

COPY No. 353

This book is invariably to be kept locked up when not in use and is not to be taken outside the ship or establishment for which it is issued without the express permission of the Commanding Officer.

BR 1736 (20)
C.B. 3081 (20)

BATTLE SUMMARY No. 27

NAVAL AIRCRAFT ATTACK ON THE "TIRPITZ"
(OPERATION "TUNGSTEN")

3rd April, 1944

1945

CONFIDENTIAL

This book is the property of His Majesty's Government.

It is intended for the use of Officers generally, and may in certain cases be communicated to persons in His Majesty's Service below the rank of Commissioned Officer who may require to be acquainted with its contents in the course of their duties. The Officers exercising this power will be held responsible that such information is imparted with due caution and reserve.

Sea Power Centre - Australia



R01946

CONFIDENTIAL

*Attention is called to the penalties attaching to any infraction of the
Official Secrets Acts.*

BR 1736 (20)
C.B. 3081 (20)

BATTLE SUMMARY No. 27

NAVAL AIRCRAFT ATTACK ON THE "TIRPITZ"

(OPERATION "TUNGSTEN")

3rd April, 1944

TACTICAL, TORPEDO AND STAFF DUTIES DIVISION
(HISTORICAL SECTION),
NAVAL STAFF,
ADMIRALTY, S.W.1.

(T.S.D. 759/44. November, 1944.)

Amend No. 1. P. 81/48. J. B. Clerk 3. 6. 48

[Handwritten signature]

OFFICE (25)

BATTLE SUMMARY No. 27

NAVY AND ARMY OFFICE OF THE SECRETARY
(COMMUNICATIONS SECTION)

1948

(1948)

BATTLE SUMMARY No. 27

NAVAL AIRCRAFT ATTACK ON THE "TIRPITZ"

(OPERATION "TUNGSTEN")

3rd APRIL, 1944

CONTENTS

<i>Section</i>	<i>Page</i>
1. Introduction	1
2. Plan and preparations	1
3. Passage from Scapa	3
4. Departure of First Strike	5
5. First Strike	6
6. Second Strike	7
7. Return to Scapa	8
8. Lessons and comments	9
9. Conclusion	10
Appendices	
A. H.M. Ships taking part, with C.O.s	12
B. Aircraft taking part; Particulars	14
B (1). Aircraft taking part; Nominal List of Crews	14
C. Bombing attacks; Tactical details	18
C (1). Bombing attacks; Air Crews' Report	20
C (2). Operation "Tungsten" Aircraft losses	22
D. Bombing attacks; Analysis of hits claimed	23
E. Flying Programme	24
E (1). Analysis: Fleet Carriers' Flying Programme	25
F. Principal German Air Bases affecting Operation	25
Index	26

Plans

- | | | |
|--|---|-------|
| <ol style="list-style-type: none"> 1. Scapa to Spitzbergen: Assembly of Forces 2. Alten Fiord and Approaches 3. Kaa Fiord, showing Berths and Defences 4. Diagram showing Admiralty Assessment of Hits | } | A end |
|--|---|-------|

Abbreviations

A/A	..	Anti-aircraft.
A.P.	..	Armour Piercing.
A/S	..	Anti-submarine.
HA/LA.	..	High Angle or Low Angle (Guns).
M.C.	..	Medium-cased (Bombs).
R/T	..	Radio Telephony.
S.A.P.	..	Semi-armour-piercing (Bombs).
T.A.G.	..	Telegraphist Air Gunner.
T.B.R.	..	Torpedo Bomber Reconnaissance.
T/B	..	Torpedo Bomber.

SOURCES

1. M.056731/44. C.-in-C., Home Fleet, Operation "Tungsten," dated 20th April, 1944.

Enclosure. (1) Vice-Admiral, Second-in-Command, Home Fleet, No. 2nd B.S. 128/026, of 10th April, 1944, Report on Operation "Tungsten."

Appendices

 - I. Ships taking part in Operation "Tungsten" and names of Flag and Commanding Officers.
 - II. Bombing Tactics Employed and Results of Attack.
 - III. Intelligence Material Supplied.
 - IV. Analysis of Flying Programme for Fleet Carriers.
 - V. Communications, Fighter Direction and Radar.
 - VI. Copy of Operation Orders.

Enclosures

 - (1) *Victorious'* report, No. 0137/6206, of 5th April, 1944, with enclosures and appendices.
 - (2) *Furious'* report, No. 02524Z.4, of 5th April, 1944, with enclosures and appendices.
 - (3) Rear-Admiral Escort Carriers Report, E.C., No. 0675/4, of 7th April, 1944, with enclosures.

Enclosure. (2) Home Fleet Signals 262341/March, 011121/April and 031800/April, 1944.
2. M.056600/44. Operation "Tungsten": Assessment of Damage.
3. A.W.D.828 and 844/44. Examination of Bomb Damage.

BATTLE SUMMARY No. 27

NAVAL AIRCRAFT ATTACK ON THE "TIRPITZ" (OPERATION "TUNGSTEN")

3rd APRIL, 1944

1. Introduction

Monday, 3rd April, 1944, was a red letter day for the Naval Air Arm. On that day powerful forces of Bombers and Fighters attacked the German battleship *Admiral Von Tirpitz*¹ in her strongly defended anchorage at Kaa Fiord, Norway, mauled her severely and returned to their carriers, having lost but three of their number.

The *Tirpitz* had been damaged by midget submarines the previous September (1943), and since then had not moved from Kaa Fiord, but it was believed that temporary repairs had been effected by March, and though she was probably not 100 per cent. fit for operations, she constituted a potential threat to the North Russian convoys. It was therefore "highly desirable to put her out of action again,"² and plans were put in hand for an attack by carrier borne aircraft.

Her berth was known to be strongly defended by nets, A/A guns, flak ships and smoke generating apparatus. In addition, five *Narvik*³ class destroyers were stationed at Alten Fiord (see Plan 2), and a considerable number of submarines—normally employed against the North Russian convoys—were maintained at Narvik, Hammerfest and other northern ports. The air forces based in the immediate neighbourhood were small, but they could be rapidly reinforced in an emergency (see Appendix F). Three routine reconnaissance flights—in the Faeroes, Spitzbergen and Jan Mayen areas—were flown almost daily.

2. Plan and Preparations. (Plans 1 and 2)

The planning, preparation and execution of the project, which was known as operation "Tungsten," was entrusted by the Commander-in-Chief, Home Fleet,⁴ to his second-in-command, Vice-Admiral Sir Henry Moore,⁵ Captain L. D. Mackintosh,⁶ an officer of great experience in Naval air matters, being specially appointed as his Chief of Staff.

The following ships⁷ were detailed to take part :—

One battleship (*Anson* (Flag, Vice-Admiral Moore)).

Two Fleet carriers (*Victorious*, *Furious*).

Four escort carriers (*Emperor*, *Searcher*, *Pursuer*, *Fencer*).

¹ *Admiral von Tirpitz*, 45,000 tons, 30·25 knots; 8—15-in., 12—5·9-in. H.A./L.A., 16—4·1-in. H.A., 16—37-mm., 4 to 6 quadruple 20-mm., some 20-mm. single guns.

² Vice-Admiral, Second in Command, Home Fleet, operation orders.

³ *Narvik*, 2,400 tons, 39 knots; 5—5·9-in. H.A./L.A., 4—1·46-in. A/A., 5 to 10—0·79-in. A/A. guns.

⁴ Admiral Sir Bruce Fraser, G.C.B., K.B.E.

⁵ Vice-Admiral Sir Henry Moore, K.C.B., C.V.O., D.S.O.

⁶ Captain L. D. Mackintosh, D.S.O., D.S.C., R.N. The Vice-Admiral subsequently wrote: "His knowledge and experience of naval air matters were of great assistance . . . both in planning and carrying out the operation."

⁷ See Appendix A. List of ships, with commanding officers.

Four cruisers (*Royalist* (Flag, Rear-Admiral, Escort Carriers¹), *Jamaica*, *Belfast*, *Sheffield*).

Two Fleet oilers (*Brown Ranger*, *Blue Ranger*).

Fourteen destroyers.

It was originally intended to carry out the operation between 7th and 16th March, but the *Victorious* was delayed in dockyard hands and it had to be postponed for about a fortnight. Even this left very little time for training, especially in the case of the *Victorious*, some of whose squadrons were newly formed.²

Vice-Admiral Moore's plan had to cover two distinct phases—the assembly of the surface forces at the flying off position and the details of the air attack. It was framed so as to be readily adaptable to an alternative locality, in case the *Tirpitz* should shift berth, and was sufficiently flexible to permit easily of postponement in event of bad weather. In order to minimise the risk from enemy submarines and also to give the surface forces a good chance of making their approach undetected, it was decided to synchronise the operation with the passage of an outward bound North Russian convoy, which was certain to draw the submarines to the eastward of Bear Island. Convoy J.W.58 was due to leave Loch Ewe for Kola Inlet on 27th March; this was accordingly chosen as "D-Day," and provisional arrangements were made to carry out the air attack on D + 8 Day, 4th April, by which time the convoy would be in the Barents Sea.

Part of the "Tungsten" force was to be included in the battleship covering force, and for the 1,200 mile passage to Northern Norwegian waters the following organisation was laid down:—

Force 1, consisting of the *Duke of York* (Flag, Commander-in-Chief), *Anson* (Flag, Vice-Admiral Moore), *Victorious*, *Belfast* and six destroyers, covering convoy J.W.58.

Force 2, the remainder of the "Tungsten" force, under Rear-Admiral Bisset, was to meet Force 1 in position "OO," lat. 72° 30' N., long. 13° 00' E. (some 250 miles to the north-westward of Kaa Fiord), at 1800, 3rd April, when the Commander-in-Chief intended to part company, leaving the Vice-Admiral to conduct the operation against the *Tirpitz*.

The air attack was to be made by two bombing forces of 21 Barracudas each launched from the Fleet carriers, supported by Wildcats and Hellcats from the *Pursuer*, *Searcher* and *Emperor* and Corsairs from the *Victorious*. The first strike was to be carried out by No. 8 (*Furious*) Wing; the second, which was to leave the carriers an hour later, by No. 52 (*Victorious*) Wing.³ Nine bombers were to be flown off from the *Furious* and 12 from the *Victorious* in each strike.

¹ Rear-Admiral A. W. La T. Bisset.

² This training was further curtailed by 24 hours owing to the necessity for sailing the *Victorious* with the convoy covering force. Vice-Admiral Moore considered "that the efficiency which they achieved in the short time available was most creditable."

³ This necessitated one squadron of the *Furious* wing being accommodated in and operated from the *Victorious* and vice versa. The alternative was for each carrier to operate its own aircraft and each attack to be carried out by a composite strike composed of a squadron from each carrier. Either method has its objections, but reporting on the operation the Vice-Admiral expressed the opinion that, while aircraft should operate from their own carrier if possible, "the advantage of operating a complete wing as a unit which has been trained together outweighs the disadvantages."

It was decided to use four different types of bombs, the effect of which would be complementary,¹ and each bombing force was to be armed as follows :—

- (a) Eleven aircraft with three 500 lb. S.A.P. each.
- (b) Five aircraft with one 1,600 lb. A.P. each.
- (c) Five aircraft with three 500 lb. M.C. or 600 lb. A/S each.²

As a result of training practices, it was found that bombing errors in range were more than double those in line under conditions of light wind. For this reason the direction of the attack was to be along the length of the target, the bombs being released in a tight stick to give a maximum probability of hitting with at least two bombs in each successful attack. Fighter protection for the Fleet during the attack was to be provided by Seafires from the *Furious* and Wildcats from the *Fencer*.³ Zero time was fixed for 0415 on whatever day the operation might take place, when the carriers would be approximately 120 miles to the northward of Kaa Fiord (position "PP," lat. 71° 30' N., long. 19° 00' E.).

During the weeks preceding the attack, training was carried out energetically. A full scale bombing and air firing range, representing realistically the *Tirpitz* in Kaa Fiord, and including smoke defence and dummy A/A batteries, was constructed at Loch Eriboll. Ordnance and special target maps of an exactly similar type to those provided for the actual operation were supplied to all air crews; and in spite of unfavourable weather, a large number of practices were carried out by both T.B.R.s and Fighters, which in the event "proved to be of inestimable value."⁴ A full dress rehearsal of the whole operation was staged off Scapa, testing the forming up and flying procedure with Loch Eriboll as the target, on 28th March, and two days later the forces left Scapa to carry out the operation.

3. Passage from Scapa. (Plan 1)

The Commander-in-Chief, Home Fleet, sailed from Scapa with Force I (*Duke of York, Anson, Victorious, Belfast*, screened by the destroyers *Onslaught, Javelin, Piorun, Sioux* and *Algonquin*) in the forenoon of 30th March. A full calibre concentration shoot by the battleships and live bombing by the *Victorious* was carried out at Stack Skerry, and course was then shaped to the N.N.W. for position "C"—east of the Faeroes—where the screening destroyers were detached to Skaale Fiord (Faeroes) with orders to fuel and then join Force 2,

¹ The 1,600 lb. A.P. bomb, if released above 3,500 ft., could penetrate the main armour and do vital damage, but offered less chance of hitting, due to the smaller number which could be carried.

The 500 lb. S.A.P. bomb, if released above 2,000 ft., which could penetrate the 2-inch weather deck and do serious between-deck damage, could be carried in sufficient numbers to give a reasonable expectation of several hits.

The 500 lb. M.C. bomb should detonate above the deck or water, and cause casualties by blast and splinters to exposed enemy A.A. personnel, thereby reducing casualties to our bombers. These bombs were to be carried by the first aircraft to attack.

The 600 lb. A/S. bomb might cause considerable underwater damage by a near miss up to 30 ft., and would detonate on hitting the ship, causing damage to the superstructure and helping to eliminate A.A. fire.

² This was subsequently modified, and the forces were actually armed as follows :—
1st Strike.—(a) 9; (b) 7; (c) 5.

2nd Strike.—(a) 13; (b) 3; (c) 5.

Only two 600 lb. A/S bombs per aircraft were carried on account of the light wind prevailing at the time.

³ "The air plan was complicated by the employment of three different classes of carrier and five different types of aircraft, three of which were practically untried operationally by us. Also three of the four types of bombs which it had been decided to use in the attack had not previously been used in operations in this country."—Vice-Admiral Moore's report.

⁴ Vice-Admiral Moore's report.

being relieved by the *Milne*, *Meteor*, *Matchless*, *Marne*, *Ursa* and *Undaunted*, which had fuelled there the day before. Force 1 then steered to the north-eastward to provide cover for convoy J.W.58. By the morning of the 1st April it was clear that the convoy, though shadowed intermittently by hostile aircraft, was making satisfactory progress, and had indeed inflicted casualties on both aircraft and U-boats, without itself suffering any damage. No other enemy air reconnaissance, apart from routine meteorological flights,¹ was taking place. This apparent lack of interest in any possible covering force suggested that a sortie by the *Tirpitz* was unlikely. The weather was unusually favourable for air operations, so, following Nelson's maxim never to trifle with a fair wind, the Commander-in-Chief decided to cease covering the convoy and to advance the date of operation "Tungsten" by 24 hours. This decision he signalled to all concerned at 1121,² 1st April, at the same time altering the rendezvous with Force 2 to a position 75 miles 195° from the previous one, in order to give Rear-Admiral Bisset time to reach it by 1900 the next day (2nd April).³

Force 2 (*Royalist*, *Searcher*, *Emperor*, *Pursuer*, *Fencer*, *Furious*, *Sheffield*, *Jamaica*, with the Fleet oilers *Blue Ranger* and *Brown Ranger*, screened by *Virago*, *Verulam*, *Vigilant*, *Swift* and *Wakeful*) meanwhile had sailed from Scapa at 1900, 30th March, and shaped course to the westward of the Orkneys to pass through positions "C" (off the Faeroes), where it was joined by the *Onslaught*, *Piorun*, *Javelin*, *Sioux* and *Algonquin* from Skaal Fiord, and "D." There was a fresh northerly wind, and the oilers experienced some difficulty in keeping up, being unable to maintain their reputed speed of 13 knots.

At 1435, 1st April, Rear-Admiral Bisset received the Commander-in-Chief's signal advancing the date of operation "Tungsten." This necessitated proceeding at once at the Force's maximum speed—17 knots—the two oilers, with the *Piorun* and *Javelin* as escort, being detached to make for position "QQ," some 300 miles to the north-westward of Alten Fiord, where they were to stand by to fuel destroyers in case of need.

The next day (2nd April) there was a slight contretemps which might have had most serious consequences. At 0650 the *Pursuer* had to reduce speed on account of a breakdown of her steering gear. Shortly afterwards the Force was turned by blue pendant to close her, as the visibility was not very good at the time and Rear-Admiral Bisset did not wish to get separated too far. "Then occurred an incident which . . . showed most clearly the limitations of the Fleet Wave Short Range (210 kc/s) for manœuvring. The visibility suddenly shut down to nothing in a blinding snowstorm; *Pursuer* and Force 2 were approaching each other on opposite courses, and the signal for Force 2 to turn to the original course could not be got through even to all ships of the original body, quite apart from the screen. Luckily the visibility cleared just in time to avoid a serious incident, and the *Pursuer* joined at 0725."⁴

¹ During the forenoon, 1st April, the *Victorious's* airborne Corsairs could have intercepted the Trondheim *Zenit*, both outward and inward bound; but as the plot showed that it would not sight the fleet, it was allowed to proceed unmolested, for fear that it might get off a fighter alarm report and thus betray the presence of the fleet.

² Times throughout, except where otherwise stated, are B.S.T. (Zone—1).

³ From C.-in-C., Home Fleet.

011121/April, 1944.

To V.A.2, R.A.E.C., Admiralty,
S.B.N.O., North Russia, V.A.D., C.S.10.

Intend operation "Tungsten" take place on D plus 7 (R) 7. Force 2 amend route to pass through position L and rendezvous with Force 1 in new position YY 195° 75 miles from position OO at 1900A, 2nd April.

Detached Force 9 with two destroyers to proceed direct to QQ.

⁴ Rear-Admiral Bisset's report.

The junction between Forces 1 and 2 was effected without difficulty in the afternoon, 2nd April, and at 1620 the Commander-in-Chief in the *Duke of York*, with the *Matchless* and *Marne*, parted company and proceeded to the north-westward,¹ while Vice-Admiral Moore with the "Tungsten" forces² steered direct for the flying off position ("PP"), which it was intended to reach at 0415³ the following morning.

"By 0300 on 3rd April it appeared that everything was in our favour. So far as we knew we had not been sighted, and flying conditions were perfect for putting the operation into effect. There was a light off-shore wind, and visibility was in fact so good that while landing on the strikes later we sighted the Norwegian coast at a distance of about 50 miles."⁴

4. Departure of First Strike. (Plans 1 and 2)

Meanwhile, in the carriers, final preparations had been in progress since the previous evening.

In the *Victorious* the flying programme was complicated throughout by the fact that she was carrying more aircraft than she had been designed to operate, and this difficulty was enhanced by the necessity of handling two types of aircraft and four types of bombs. All aircraft were fuelled and serviceable by 1700, 2nd April, and the Corsair long range tanks fitted, but these were not filled till 0100, 3rd April. Bombing up was carried out at 1800.

Anxiety had been felt as to the effect of North Sea winter conditions on the aircraft necessarily parked on deck.⁵ These were all allocated to the second strike, and after running their engines at 0200, were struck down to the comparatively warm hangar, while the first strike was ranged on deck.

At 0130, "that ghastly hour when man's stamina is at its lowest,"⁶ the air crews were called for last minute briefing. By 0405, 3rd April, all aircraft were ready, and their engines were started up; there was not a single failure in any of the carriers—a fine tribute to the work of the maintenance personnel and aircraft handling parties. The air crews were in fine fettle. "Knowing

¹ The C.-in-C. cruised within about 200 miles of the "Tungsten" operating area until news was received of the successful termination of the operation, when he returned to Scapa, as previously arranged, arriving at 0830, 5th April.

² The "Tungsten" forces were organised as follows:—

Force 7.—*Anson* (flag), *Victorious*, *Furious*, *Jamaica*, *Belfast*, 6 destroyers.

Force 8.—*Royalist* (flag, Rear-Admiral), *Emperor*, *Searcher*, *Fencer*, *Pursuer*, *Sheffield*, 6 destroyers.

Force 9 (detached).—*Blue Ranger*, *Brown Ranger*, 2 destroyers.

³ Sunrise, 3rd April, was at 0435; nautical twilight (sun 12° below horizon) commenced 0127. The moon was in the first quarter (full moon 8th April) and set at 0626, 3rd April.

⁴ Vice-Admiral Moore's report.

⁵ Captain Denny in his report stated that the "*Victorious* flight deck is very wet in any weather, and the spray and sleet were freezing on the deck."

Vice-Admiral Moore subsequently remarked, "It was realised that for the *Victorious* to carry 45 aircraft would involve the operation of a deck park, which in Northern waters may be undesirable, owing to the risk of unserviceability. Although this would not be acceptable for a long period, it was considered that for the short period involved the increase in striking potential justified this risk, and as it turned out only one *Barracuda* was unserviceable on the day of the attack."

⁶ *Victorious* report.—Officers had been informed under conditions of strict secrecy of the intended operation some days previously, and were thus able to make themselves acquainted with the large amount of intelligence available. Detailed briefing of squadrons separately was completed at sea on 1st April, when telegraphist air gunners were for the first time given details of the plan. After full briefing in the *Victorious* the two strike leaders were flown over to the *Furious* to co-ordinate briefing of the other half of each strike.

Army liaison officers were embarked in the escort carriers and working in close co-operation with the air staff officers rendered valuable assistance in briefing the fighter pilots.

that they were about to attempt an opposed attack of a character which hitherto had not been attempted in the European theatre, they left the carriers' decks in the greatest of heart and brimful of determination, and proceeded through the complicated business of forming up and taking departure to the target exactly as if a parade ground movement. That in fact they met no German Air Force opposition subtracts not one iota from the credit that is due to them."¹

Zero hour for flying off was 0415, and at 0416 the first of the ten escorting Corsairs took off from the *Victorious*, followed 8 minutes later by the twenty-one Barracudas from her and the *Furious*. The remainder of the Fighter Escort flew off from the escort carriers between 0423 and 0426,² and by 0437 " had made a perfect form up with the Barracuda Wing, and at that time took departure³ for the target on a course of approximately 120°."⁴

Weather conditions were ideal—a good steady breeze of 12 to 14 knots from the southward, maximum visibility with very little cloud in the direction of the coast and no swell.

" It was a grand sight with the sun just risen to see this well balanced striking force of about 20 Barracudas and 45 Fighters departing at very low level between the two forces of surface ships, and good to know that a similar sized force would be leaving again in about an hour's time."⁵

The whole strike was under the command of Lieut.-Commander R. Baker-Faulkner, of the *Furious*, the Senior Officer of the Bombers, under whom Lieut.-Commander F. R. A. Turnbull, of the *Victorious*, commanded the Corsairs, and Lieut.-Commander J. W. Sleigh, D.S.C., of Rear-Admiral Bisset's staff, the Hellcats and Wildcats.

For twenty minutes they flew low over the water, commencing to climb to 10,000 ft. at 0457, when some 25 miles from the Norwegian coast. Two minutes later Loppen Island was identified fine on the port bow, and the coast was crossed at 0508. Passing close west of the head of Lang Fiord⁶ they proceeded to the eastward down the snow covered valley towards the head of Kaa Fiord, finally swooping on their unsuspecting quarry from the south-west.

5. First Strike. (Plan 2)

The attack was carried out almost exactly as planned, and it was soon clear that the enemy had been caught napping. A destroyer and a large merchant vessel in Lang Fiord showed no sign of life, though the Hellcat squadron passed directly overhead. No hostile aircraft were seen, nor was there any interference from flak till the strike was within 3 miles of the target area.

¹ *Victorious* report.

² A/S patrol and fighter protection for the Fleet were flown off from the *Fencer* and *Furious* with the first strike.

³ The departure point for the strikes had been fixed as four miles from the Fleet carriers in the direction of the escort carrier force.

⁴ Rear-Admiral Bisset's report. The Rear-Admiral remarked " The forming up of the composite striking force worked so smoothly that I consider the method used should be standardised." With this opinion Vice-Admiral Moore fully concurred.

⁵ Rear-Admiral Bisset's report. Admiral Bisset added: " It was especially heartening to an ex-carrier captain accustomed for several years to be very short of aircraft (especially fighters) and made one wonder ' what might have been ' if the Fleet Air Arm had been adequately supplied with aircraft in the early days of the war."

⁶ The fighters jettisoned their long range tanks between Alta and Lang Fiords, after 1 hour 5 minutes flying.

At about 0528 the Force was deployed and began its initial dive from 8,000 ft.; at the same time high angle batteries at the head of the fiord and elsewhere opened a heavy but inaccurate fire, and the *Tirpitz* was sighted in the expected position. Diving to keep hill cover, Lieut.-Commander Baker-Faulkner sent all Hellcats and Wildcats down to "strafe" guns and target, which they did most effectively and "undoubtedly spoilt the *Tirpitz* gunnery,"¹ while the Corsairs patrolled over the whole area at about 10,000 ft. A smoke screen was started all round the fiord as soon as the aircraft were sighted, but it was too late, and a minute afterwards (0529) the bombers dived to the attack, releasing their bombs from heights of between 3,000 and 1,200 ft. Hits were scored immediately, causing heavy explosions and flames, and it was evident that the *Tirpitz* was severely damaged. Exactly 60 seconds after the first bomb had fallen, the attack was over, and the aircraft, leaving the enemy on fire in several places, headed to the north-west for Silden Island, whence they took their departure for the carriers. On the way out the fighters engaged a flak ship, a destroyer and two armed trawlers, leaving the latter on fire. No difficulty was experienced on the return passage to the Fleet, which was sighted at a distance of 40 miles. Only one Barracuda was missing;² the remainder, to quote from the *Victorious* report, "returned in flight formation with an unanimous broad grin," landing on between 0619 and 0642. One Hellcat whose hook had been damaged by the enemy landed in the water and was lost, the pilot being picked up by the *Algonquin*.

6. Second Strike. (Plan 2)

Meanwhile, at 0525—just as the first strike was attacking—the second strike had commenced flying off the carriers. One Barracuda failed to start, and another, after an apparently successful take off from the *Victorious*, crashed into the sea, all the crew being lost.³ The remaining 19 with their escort of 45 fighters formed up at between 50 and 200 ft. and took their departure at 0537. The strike was commanded by Lieut.-Commander V. Rance of the *Victorious*, and Lieut.-Commander M. F. Fell of the *Searcher*, was senior officer of the close escort.

After crossing the coast the initial approach was made at 10,000 ft. for about 12 miles; this was slowly reduced, and the final attack was commenced from 7,500 to 7,000 ft. A large brown smoke screen, visible 40 miles away, had been laid from generators all round the target area and from the *Tirpitz* herself; "it did not interfere with bombing, but must have hampered close range weapons considerably."⁴ Again no enemy aircraft was encountered and the Hellcats went down to attack the heavy gun positions as soon as they opened fire, the Wildcats attacking the *Tirpitz's* exposed personnel just prior to the main attack. She appeared to be on an even keel, and of normal trim and draught, despite the efforts of the first strike; but she had swung across the fiord with her stern nearly aground, and was thought to be drifting. The bombers' final dive was carried out in quick succession, the port column attacking first at 0636; bombs were released at heights of 3,000 ft. or a little less.

¹ Report by Lt.-Cmdr. Baker-Faulkner.

² Aircraft M of 830 Squadron. It was seen after the attack in a controlled glide with its engine stopped at a height of about 1,000 ft., proceeding up Kaa Fiord in a south-westerly direction; "there is every reason to expect that he was able to make a good forced landing." (*Furious* report.) (See Appendix C (2).)

³ Aircraft Q of 829 Squadron, see Appendix C (2).

⁴ Report by Lieut.-Cmdr. Rance.

There was considerable close range flak, mostly in the form of a box barrage, round the target. One Barracuda was hit,¹ but is believed to have carried out its attack. By the time the last aircraft dived the *Tirpitz* had ceased firing and was burning fiercely amidships. As in the first strike, the attack had lasted just a minute.

The strike withdrew towards Silden Island, the fighters as before engaging targets as they presented themselves, amongst others a 5,000-ton merchant ship—which was left smoking—in Lange Fiord, one of about 3,000 tons in Ox Fiord, and a wireless or direction-finding station.

Visibility was still extreme, and the Fleet was found without difficulty; two destroyers which had been sent inshore for air-sea rescue (though fortunately not required for this purpose), were useful as signposts, keeping their forward guns pointed in the direction of the Fleet. By 0758 all aircraft had landed safely on the carriers.²

7. Return to Scapa

During the absence of the Air Striking Forces the Fleet had remained in the vicinity of position "PP," fighter protection and anti-submarine patrols being maintained by aircraft from the *Fencer* and *Furious*.³ After the second strike had landed on, course was shaped to the west-north-westward, while in the *Victorious* reports of the air crews were collected and analysed, photographs of the attack developed and examined, and a preliminary estimate of hits and damage got out. This was signalled to the Vice-Admiral at 1737, 3rd April.⁴

¹ Aircraft M of 829 Squadron. It made its getaway with the remainder and was subsequently seen diving vertically in flames on to the mountain side. (See Appendix C (2).)

² One Barracuda still had a 600-lb. A/S bomb, which could not be jettisoned owing to an electrical failure. This aircraft was landed on the *Victorious* last of all, the flight deck being cleared in case of mishaps. All, however, went well.

³ A total of 40 Barracudas and 81 Fighters took part in the two strikes; 25 Fighters (Seafires and Wildcats) were retained with the Fleet for its defence and nine Swordfish for A/S patrols. After the attack was over, Corsairs from the *Victorious* relieved the *Furious* Seafires on combat patrol.

⁴ "To V.A.2 (R) *Furious*. From *Victorious*.

Preliminary examination completed and following claims are considered well founded:—

- (1) First Strike 827 and 830 Squadrons.
3—1,600-lb. A.P., 4—500-lb. S.A.P., 3—500-lb. M.C. hits.
- (2) *Tirpitz* during 1st strike was in a position shown in Mosaic A. A 1,600-lb. hit was obtained vicinity fore superstructure, 3—500-lb. bombs hit amidships and a number forward of bridge. Photographic evidence exists of between-deck bomb detonations. Nevertheless, when 2nd strike arrived, though probably drifting with engines stopped, *Tirpitz* still on an approximate even keel and normal trim and draught.
- (3) Smoke generators started during attack, but were ineffective. Flak was not experienced until just before the attack started and was light and ineffective.
- (4) Second Strike 829 and 831 Squadrons.
4—500-lb. S.A.P., 2—500-lb. M.C. and 1—600-lb. A/S hits are allocated (a) one hit starboard side of mainmast, which caused large explosion, (b) two hits on foremast, causing big explosions, (c) one abreast Y turret and three amidships.
- (5) Between strikes *Tirpitz* had shifted berth to position bows 295352, stern 30352 and was shrouded in smoke screen which did not interfere with aiming, but together with bomb smoke made observation of results difficult. Flak was heavy, but ragged in target area, a box barrage being put up over target.
- (6) Those near misses which appear in photographs so far seen are not judged near enough to cause substantial damage.
- (7) *Tirpitz* was left shrouded in smoke with two fires burning amidships, and had ceased fire when last aircraft dived.
- (8) No signs of G.A.F. were observed.
- (9) I believe *Tirpitz* now to be useless as a warship. 031737A."

For final assessment of hits, see Appendix D and Plan 4.

Seventeen direct hits, three of them by 1,600 lb. bombs, were judged to have been scored, and the *Tirpitz* was considered to be out of action.

Vice-Admiral Moore had intended to repeat the attack the next morning (4th April), and during the afternoon the re-fuelling of destroyers by the Fleet was started as an urgent evolution, the consequent reduction in anti-submarine protection being accepted.¹ Later, after receiving reports of the serious damage already inflicted on the *Tirpitz*, and also of the "fatigue of the air crews and their natural reaction after completing a dangerous operation successfully,"² he decided to cancel further operations, and directed all forces, including the Fleet oilers (Force 9), to return to Base.

Forces 7 and 8 shaped course accordingly at 2100, 3rd April, the *Searcher*, which had developed a defect limiting her speed to 12 knots, being ordered to follow under the escort of the *Jamaica*, *Sioux* and *Virago*. The passage was uneventful, and at 1630,³ 6th April, Forces 7 and 8 entered Scapa Flow, where they were given a rousing reception by the Commander-in-Chief and the ships of the Home Fleet in harbour. The *Searcher*, closely followed by the Fleet oilers, with their respective escorts,⁴ arrived safely some ten hours later.

8. Lessons and Comments

Commenting on the Air side of the operation, Vice-Admiral Moore emphasized the value of the preliminary practices at Loch Eriboll; "the importance of this training cannot be overstressed." He attributed much of the success of the attack to the ideal weather conditions and to the achievement of surprise; and considered it "clear that the 'straffing' by fighters 'softened up' the defence, and later the instantaneously fuzed bombs reduced it to a negligible quantity." The large number of maps, charts, photographs and scale models which gave the air crews a clear picture of what to expect was a contributory factor to the success.⁵

The air communications worked satisfactorily throughout, but—in spite of strict orders to the contrary—R/T silence was broken by several aircraft before they reached the coast. This might well have prejudiced the success of the whole operation.

With regard to the surface ships, no difficulty was experienced in manœuvring the two carrier forces, in spite of the inequality of their speeds.⁶ Both forces kept in visual signalling touch, both during the flying operations and on passage; if the enemy had attacked by air at any time it would have been possible to provide fighter protection for the whole Fleet with one force of fighters.

¹ There had been two reports of possible submarines in the area during the forenoon; air search had, however, failed to make contact.

² This fatigue has been frequently mentioned in United States reports of operations in the Pacific, and a number of accidents have been ascribed to it.

³ M.S.T. (Zone-2).

⁴ Force 9's escort had been reinforced on 5th April by the *Ulysses* from Scapa, by order of the Commander-in-Chief.

⁵ The careful briefing of the air crews has already been mentioned (see Section 4 and note).

⁶ This threw a heavy strain on the engine room departments of escort carriers. Rear-Admiral Bisset remarked:—"A special word of praise is due to the engine room departments of the escort carriers. From 1430 on Saturday, 1st April to 1600 on Thursday, 6th April, the ships were for the most part steaming at their full speed of 17 knots with nothing in hand for station keeping . . . their total engine room complement amounts to approximately 13 officers and 30 ratings."

Probably the most important point—in its wider application—raised by the operation was the question of the type of ship from which the Senior Flag Officer could most advantageously direct it. During the planning stages, Vice-Admiral Moore had considered shifting his flag to the *Victorious*, but owing to her late arrival and limited accommodation, he decided to remain in the *Anson*. "On the limited experience of this one operation," he subsequently wrote, "I am of the opinion that the Senior Officer of a large force of this nature should not be in a carrier, but that either a junior Flag Officer or the Senior Carrier Captain should be responsible to him for matters concerning flying, thus avoiding overloading the Senior Flag Officer with the more technical side of the operation."

The Commander-in-Chief commented on this point that much would depend on the nature of the operation, and remarked "For a planned operation the Admiral has the advantage in the battleship, since her signalling arrangements are better for manœuvring the force and the carriers' attention can be devoted to air matters. For operations which are uncertain and where frequent changes of plan may be necessary, the advantage may be with the carrier."¹

Further experience will no doubt determine the question, but it is perhaps worth noting that on this occasion a considerable amount of signalling was necessary in order to put Vice-Admiral Moore *au fait* with the results of the attack and the air situation, on which depended his decision whether or not to attack next day. This decision could possibly have been reached earlier had he been in direct personal touch with the air situation on board a carrier.

9. Conclusion. (Plan 4)

It is not possible yet to estimate the full results of the raid² with accuracy, but enough is known to regard it as a distinct success. The smoke from the bursting bombs, as well as the enemy smoke screen, made accurate observation at the time difficult and obscured some of the photographs taken; and the damage caused cannot, of course, be known for certain till enemy records are available. The lowest assessment of hits on the *Tirpitz* allowed eight certain, of which three were by 1,600-lb. bombs, and five probable, a total of at least 13 (see Appendix D). On the basis of the certain hits only, expert opinion deemed that "although temporary repairs sufficient to enable the ship to proceed to sea for an emergency operation could possibly be effected in three months, completely effective repair would take considerably longer." If the probable hits were included, it was considered unlikely that the ship could take part in any form of offensive operation in less than five months.

In addition to the bomb damage to the *Tirpitz*, the fighters left their mark on at least two merchant ships, two flak ships and a destroyer, besides setting on fire two armed trawlers, silencing (temporarily) A/A batteries and shooting up various shore installations.

Nor can it be doubted that the moral effect of the successful attack in the teeth of all the defences, for the loss of two bombers shot down, must have been as depressing for the enemy as exhilarating for the Naval Air Arm. Not that they appeared to need much "exhilarating"; Captain Denny's remarks on the

¹ Opinions from sea on this important point have been called for, and since this operation much experience has been gained. There are both advantages and disadvantages in the Admiral flying his flag in the carrier, and the choice of ship must depend to a large degree upon the type of operation which is being carried out and the type and strength of the enemy's forces.

² September, 1944.

spirit in which they set out on their hazardous task have already been quoted, and their determination to press the attack right home caused a considerable number to drop their bombs at much lower heights than those ordered (which may have detracted from the effectiveness of some of the A.P. and S.A.P. hits obtained). As for the fighters, the following signal from the *Victorious* to the Rear-Admiral, Escort Carriers, shows what the bombers thought of their performance: "Strike leaders and aircrews of both strikes wish to thank the fighter escort for the superb way in which the fighters went down on to the flak. In addition, fighters can claim a burning tanker."

All did well. In Vice-Admiral Moore's words: "Great credit is due to Rear-Admiral A. W. La T. Bisset, Rear-Admiral, Escort Carriers, and the Commanding Officers of the Fleet and Escort Carriers for the efficiency and team work which was achieved in so short a time, and for the smoothness with which the operation was carried out. But above all, I wish to express my admiration for the brilliant and daring attack carried out by the aircrews themselves, most of whom were having their first experience of enemy action." These remarks were endorsed by the Commander-in-Chief, who also paid tribute to the "careful planning, preparation and handling of his forces" by the Vice-Admiral, which was "so largely responsible for the great success of the operation."

APPENDIX A

SHIPS EMPLOYED IN OPERATION "TUNGSTEN"

BATTLESHIP

<i>Anson</i>	..	10—14-in., 16—5·25-in. HA/LA. guns.	Flag, Vice-Admiral Sir Henry R. Moore, K.C.B., C.V.O., D.S.O. (Vice-Admiral 2nd-in-Command, Home Fleet). Captain E. D. B. McCarthy, D.S.O., R.N.
--------------	----	-------------------------------------	---

FLEET CARRIERS

<i>Victorious</i>	..	16—4·5-in. guns. 24 Barracudas, 21 Corsairs.	Captain M. M. Denny, C.B., C.B.E., R.N.
<i>Furious</i>	..	12—4-in. HA/LA. guns. 18 Barracudas, 15 Seafires.	Captain G. T. Philip, D.S.O., D.S.C., R.N.

ESCORT CARRIERS

<i>Searcher</i>	..	2—4-in. HA/LA. guns. 20 Wildcats.	Captain G. O. C. Davies, R.N.
<i>Emperor</i>	..	2—4-in. HA/LA. guns. 20 Hellcats.	Act. Captain T. J. N. Hilken, D.S.O., R.N.
<i>Pursuer</i>	..	2—4-in. HA/LA. guns. 20 Wildcats.	Act. Captain H. R. Graham, D.S.O., D.S.C., R.N.
<i>Fencer</i>	..	2—4-in. HA/LA. guns. 10 Wildcats. 9 Swordfish.	Act. Captain W. W. R. Bentinck, O.B.E., R.N.

CRUISERS

<i>Royalist</i>	..	8—5·25-in. guns.	Flag, Rear-Admiral A. W. La.T. Bisset (Rear-Admiral, Escort Carriers). Captain M. H. Eveleigh, R.N.
<i>Belfast</i>	..	12—6-in., 12—4-in. H.A. guns.	Captain F. R. Parham, D.S.O., R.N.
<i>Sheffield</i>	..	12—6 in., 8—4 in. H.A. guns.	Captain C. T. Addis, D.S.O., R.N.
<i>Jamaica</i>	..	12—6-in., 8—4-in. H.A. guns.	Captain J. Hughes-Hallett, D.S.O., R.N.

DESTROYERS

<i>Milne</i>	..	6—4·7-in., 1—4-in. H.A. guns. 5—21-in. torpedo tubes.	Captain J. M. R. Campbell, D.S.O., R.N. (Capt. (D) 3rd Flotilla).
<i>Ursa</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Commander D. B. Wyburd, D.S.C., R.N.
<i>Onslaught</i>	..	4—4·7-in., 1—4-in. H.A. guns. 8—21-in. torpedo tubes.	Commander The Hon. A. Pleydell-Bouverie, R.N.
¹ <i>Piorun</i>	..	6—4·7-in., 1—4-in. H.A. guns. 5—21-in. torpedo tubes.	Commander S. Dnienisiewicz, V.M.
<i>Verulam</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. W. S. Thomas, D.S.C., R.N.
<i>Meteor</i>	..	6—4·7-in., 1—4-in. H.A. guns. 5—21-in. torpedo tubes.	Lt.-Com. D. J. B. Jewitt, R.N.
<i>Undaunted</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. A. A. MacKenzie, R.D., R.N.R.

¹ On loan to the Polish Navy.

APPENDIX A—*continued*DESTROYERS—*continued*

<i>Vigilant</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. L. W. L. Argles, R.N.
<i>Virago</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. A. J. R. White, R.N.
<i>Swift</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. J. R. Gower, R.N.
<i>Javelin</i>	..	6—4·7-in. guns. 10—21-in. torpedo tubes.	Lt.-Com. P. B. N. Lewis, D.S.C., R.N.
<i>Wakeful</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	Lt.-Com. G. D. Pound, D.S.C., R.N.
¹ <i>Algonquin</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	A/Lt.-Com. D. W. Piers, D.S.C., R.C.N.
¹ <i>Sioux</i>	..	4—4·7-in. guns. 8—21-in. torpedo tubes.	A/Lt.-Com. E. E. G. Boak, R.C.N.

¹ Royal Canadian Navy.

APPENDIX B

PARTICULARS OF AIRCRAFT TAKING PART IN OPERATION "TUNGSTEN"

Type of Aircraft.	Crew.	Armament/Rounds per Gun.	Load Carried.	Speed.	
				Maximum.	Cruising.
Barracuda II	3	2 × .303-in./500 2 × .303-in./500 (free).	1 × 1,600-lb. A.P. or 3 × 500-lb. M.C. or 3 × 500-lb. S.A.P. or 2 × 600-lb. A.S.	188 knots at 2,000 ft.	145 knots at 5,000 ft.
Corsair ..	1	6 × .5-in./200	—	352 knots at 23,000 ft.	216 knots at 20,000 ft.
Hellcat ..	1	6 × .5-in./200	—	342 knots at 23,000 ft.	212 knots at 20,000 ft.
Wildcat V..	1	4 × .5-in./400	—	273 knots at 21,000 ft.	184 knots at 15,000 ft.
Wildcat VI	1	4 × .5-in./240	—	270 knots at 21,000 ft.	184 knots at 15,000 ft.
Seafire III..	1	2 × 20-mm./135 4 × .303-in./350	—	306 knots at 12,000 ft.	190 knots at 20,000 ft.

APPENDIX B (1)

NOMINAL LIST OF AIR CREWS TAKING PART IN THE ATTACK

1. Fighter Support Supplied by "Victorious" ("Corsairs")

Fighter Wing Leader—Lt.-Com. F. R. A. Turnbull, R.N.

Lt.-Com. (A) P. N. Charlton, R.N.

Ty. Sub-Lt. (A) G. A. Rawstron, R.N.Z.N.V.R.

Ty. Sub-Lt. (A) J. S. Bird, R.N.V.R.

Ty. Sub-Lt. (A) M. C. Kelly, R.N.V.R.

Ty. Sub-Lt. (A) J. F. R. Ball, R.N.V.R.

Ty. Sub-Lt. (A) C. H. D. Grayson, R.N.V.R.

Lt.-Com. (A) C. C. Tomkinson, R.N.V.R.

Ty. Sub-Lt. (A) L. D. Durno, R.N.V.R.

Ty. Sub-Lt. (A) A. J. French, R.N.Z.N.V.R.

Ty. Sub-Lt. (A) B. L. Hayter, R.N.V.R.

Ty. Sub-Lt. (A) D. Robertson, R.N.V.R.

Ty. Sub-Lt. (A) W. H. Rose, R.N.V.R.

Ty. Sub-Lt. (A) W. Knight, R.N.V.R.

Ty. Sub-Lt. (A) V. A. Fancourt.

Ty. Sub-Lt. (A) E. Hill, R.N.V.R.

Ty. Sub-Lt. (A) J. W. Mayhead, R.N.Z.N.V.R.

Ty. Sub-Lt. (A) D. J. Sheppard, R.N.V.R.

Ty. Sub-Lt. (A) A. W. Direen, R.N.Z.N.V.R.

Ty. Sub-Lt. (A) M. T. Blair, R.N.V.R.

Ty. Sub-Lt. (A) S. Leonard, R.N.V.R.

APPENDIX B (1)—continued

2. Fighter Support Provided by Escort Carriers

1st Strike

A/Lt.-Com. J. W. Sleight, D.S.C., R.N. (of R.A.E.C. Staff, operating from *Pursuer*).

Searcher (Wildcats)

Ty. A/Lt.-Com. (A) J. Cooper, R.N.V.R.
 Lt. J. Cotching, R.N.R.
 Ty. Sub-Lt. (A) K. B. Pearson, R.N.V.R.
 Ty. Sub-Lt. (A) J. M. Boswell, R.N.V.R.
 Ty. Sub-Lt. (A) P. J. M. Canter,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) W. S. Smith, R.N.V.R.
 Ty. Sub-Lt. (A) C. G. Sanville, R.N.V.R.
 Ty. Sub-Lt. (A) F. T. Sherborne, R.N.V.R.

Pursuer (Wildcats)

Ty. A/Lt.-Com. D. R. B. Cosh,
 R.C.N.V.R.
 Ty. Lt. H. P. Wilson, R.C.N.V.R.
 Ty. Lt. (A) A. G. Woods, R.N.V.R.
 Ty. Lt. (A) D. R. Gardner, S.A.N.F.
 Ty. Lt. (A) A. N. Pym, R.N.V.R.
 Ty. Sub-Lt. (A) D. L. W. Frearson,
 R.N.V.R.
 Ty. Sub-Lt. (A) N. K. Turner, R.N.V.R.
 Ty. Sub-Lt. (A) A. C. Lindsay, R.N.V.R.
 Ty. Sub-Lt. (A) A. A. Davison,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) T. L. M. Brander,
 R.N.V.R.
 Ty. Sub-Lt. (A) M. J. Leeson, R.N.V.R.

Emperor (Hellcats)

Lt.-Com. (A) S. J. Hall, R.N.
 Ty. Sub-Lt. (A) J. G. Devitt, R.N.V.R.
 Ty. Sub-Lt. (A) J. H. Jellie,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) R. L. Thompson,
 R.N.V.R.
 Ty. Sub-Lt. (A) B. Ritchie, R.N.V.R.
 Ty. Sub-Lt. (A) R. S. Holloway, R.N.V.R.
 Ty. Sub-Lt. (A) T. H. Hoare,
 R.N.Z.N.V.R.
 Sub-Lt. C. H. Roncoroni, R.N.R.
 Ty. Sub-Lt. (A) S. A. Craig, R.N.V.R.
 Ty. Sub-Lt. (A) R. Hooker, R.N.Z.N.V.R.

2nd Strike

A/Lt.-Com. (A) M. F. Fell, R.N. (*Searcher*).

Searcher (Wildcats)

Ty. A/Lt.-Com. (A) G. R. Henderson,
 R.N.V.R.
 Ty. Lt. (A) R. J. Harrison, R.N.Z.N.V.R.
 Ty. Lt. (A) C. G. Cullen, R.N.V.R.
 Ty. Lt. (A) W. J. Sheppard, R.N.V.R.
 Ty. Sub-Lt. (A) E. F. Hocking, R.N.V.R.
 Ty. Sub-Lt. (A) S. W. Edney,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) D. Farthing, R.N.V.R.
 Ty. Sub-Lt. (A) H. J. Pain, R.N.V.R.
 Ty. Sub-Lt. (A) A. Sharpe, R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) C. St. George,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) A. R. Duff, R.N.Z.N.V.R.

Pursuer (Wildcats)

Ty. A/Lt.-Com. (A) L. A. Hordern,
 R.N.V.R.
 Ty. Lt. (A) A. C. Martin, R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) V. H. Martin,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) D. Symons, R.N.V.R.
 Ty. Sub-Lt. (A) A. B. Christie,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) R. Banks, R.N.V.R.
 Ty. Sub-Lt. (A) R. C. Wilkinson,
 R.N.V.R.¹
 Ty. Sub-Lt. (A) W. Park, R.N.V.R.

Emperor (Hellcats)

Lt.-Com. (A) S. G. Orr, R.N.V.R.
 Ty. Sub-Lt. (A) G. J. Elger, R.N.V.R.
 Lt. O. R. Oakes, R.M.
 Ty. Sub-Lt. (A) B. F. Brine, R.N.V.R.
 Ty. Sub-Lt. (A) A. C. McLennan,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) G. A. M. Flood,
 R.N.V.R.
 Ty. Sub-Lt. (A) C. D. Spencer, R.N.V.R.
 Ty. Sub-Lt. (A) R. A. Cranwell,
 R.N.Z.N.V.R.
 Ty. Sub-Lt. (A) L. M. Wenyon, R.N.V.R.
 Ty. Sub-Lt. (A) D. R. P. Owen, R.N.V.R.

¹ Had to return to carrier before taking part in strike.

APPENDIX B (1)—continued

3.—Bombers

1st STRIKE

No. 8 T.B.R. Wing ("Furious")

Wing Leader, Lt.-Com. (A) R. Baker-Faulkner, R.N.

Aircraft.	Pilot.	Observer.	Air Gunner.
<i>827 SQUADRON</i> (Flown off from "Victorious")			
K	Lt.-Cdr. (A) R. Baker-Faulkner, R.N.	Lt. G. M. Micklom, R.N.	Ldg. Air. A. M. Kimberley.
A	Ty. Lt. (A) H. R. Emerson, R.N.Z.N.V.R.	Lt.-Cdr. (A) K. H. Gibney, R.N.	C.P.O. Air C. Topliss.
Q	Ty. Sub-Lt. (A) C. M. Lock, R.N.V.R.	Ty. Sub-Lt. (A) J. Grieveson, R.N.V.R.	Ldg. Air. D. E. Wootten.
C	Ty. Sub-Lt. (A) J. D. Herrold, R.N.V.R.	Ty. Sub-Lt. (A) G. Alexander, R.N.V.R.	Ldg. Air. H. N. Hoyte.
M	Ty. Sub-Lt. (A) I. G. Robertson, R.N.V.R.	Ty. Sub-Lt. (A) H. W. Pethick, R.N.V.R.	Ldg. Air. J. Coulby.
F	Ty. Sub-Lt. (A) D. W. Collett, R.N.V.R.	Lt. G. C. Yorke, R.N.	Ldg. Air. T. Cartnell.
G	Ty. Sub-Lt. (A) E. E. Green, R.N.V.R.	Ty. Sub-Lt. (A) L. J. Jouning, R.N.V.R.	Ldg. Air. R. H. Lee.
P	Ty. Sub-Lt. (A) J. A. Gledhill, R.N.V.R.	Ty. Sub-Lt. (A) J. McCormick, R.N.V.R.	Ldg. Air. N. A. F. Poole.
H	Ty. Sub-Lt. (A) J. Watson, R.N.V.R.	Ty. Sub-Lt. (A) R. D. Smith, R.N.V.R.	Ldg. Air. R. R. Williams.
B	Ty. Lt. (A) P. G. Darling, R.C.N.V.R.	Ty. Sub-Lt. (A) H. E. K. Gale, R.N.V.R.	Ldg. Air. E. Hunter.
R	Ty. Sub-Lt. (A) A. D. Ritchie, R.N.V.R.	Ty. Sub-Lt. (A) K. A. Sellers, R.N.V.R.	Ldg. Air. W. Murray.
L	Ty. Sub-Lt. (A) J. R. Brown, R.N.V.R.	A/Ty. Sub-Lt. (A) D. L. Pullen, R.N.V.R.	Ldg. Air. P. A. Reynolds.
<i>830 SQUADRON</i> (Flown off from "Furious")			
A	A/Ty. Lt.-Com. (A) R. D. Kingdon, R.N.V.R.	Ty. Lt. (A) J. B. Armistage, R.N.Z.N.V.R.	C.P.O. Air. A. E. Carr.
C	Ty. Sub-Lt. (A) A. E. Browse, R.N.V.R.	Ty. Sub-Lt. (A) A. H. Dobbie, R.N.V.R.	A/Ldg. Air. G. F. Priestley.
B	Ty. Sub-Lt. (A) D. S. Clarabut, R.N.V.R.	Ty. Sub-Lt. (A) E. D. Knight, R.N.V.R.	Ldg. Air. W. A. Ball.
H	Ty. Sub-Lt. (A) J. A. Grant, R.N.V.R.	Ty. Sub-Lt. (A) A. C. P. Walling, R.N.V.R.	Ldg. Air. D. P. Bussey.
M ¹	Ty. Sub-Lt. (A) T. C. Bell, R.N.V.R.	Ty. Sub-Lt. (A) R. N. Drennan, R.N.V.R.	Ldg. Air. G. J. Burns.
F	Ty. Lt. (A) J. B. Robinson, R.N.V.R.	Ty. Sub-Lt. (A) R. L. Eveleigh, R.N.V.R.	A/P.O. Air. S. W. Lock.
G	Ty. Sub-Lt. (A) D. E. Rowe, R.N.Z.N.V.R.	Ty. Sub-Lt. (A) D. A. Brown, R.N.Z.N.V.R.	Ldg. Air. A. C. Wells.
K	Ty. Sub-Lt. (A) J. D. Britton, R.N.V.R.	Ty. Sub-Lt. (A) J. C. Fairclough, R.N.V.R.	Ldg. Air. J. Whyte.
L	Ty. Sub-Lt. (A) R. G. Williams, R.N.Z.N.V.R.	Ty. Sub-Lt. (A) R. D. Burton, R.N.V.R.	Ldg. Air. A. H. Thomson.

¹ Failed to return from attack.

APPENDIX B (1)—continued

3.—Bombers—continued

2nd STRIKE

No. 52 T.B.R. Wing ("Victorious")

Wing Leader: Act. Lt.-Com. (A) V. Rance, R.N.

Aircraft.	Pilot.	Observer.	Air Gunner.
<i>829 SQUADRON</i> (Flown off from "Victorious")			
L	Ty. Lt. (A) M. Meredith, R.N.V.R.	Lt.-Cdr. V. Rance, R.N.	C.P.O. Air. T. L. Cridland.
B	Ty. Sub-Lt. (A) A. Hamersley, R.N.V.R.	Ty. Sub-Lt. (A) E. R. Shipley, R.N.V.R.	Ldg. Air. T. Harding.
F	Lt. P. Hudson, R.N.	Ty. Sub-Lt. (A) I. D. C. Cooksey, R.N.V.R.	Ldg. Air. R. T. Knight.
H	Ty. Sub-Lt. (A) S. C. Taylor, R.N.Z.N.V.R.	Ty. Sub-Lt. (A) N. Harrison, R.N.V.R.	Ldg. Air. A. B. Sim.
A	Lt.-Cdr. D. Phillips, R.N.	Ty. Sub-Lt. (A) H. Ashford, R.N.V.R.	C.P.O. Air. E. J. W. Sherlock.
K	Ty. Lt. (A) G. W. Grindred, R.N.V.R.	Ty. Sub-Lt. (A) P. Hollis, R.N.V.R.	Ldg. Air. I. Kitley.
P	Ty. Sub-Lt. (A) M. C. Farrer, R.N.Z.N.V.R.	Ty. Sub-Lt. (A) S. A. Erratt, R.N.V.R.	Ldg. Air. R. Bacon.
G	Ty. Lt. (A) N. B. Hustwick, R.N.Z.N.V.R.	Ty. Sub-Lt. (A) E. Stacey, R.N.V.R.	Ldg. Air. T. Spencer.
R	Ty. Sub-Lt. (A) A. N. Towlson, R.N.V.R.	Ty. Sub-Lt. (A) L. J. Ryan, R.N.Z.N.V.R.	Ldg. Air. W. Firth.
Q ¹	Ty. Sub-Lt. (A) E. C. Bowles, R.N.V.R.	Ty. Lt. (A) J. P. Whitaker, R.N.V.R.	Ldg. Air. C. J. Colwell.
M ²	Ty. Sub-Lt. (A) H. H. Richardson, R.N.V.R.	Ty. Sub-Lt. (A) A. G. Cannon, R.N.V.R.	Ldg. Air. E. Carroll.
<i>831 SQUADRON</i> (Flown off from "Furious")			
A	Lt.-Cdr. (A) D. Brooks, R.N.	Ty. Lt. (A) D. S. Miller, R.N.V.R.	P.O. Air. T. W. Halhead.
K	Ty. Lt. (A) C. G. Hurst, R.N.V.R.	Ty. Lt. (A) W. S. Lindores, R.N.V.R.	Ldg. Air. D. Robinson.
G	Ty. Sub-Lt. (A) P. H. Abbott, R.N.V.R.	Ty. Sub-Lt. (A) L. W. Peck, R.N.V.R.	Ldg. Air. V. Gallimore.
C	Ty. Sub-Lt. (A) N. H. Bovey, R.N.V.R.	Ty. Sub-Lt. (A) W. Smith, R.N.V.R.	Ldg. Air. V. Watkins.
F	Ty. Lt. (A) G. Russell-Jones, R.N.V.R.	Ty. Sub-Lt. (A) J. Cartwright, R.N.V.R.	Ldg. Air. G. A. McRae.
L	Ty. Sub-Lt. (A) R. N. Robbins, R.N.V.R.	Ty. Sub-Lt. (A) J. Coe, R.N.V.R.	Ldg. Air. T. Ward.
B	Ty. Sub-Lt. (A) T. M. Henderson, R.N.V.R.	Ty. Sub-Lt. (A) V. Hutchinson, R.N.V.R.	Ldg. Air. V. Smyth.
H	Ty. Sub-Lt. (A) M. M. Bebbington, R.N.V.R.	Ty. Sub-Lt. (A) G. J. Burford, R.N.V.R.	Ldg. Air. R. R. Rankin.
M	Ty. Sub-Lt. (A) P. Hunter, R.N.V.R.	Ty. Sub-Lt. (A) E. M. King, R.N.V.R.	Ldg. Air. W. A. Allen.

¹ Crashed in sea after take-off; all crew lost.² Shot down.

APPENDIX C

BOMBING ATTACK : TACTICAL DETAILS

1st STRIKE

No. 8 T.B.R. Wing ("Furious")

Wing-Leader, Lt.-Com. (A) R. Baker-Faulkner, R.N.

Aircraft in Order of Dive.	Bomb Load.	Column.	Direction of Attack.	Angle of Dive and Height of Release.
<i>827 SQUADRON</i> (Flown off from "Victorious")				
K	3—500-lb. M.C. . .	—	Stern to bow . . .	1,200 ft.
A	1—1,600-lb. A.P.	Starboard	From Green 130° . .	50°, 3,000 ft.
Q	3—500-lb. S.A.P.	Starboard	—	50°, 2,500 ft.
C	3—500-lb. S.A.P.	Starboard	From Green 120° . .	50°, 2,500 ft.
M	3—500-lb. S.A.P.	Starboard	From Green 100° . .	55°, 2,000 ft.
F	1—1,600-lb. A.P.	Port . .	Stern to bow . . .	45°, 2,500 ft.
G	3—500-lb. M.C. . .	Port . .	—	55°, 2,000 ft.
P	2—600-lb. A/S . .	Port . .	Stern to bow . . .	70°, 1,500 ft.
H	2—600-lb. A/S . .	Port . .	From Red 170° . . .	50°, 2,500 ft.
B	3—500-lb. S.A.P.	Starboard	From Green 100° . .	50°, 2,800 ft.
R	3—500-lb. M.C. . .	Port . .	From Red 130° . . .	50°, 2,500 ft.
L	3—500-lb. M.C. . .	Starboard	From Green 120° . .	55°, 2,500 ft.
<i>830 SQUADRON</i> (Flown off from "Furious")				
A	1—1,600-lb. A.P.	Port . .	—	30°, 2,500 ft.
C	3—500-lb. S.A.P.	Port . .	Port quarter to starboard bow.	50°, 2,000 ft.
B	1—1,600-lb. A.P.	Port . .	Port bow to starboard quarter.	45°, 1,200 ft.
H	3—500-lb. S.A.P.	Port . .	Starboard quarter to port bow.	70°, 2,000 ft.
M	3—500-lb. S.A.P.		Shot down.	
F	1—1,600-lb. A.P.	Port . .	—	45°, 2,000 ft.
G ¹	1—1,600-lb. A.P.	Port . .	Port bow to starboard quarter.	45°, 2,700 ft.
K	1—1,600-lb. A.P.	Port . .	—	45°, 2,000 ft.
L	3—500-lb. S.A.P.	Port . .	Bow to stern . . .	65°, 2,500 ft.

¹ Bomb failed to release.

APPENDIX C—continued

2nd STRIKE

No. 52 T.B.R. Wing ("Victorious")

Note.—One of the aircraft of this strike shown as carrying 500-lb. S.A.P. bombs actually carried 2—600-lb. A/S bombs.

Wing-Leader, Lt.-Com. (A) V. Rance, R.N.

Aircraft in Order of Dive.	Bomb Load.	Column.	Direction of Attack.	Angle of Dive and Height of Release.
<i>829 SQUADRON</i>				
<i>(Flown off from "Victorious")</i>				
L	3—500-lb. S.A.P.	Port ..	—	—
B	3—500-lb. M.C. ..	Starboard	—	—, 4,000 ft.
F	3—500-lb. M.C. ..	Port ..	Across target	—, 2,000 ft.
H	3—500-lb. S.A.P.	Starboard	—	75°, 2,000 ft.
A	3—500-lb. M.C. ..	Not in formation.	—	65°, 3,500 ft.
K	3—500-lb. S.A.P.	Port ..	—	60°, 2,000 ft.
P ¹	3—500-lb. S.A.P.	Port ..	—	65°, 2,500 ft.
G	1—1,600-lb. A.P.	Port ..	—	50°, 3,000 ft.
R	1—1,600-lb. A.P.	Starboard	—	65°, 3,500 ft.
Q	1—1,600-lb. A.P.	Crashed in sea after take off.		
M		Shot down.		
<i>831 SQUADRON</i>				
<i>(Flown off from "Furious")</i>				
A	3—500-lb. S.A.P.	Starboard	Port quarter to starboard bow.	—
K	3—500-lb. S.A.P.	Starboard	Port quarter to starboard bow.	—, 3,000–3,500 ft.
G	3—500-lb. S.A.P.	Starboard	Stern to bow	—, 3,000 ft.
C	3—500-lb. S.A.P.	Starboard	From port quarter	—
F	3—500-lb. S.A.P.	Starboard	From port quarter	—, 2,000 ft.
L	3—500-lb. S.A.P.	Starboard	Stern to bow	—
B ²	3—500-lb. S.A.P.	Starboard	Stern to bow	—, 3,000 ft.
H	3—500-lb. S.A.P.	Starboard	Stern to bow	—, 3,000 ft.
M	3—500-lb. S.A.P.	Starboard	Stern to bow	—

¹ Bombs dropped safe, owing to electrical failure.

² One bomb failed to release.

APPENDIX C (1)

BOMBING ATTACKS : AIR CREWS' REPORTS

1st STRIKE

No. 8 T.B.R. Wing ("Furious")

Aircraft in Order of Dive.	Observations.
<i>827 SQUADRON</i>	
A	Flak, both light and heavy, inaccurate. Explosion seen about the bridge superstructure.
Q	One hit abaft funnel by one of first aircraft; one hit forward; smoke puff from after end of ship.
C	Two of Wing-Leader's bombs hit near "A" and "B" turrets, and two other hits about the same time, port side amidships; one bomb fell in water. No enemy opposition.
M	First two bombs hit forward turrets; bomb from Aircraft C hit amidships and bomb from A hit further aft.
F	One hit on forecastle; two hits on "A" turret; a splash 20 yards on port beam. Smoke just started.
G	Aircraft next ahead hit bridge, deep red flash between funnel and bridge on port side; two exploded near ship in mid-air, another hit "X" turret.
P	Both own bombs hit starboard side of bridge. Aircraft ahead's bombs all seemed to be on target; six to seven hits amidships seen before attacking.
H	One hit seen on bow before attack; Aircraft "P" got two hits on port side of bridge and one aft; one bomb astern.
B	Wing-Leader's bombs, at least one, possibly two, hit before bridge, causing smoke and flame.
R	Leader scored two hits, one before bridge, one just further aft.
L	Aircraft "B" caused big explosion amidships; sheets of flame just before funnel. Two near misses, 30 yards to starboard.
<i>830 SQUADRON</i>	
A	During getaway, superstructure was enveloped in grey smoke, with tips of orange flame appearing at intervals.
C	Very large explosion on forecastle; "Pilot yelled that the C.O. (Aircraft "A") . . . had got a hit." One of own bombs hit amidships; three bombs seen to fall in fiord.
B	Before dropping bombs, at least one 1,600-lb. bomb seen to hit; several smaller explosions. Large column of smoke rose very quickly to about 1,300 ft.
H	Explosion amidships and large column of white smoke; smaller smoke column from bridge area; large explosion and dense white smoke from "B" turret.
F	Steady red glow amidships and smoke pouring up.
G	Bomb hit, producing large sheet of flame forward control position, followed by heavy pall of smoke. Ship's flak ineffective. Own bomb (1,600-lb.) failed to release.
K	During din, saw <i>Tirpitz</i> constantly hit by various bombs. Aircraft "F" hit amidships with 1,600-lb. bomb, causing large explosion. Target enveloped in large red flames, with smoke amidships. Own bomb (1,600-lb.) hit near the previous one with similar result. <i>Tirpitz</i> was stationary, and heading about 330° up Kaa Fiord.
L	Several explosions seen through smoke during run in. Bomb from Aircraft "K" exploded amidships. One near miss 50 ft. from port bow, and several bombs bursting near an oil tank and five smoke generators on beach alongside ship.

APPENDIX C (1)—*continued*

2nd STRIKE

No. 52 T.B.R. Wing ("Victorious")

Aircraft in Order of Dive.	Observations.
<i>829 SQUADRON</i>	
B	Hits seen amidships, starboard side by bridge.
F	Target hit amidships by leader's bombs. Smoke screen over area, but ship visible.
H	Own bombs and another stick missed over. Saw one Barracuda shot down—port wing broken and on fire.
A	Own bombs hit amidships. Fire, a dull red glow about the size of a gun turret.
K	Large explosion amidships; two near misses seen.
P	Smoke obscured everything except target. Red glow amidships, port side, observed. One aircraft, which seemed to have dropped bombs, seen to dive in flames. Own bombs dropped safe, owing to electrical failure.
G	Hit by another aircraft seen abaft funnel, port side; smoke issuing from between two forward turrets. Saw Barracuda with smoke coming from wing.
R	One hit on stern, slightly to port between turrets. A large swirl astern, either near miss or screws turning.
<i>831 SQUADRON</i>	
A	Large fire burning port side by bridge superstructure; second fire broke out in similar position, starboard side.
K	Ship appeared to be adrift with stern almost aground, bow into fiord. Saw two hits amidships; black smoke and flames from funnel. Own bombs, one hit starboard side amidships, two near misses. One Barracuda on fire flying north, apparently under control.
G	Large fire seen amidships; fresh explosion seen just before releasing bombs. Own bombs, one hit after gun turret, one near miss astern.
C	Stern within 30 yards of shore. Fierce fire near "X" turret. Saw two hits amidships, one on either beam, apparently from separate aircraft, and one hit on port side of forecastle.
F	Large orange flame billowing from funnel; an explosion on bows and fire amidships.
L	Saw two hits amidships, fire and belching flames; one hit on forecastle. Own bombs fell short.
B	Fierce fire burning amidships. One of own bombs failed to drop and was subsequently jettisoned over sea.
H	Saw four bomb hits, and one burst on land about 30 yards astern of target.
M	One large explosion just forward of superstructure, followed by an explosion near "B" turret; near miss astern on the coast.

APPENDIX C (2)

OPERATION TUNGSTEN : AIRCRAFT LOSSES

Barracudas (3)

Aircraft.	Crew.	Remarks.
M 830 Squadron (<i>Furious</i>).	Sub-Lt. (A) T. C. Bell, R.N.V.R., Pilot. Sub-Lt. (A) R. N. Drennan, R.N.V.R., Observer. Ldg. Air. G. J. Burns, T.A.G.	Damaged in First Strike ; seen in controlled glide after the attack, and may have made good forced landing.
Q 829 Squadron (<i>Victorious</i>).	Sub-Lt. (A) F. C. Bowles, R.N.V.R., Pilot. Lt. (A) J. P. Whittaker, R.N.V.R., Observer. Ldg. Air. C. J. Colwill, T.A.G.	Crashed in sea after a successful take-off. Crew all killed.
M 829 Squadron (<i>Victorious</i>).	Sub-Lt. (A) H. H. Richardson, R.N.V.R., Pilot. Sub-Lt. (A) A. G. Cannon, R.N.V.R., Observer. Ldg. Air. E. Carroll, T.A.G.	Shot down in flames during second strike. Possibly crew baled out.

Hellcat (1)¹

(<i>Emperor</i>).	Sub-Lt. T. H. Hoare, R.N.Z.N.V.R.	Hook damaged by enemy. Landed in water ; pilot saved by H.M.S. <i>Algonquin</i> .
---------------------	-----------------------------------	---

¹ Rear-Admiral Bisset decided against the risk of landing this aircraft without hook on either of the Fleet Carriers because of the large number of aircraft in ~~repair~~ *the air* at the time.

APPENDIX D

ANALYSIS OF HITS CLAIMED

Notes.—(1) This Appendix is based on V.A.C. 2nd B.S. 128/026 of 10th April, 1944, Appendix II; "Victorious" letter 0137/6206 of 5th April, 1944, Appendices I, II and Enclosure IV, and M.056600/44 containing Admiralty Assessment. In columns (3) and (4) the figures have been adjusted, where necessary, to agree with the bomb loads carried as stated in "Victorious" report, and reports of individual aircraft.

(2) The Admiralty assessment states that although the hits shown in columns (7) and (8) are all that can be established from the evidence now (3rd May, 1944) in possession of the Admiralty, "it is emphasised that this assessment . . . is conservative, and that a larger proportion of hits, particularly with 500-lb. S.A.P. bombs is regarded as probable."

Type of bomb.	Number carried per aircraft.	Number of aircraft to attack.	Total bombs dropped.	Hits claimed.		Admiralty* assessment.	
				Classified hits separately identified.	Other hits supported by photographic evidence.	Certain.	Probable.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>1st Strike</i>							
1,600 lbs. A.P. ¹ ..	1	7	6	2	1	2	2
500 lbs. S.A.P. ..	3	8	24	5	2	1	1
500 lbs. M.C. ..	3	4	12	2	1	2	—
600 lbs. A/S ..	2	2	4	1	—	1	—
Total ..	—	21	46	10	4	6	3
<i>2nd Strike</i>							
1,600 lbs. A.P. ..	1	2	2	1	—	1	—
500 lbs. S.A.P. ² ..	3	13	38	3	2	1	2
500 lbs. M.C. ..	3	3	9	1	2	—	—
600 lbs. A/S ¹ ..	2	1	1	1	—	—	—
Total ..	—	19	50	6	4	2	2
Grand Total ..	—	40	96	16	8	8	5

¹ One bomb failed to release.

² Three bombs dropped "safe."

APPENDIX E

FLYING PROGRAMME

Note.—Fleet protection provided by *Furious* Seafires and *Fencer*. *Fencer* to keep four Wildcats airborne continuously, and to have four more at stand-by on deck.

Time Zero plus. (Zero 0415).	<i>Victorious.</i>	<i>Furious.</i>	<i>Pursuer. Emperor. Searcher.</i>
0.00-0.10 0.08-0.20	Fly off twelve Corsairs.	Fly off two Seafires (A).	Each fly off ten fighters, (First Strike escort).
0.10-0.20 0.20-1.20 0.20-0.56 0.20-1.00	Fly off twelve Barracudas. First Strike takes Departure : Range up twelve Barracudas, twelve Corsairs.	Fly off nine Barracudas. Proceeds to Target. Range up nine Barracudas.	
0.20-0.35			Each range up ten fighters.
1.00-1.20 1.10-1.20	Fly off Second Strike.	Fly off Second Strike.	Fly off Second Strike.
1.20-2.20 1.20-1.35 1.20-1.30 1.30-1.35 1.35-1.45	Second Strike takes Departure : First Strike Attacks.	Proceeds to Target. Range four Seafires (B). Fly off four Seafires (B). Land on two Seafires (A).	
1.35-2.35 2.10-2.20 2.20-2.35	First Strike returns to Carriers. Second Strike Attacks.	Range four Seafires (C). Fly off four Seafires (C). Land on four Seafires (B).	
2.20-2.25 2.25-2.35 2.35-3.35 2.35-2.55 2.35-3.05 2.35-2.50	Second Strike returns to Carriers. Land on twelve Corsairs. Land on twelve Barracudas.	Land on nine Barracudas.	Land on fighters.
2.50-3.15 3.25-3.35 3.35-3.55 3.35-4.05 3.35-3.50 3.50-4.15 4.05-4.15 4.15-4.20	Land on twelve Corsairs. Land on twelve Barracudas.	Land on four Seafires (C). Land on nine Barracudas. Range four Seafires (D). Fly off four Seafires (D).	Land on fighters.

APPENDIX E (1)

ANALYSIS : FLEET CARRIERS' FLYING PROGRAMME

Notes.—Planned times have been adjusted as follows:—Time to and from target, 20 minutes less each way. 15 minutes allowed for attacking has been included in the time to target and counts as time taken to climb to attacking height.

Zero Time 0415.		<i>Victorious.</i>	<i>Furious.</i>
Planned Time. Zero plus.	Operational Time. Zero plus.		
0.00-0.10	0.01-0.08	Off ten Corsairs.	
0.10-0.20	0.09-0.15	Off twelve Barracudas, one Corsair.	
0.08-0.10	0.08-0.09		Off two Seafires (A).
0.10-0.20	0.09-0.13		Off nine Barracudas.
0.20	0.21	First Strike took Departure.	
1.15	1.14	First Strike Attack.	
1.00-1.10	1.00-1.05	Off ten Corsairs.	
	1.05-1.18	Off eleven Barracudas.	
1.10-1.20	1.06-1.09		Off nine Barracudas.
1.20	1.23	Second Strike took Departure.	
1.30-1.35	1.33-1.35		Off four Seafires (B).
1.35-1.45	1.37-1.42		On two Seafires (A).
1.55	1.55	First Strike Returned.	
2.15	2.21	Second Strike Attack.	
1.55-2.35	2.03-2.25	Land on First Strike.	
1.55-2.25	2.03-2.23		Land on First Strike.
2.20-2.25	2.54-2.55		Off four Seafires (C).
2.25-2.35	2.57-3.11		On four Seafires (B).
2.55	3.00	Second Strike Returned.	
2.55-3.35	3.05-3.40	Land on Second Strike.	
2.55-3.25	3.13-3.43		Land on Second Strike.

APPENDIX F

PRINCIPAL GERMAN AIR BASES AFFECTING OPERATION

Name.	Position.	Distance from Kaa Fiord.	Remarks. (a) Normal use. (b) Normal number of Fighters.
1. Alta	69° 59' N. 23° 19' E.	5 miles	(a) Landing ground. (b) Four Me.109.
2. Banak	70° 04' N.	30 miles	(a) T/B base. Meteorological flight. (b) Nil.
3. Kirkenes-Petsamo	—	85-130 miles	(a) Air attack, North Russian Front (Army co-operation) Barents Sea reconnaissance. (b) Twenty-four Me.109.
4. Tromso	69° 41' N. 19° 01' E.	85 miles	(a) Flying boat base. (b) Nil.
5. Bardufoss ..	69° 03' N. 18° 32' E.	110 miles	(a) Reconnaissance and Meteorological. (b) Nil.
6. Narvik area ..	—	190 miles	(b) Five Me.109.
7. Trondheim area ..	—	480 miles	(a) Reconnaissance and Meteorological. (b) Twelve F.W.190.
8. Bergen-Stavanger	—	900 miles	(a) Reconnaissance ; Meteorological ; T/B. (b) Thirty to forty Me.109 and Me.110.

INDEX

Numbers refer to Sections

A/A fire, German, 5, 6.

Admiral Von Tirpitz, battleship, 1 (and note), 2, 3 ; attacked by aircraft, 5, 6 ; damage, 7, 9, App. D.

Air attack, method, 2 ; on *Tirpitz*, 5, 6.

Aircraft, British, *Bombers* (*Barracudas*), 1 ; organisation and loads, 2 ; serviceability, 4 ; attack on *Tirpitz*, 5, 6, 7 (note) ; losses, 5, 6, App. C (2) ; Apps. B, B (1), C, D, E, E (1). *Fighters*, escorting bombers (*Corsairs*, *Hellcats*, *Wildcats*), 2, 3, (note) ; attack A/A defences, 5, 6 ; 7 (note) ; damage inflicted by, 8 ; loss, 5, App. C (2) ; Apps. B, B (1), E, E (1) ; Fleet protection (*Wildcats*, *Seafires*, *Corsairs*), 2, 7 (and note), 8. German, 1, 3 (note) ; failure to appear, 5, 6, App. E.

Aircrews, British, briefing and departure, 4 ; return, 5 ; reaction, 7 (and note), 9 ; nominal list, App. B (1), reports, App. C (1) ; Losses, App. C (2).

Algonquin, H.M.C.S., rescues *Hellcat* pilot, 5.

Altenfiord, Northern Norway, 1.

Anson, H.M.S., Flag, Vice-Admiral, 2nd in Command, Home Fleet, 2, 3, 8, App. A.

Baker-Faulkner, Lt. Com. (A) R., R.N. Wing Leader No. 8 T.B.R. Wing, commands first strike, 4, 5, App. B (1).

Barracudas. See Aircraft.

Belfast, H.M.S., in Force " 1," 2, 3,

Bisset, Rear-Admiral A. W. LaT., R.A., escort carriers ; Flag in *Royalist*, 2 ; commands Force " 2," 3 ; 4, 8 (note), 9, App. A.

Blue Ranger, R.F.A., 2, 3.

Bombers. See Aircraft.

Bombs, types used in attack, 2 (and note) ; carried by respective strikes, App. C ; hits on *Tirpitz*, 5, 6 ; assessment of hits, 7, 9, App. D.

Briefing, 4 (and note), 8 (note).

Brown Ranger, R.F.A., 2, 3.

Commanding officers of ships taking part, App. A.

Communications, 8.

Convoy, J.W.58, 2 ; successful passage, 3.

Corsairs. See Aircraft.

Damage, to *Tirpitz*, preliminary estimate, 7 (and note), 9, App. D.

Defences, German, at Kaa Fiord, 1, plan 3.

Denny, Captain M. M., C.B., C.B.E., R.N., C.O. H.M.S. *Victorious*, remarks on departure of strikes, 4, 9.

Destroyers : British, taking part, 3, App. A ; fuelling arrangements, 2, 3, 7 ; air-sea rescue, 6. German, in Northern Norway, 1 ; *Narvik* class, 1 (note), 5, 8.

Duke of York, H.M.S., Flag, Commander-in-Chief, Home Fleet, 2, 3 (and note).

Emperor, H.M.S., 2, 3.

Eriboll, Loch, Scotland, north coast, bombing range, 2, 8.

Fatigue of air crews after operation, 7 (and note).

Fell, Lt.-Com. (A) M. F., R.N. (H.M.S. *Searcher*), commands close fighter escort, second strike, 6, App. B (1).

Fencer, H.M.S., 2, 3 ; provides fighter cover for Fleet, 7, App. A.

Fighters. See Aircraft.

Flagship, carrier or battleship more suitable ?, 8 (and note).

Flak. See A/A fire.

Flying programme, Apps. E, E (1).

INDEX—continued

- Forces, surface, 2, 3, App. A ; organisation on passage, 3 ; and for operation, 3 (note).
- Fraser, Admiral Sir Bruce, G.C.B., K.B.E., C.-in-C. Home Fleet, Flag in *Duke of York*, 2 ; decides to advance date of operation, 3 (and note), 7 ; on suitability of carrier as flagship, 8 ; 9.
- Fuelling, arrangements for destroyers, 2, 3, 7.
- Furious*, H.M.S., 2 (and note) ; flies off strike, 4 ; provides fighter cover for fleet, 7
Apps. A, E, E (1) ; aircraft, 2, 4, 5, 6, 7, Apps. B (1), C, C (1).
- German Airforce. *See* Aircraft.
- Hellcats. *See* Aircraft.
- Jamaica*, H.M.S., 2, 3 ; escorts *Searcher*, 7, App. A.
- Javelin*, H.M.S., 3 ; escorts Fleet oilers, 3, App. A.
- Kaa Fiord, Northern Norway, German defended anchorage, 1, 5.
- Loppen Island, Northern Norway, landfall of strikes, 4, 6.
- Losses of aircraft, App. C (2).
- Marne*, H.M.S., *Duke of York's* screen, 3.
- Matchless*, H.M.S., *Duke of York's* screen, 3.
- Meteor*, H.M.S., 3, App. A.
- Milne*, H.M.S., 3, App. A.
- Moore, Vice-Admiral Sir Henry, K.C.B., C.V.O., D.S.O., Second-in-Command, Home Fleet, Flag in *Anson*, plans operation "Tungsten," 2 ; passage from Scapa, 3 ; decides against repeating operation, 7 ; remarks on operation, 8 ; 9, App. A.
- Narvik* class destroyers (German), 1 (note).
- Onslaught*, H.M.S., 3, App. A.
- Organisation, surface forces, 2, 3 (note).
- Piorun*, Polish destroyer, 3 ; escorts Fleet oilers, 3, App. A.
- Plan of operation, 2.
- Pursuer*, H.M.S., 2 ; temporary breakdown, 3, App. A.
- Rance, Lt.-Com. (A) V., R.N., Wing Leader No. 52 T.B.R. Wing, Commands second strike, 6, App. B (1).
- Reconnaissance, German, 1, 3 (note).
- Royalist*, H.M.S., Flag, Rear-Admiral, escort carriers, 2, 3, App. A.
- Seafires. *See* Aircraft.
- Searcher*, H.M.S., 2, 3 ; develops defect, 7, App. A.
- Sheffield*, H.M.S., 2, 3, App. A.
- Ships taking part, 2, 3 ; organisations, 2, 3 (and note), App. A.
- Silden Island, Alten Fiord, withdrawal route, 5, 6.
- Sioux*, H.M.C.S., 3 ; escorts *Searcher*, 7, App. A.
- Skaale Fiord, Faeroes, destroyers fuel at, 3.
- Sleigh, Lt.-Com. J. W., D.S.C., R.N. (of staff of Rear-Admiral Bisset), commends close escorts, first strike 4, App. B (1).
- Submarines, German, 1 ; steps to evade, 2, 7 (and note).
- Sunrise, time of, 3 (note).
- Swift*, H.M.S., 3, App. A.

INDEX—continued

- Tactics, surface craft, 8 ; aircraft, 4, 5, 6, App. C.
- Tirpitz*. See *Admiral Von Tirpitz*.
- Training, 2 ; importance of, 8.
- "Tungsten," name of operation, 2.
- Turnbull, Lt.-Com. F. R. A., R.N., H.M.S. *Victorious*, commands corsairs, 4, App. B (1).
- Ulysses*, H.M.S., reinforces Fleet oilers, 7 (note).
- Undaunted*, H.M.S., 3, App. A.
- United States of America, fatigue of aircrews, 7 (note) ; prefer carriers to battleship as Flagship, 8 (note).
- Ursa*, H.M.S., 3, App. A.
- Victorious*, H.M.S., 2 (and notes) ; preparations for air attack, 4 (and notes), 6, 7, Apps. A, E, E (1) ; aircraft, 2, 4, 5, 6, 7, Apps. B (1), C, C (1).
- Verulam*, H.M.S., 3, App. A.
- Vigilant*, H.M.S., 3, App. A.
- Virago*, H.M.S., 3 ; escorts *Searcher*, 7, App. A.
- Visibility, closes down on Force "2," 3 ; extreme during air attack, 4, 5, 6.
- Wakeful*, H.M.S., 3, App. A.
- Weather, on passage, 3 ; during attack, 4 ; importance of, 8.
- Wildcats. See Aircraft.
- Zone time, (-1), 3 (note).

SCAPA to BARENTS SEA OPERATION "TUNGSTEN"

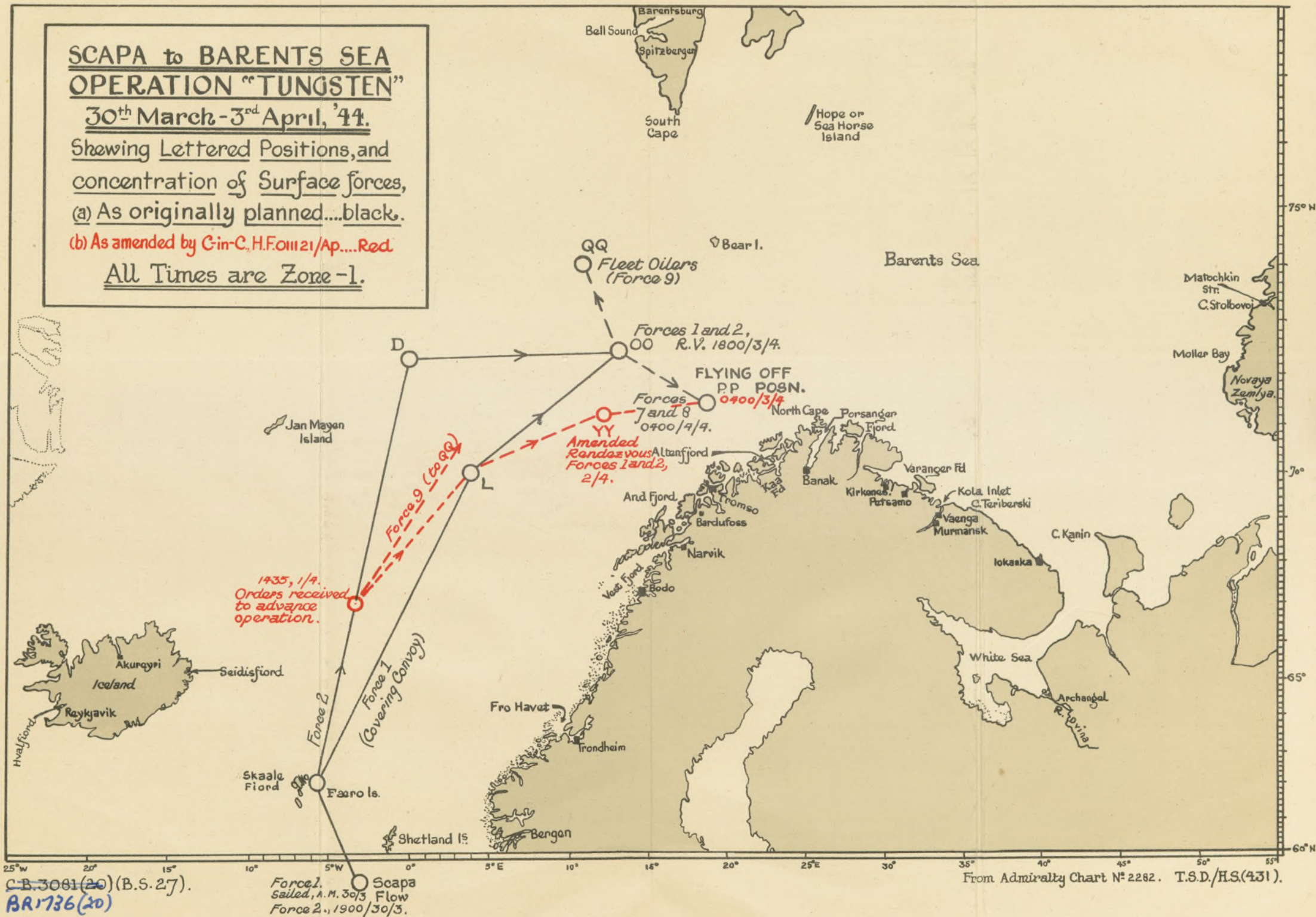
30th March - 3rd April, '44.

Showing Lettered Positions, and
concentration of Surface forces,

(a) As originally planned....black.

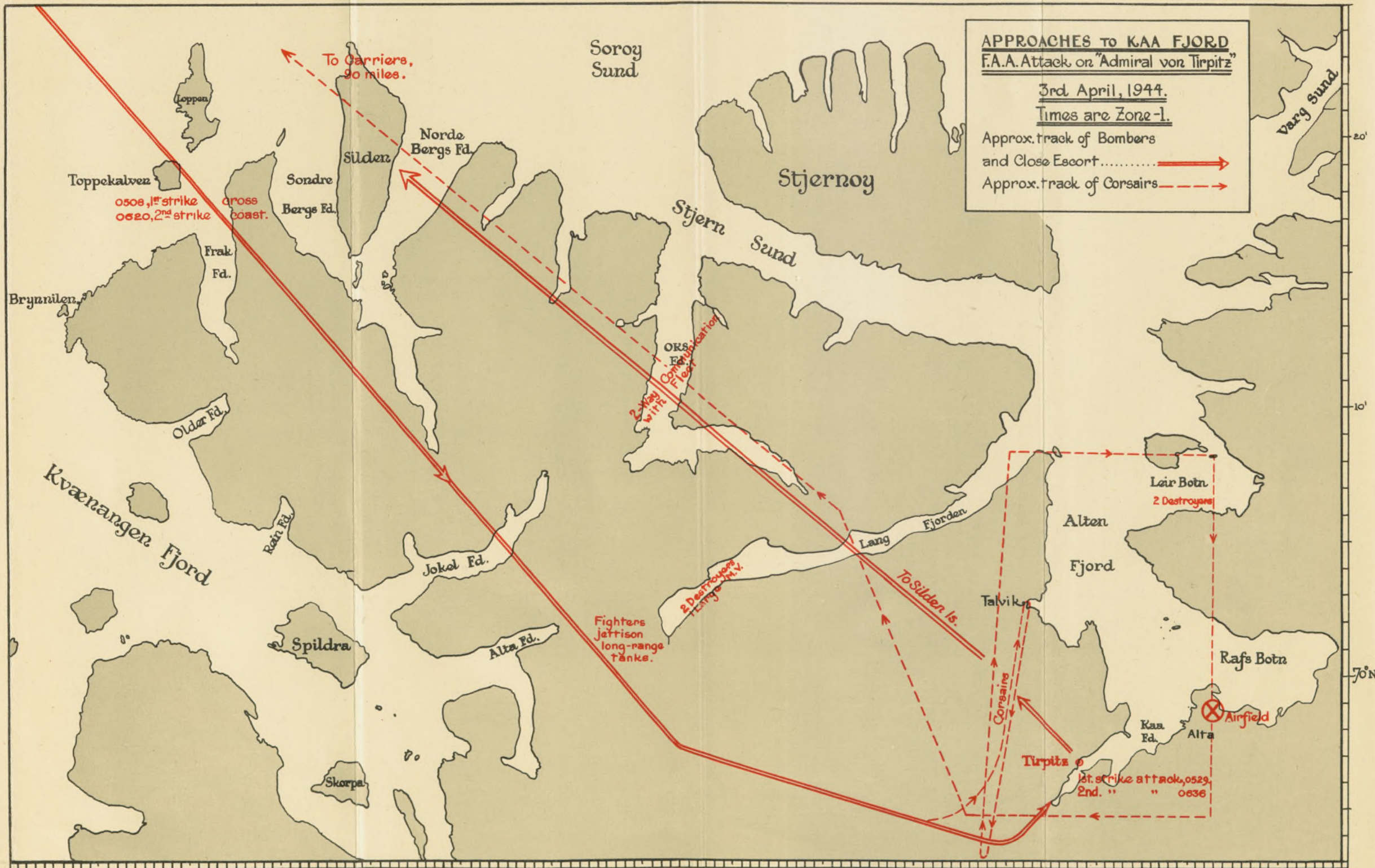
(b) As amended by Cin-C, H.F. 11121/4p....Red.

All Times are Zone -1.



C.B. 3081(20) (B.S. 27).
BR 1736(20)

Force 1. Scapa Flow
Sailed, A.M. 30/3.
Force 2., 1900/30/3.



APPROACHES TO KAA FJORD
F.A.A. Attack on "Admiral von Tirpitz"
 3rd April, 1944.
 Times are Zone -1.
 Approx. track of Bombers and Close Escort.....→→→→→
 Approx. track of Corsairs.....→→→→→

F.A.A. Attack on the "Tirpitz"

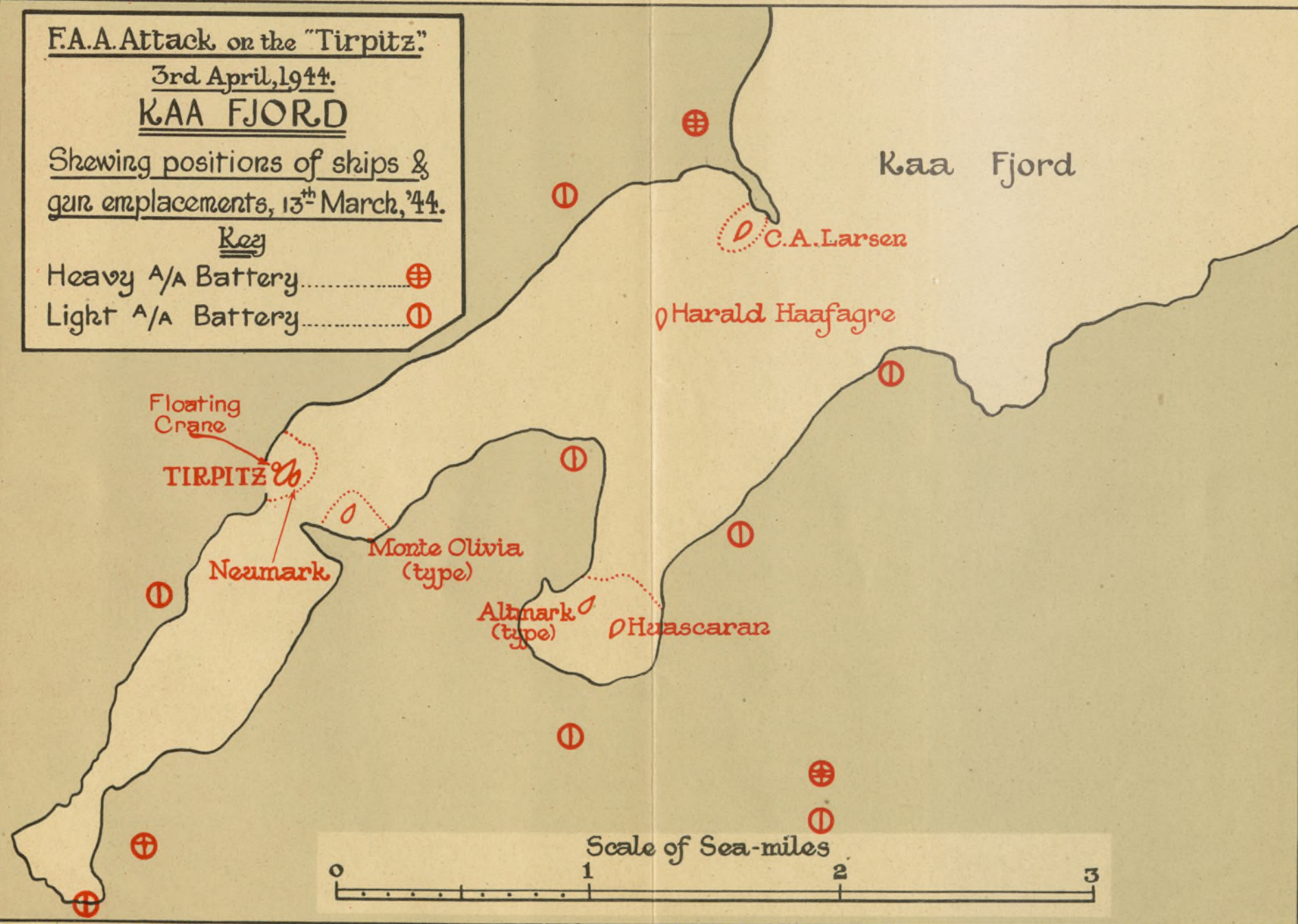
3rd April, 1944.

KAA FJORD

Shewing positions of ships & gun emplacements, 13th March, '44.

Key

- Heavy A/A Battery.....⊕
- Light A/A Battery.....⓪



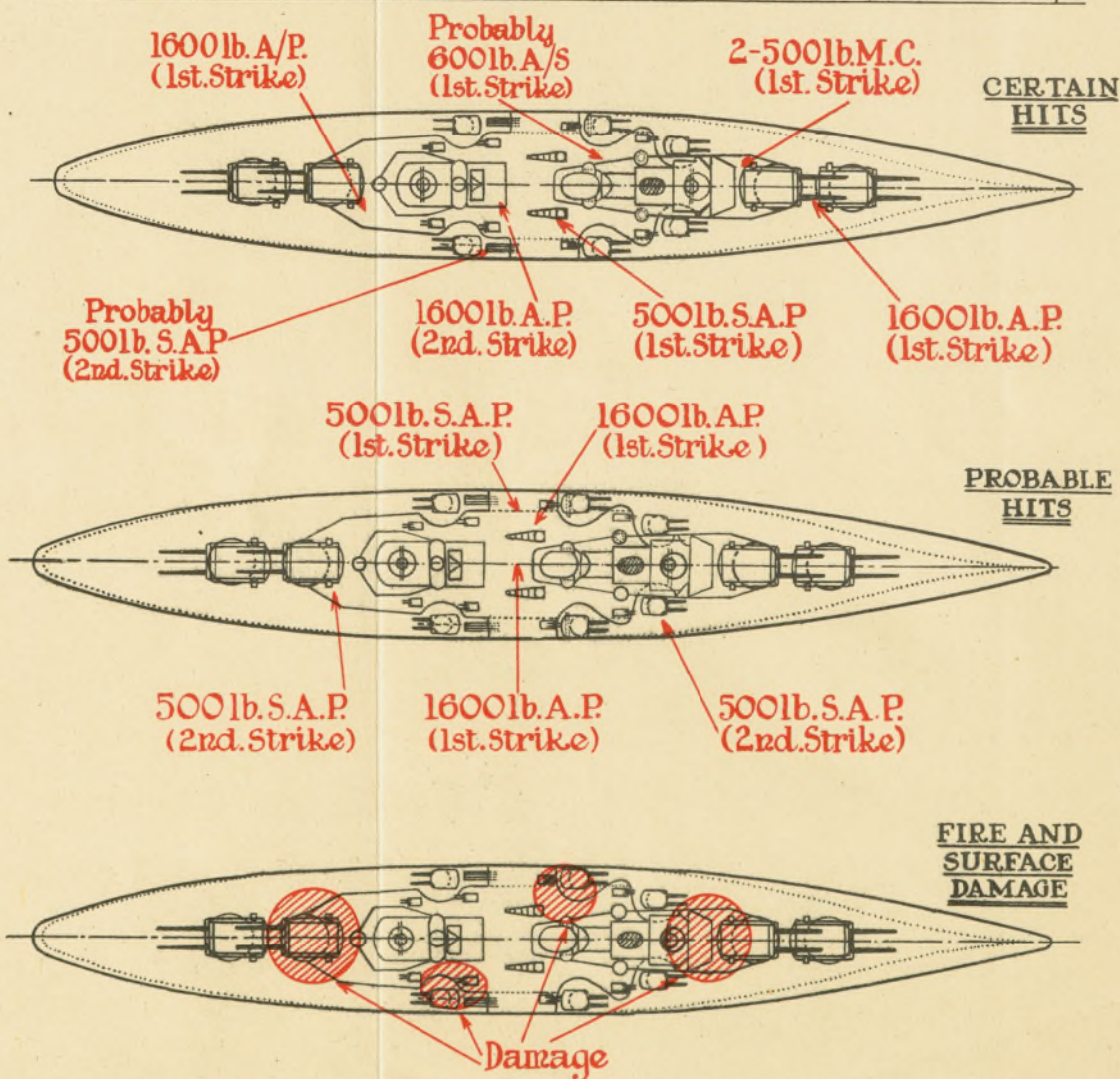
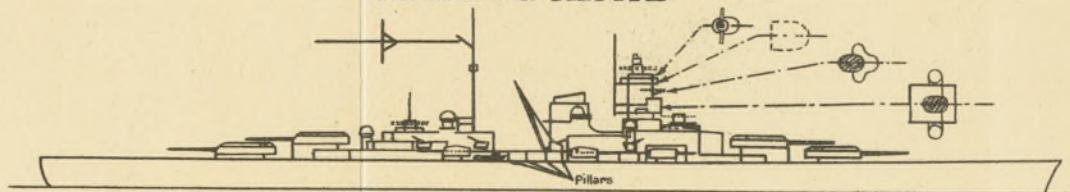
C.B. 3081(20)(B.S. 27)
BR 1736(20)

F.A.A. ATTACK on TIRPITZ, 3rd April, 1944.

Admiralty Assessment of Hits, 3/5/44

This assessment is conservative, and a larger proportion of hits, particularly with 500 lb. S.A.P. bombs is regarded as probable.

"ADMIRAL von TIRPITZ"



LIST OF BATTLE SUMMARIES ISSUED

<i>Battle Summary</i>	<i>No.</i>	
BR 1736 C.B. 3081 (1)	{	1 Operations at Oran, 3rd-6th July, 1940.
		2 Action off Cape Spada, Crete, 19th July, 1940.
BR 1736		3 Attack on <i>Richelieu</i> , Dakar, 8th July, 1940.
C.B. 3081 (2)		4 Naval Operations, Crete, 20th May-1st June, 1941.
BR 1736 C.B. 3081 (3)		5 Operations against <i>Bismarck</i> , 23rd-27th May, 1941.
BR 1736 C.B. 3081 (4)	{	6 Bardia, bombardments, 1940-41.
		7 Genoa, bombardment, 9th February, 1941.
		8 Action off Cape Calabria, 9th July, 1940.
BR 1736 C.B. 3081 (6)	{	9 Action off Cape Spartivento, 27th November, 1940.
		10 Attack on Taranto, 11th November, 1940.
BR 1736 C.B. 3081 (7)	{	11 <i>Scharnhorst</i> and <i>Gneisenau</i> , 12th February, 1942.
BR 1736		12 St. Nazaire, 28th March, 1942.
C.B. 3081 (5)		13 Actions with Enemy Disguised Raiders, 1940-41.
BR 1736 C.B. 3081 (8)		14 Loss of H.M. Ships <i>Prince of Wales</i> and <i>Repulse</i> , 10th December, 1941.
BR 1736 C.B. 3081 (9)	{	15 Naval Operations off Ceylon, 29th March-10th April, 1942.
		16 Naval Operations at the capture of Diego Suarez (Operation <i>Ironclad</i>), May, 1942.
BR 1736 C.B. 3081 (10)		17 The Conjoint Expeditions to Norway, April-June, 1940.
BR 1736 C.B. 3081 (11)		18 Mediterranean Convoys, 1941.
BR 1736 C.B. 3081 (12)		19 Mediterranean Operations, 18th-23rd April, 1941; Bombardment of Tripoli, 21st April, 1941.
C.B. 3081 (13)		20 Special Distribution.
BR 1736 C.B. 3081 (14)		21 Naval Operations at the Landings in the Southern Solomons, 7th-10th August, 1942.
BR 1736 C.B. 3081 (15)		22 Russian Convoys, 1942.
BR 1736 C.B. 3081 (16)		23 Naval Operations of the Campaign for Guadalcanal, August, 1942-February, 1943.
BR 1736 C.B. 3081 (17)		24 The Sinking of the <i>Scharnhorst</i> , 26th December, 1943.
BR 1736 C.B. 3081 (18)		25 Naval Strategy in the Pacific, December, 1941-February, 1943.
BR 1736 C.B. 3081 (19)		26 Chase and Destruction of the <i>Graf Spee</i> , 1939.
BR 1736 C.B. 3081 (20)		27 Naval Aircraft Attack on the <i>Tirpitz</i> (Operation "Tungsten"), 3rd April, 1944.

