up to the centre castle. Still later photographs show that no salvage attempts had been made on this ship, although several weeks had elapsed.



The top photograph shows a trawler type auxiliary which was severely mauled in a cannon and R.P. attack in Krossfjord on January 8, 1945, by the Dallachy Beaufighters (see letterpress, p. 15).

In the lower two photographs on January 9, 1945, the Dallachy Wing is seen attacking the "Sirius," 938 tons, in Fuglsæet Fjord. She was fast in the ice, but after the attack in which many R.P. hits were scored, turned on her side. She is subsequently reported to have sunk (see letterpress, p. 15).

April 21, 1944, Fighter Command were responsible for Air/Sea Rescue in an area bounded in the east by a line running from Southwold to the Hook of Holland, through the English Channel to a line running from Lands End to 50° N. 07° W., thence to 48° N., 07° W., and thence to 48° N., 04° 30' W. Coastal Command were responsible for all Air/Sea Rescue outside this area, including Iceland, Gibraltar, and the Azores.

At the beginning of the invasion these responsibilities were again subdivided, A.E.A.F. assuming responsibility for initiating and co-ordinating Air/Sea Rescue from Dieppe to latitude 50° N. westward to 03° 00' W., thence to 48° 30' N., 07° 00' W., and thence southwards to the boundaries of Spanish territorial waters. For this they had at their disposal one composite squadron of Warwick, Spitfire, and Walrus/Sea Otter aircraft, and two units of 68 feet high speed launches.

With the rapid advance of our armies in France this area was soon found to be impractical, and the old boundaries were reverted to. The responsibility for Air/Sea Rescue on the continent now rests with 2nd T.A.F. operating through 85 Group, who also assist Air/Sea Rescue operations from the United Kingdom when called upon to do so.

This has again been altered, with effect from February 15, when Coastal Command will take over Fighter Command's area and, in conjunction with the Royal Navy, assume entire responsibility for Air/Sea Rescue operations, taking over a proportion of Fighter Commands' aircraft and personnel for the purpose, and keeping a close liaison with 2nd T.A.F.

A larger and better Airborne Lifeboat is now coming into the Service. This is known as the Mark II. It weighs over 3,000 lbs., is just over 30 feet long, and can accommodate a crew of twenty. It has a four-stroke engine in place of the two-stroke engines in the Mark I and IA and a power range of 300 miles. It can be easily refuelled from the air, using the new plastic containers specially manufactured for the purpose.

With the slowing down of Air/Sea Rescue operations in the European theatre many of the R.A.F. H.S.L.'s will be withdrawn and their crews transferred to A.C.S.E.A. Owing to the vast distances to be covered they will be equipped with larger craft with much greater ranges.

T.3180 "Walter" is now available and should be demanded by all Squadrons in the Command. Full instructions for the operation of this very important aid to location are set out in A.P. 2554A, and should be studied by all aircrew.

Several items of equipment are undergoing final service trials, including a new Mae West and Inflatable Exposure suits. The Mae West is a great improvement on the old type, as, despite carrying more aids, the bulk has been reduced. The new Inflatable Exposure suit is to be worn by ditched crews in their dinghies. It is hoped to fasten this suit in a roll form round the buoyancy chamber inside the Mae West, so that it can be easily taken out and put on. It can be inflated with little difficulty by mouth, and the layer of air between the wearer and the elements will considerably reduce the risks of exposure.

Two new features are a lateen sailing rig and an Air/Sea Rescue Supply Dropper. The sailing rig is to be fitted in the "Q" type dinghy and will facilitate the sailing of the dinghy by inexperienced crews. A number of these dinghies with the modified rig will be made available for training at the earliest possible moment. The Air/Sea Rescue Supply Dropper, which is a replacement for the Bircham Barrel, is capable of passing through a flare chute, and can be carried on universal bomb racks or in the light series bomb containers. It contains T.3180 "Walter" emergency flying rations, can of water, signalling torch, two-star distress cartridges and medical bandages.

A personal pack is now in production, and will be used mainly in the Pacific area. It will be carried in all four-engined aircraft proceeding to the Far East. Contents will probably be: two Water Purifying Sets, one Mark II ration, six Mark III two-star red distress signals and a water storage bag.

A new responsibility, which has fallen to the lot of Air/Sea Rescue, is Jungle Survival. Already special jungle and desert survival schools are in existence in Ceylon, Assam, and Poona, at which Naval, Army, and R.A.F. personnel are given practical instruction in jungle and desert survival, but it will be necessary for aircrew before proceeding overseas to have some knowledge of what is required of them. For this purpose it is proposed to form a school in this country where the rudiments can be learnt. This will probably be attached to the School of Air/Sea Rescue, which is in the process of being transferred to Coastal Command, and is to be based at Calshot.

During the past year many stations in the Command have introduced evasion exercises. These will be encouraged, as the more personnel are exercised in the art of making use of the natural resources available the more are the chances of survival.

In the space available it is difficult to cover everything. But enough has been written to give a good indication of the operations of the year. There is no need to be complacent, but the way in which everyone in Air/Sea Rescue has played his part shows promise for even better results in 1945.

The Month's Work—January, 1945

The Anti-U-Boat Effort

1. The enemy's offensive against shipping in British Coastal waters continued during the past month. U-Boats patrolling off Halifax and west of the Straits of Gibraltar also contributed to the total of 22 ships sunk or damaged by torpedo in January. Ten of these torpedoings took place in the Irish Sea and its approaches, and one off Land's End.

2. The result has been that once again the bulk of our anti U-Boat effort has been concentrated on inshore patrols in co-operation with the escort groups, and comparatively little in the way of offensive operations has been undertaken in the transit area. A large number of convoys have also been escorted.

3. Fifteen sightings were made during the month by anti U-Boat aircraft (six Grade A and nine Grade B), mostly of the steam-wake category. The majority of these sightings were in British waters or to the North of Scotland, but two sightings were made by anti U-Boat aircraft in the Gibraltar area. In addition there were nine sightings by unarmed aircraft, including one by Y/518, a Met. Halifax from Tiree, which took a remarkable series of photographs of a wake and vapour (see plate 1).

4. Eleven U-Boats were attacked, and though no definite results were recorded, three in particular are worthy of mention. P/172, using excellent Radar tactics, claimed to have straddled a visible schnorkel pipe west of the Hebrides, while J/120 made a promising dusk attack following a Radar contact on an object, probably a U-Boat, in the act of diving off Anglesey. North of Scotland A/330 also obtained some promising results.

5. Meanwhile, production of Types XXI and XXIII U-Boats continues steadily, but none of these new types appears to have operated yet. Some successful bombing on the assembly yards during the past month and the general military situation will undoubtedly have had a serious effect on production. For instance, a number of tail sections for the Type XXI were captured at Strasbourg, and the Russian advance into Silesia may lead to the capture, or neutralisation, of other factories engaged in similar work. The most notable event of the month, the Russian advance to the Baltic in the East Prussian area, is probably the most serious blow to the U-Boats by its effect on training and because of the loss of Pillau and other ports.

6. Despite all this, the enemy's success with his old type U-Boats will no doubt encourage him to speed up the offensive and the threat therefore continues to grow. For our part we shall continue to harry the U-Boats in the inshore waters, always bearing in mind that our most pressing need is to find some way of taking the offensive once again in the U-Boat transit areas.

Anti-Shipping

7. Very bad weather seriously interfered with our anti-shipping activities during the first month of the New Year. No sorties at all were flown on about half the days of the month. Despite these adverse conditions, however, results were satisfactory, and our claim of four ships sunk, with a further twenty-two damaged, are equal to last month's figures.

8. Few targets were found in the southern area of the North Sea, and only two daylight attacks were made. One of these took place on the 17th, when thirty-two Beaufighters of the North Coates Wing attacked ships in the heavily defended anchorage at Den Helder. The main target, the hull of a half completed merchant ship of about 6,500 tons, was surrounded by six escort vessels. In the face of intense flak, our Beaufighters damaged the hull and five of the escorts. It was an expensive sortie, however, for the flak from shore batteries and ships destroyed six of our aircraft and damaged eleven others.

9. A large number of night attacks were made in this area, but—as usual—mostly with unobserved results. Nevertheless, three vessels were claimed as damaged by bombs.

10. The Norwegian coast was the scene of seven attacks in force by the Beaufighter and Mosquito Wings from Dallachy and Banff. Probably the most successful of these attacks was made in Eidsfjord on the 25th. Sixteen Mosquitos attacked a stationary convoy of seven ships with R.P. and cannon. Over 50 R.P.s found their mark and resulted in the sinking of a merchant vessel of 5,100 tons and a 500-ton coaster. In addition, a 3,000-ton merchant vessel was damaged. This was accomplished without the loss of a single aircraft.

11. January 9 was also a profitable day for the strike wings, and three separate attacks were made. On one of these attacks Mosquitos seriously damaged the *Claus Rickmers*, a merchant vessel of 5,165 tons, off Leirvik. Within an hour of this, two formations of Beaufighters each sank a small ship, one south of Hisoy and the other in Fuglsæt Fjord. All our aircraft returned from the day's operations.

12. Although the Halifax squadrons made a few attacks in the Skagerrak, most of their effort was concentrated in the area north of 62° North. During the evening of the 25th, C/502 attacked a 4,000-ton merchant vessel south-west of Kristiansund. Three direct hits were scored with 500 lb. bombs, and the ship was left listing and low in the water.

13. On January 11 the Mosquitos proved their value as fighter escort to a formation of Beaufighters. The combined force, on an anti-shipping patrol, was intercepted off Lister by about ten enemy fighters. During the ensuing combats three Me.109's and one F.W.190 were destroyed, for the loss of one Beaufighter and one Mosquito.

I.—ANTI U-BOAT

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

JANUARY, 1945

Duty and Base or Area.	Total Sorties. (1)	Hours Flown.		U-Boats Sighted.		U-Boats Attacked.		Hours per Sighting.		Number of Sorties.		
		Base to Base. (2)	On Patrol. (3)	Day. (4)	Night. (5)	Day. (6)	Night. (7)	Base to Base. (8)	On Patrol. (9)	When U-Boat Sighted. (10)	When U-Boat Attacked. (11)	
<i>Convoy Cover</i>												
United Kingdom	108	1,112	786	—	—	—	—	—	—	—	—	
Iceland	13	94	72	—	—	—	—	—	—	—	—	
Gibraltar and Moroccan Sea Frontier	228	1,661	965	2	—	—	—	830	482	2	—	
Azores	8	103	31	—	—	—	—	—	—	—	—	
TOTAL CONVOY EFFORT	357	2,970	1,854	2	—	—	—	1,485	927	2	—	
<i>A/U Patrols</i>												
<i>Northern Transit</i>												
United Kingdom	220	1,921	1,318	— (2)	— (2)	— (2)	— (1)	480	329	— (4)	— (3)	
Iceland	69	738	383	—	—	—	—	—	—	—	—	
<i>Northern Convoy (including Irish Sea) (see Note (4))</i>												
United Kingdom	380	3,421	2,527	2 (3)	2	2 (3)	2	489	361	4 (3)	4 (3)	
Iceland	22	225	124	—	—	—	—	—	—	—	—	
Azores	34	406	137	—	—	—	—	—	—	—	—	
<i>Bay of Biscay and Channel Approaches (see Note (4))</i>												
United Kingdom	614	4,712	3,518	— (2)	—	— (1)	—	2,356	1,759	— (2)	— (1)	
<i>Central Convoy</i>												
Gibraltar and Moroccan Sea Frontier	262	1,619	1,118	—	—	—	—	—	—	—	—	
Azores	13	151	75	—	—	—	—	—	—	—	—	
TOTAL A/U PATROLS	1,614	13,193	9,200	2 (7)	2 (2)	2 (6)	2 (1)	1,015	707	4 (9)	4 (7)	
ADD CONVOY EFFORT	357	2,970	1,854	2	—	—	—	—	—	2	—	
TOTAL A/U EFFORT	1,971	16,163	11,054	4 (7)	2 (2)	2 (6)	2 (1)	1,077	737	6 (9)	4 (7)	
				6 + (9)		4 + (7)						
				U-Boats Sighted.		U-Boats Attacked.						

Notes.—(1) Grade "B" Sightings and Attacks (i.e., swirls, wakes or smoke believed caused by a U-Boat) are shown separately in brackets and are not included in the main totals.

(2) The above figures do not include nine Chance Sightings (7 Grade "A" and 2 Grade "B") made by aircraft not carrying major weapons.

(3) Hours per sighting under columns (8) and (9) include both Grade "A" and Grade "B" Sightings.

(4) During the month a considerable proportion of the operations in the Northern Convoy Area by home based aircraft was concentrated in the Irish Sea and its north-west approaches. Similarly flying in the Bay Area was restricted to the Channel and south-west approaches. For further details of these inshore operations in the home approaches see chart facing page 10.

Squadron Results—January, 1945

Sightings by A/U Aircraft

						Sorties when U-Boat Sighted.	Sorties when U-Boat Attacked.
53	Liberator L.L.	Leuchars	..	..	..	— (1)	—
86	Liberator L.L.	Tain	..	..	..	— (1)	— (1)
103 (U.S.N.)	Liberator	Dunkeswell	..	..	..	— (1)	—
120	Liberator L.L.	Ballykelly	..	..	..	1	1
206	Liberator L.L.	Leuchars	..	..	..	— (1)	— (1)
330 (Norwegian)	Sunderland	Sullom Voe	..	..	..	— (1)	— (1)
423 (R.C.A.F.)	Sunderland	Castle Archdale	..	..	..	1 (3)	1 (3)
22 (S.A.A.F.)	Ventura	Gibraltar	..	..	..	2	—
172	Wellington L.L.	Limavady	..	..	..	1	1
304 (Polish)	Wellington L.L.	Benbecula	..	..	..	1 (1)	1 (1)
						<u>6 (9)</u>	<u>4 (7)</u>

Chance Sightings by Aircraft on other duties

								Number of Targets Sighted.
3 G.R.S.	Anson	Squires Gate	..	..	..	..	..	1
1 (French)	Catalina	U.S. Moroccan Sea Frontier	..	..	..	..	..	1
518	Halifax	Tiree	..	..	..	..	..	2 (1)
333 (Norwegian)	Mosquito	Banff	..	..	..	..	..	1
304 (Polish)	Wellington L.L.	Limavady	..	..	..	..	..	2
6 O.T.U.	Wellington	Silloth	..	..	..	..	..	— (1)
								<u>7 (2)</u>

Assessments

(Received up to 12th February, 1945.)

Month.	Known Sunk.	Probably Sunk.	Damaged, "A."	Damaged, "B."	Slight Damage.	Insufficient Evidence of Damage.	No Damage.	Insufficient Evidence of U-Boat.	Unassessed.
November	—	1*	—	—	—	3	5	3	—
December..	—	1	—	—	—	4	1	1	1
January ..	—	—	—	—	1	1	—	2	4 (3)

* The November "Probably Sunk" is shared with Naval Forces in the following circumstances. The target was first located by a Coastal Aircraft which reported a Radar contact not seen visually owing to bad visibility—the aircraft homed to the position an Escort Group which found and probably sunk the U-Boat. The Admiralty Assessment Committee have awarded part of the credit for this success to the aircraft which first found the quarry.

RECENT ATTACKS ON U-BOATS

Flare Attack on a Fully Surfaced U-Boat

In the early hours of December 20 **Fortress T/220** was patrolling on a north-easterly course at 1,500 feet when the Mark X Radar picked up a contact 10 miles away bearing Red 150°. As soon as the navigator had checked that there was no shipping in the area, course was altered to 256°. The Radar contact was regained on completion of turn, bearing Red 36°, range 11 miles. The pilot altered course to 220°. The contact then showed Green 3°, range 10 miles. Course was again altered 3° to starboard on to course 223° and the aircraft started losing height at the rate of 400 to 500 feet per minute. After minor course alterations, a constant bearing of Red 3° was held from a range of 4 miles, height then being 500 feet. The aircraft continued losing height, levelling out at 200 feet, when the range was 2 miles. No further alteration of course occurred. When flying on course 320° at 250 feet, twenty 1·7-inch flares were released starting at a range of 1 mile. A fully surfaced U-Boat of large type estimated 300 feet in length was at once seen, bearing Red 3° distant 1 mile in position 42° 04' N., 19° 46' W., course 140, ten knots. The target was held on Radar until after the visual sighting. The conning tower was very long and low in proportion, with one bandstand, and appeared to be mounted on an island. Two quadruple mountings and one single gun were seen on the bandstand. The aircraft altered course slightly to port and tracked over the target at an angle of 100° Red to U-Boat's track, and an attack was made from 150 feet. Six depth charges were selected but, due to an Intervalometer fault, eight released, spaced at 55 feet and set to shallow depth. Mark III bombsight was used. Three points of entry of the depth charges were seen, one being an

overshoot of 100 feet, the other two being under shoots, the furthest one under shooting by 100 feet. The depth charge which overshot was seen to explode. As the aircraft passed over the U-Boat, the flight engineer, looking through the bomb bay, clearly saw the rear portion of the conning tower and most of the stern of the U-Boat. There was no flak from the U-Boat and on the run in the nose gunner held fire so as not to disturb the bomb aimer. The tail gunner fired about 30 rounds, but no hits were observed. After the attack the aircraft continued on course to enable the Radar operator to regain contact but he was unsuccessful. Nothing further was seen of the U-Boat although aircraft remained in the area for 40 minutes while position of attack was checked by astro. Before leaving for base the **Fortress** dropped a Mark II marine marker. Sono buoy contact was obtained by another aircraft one and a half hours after the attack, and strong signals were received indicating an engine speed of 120 r.p.m.

Comment

It is considered that this U-Boat survived undamaged and Sono Buoy evidence confirms that her diving abilities were unimpaired.

The Radar homing checks well with the theory of constant bearing approach. The expected relative drift was 2° port compared with the 3° port as used by the crew. In theory this would cause the target to move further to port, and it may well be that the bearing on visual sighting was greater than 3° port. The lack of damage to the U-Boat may have been due to an insufficient alteration of course to port, followed by a close miss astern.

Perseverance Rewarded

On December 26, **Wellington F/407 (R.C.A.F.)** was on patrol flying due south when a Radar contact was obtained bearing Green 90°, range 6 miles. The weather was good except for sea haze. The aircraft homed on course 300° losing height, and the Leigh Light was switched on at three-quarters of a mile, eventually illuminating a feather disappearing under the starboard wing on a bearing of Green 70°. The aircraft lost the contact astern at 1 mile range and failed to pick it up again on returning on reciprocal track from 4 miles range. The area was searched thoroughly for 40 minutes and the contact was regained at 2157 hours, 4 miles dead ahead, with the aircraft at 750 feet. Height was lost and Leigh Light was switched on at three-quarters of a mile.

When it was too late to attack, the searchlight operator sighted a Schnorkel under the aircraft in position 49° 56' N., 02° 39' W., course 110° and speed about 4 knots. The aircraft passed over and continued on course 125° to 4 miles range and turned on reciprocal, picking up the contact when at 600 feet bearing Green 10°. Homing on course 300° and losing height, the Leigh Light was switched on at three-quarters of a mile and the second pilot, in the nose, sighted a feather half a mile away, then a definite Schnorkel a quarter of a mile away. The captain saw the feather only and, as soon as this was seen and immediately before the nose of the aircraft obscured the target from view, he attacked from Green 10° to U-Boat's course, releasing from

125 feet five depth charges, set to shallow depth, spaced at 60 feet. Six depth charges were selected but number five of the stick hung up. No further visual or Radar evidence of the U-Boat was found although the area was searched by Leigh Light. At the time of sighting an escort group was bearing 340° 14 miles from position and at 2258 hours this group arrived on the spot. The aircraft patrolled until P.L.E. was reached at 0145 hours and then set course for base.

Comment

After a persevering series of approaches, the Schnorkel was illuminated in time for an attack. There is, however, no evidence on which to base an assessment, although it appears that the depth charges may have overshot.

Admiralty Assessment

This attack has been assessed "Insufficient evidence of damage."

Two Clouds of Whitish Smoke

Just before 1100 hours on December 28, **Sunderland E/423 (R.C.A.F.)** was patrolling on track 205° in fine weather when the second pilot sighted a cloud of whitish smoke bearing Red 10° distant 20 miles. The captain at once altered course to investigate, and, some two minutes after the first sighting, a second cloud of whitish smoke was seen fourteen miles away bearing Red 10°. The second cloud (Target B) bore about 060° distant 2½ miles from the first cloud (Target A). Binoculars were used to scrutinise both targets and although nothing other than smoke or vapour was seen, target B appeared to be moving in a direction of 230°. While the aircraft was still 8 miles away the navigator began to take photographs of the smoke clouds. The aircraft made a gradual turn to port in order to approach target B up track and when the aircraft was about 2 miles from target B the original target A had evidently stopped Schnorkelling and vapour disappeared entirely. Vapour from target B was itself dispersing and had vanished when the aircraft was half a mile away. At this moment a periscope was sighted projecting about one foot above the water in position 53° 39' N., 10° 26' W., course 230°, two knots. Five members of the crew saw and identified the periscope, which appeared to be dipping in and out of the slight swell. The front gunner perceived a gradual turning movement of the periscope as if the U-Boat was still keeping normal lookout. The aircraft lost height on a course of 220° and attacked from Green 170° releasing, from about 35 feet, eight depth charges, set to shallow depth and spaced at 60 feet. The point of aim was fixed so that the first depth charge would enter

the water 100 feet short of the periscope and along track. One Mark II Marine Marker was dropped and the aircraft held steady while the rear-facing camera obtained photographs. The point of entry of the depth charges relative to periscope could not be seen since the depth charge splashes obliterated both the periscope and the slight feather. However, all eight depth charges functioned correctly and large blobs of heavy oil were seen slowly bubbling to the surface two minutes after the attack. After 20 minutes a patch of heavy dark coloured oil had formed, about 300 yards in diameter and covering the entire area of the position of attack and was distinctly seen for twenty minutes then slowly dispersed. W/T and R/T messages were sent out immediately and homing transmissions began. Contact was made with the Second Escort Group which was about 55 miles distant and four escort vessels arrived in the position of the attack at 1648 hours. Full details were passed to the S.N.O. who acknowledged and began patrolling south of the marker. Nothing further was seen and at 1747 hours the aircraft set course for base.

Comment

The captain is congratulated on the efficiency of his crew's lookout, the apparent accuracy of his attack, and the good co-operation with E.G.2.

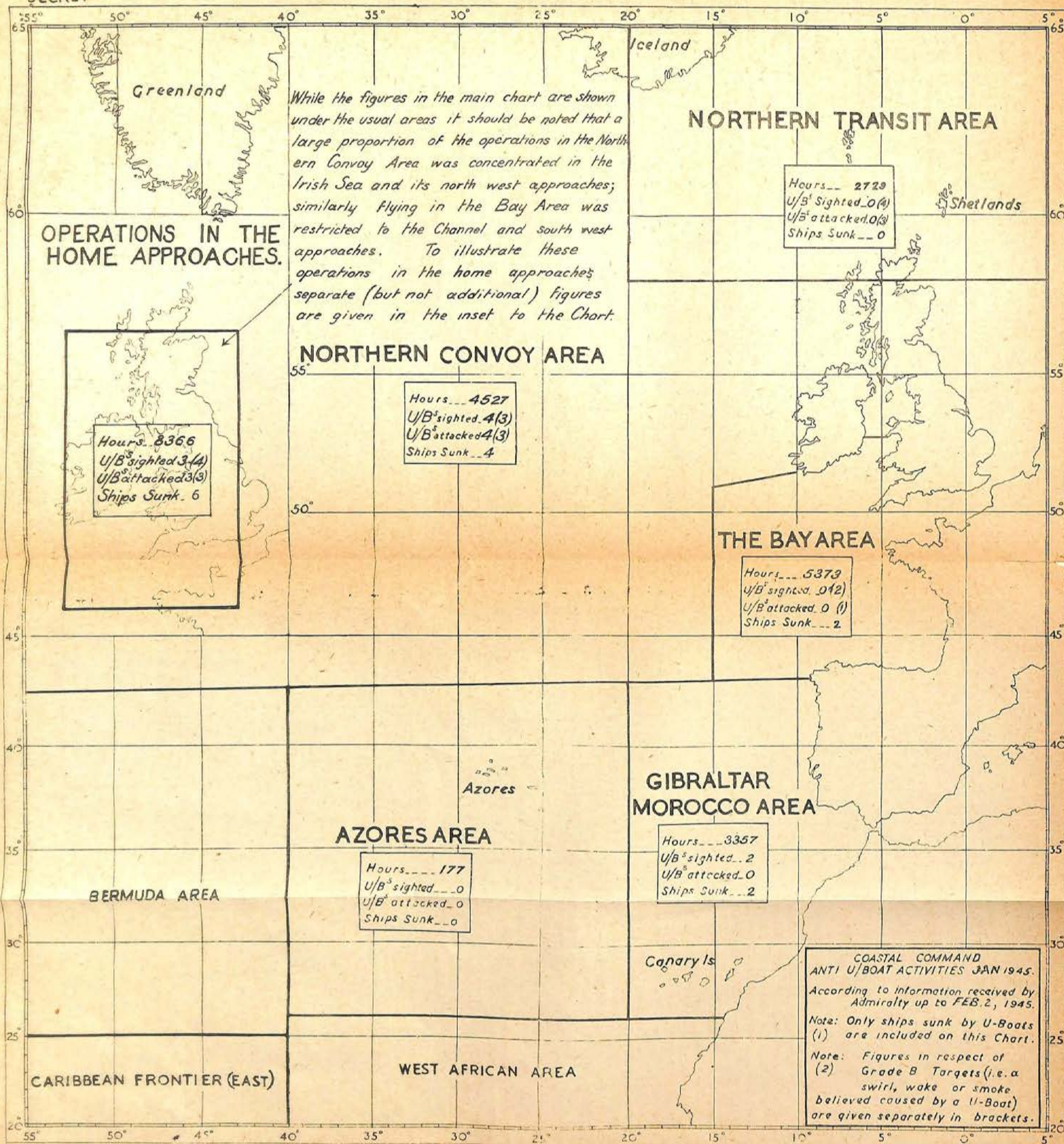
From the visual evidence it appears that there may have been two U-Boats Schnorkelling on a south-westerly course. The extent of the oil seen after the attack suggests that the fuel tanks may have been damaged or that oil may have been forced out by concussion.

A Schnorkel Attack in the English Channel

In the early hours of the morning on December 30, **Wellington L/407 (R.C.A.F.)** was flying due south on an anti-U-Boat patrol when a Radar contact was obtained 7 miles away bearing Red 30°. The sea was calm in a light wind and a full moon was nearing its maximum altitude. The aircraft immediately turned on to a homing course of 151°. At 0211 hours the captain and the second pilot sighted, up moon, a very pronounced wake and then a Schnorkel, bearing dead ahead, distant half-a-mile, in position 50° 05' N., 02° 31' W., course 300°, speed 6 knots. The aircraft was too high to attack during the first run and so the captain turned to port and made a second run on course 270°. At three-quarters of a mile the Leigh Light was switched on and the Schnorkel was picked up

although the illumination was affected by haze. The Schnorkel was also clearly visible by moonlight. The aircraft attacked from Green 150° to U-Boat's course, releasing from 125 feet six depth charges, set to shallow depth, spaced at 60 feet. All depth charges were seen by the rear gunner to explode, the first 30 yards on the starboard quarter, numbers two and three straddling the Schnorkel about 10 to 15 yards astern of it. All depth charges were also felt to explode by the slight concussion in the aircraft. After the attack the aircraft turned to port and climbed to 1,500 feet to assist the wireless operator to transmit his signals, circling the area of the attack which was clearly visible in the moonlight. The two flame floats dropped at

SECRET



either end of the stick of depth charges were seen to be burning. The Schnorkel disappeared immediately after the attack and the Radar contact was lost and not picked up again. The aircraft remained in the area for 47 minutes then at 0300 hours, as P.L.E. had been reached, course was set for base.

Comment

As, after a 7-mile run on the first approach, the aircraft was too high to attack, it is obvious that the captain did not expect to find a target at the end of the homing. This abortive approach may have been caused by the fact that the crew had been in the habit of turning to home on to a contact before a speed

check had been completed. As a result of this habit, many unnecessary runs would be started on targets which turned out to be aircraft: the night anti U-Boat ideal of a perfect attack at the end of each run would thus fade further into the background.

The U-Boat did not dive as a result of the aircraft's first run and the captain was able to redeem his error by making a good attack after the second run. It is possible that the U-Boat was damaged.

Admiralty Assessment

This attack has been assessed by the Admiralty Assessment Committee as "Insufficient evidence of damage."

Conning Tower Sighted

At dusk on January 12 **Liberator J/120** was flying at 1,300 feet on an anti-U-Boat patrol in the Irish Sea. There was 9/10 cloud at 2,000 feet and the wind was north-easterly at 30 knots. At 1800 hours, while the A.S.V. was switched to the 5-mile range, a contact was obtained $3\frac{1}{2}$ miles away bearing Green 30° . The aircraft lost height to 700 feet and homed on track 268° . Contact was lost during the turn but picked up again at just under 3 miles and held until a wake was sighted 2 miles away bearing Green 8° in position $53^\circ 07' N.$, $05^\circ 45' W.$ At the head of the wake the captain momentarily saw a conning tower on course 260° , speed 4 knots. A run in was made at 50 feet and six depth charges were dropped, set to shallow depth, spaced at 55 feet. Mark III bombsight was used. The aircraft tracked over the apex of the wake, the apex being used as the aiming point and the depth charges were seen to straddle the wake at a slight angle. The aircraft made a second run over the scene, and a black patch 50 yards in diameter was seen on course 270° distant 50 to 100 yards from the flame float marking the depth charge scum. On this run a marine marker and a Sono buoy were released. R/T was then used to home three escort vessels. Meanwhile nothing could be distinguished on the Sono buoy, water noises and

shore echoes being too great. The escort vessels arrived at 1918 hours. Final homing was simplified by the aircraft's landing light being used vertically whilst circling the marker. S.O.E. was advised by R/T of the situation and on instructions from Control, Patrol Baker was carried out. The captain finally returned to the scene at 0400 hours when the S.O.E. stated "No contact, its all yours." P.L.E. was reached at 0406 hours and having informed S.O.E. and the aircraft base, the captain set course for home.

Comment

This is an interesting attack in that, for the first time for some months, the conning tower of a U-Boat was seen close to our coasts.

It is difficult to understand why the range of the Radar was restricted by using the 5-mile scale. If the 15-mile range had been used, there might have been more information on the behaviour of the U-Boat before the visual-sighting was made. In the circumstances it is difficult to decide whether the U-Boat had been fully surfaced or whether the conning tower had merely broken surface due to poor depth keeping in the rough sea.

The attack was well executed, and was rewarded by promising after evidence.

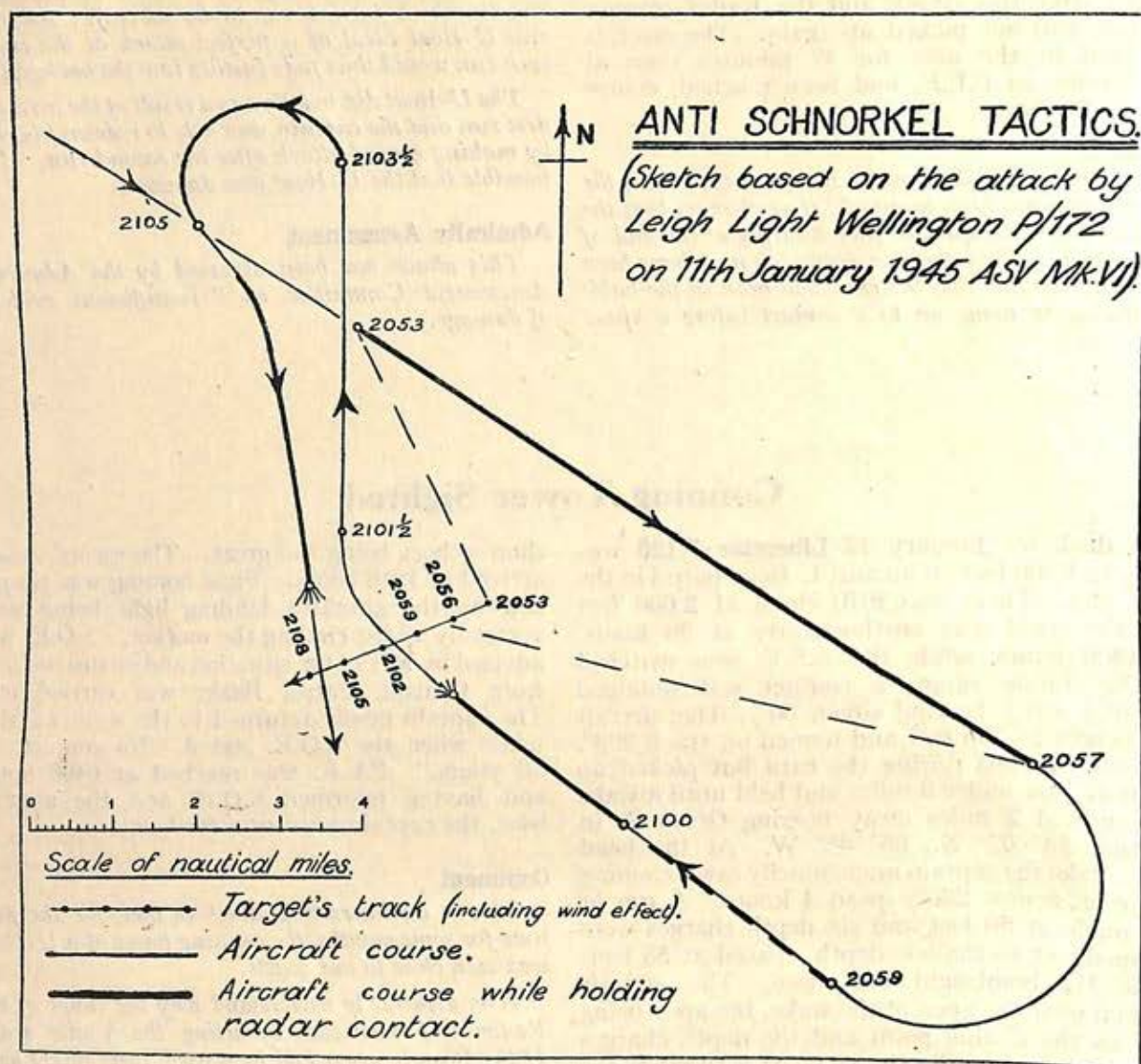
Anti-Schnorkel Tactics—Theory and Practice

The Form U-Bat reporting the Schnorkel attack by P/172 on January 11, 1945, was so carefully made out that, by assuming the few missing details, it is possible to plot out the whole action. None of the assumptions are unreasonable and it is most interesting to see how the practical results reported by the aircrew fit into the scale diagram which has been plotted theoretically. The tactics described below are for a purely hypothetical case, and it is pointed out that individual details are not, of necessity, applicable to the attack from which the basic details are drawn. This article illustrates the application against Schnorkel of the theory of the "Navigated Approach" and the "Constant

Bearing Approach" as discussed in Part IV of the Coastal Command Manual of Anti U-Boat Warfare.

It has been assumed that the target was steering 220° at a speed of five knots throughout the action and that the wind was 273° five knots. The relative wind was thus from 247° at nine knots. In order to keep the diagram clear, it has been assumed that there was no wind and that the target's course and speed was 247° nine knots.

The various assumptions which have been made are not noted separately but are included in the table below. The report on which this article is based is given on page 13.



- Time.*
- 2053.00. Course 124° T. TAS 142 kts. Contact 30° starboard, 3½ miles.
- 2057.00. Same course and speed. Contact 160° starboard, 7 miles. Contact speed checked.
- Began rate ½ turn to starboard at average TAS 150 kts. Radius 1.68 miles.
- 2059.00. Turn completed. Steady on course 308° T. TAS 165 kts. intermittent contact regained, range 6½ miles, bearing 2° starboard, but reported as dead ahead.
- 2100.00. Same course. TAS. 180 kts. Contact firm, range 3½ miles. Dead ahead. Relative drift 3° starboard.
- 2100.50. Same course and speed. Range 1 mile. Leigh Light on. Target not seen due to haze. Due to failure to allow for relative drift, theoretical bearing of target at time of illumination = 8° port.

- Time.*
- 2101.10. Crossed target's track on course 308° T. with target 360 yards to port. This because target was dead ahead at 3½ miles, and course was held steady with relative drift 3° starboard. The Radar operator must have missed the change of bearing which only became appreciable at about 1¼ miles.
- 2101.30. Completed turn to starboard onto 360° T. Climbed at average TAS 135 kts.
- 2103.30. Began rate ¾ turn to port onto 140° T., TAS 150 kts. Radius 0.96 miles.
- 2105.00. Steady on course 140° T.
- 2105.10. Contact regained 30° starboard, five miles, turned on to course 170° T. Contact given as 5° port, but was probably about 3° port. As the relative drift was about 3° port the bearing remained steady during the approach. TAS 165 kts.
- 2106.50. Target sighted in Leigh Light beam.
- 2107.00. Attack made.

It is interesting to see that the two A.S.V. bearing errors mentioned are in the same sense, suggesting that, with the assumed details, the A.S.V. cursor may have been aligned so that the Radar gave a bearing 2° less than the scanner direction.

Some of the Forms U-Bat which are received at

Headquarters, Coastal Command, give no clue as to the courses flown by the aircraft between the original contact and the time of the attack. As a test of the completeness of the Form U-Bat, the finished report should be read with a view to producing a scale diagram similar to that above. Few assumptions should remain to be made.

The Shape of Things to Come

On January 11, Wellington P/172 was patrolling on a course of 124° when at 2053 hours the Radar operator picked up a contact at a range of $3\frac{1}{2}$ to 4 miles bearing Green 30° . The captain checked target speed and when at 2057 hours contact bore Green 160° range 7 miles, turned to starboard on to course 308° . During this turn contact was lost but was regained intermittently at 7 miles down to $3\frac{1}{2}$ miles when it became steady. Height had now been lost to 200 feet and contact remained dead ahead with no change of course. The captain continued heading to 1 mile when the Leigh Light was switched on. Nothing was seen owing to haze, and the aircraft climbed on course 360° to 700 feet for approximately two minutes and then turned to port on to a course of 140° . Contact was regained at 5 miles bearing Green 25° , and the aircraft altered course 30° to starboard on to 170° , contact was now bearing Red 5° . Height was reduced to 150 feet at 3 miles and when range was 1 mile Leigh Light was switched on illuminating a Schnorkel bearing Red 5° , distant half a mile, in position $57^\circ 15' \text{ N.}$, $10^\circ 30' \text{ W.}$, course 220° , at 5 knots. Sighting was made first by the second pilot and then immediately afterwards by the captain and navigator. The Wellington attacked from Green 130° to Schnorkel's course, releasing from 150 feet six depth charges, set to shallow depth, spaced at 60 feet. The Schnorkel was visible at the time of the attack. The depth charges entered the water slightly ahead of the Schnorkel and the

rear gunner saw at least four explosions. Two hundred rounds of tracer were fired into the depth charge plumes. The Radar contact, which had been firm up to the time of attack, now disappeared and was not regained. The aircraft turned back to search the surface between the flame floats and two Mark II marine markers were dropped, but nothing was seen on account of smoke and haze. The aircraft remained in the area until midnight and then set course for base, having been recalled by Group.

Comment

The captain and crew are congratulated on an excellent performance. It is encouraging to note that a Schnorkel can be held on the ASV, while a speed check is made and that the aircraft can return to the spot after having failed to carry out an attack at the first attempt.

Had the sea been rougher it is felt that the chances of regaining contact might have been jeopardised by the alterations of course after the first run over. It is suggested that, after an abortive run, the aim should be to maintain the original attacking course to a range of about 5 miles beyond the target, and then to turn (a little over 180° in no wind conditions) so as to regain contact within a few degrees of dead ahead. In a strong wind it will be essential to have assistance from the navigator if the contact is to be regained.

A scale drawing based on this report appears on the opposite page.

II.—ANTI-SHIPING

SUMMARY OF ANTI-SHIPING OPERATIONS BY COASTAL COMMAND AIRCRAFT JANUARY, 1945

Weapons 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	12	—	12	—	—	—	—	—
R.P.	248	31	279	71	16	87	82	5
Bomb	53	—	53	6	—	6	6	—
Tsetse	13	1	14	1	—	1	—	—
Depth charge	37	—	37	19	16	35	35	1
Cannon and M/G only	180	35	215	—	—	—	—	—
TOTAL—DAY	543	67	610	97	32	129	123	6
NIGHT OPERATIONS								
Torpedo	5	—	5	1	—	1	—	1
R.P.	9	—	9	69	6	75	26	49
Bomb	189	9	198	—	—	—	—	—
Depth charge	1	—	1	—	—	—	—	—
TOTAL—NIGHT	204	9	213	70	6	76	26	50
ALL OPERATIONS								
Torpedo	17	—	17	1	—	1	—	1
R.P.	257	31	288	71	16	87	82	5
Bomb	242	9	251	69	6	75	26	49
Tsetse	13	1	14	6	—	6	6	—
Depth charge	38	—	38	1	—	1	—	—
Cannon and M/G only	180	35	215	19	16	35	35	1
GRAND TOTAL	747	76	823	167	38	205	149	56

Note.—The depth charges referred to above were carried on patrols directed against Midget U-Boats.

FINAL ASSESSMENTS FOR DECEMBER, 1944

Day :—

R.P.

1 T.T.A. damaged.

R.P. and Cannon

7 M/V.s (totalling 15,352 tons) sunk.

3 M/V.s (totalling 4,000 tons) seriously damaged.

5 M/V.s (totalling 15,695 tons) damaged.

Tsetse and Cannon

1 T.T.A. sunk.

2 M/V.s (totalling 3,600 tons) damaged.

1 Tug (200 tons) damaged.

1 T.T.A. damaged.

Night :—

Bombs

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

1 Tanker (8,000 tons) damaged.

2 M/V.s (totalling 3,000 tons) damaged.

1 E/V damaged.

RESULTS CLAIMED FOR JANUARY, 1945

(Subject to Assessment)

Day :—

R.P. and Cannon

2 M/V.s (totalling 6,038 tons) sunk.

1 Coaster (500 tons) sunk.

1 Yacht (70 tons) sunk.

2 M/V.s (totalling 5,765 tons) seriously damaged.

1 "M" Class M/S seriously damaged.

2 T.T.A.s seriously damaged.

1 M/V (3,000 tons) damaged.

1 M/V Hull (6,500 tons) damaged.

3 "M" Class M/S damaged.

3 T.T.A.s damaged.

1 Tug damaged.

2 Barges damaged.

R.P. and Tsetse

1 M/V (1,500 tons) damaged.

Night :—

Bombs

1 M/V (4,000 tons) seriously damaged.

1 M/V (3,000 tons) damaged.

3 Vessels damaged.

Shipping Strikes in January

On January 8, 12 **Beaufighters** of the **Dallachy Wing** attacked some small ships south of Bergen. (See plate 4.) A tug and a barge it was towing were attacked with R.P. and cannon and many strikes were scored on both vessels. In addition, a 600-ton merchant vessel was seriously damaged by R.P. and was left covered in smoke. All the **Beaufighters** returned safely to base and only two of them were slightly damaged.

The next day 17 **Mosquitos** of the **Banff Wing** sighted four merchant vessels and three auxiliaries off Leirvik. (See plate 5.) They attacked with R.P. and cannon and obtained over 40 R.P. hits on the "Claus Rickmers," a merchant vessel of 5,165 tons, leaving her on fire. Several hits were scored on a trawler-type auxiliary, which was also damaged.

About half an hour later **Beaufighters** of the **Dallachy Wing** attacked the "Sirius," a merchant vessel of 938 tons, in Fuglsæt Fjord. (See plate 4.) They scored about 40 hits with R.P. and the ship was left heeled over, afire, and with her decks awash. She is since reported to have sunk. All our aircraft returned safely from these two attacks.

Beaufighters of the **Dallachy Wing** again attacked enemy shipping on January 10. They sighted a trawler-type auxiliary north of Lepsoy

Island, and after attacking it, saw two explosions aboard. The vessel was left burning furiously. A little to the north was an "M" class mine-sweeper, which was also attacked with R.P. and cannon and left on fire. Two **Beaufighters** were missing from this operation. They both crashed, one into the sea and the other on the island.

During the night of January 13, **Halifax C/58**, on patrol in the Skagerrak, obtained a Radar contact about 15 miles away. On homing, the pilot sighted two merchant vessels of 3,000 tons, each, a few miles east of Kristiansand South. A bombing attack was made from 5,000 feet and a direct hit scored on one of the ships. Debris and sparks were thrown high into the air and the vessel was left enveloped in smoke.

On January 15 another attack on shipping off Leirvik was made by the **Banff Wing Mosquitos** (see plate 7). The "Claus Rickmers" already damaged earlier in the month was again hit with R/P and six pounder cannon. Another merchant vessel of 1,500 tons, and a trawler type auxiliary also received a number of hits with R/P and cannon shells, and both were left burning furiously. As the **Mosquitos** were breaking away from this attack they were intercepted by a force of nine F.W.190s. Five of our aircraft failed to return.

On January 17 the **North Coates Wing** made a gallant attack on enemy ships in the notoriously heavily defended anchorage at Den Helder. Thirty-two Beaufighters, half of which carried R.P. and the others cannon only, were escorted by two squadrons of Spitfires. They sighted the hull of a half completed merchant ship surrounded by four minesweepers and four trawler-type auxiliaries. An attack was made in the face of intense flak, and the merchant vessel hull, two minesweepers and one auxiliary were left in flames. (See plate 8.) Four Beaufighters were shot down by the devastating fire from shore batteries and escort vessels, and two others, which had probably been hit as well, collided over the target and crashed south of Den Helder. In addition, eleven other Beaufighters were damaged.

On January 25 16 Mosquitos of the **Banff Wing**

made an R.P. and cannon attack on a convoy of seven ships, stationary in Eidsfjord. (See plate 9.) Over 30 R.P. hits were obtained on a 5,100-ton merchant vessel, and several on another merchant vessel of 3,000 tons. A coaster of about 500 tons was also hit and, with the two merchant vessels, was left on fire. Reports have since been received which indicate that the larger merchant vessel and the coaster have sunk. All the Mosquitos returned safely, and only one of them sustained slight damage.

During the same evening, **Halifax C/502** sighted a 4,000-ton merchant vessel and an escort vessel off Kristiansund North. The Pilot attacked with 500-lb. M/C bombs from over 6,000 feet and scored three direct hits on the merchant vessel. This caused a fire and a great deal of smoke, the merchant vessel was last seen listing and low in the water.

III.—OTHER OPERATIONAL FLYING

Combats with Enemy Aircraft

On January 12 **Mosquito Q/333**, while on an anti-shipping reconnaissance off the Norwegian coast, sighted a Ju.52 north-west of Lister. The enemy aircraft was about 4 miles away when first sighted, so the Mosquito pilot jettisoned his drop tanks and increased speed to intercept. When about 600 yards astern of the Ju. he fired a short burst of cannon. These shots fell below the enemy, but the pilot opened fire again from 300 yards and, closing to 100 yards, saw strikes on the fuselage, starboard wing and engine of the Ju.52. The enemy aircraft crashed into the sea, where it broke up and burned fiercely.

A force of 21 **Beaufighters** from **Dallachy**, and 14 **Mosquitos** from **Banff** set out to attack enemy

shipping off the Norwegian coast on January 11. Before any shipping was located, however, the force was intercepted off Lister by about 10 single engined enemy fighters. The Beaufighter leader ordered his aircraft to take evasive action, while the faster and more manoeuvrable Mosquitos went in to the attack. (See plate 6.) Several combats ensued during which three Me.109s and one F.W.190 were destroyed. A Mosquito and a Beaufighter were shot down during this action, and also an A.S.R. Warwick which was last seen investigating the area where the Mosquito had crashed. **Mosquito R/235** put up a fine performance by shooting down two Me.109s, **X/143** also shot down a Me.109 and **T/248** destroyed a F.W.190.

Air/Sea Rescue

During the month of January 45 members of aircrew were rescued by the Air/Sea Rescue Service. Outstanding incidents were:—

(1) During the morning of January 1 Humber radio reported automatic S.O.S. signals on 500 k/cs. Thunderbolts from Boxted searched along the bearing and at 1156 hours sighted four dinghies containing six survivors, 120 miles east of Flamboro' Head. **Warwick U/280** scrambled from Beccles and dropped a Lindholme dinghy which was retrieved and boarded successfully. R.M.L. 515 sailed from Yarmouth to pick up the survivors. A Walrus joined in, but found the sea too rough for landing and two airborne lifeboats were dropped. The first, by **A/280**, was a failure, because the parachutes did not open and the boat was smashed when it hit the sea, but the second, by **B/280**, was a perfect drop, landing 30 yards downwind of the dinghies, and the survivors hauled themselves aboard by means of the rocket line.

Because of a deterioration in the weather at all the east coast aerodromes, **U/280** was diverted to land at Thorney Island. This made it necessary

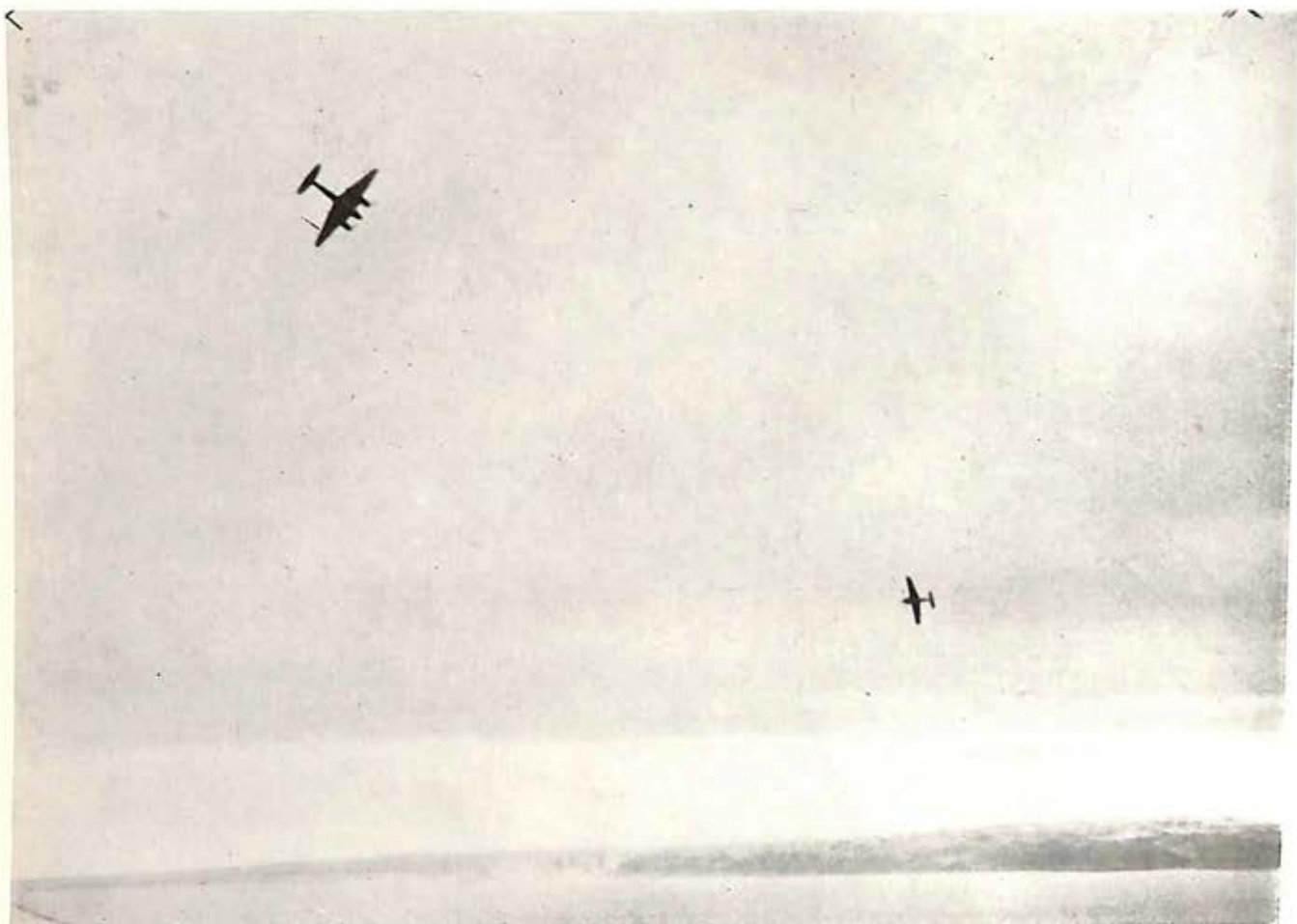
to go off patrol early and leave the lifeboat uncovered. The spot was well marked with flame floats and **T/280** found it without difficulty. The R.M.L. was getting near by this time and was guided to the lifeboat by flares and flame floats. At 1955 hours the survivors were taken aboard and safely landed at Yarmouth the next morning. They were from 603 Squadron, 398 Bomber Group, U.S.A.A.F.

(2) **Wellington N/18, O.T.U.**, Finningly, sent an S.O.S. during the night of January 27, and this was at once tied up with a faded broad I.F.F. track south-east of the Mull of Galloway. An Anson from Jurby was scrambled. Soon after a report came in that red flares had been seen two miles east of Maughold Head, Isle of Man. A seaplane tender was despatched from Ramsey and the Anson diverted to the spot. Less than half an hour after the flares were first reported, the Anson watched, by moonlight, the rescue of all



The top photograph shows a small vessel which was attacked and sunk by Beaufighter of the Dallachy Wing off Hisoy, in Norway, on January 9, 1945. She was the "Blauweiss," of some 70 tons. Reports since received state that she was being used by the Gestapo. The report also regretted that the occupants had survived.

The lower two photographs show the German "Claus Rickmers," 5,165 tons, in Leirvik harbour. Although the ship was not sunk, serious damage was inflicted and two trawler type auxiliaries were also damaged, one of them seriously. This ship was attacked by the Banff Wing on January 9, 1945 (see letterpress, p. 15).



These photographs were taken on January 11, during a series of combats that ensued when a mixed force of Mosquitos and Beaufighters encountered some 8 or 10 Me. 109's and F.W. 190's off Lister on the Norwegian coast. Three Me. 109's and 1 F.W. 190 were destroyed, and 1 F.W. 190 probably destroyed, and another damaged. Our losses were 1 Mosquito, and 1 Beaufighter and an Air/Sea Rescue Warwick. One of the F.W. 190's can be seen in the lower photograph with a large piece of its starboard wing shot away (*see letterpress, p. 16*).



six members of the Wellington's crew from their dinghy.

(3) **Beaufighter J/144** was outward bound on a strike on January 29 when the starboard engine cut and course was set back to base. After carrying out S.O.S. procedure and obtaining two fixes the captain decided to make for Sumburgh.

Attempting to land there, the aircraft overshot and, fearing he might hit the aerodrome buildings, the pilot ditched a mile off shore. An Anson

dropped a Lindholme dinghy which landed upside down but the crew climbed on to it. Two H.S.L.s and an R.M.L. were told to proceed to the dinghy but in the meantime there was plenty of activity on the aerodrome; the medical officer and two of his orderlies raced down to the shore where they met three crofters and an airman on leave who had prepared a rowing boat. They set off, rescued the Beaufighter crew in half an hour in spite of rough seas and returned to Sumburgh. The crew were admitted to sick quarters suffering from exposure and abrasions.

Photographic Reconnaissance

The main photographic reconnaissance effort was concentrated in the first half of the month, when weather conditions were more suitable. Most of the work was confined to assessing the effect of the bombing policy to disrupt enemy rail communications to the Western Front. Following the attack system of the bombing forces the hitherto strategical reconnaissance squadrons became almost tactical in their photography of rail targets close to the front line.

At the conclusion of this tactical phase 106 Group returned to their normal strategical function, namely the provision of intelligence on rail, oil and other industrial targets. Norwegian ports and anchorages have received fairly frequent reconnaissance, but German ports have not been covered very much.

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

540 Squadron, Mosquito

We were airborne at 1105 hours for reconnaissance of the railway and marshalling yards between Osnabrück and Hamburg. We entered the continent at 30,000 feet over the Hague. Trails had begun about 23,000 feet so it was decided to continue climbing and try to get above them. The whole of the railway from Osnabrück to just south of Hamburg was covered by low stratus cloud, so course was set direct for an oil target at Harburg, to the south-west of Hamburg.

We increased height to 37,000 feet, making a run across the oil target from north-west to south-east, at the same time we were still in light but fairly persistent trails. Half-way across the run about 10 bursts of heavy and most accurate flak were met, so a turn was made to port, away from the target area. It was then decided to make one more run to cover the marshalling yards of Hamburg. This was made from west to east. The observer directed the aircraft on to its run and then returned to his seat. When directly over the target a loud bang was heard and the aircraft shook violently. A hole was seen in the perspex of the bomber panel and the observer hit in the stomach, presumably by the same piece of flak. The splinter penetrated his harness and his flying suit, and came to rest against the skin of his stomach, which was merely bruised. To attack the target we had dived from 37,000 feet to 35,000 feet and had a true airspeed of well over 400 m.p.h. We continued to dive away to port apart from the shock it received did not seem to be badly damaged.

Course was set to the north for the coast. When about 20 miles to the north-west of Hamburg a single engine jet was seen climbing from the port quarter. It continued its climb into sun on a large sweeping curve and then turned on to our tail at a range of two to three miles. The aircraft was put into a dive and revs. increased to 3,000, the throttle being pushed through the

gate. The jet held on our tail for about three minutes, but did not close to attack. We presumed it was short of fuel. By this time we were at 26,000 feet and off the coast near Bremerhaven. The aircraft was very cold, but still flying well. Revs. and boost were reduced to 2,650 + 6 lbs. and course set for Coltishall. V.H.F. contact was made with Coltishall at 1400 hours, and we landed at base at 1435 hours without further incident.

When the aircraft was examined it was discovered that the bomb aimer's panel was shattered, the starboard aileron was holed, and that there were one or two small holes in the fuselage.

541 Squadron, Spitfire

On January 6 I was briefed for complete cover of Berlin, Hanover and targets near Hanover. I took off from base at 1040 hours and flew at 1,000 feet under a front to the east coast, then climbed through heavy persistent condensation trails to 38,000 feet. At this height I was still leaving some persistent trail about 300 yards long. My tachometer was fluctuating badly between 2,500 and 3,000 revs., but since there was no variation of engine traction I continued. I flew over 10/10 cloud to see my first land on the outskirts of Magdeburg, continued on to Berlin, but since it was completely covered and no chance of improvement for some time, I flew south to Leipzig. By this time I was almost continually iced up inside the cockpit, but I managed to clear enough small patches on the hood to navigate after five runs over Leipzig at 38,000 feet. I saw two trails coming in from the south-east at about 39,000 feet, so I turned north and finished my coverage on the sixth run at full boost and revs. Three minutes later I saw the other aircraft break away to the south-west. I returned to normal cruising and returned to Berlin but found it still in 10/10 cloud so I set course for Halle which was on the edge of the cloud. My tachometer now was completely u/s and reading zero, therefore I flew on boost. I did one run over Halle east to west and set course for home at 1320 hours.

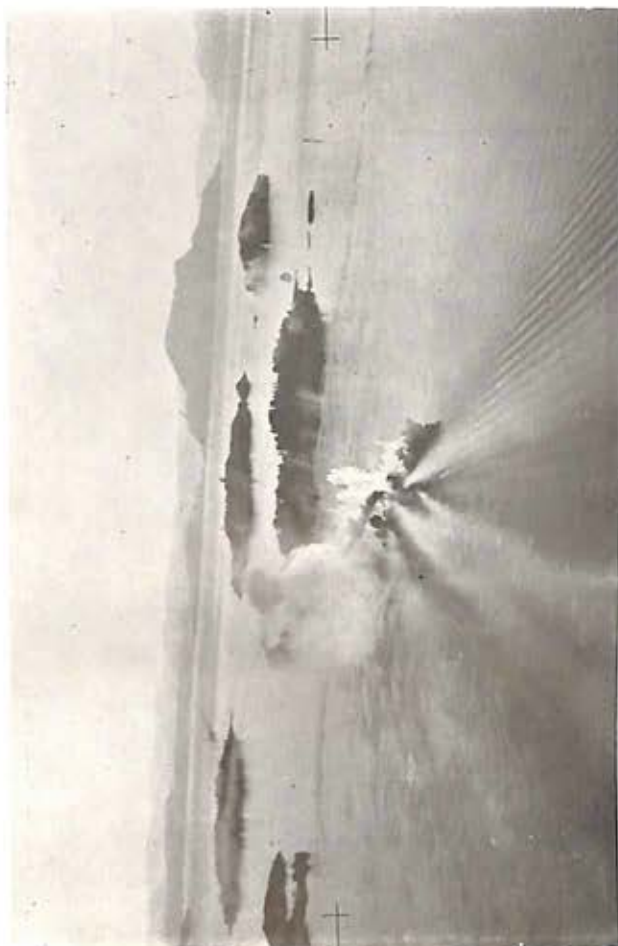
At about 1350 hours near Hanover the engine began to run very roughly, due to port magneto failing, and much heavy black oil was expelled from both exhausts and compressor cowling. I set course towards the south so as to be in our own territory in case of complete failure.

When I estimated myself over the Belgium coast near Zeebrugge I set course for Bradwell. At 1435 hours my glycol temperature dropped from 105° C. to 80° C., oil temperature to 65° C. from 80° C. and oil pressure to 55 lbs. from 70 lbs. The cabin heat failed too, going down to 0° C. from +25° C. At this point I called Bradwell and got a fix "50 miles Bradwell 240° M." I flew on this for five minutes and then turned west to put me over land near Ipswich. By this time the hood was almost completely covered by oil and there was 10/10 cloud under me. I heard other aircraft being diverted from Bradwell so called for, and obtained a diversion and vector to Manston. I continued in R.T. touch with Manston on courses 240-250°, but at 1450 hours the oil pressure had fallen to 25 lbs.

Shortly afterwards at 25,000 feet my engine over-reved so I pulled throttle and pitch right back and turned off ignition and petrol. The

engine was smoking so much I could not see my wing tips, the windscreen and hood was covered with oil and I was iced up inside. As there was 10/10 cloud under me I prepared to bale out. After approximately one minute of overrunning, the engine seized at 20,000 feet. I continued homing on Manston but asked for a fix and an aerodrome within 10 miles of my position. At 6,000 feet I was still in cloud, but at about 5,000 feet I came under the haze and saw the ground, so I strapped myself in again, called Manston, and told them I was force landing. I landed at 1510 hours in the grenade practice field of an army camp. Landing was not particularly heavy but my subsequent run was extremely rough due to old ploughing ridges running at right angles to my landing. In the last five yards I hit a post with my starboard wing and it was snapped off at the root. The port wing was also pushed in from the bottom by a slit trench embankment. There was no other extensive damage. The engine was still smoking half an hour afterwards.

I then rang base and took my magazines, which were undamaged, to the nearest airport where there was a Master aircraft waiting for me. I landed at base at 1700 hours.



A follow-up attack on the damaged "Claus Rickmers" at Leirvik was made by the Banif Mosquitos on January 15. In addition to scoring further damage on this ship, a trawler type auxiliary was heavily attacked and sunk, and a vessel of 1,000 tons damaged. The above photographs show the attack on the T.T.A. (see letterpress, p. 15).



On January 17, the hull of a "Hanso" ship of about 6,500 tons which was en route from the building yards in Rotterdam to Germany, was attacked with its escorts in the Marsdiep anchorage off Den Helder. The North Coates Wing, using R.P. and cannon, damaged the hull, sank a patrol vessel and damaged two more patrol vessels as well as three "M" Class minesweepers. In the top photograph two of the minesweepers can be seen. The hull, which is part of the German emergency shipbuilding programme is seen in the lower photographs (see letterpress, p. 16).

IV. SPECIALIST AND GENERAL ARTICLES

Training in 1944

A year ago in a Review of Training during 1943, the emphasis was naturally on the quantity of training done in the O.T.U.s, for in that year No. 17 Group reached its peak output in providing replacement crews for home and overseas squadrons.

In a review of 1944, the emphasis changes in two ways; the O.T.U.s continued to play their part in providing new crews for home squadrons, but smaller overseas commitments enabled them to pay more attention to quality and less to quantity. The importance of squadron training also increased, because of the amount of new equipment which was introduced and the importance of the tasks which had to be undertaken during the year.

No. 17 Group, with a smaller number of O.T.U.s to control, was thus able to concentrate on improving the standard of training. The Air Ministry helped this improvement by allowing more flying in the O.T.U. courses. Everyone connected with training in Coastal Command during the past four years knows that at one time it was an apparently immutable rule that an O.T.U. course should give 72 hours flying to every crew trained. How this figure was calculated is lost in the obscurity of 1940. By 1944 it had become clear, even to those in authority, that this was inadequate. Furthermore, in 1944, it became possible to provide additional aircraft, equipment and maintenance staff to give a longer course. Now, with certain exceptions, the standard O.T.U. course provides 87 hours flying per crew. Thus much more time can be spent on instruction in Radar and other important devices than was ever possible before.

In retrospect, it will be generally agreed that the O.T.U.s have done their job well in 1944, and have taken the opportunity provided by the additional flying to concentrate on the training of highly qualified crews. There is no complacency in this statement, for the O.T.U.s are the first to admit that their product can still be improved. Even now the limited time at their disposal is only barely sufficient to bring crews up to scratch.

Another factor instrumental in improving the standard of training has been the closer liaison established between squadrons and the O.T.U.s training their replacement crews. This liaison has long been the object of Command training policy, but it is only recently that squadrons and O.T.U.s have succeeded in establishing it. The more squadron commanders and leaders in squadrons visit the O.T.U.s training their replacement crews, and the more that section commanders of O.T.U.s visit the squadron for whom they are training crews, the better will be the crews leaving the O.T.U.

The achievements of the O.T.U.s, important

as they are, have been rather overshadowed by the tremendous training drive carried out in the operational squadrons. No less than twenty-eight changes of role or re-equipment with new types of aircraft took place during 1944. In each case the necessary training was done within the squadron without assistance from outside, and in many cases whilst continuing to operate offensively. In addition, squadrons have had to give training to crews in the various new items of equipment such as Loran, which have been added to their aircraft.

The training involved in converting a squadron from one role to another or from one Mark of A.S.V. to another is very often much greater than the training required to convert a squadron from one type of aircraft to another. In the latter case it may only be necessary to convert the pilot and teach a new crew drill to the crew, whereas in the former, a considerable amount of training may have to be given to all members of the crew. The majority of the twenty-eight conversions mentioned above were in fact changes of role, such as a Liberator squadron whose work had been day convoy cover, converting to night Leigh Light operations. As the year wore on, there were increasing numbers of this type of conversion, and the facilities peculiar to this training became more and more crowded. Nevertheless by careful co-operation the job was done.

Conversions of squadrons from one type of aircraft to another were not quite so common and not so difficult. Mosquito fighter squadrons first appeared in the Command in 1944, and in the course of the year three squadrons converted from Beaufighters to Mosquitos without much trouble. In the autumn the first Warwick Leigh Light aircraft made its appearance, but again the conversions to this from Wellingtons did not raise any new problems.

This year also saw a change of heart among squadron commanders. No longer was it necessary for the Command and Groups to order reluctant squadron commanders to do more training. Instead, it was squadron commanders who asked for more and more time in which to train. The realisation of the need for more and more training was brought about by the intensive period of training before the invasion of Europe. For two months the operational effort of the squadrons was severely curtailed and the flying devoted to training. The more training they did, the more squadrons asked for, because their shortcomings were shown up by the extra training.

The seeds sown by this training in April and May bore fruit in the operations in June and July. All crews in squadrons were at the peak of their efficiency and were able to press home their attacks against the enemy with a great success.

In the autumn, first the introduction and then the improvement of schnörkel in U-Boats made it necessary to achieve an even higher degree of efficiency in anti U-Boat squadrons. Additional submarines were lent and special schnörkel buoys were provided by the Admiralty in an endeavour to ensure that all the necessary facilities for the special training were available. A temporary lull in the U-Boat war enabled the anti U-Boat squadrons to undertake a second intensive training drive. What the results of this will be is not yet known.

In such ways, by the number of new types of equipment and the altered tactics of the enemy, did anti U-Boat squadron crews have to achieve a mounting standard of efficiency against the enemy.

With the anti-shipping squadrons the story was slightly different. Although efficiency was a necessary aim in all squadrons, the standard achieved and the standard which was to be achieved did not alter to quite the same extent as in the anti U-Boat squadrons. Nevertheless these squadrons also did intensive training before D-day, which in turn provided results which could not have been achieved in any other way.

In the autumn of the year it became evident that there would be targets on a larger scale than before, and, therefore, the amount of operational flying done in the squadrons was increased. This in turn created a training

problem, but in this case it was quantity and not quality that caused the difficulty. The squadrons found that the higher incidence of tour expiry reduced their strength of crews, and it became necessary to make additional training arrangements. At the very end of the year Air Ministry approval was given to the establishment of a training unit to train more crews for the squadrons. The Beaufighter training was left at East Fortune. But the shortage of Mosquito duals in the Air Force made it necessary to concentrate all Mosquito training at one Unit, and accordingly at the end of the year arrangements were in hand to centralise all Mosquito training for P.R. and G.R. crews at No. 8 O.T.U. at Haverfordwest.

It can never be possible to say that training is completely satisfactory. In war-time it is always necessary to balance up the amount of flying time which can be devoted to training against the amount of flying time which must be devoted to operations. This balance can never be entirely satisfactory to either. Within the limits of the time available, all those concerned with training can feel some cause for satisfaction. The operational results show in cold figures what has been achieved against the enemy by operational training, and the Accident Returns show in similar figures what has been achieved in flying training. While both show that improvement occurred in 1944, both leave further room for improvement in 1945.

The Sinking of "Seehund 312"

The following is an account given by a prisoner of war of the patrol and sinking on January 5, 1945, of a "Seehund"; details are not necessarily accurate and do not represent a considered British view of the story.

The "Seehund" is a two-man midget U-Boat and is believed to have the following general characteristics:—

- (a) Length: about 38 feet.
- (b) Armament: two torpedoes.
- (c) Propulsion: both diesel and electric.
- (d) Endurance: 3 to 5 days.

Seehund 312 left the lock at IJmuiden at about 1730 hours on January 1. She proceeded at full speed, about 8 knots, close inshore as far as the Hook of Holland and thence 242° to two narrow banks from which it was hoped to fix position. The two banks were reached at 0800 hours on January 2 and course was altered to Quinte Bank. Half an hour later, while still on the surface, three light warships, probably M.G.B.s, were sighted approaching from dead ahead. The *Seehund* submerged and altered course. An hour later she surfaced and made for Quinte Bank.

At 1030 hours the *Seehund* submerged again, lay on the bottom from time to time and proceeded on approximate course 180°. The coxswain made allowance for underwater currents but the *Seehund* was nevertheless taken off her course further into the Scheldt.

Just after dark a red light was sighted astern and proved to be that of a large merchant ship outward bound from Antwerp. The coxswain tried to turn but, owing to the large turning circle, found he was too late to attack. He was attempt-

ing to follow the ship when a destroyer, apparently stationary, was sighted about 100 metres ahead. The coxswain realized that he must have been sighted and fired a torpedo, regardless of the fact that the destroyer was far too close. The destroyer immediately opened fire. The *Seehund* submerged to 8 metres, the greatest depth the water would allow, and zigzagged at full speed (4 to 5 knots) on a mean course of 240°. The hunt lasted about 30 minutes, with the destroyer dropping some kind of light charge from time to time. When the destroyer could no longer be heard the coxswain bottomed his *Seehund* and relaxed for an hour. The next morning when the *Seehund* surfaced the coxswain sighted some M.G.B.s and decided to submerge. He remained in the area until the evening and then made for Quinte Bank again where he fixed his position by the buoy and bottomed. The next day, as the sea was very rough, the coxswain decided that it was quite safe to proceed on the surface and made for a point about a mile off Ostend. Here he submerged and moved gradually towards Blankenberghe. In the afternoon, deciding that the sea was again

too rough, the coxswain thought he had better make for home via Quinte Bank.

At about 1500 hours he sighted a few light warships together with at least one merchant ship inbound. He got ready for an attack although his Seehund was in a sorry condition and water was entering at some point. It was not easy to dive as the stern connection of the bilge pump seemed to be blocked. In order to pump out the bilges the coxswain had to trim down forward and use the forward pump, but the forward connection ceased to work. Regardless of these difficulties the coxswain attacked the merchant ship at a range of 1,000 metres. He did not aim very accurately and heard no explosion. The Seehund submerged at full speed and course was set for Quinte Bank. On the way unsuccessful attempts were made to repair the pumps, but water continued to enter. It was now discovered that the leak lay in the air intake valve. Water was up to the coxswain's calves. From time to time he surfaced and towards evening sighted what was probably the buoy on Quinte Bank.

At about midnight, thinking that he was too close to the convoy route, the coxswain decided to get out of the area. He hoped to charge his

seriously depleted batteries on the surface, but owing to a fault in the fuel supply the diesel failed. It was repaired but only worked for half an hour; the diesel was dependent on air from inside the boat and pressure dropped to 400 millibars below atmospheric. For half an hour it was impossible to open the hatch, but the coxswain at last managed to let in a little air and equalize the pressure. Conditions inside the Seehund were indeed appalling, but the coxswain, thinking that he was now off Schouwen, felt fairly safe. The batteries were empty and the Seehund drifted. More water entered until it again reached the top of his calves, but land was in sight approximately eight miles away and three tall chimneys were seen which the coxswain felt must be Hellevootsluis. At this moment a line of Allied patrol vessels was sighted and as the water was practically up to the hatch the coxswain decided it was time to be rescued. He fired Very lights and climbed up on to the superstructure, closing the hatch immediately to prevent the Seehund sinking with the engineer. Fortunately for the latter no more water entered and the engineer abandoned ship, bringing with him the rubber dinghy. Explosive charges had been set and the Seehund sank. The coxswain and the engineer were both picked up.

Sharks

The following article has been received from a member of the R.A.A.F. See also Shark sense Coastal Command Review, Vol. III, No. 8.

A great deal has been written about sharks and extreme views are being expressed by two schools. One maintains that man has nothing to fear from sharks. In fact, the shark is such a timid and sulking creature that a harsh word or a smart slap will send him on his way with fear and terror in his heart. The other, however, maintain that so ferocious and deadly is the shark that man is almost his only prey. As in most arguments, truth is found in the balance of the two extremes. If forced to ditch in tropical waters, it is advisable to have some idea of the relative danger from sharks.

There are some 80 different kinds of sharks in southern waters. This sounds a great many but less than a third of the species is harmful to man. The vast majority are small and relatively insignificant creatures which feed on fishes, crabs and other such animals. The species most dangerous to man are the Mako, Tiger, Hammerhead, White, Grey Nurse, Ground and Blue Shark.

Between the years 1803 and 1940, there have been approximately 216 well-authenticated shark attacks and tragedies around the Australian coast, yet there are many people who say that sharks do not attack human beings. Unfortunately, cases of sharks attacking human beings in Australia are only too numerous, scarcely a year passing without reports of serious attacks.

Habit of Sharks

Some sharks live and feed at considerable depths and most of them feed on the ocean bottom. Hungry sharks sometimes will follow fish up to the surface and into shallow waters along the shore. When a shark explores such waters he is more likely to be dangerous.

Sharks seem to feed most actively during the night and particularly at dusk and dawn. After dark, they show an increased tendency to move toward the surface and into shore waters.

A shark's natural food generally consists of a wide variety of small marine animals such as fish, squids, crabs and shellfish. A shark prefers food which is fairly easy to get and especially goes after stragglers from schools of fish and after prey which has been wounded or helpless. He will follow a ship and eat garbage thrown overboard.

A shark first finds food by smelling it. Such things as garbage, body wastes, and blood probably stimulate him to explore for food. A shark is attracted by weak fluttery movements and is repelled by strong, regular movements and certain loud, strange noises. There is a popular superstition that sharks are blind. This is incorrect.

Fishermen have observed that a shark will swim under and around schools of fish. The schools are indicated by many fine surface ripples, by fish breaking the surface and by flights of feeding ocean birds. When a gamefish is hooked, it is often attacked vigorously by a shark. Wherever fish are being caught, sharks are likely to be found.

Although a shark will investigate any large floating object, it will not attack a man unless he is hungry. Often the shark will swim away after investigating. At other times he may approach and circle the object once or twice, or he may swim close and nudge the object with his snout.

When swimming, a shark cannot stop suddenly or turn quickly in a tight circle. A good swimmer can avoid a single large shark by evasive action.

A shark rarely jumps out of the water to take food, but, he may seize his prey near the surface. For this reason, men on rafts are relatively safe unless they dangle their hands, arms, feet or legs in the water.

Sharks in schools sometimes jump clear of the water and fall back with a splash. Such action possibly involve play or courtship; it does not mean that the sharks are feeding, hungry or vicious. There is no need to be alarmed by jumping sharks.

Protective Measures Against Sharks

In the Water

- (1) Keep a sharp look-out for sharks.
- (2) Keep your clothing and shoes on.
- (3) If in a group threatened or attacked by a shark, bunch together and form a tight circle. Face outward so you can see an approaching shark. If the sea is rough, tie yourselves together. Ward off attack by kicking or stiff-arming the shark.
- (4) Stay as quiet as possible. Float to save energy. If necessary to swim, use strong regular strokes. Do not make frantic irregular movements. When swimming alone stay away from schools of fish.
- (5) If a single shark threatens at close range :—
 - (a) Use strong regular swimming movements. Try feinting toward the shark—he may be scared away.
 - (b) Don't swim away directly in the shark's path. Face the shark and swim quickly to one side.
 - (c) Kick or stiff-arm a shark to push him away, or grasp a side fin and swim with shark until you can veer away from it.
 - (d) Make loud sounds by slapping the surface of the water with cupped hands. Always use regular strokes.

- (e) Use a knife at close quarters in a show-down.
- (f) Use the shark repellent sparingly. Save it especially for use in water at night.

On a Raft

- (1) Don't fish from raft when sharks are nearby. Abandon hooked fish if a shark approaches. Don't clean fish into water when sharks are sighted.
- (2) Don't throw waste overboard if sharks are around.
- (3) Don't dangle hands or feet in water, especially when fishing.
- (4) If a shark threatens to attack or to damage the raft, discourage him by jabbing his snout or gills with an oar, but be careful not to break the oar, and don't take round-house swings that may upset you.
- (5) Fire a pistol above a shark—it will probably frighten him away.
- (6) Look for sharks around and under the raft before going into water or landing.

First Aid for Shark Victims

- (1) The first and most important measure is to stop bleeding quickly. Help the victim into a raft or ashore as soon as possible. Stop bleeding and treat for shock, by giving morphia and fluids and by keeping victim warm and lying down.
- (2) If in the water in a group, form a circle around the victim and stop bleeding by using a tourniquet improvised from an article of clothing.

Conclusion

There is no doubt that sharks, on occasions, do attack human beings, but the chances of encountering dangerous species are not great. If the protective measures given in this article are put into practice the probability is that even a dangerous shark will not attack.

Aids to Schnorkel Sightings

The change from a 200-foot U-Boat ploughing through the sea producing a large wake to a few feet of metal moving slowly through the sea may have caused the average lookout to develop rather a pessimistic attitude towards his job.

Operational Sighting Ranges

An interesting comparison can be drawn between the range of pick-up of surfaced U-Boats, Schnorkel, periscopes and dinghies.

Comparison of Sighting Ranges of Surfaced U-Boats, Schnorkel, Periscopes and Dinghies

	Av. range (n.m.)		
Surfaced U-Boats	5.6
U-Boat periscopes (all)	2.0
(with wake)	2.6
(no wake)	0.8
"J" type dinghies	1.6
Schnorkels (all)	4.0
(with vapour)	5.6
(with wake)	4.5
(no wake or vapour)	0.9

These operational results show that while the visual range on Schnorkel and periscopes which show no vapour or wake is very small (similar to that obtained on Schnorkel trials), in practice Schnorkels do produce vapour and wake to an extent which on occasions considerably increases the range at which they can be detected. There have been two sightings at approximately 20 miles of Schnorkel vapour.

The lookout searching for a stationary Schnorkel which is not "smoking" has as difficult a task as the A.S.R. lookout searching for a dinghy.

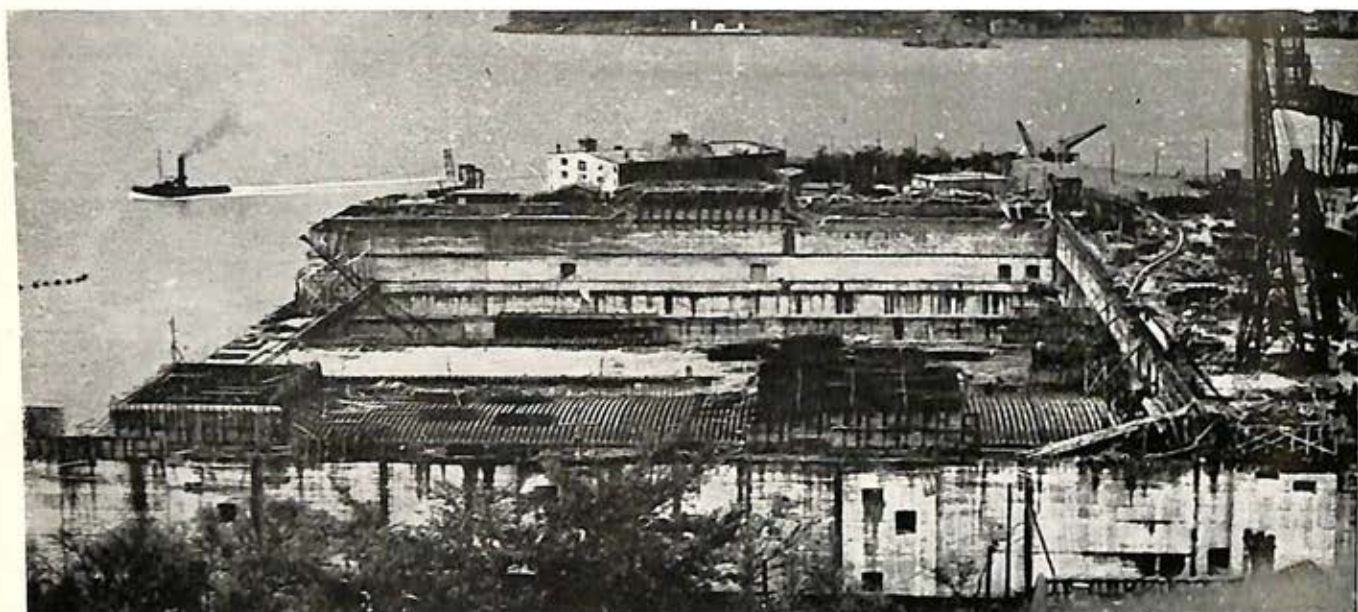
Sightings by Aircraft fitted with Radar

The importance of visual lookouts in searching for Schnorkel by day is shown below :—

Sightings of	By			Per cent.
	Radar.	Eye.	Radar.	
Periscopes and Schnorkel	13	33	28	
Surfaced U-Boats ..	49	56	47	



On January 25, a very successful attack was made by the Rait Wing on shipping at anchor in Fjrdstord near Askvoll. Using R.P. and cannon they sank the "Hse Fritzen," 5,099 tons, and the "Bierghinn," 690 tons, besides damaging another ship of 3,000 tons. The "Hse Fritzen" can be distinguished by her goal post masts. (see letterpress, p. 16).



From time to time photographs from ground sources in Norway are received. The photographs on this page, taken at various times in the past few months show :—top, the U-Boat shelters under construction in the Laksevaag at Bergen.

Middle :—A " Narvik " Class destroyer off Tromsø.

Bottom :—The U-Boat shelters at the Laderhammeren Basin in Trondheim.

It can be seen that the relative efficiency of Radar by day has diminished, hence the importance of visual lookout improvement has increased.

The Value of Binoculars

It would be expected that for such small objects the relative advantage of binoculars would be greater than for surfaced U-Boats. This expectation is borne out by the following table of operational results:—

Visual Pick-up Ranges With and Without Binoculars

Periscopes. Schnorkel U-Boats.

Average binocular range (nautical miles).	5.1	6.5	9
Average naked eye range.	1.7	3.5	6
Binocular range } ..	3	2	1½
Naked eye range }			

Periscopes are seen three times and Schnorkels twice as far away with binoculars as with the naked eye. The relative advantage of binoculars is severely limited by the meteorological visibility; for this reason it has in the past been recommended that they should not be used when the visibility is less than 10 miles. For these small objects this should be changed to 5.

Use of Binoculars

The following table shows, however, that very few U-Boats—surfaced or Schnorkelling—are in fact either first sighted or even recognised by the use of binoculars. (By binocular recognition is meant the use of binoculars to identify the vague phenomena: wakes, "smoke," odd-looking waves, etc., which are usually first seen.)

Periscopes. Schnorkels. U-Boats.

Binocular sightings	2(6%)	3(18%)	5(3%)
Binocular recognition	5(17%)	7(39%)	30(16%)
Out of a Total	30	17	190

In particular, it is of interest to see how many radar contacts are first identified by binoculars, since here a rough bearing and exact range are available which should make binocular search very simple. The following table shows these facts:—

Use of Binoculars when Homing

Periscopes. Schnorkels. U-Boats.

Total radar contacts	8	5	53
Binoculars used	2	1	9
Per cent. of occasions when binoculars used.	25%	20%	17%

It is fully understood that binoculars are difficult to use in aircraft, but if one crew or squadron can overcome the difficulties, all squadrons can do the same. The problem of the weight of binoculars will be overcome by the introduction of the new Holder for Binoculars, Mark I, Stores reference No. 6E/391. These holders will shortly be available and lectures will be given to all aircrew on their value and use.

There are often complaints about the quality of binoculars now issued to aircrews. If in fact they have become seriously out of adjustment or damaged, they should be returned to stores and a new pair taken out.

The 7 × 50 binocular is the best available in this country, and if all crews really got down to taking the trouble of using them and using them correctly, they would find them excellent for the job, and they would get the results that others have obtained.

Do not forget that if you use binoculars for scanning you will double your chances of sighting a Schnorkel, and your extra effort may have a considerable effect on the new and critical phase of the anti U-Boat situation in Home waters.

Anti-Glare Glasses

There is one other point worth mentioning. Have lookouts taken the trouble to provide themselves with proper anti-glare glasses or goggles (Stores reference, 22C/961, 22C/1072 and 22C/1039.) Have a look at these and pick out the ones which suit you best. They will make a considerable difference if you are searching up or near the sun's path, both by increasing your efficiency and decreasing fatigue.

Summing Up

(1) In searching for Schnorkel by day, visual lookouts are of even greater importance than when searching for surfaced U-Boats.

(2) That due to the production of vapour and wake Schnorkel can be seen at considerable distance.

(3) That binoculars and anti-glare glasses are not used as much as they could be, and the difficulties which have been overcome by some can be overcome by all.

(4) That a critical stage has once more arisen in the anti U-Boat war and every effort must be made by crews to search out and sink the Schnorkel-fitted U-Boats.