

## A Detailed Analysis of the Loss of Cornwall and Dorsetshire

### Introduction

The Imperial Japanese Navy's foray into the Indian Ocean in April 1942, "Operation C", was the largest and longest IJN operation between Pearl Harbor and Midway, but no comprehensive study of it has yet been written.<sup>1</sup> Some aspects of Operation C are nevertheless comparatively well known, including the sinking on 5 April of the British heavy cruisers Cornwall and Dorsetshire by 53 D3A dive bombers, but even this incident has never been analysed in detail. The aim of this article is to do precisely that.

Note: Local time (Zone F, GMT+6) is used in this article and distances are in nautical miles.

### Cornwall and Dorsetshire: County Class Treaty Cruisers



**Dorsetshire in silhouette. Taken between 1931 and 1934, it shows to advantage the profile of all 13 County Class cruisers during the early 1930s – four twin 8-inch guns, three funnels, one floatplane amidships, no hangar.<sup>2</sup>**

Cornwall and Dorsetshire were respectively the second and the last of 13 heavy cruisers completed between 1927 and 1930 for the RN and RAN. The 11 RN ships were all named after English counties (the RAN ships were named Australia and Canberra), so the 13 ships were known as the County class, but in fact they belonged to three similar but different classes. The first seven, including Cornwall, constituted the Kent class, the next four were the London class, and the final two were the Norfolks – Norfolk itself and Dorsetshire.

These 13 ships and their counterparts in France, Italy, Japan and the US were also known as "treaty cruisers", because their construction was subject to the limitations specified in the Treaty for the Limitation of Naval Armament, signed in February 1922 by the UK, France, Italy, Japan and the US at the conclusion of the famous Washington Conference. The treaty limited cruisers to a maximum standard displacement of 10,000 tons and to guns of a maximum calibre of 8-inches.

While the Admiralty believed, post Washington, that British trade could be better protected by a large number of smaller cruisers, they could not leave the Royal Navy entirely bereft of ships which could take on the 10,000 ton 8-inch cruisers completed for foreign navies after the treaty came into effect. It was this which prompted the building of the Counties.

The design of any cruiser always involved trade-offs between armament, speed, range, protection and other desiderata, but while the Italians and Japanese produced well balanced designs by exceeding the 10,000 ton limit and lying about it, the British scrupulously respected the treaty, as did the French and Americans. Forced to compromise to stay within the 10,000 ton limit but unwilling to sacrifice armament or range, for the Kent class the Admiralty accepted a designed maximum speed of 31.5 knots at standard displacement, rather than the desired 33 knots, so that 400 tons could be saved by fitting 80,000 shaft horsepower (shp) machinery instead of a 100,000shp plant. Many other corners were also cut to save weight, including the omission of a floatplane, the first use of aluminum in a British warship for non-supporting structures, using rivets with smaller heads to save 40 tons, and even cladding the deck with fir rather than teak planking. The designers' calculations showed that such measures would not be enough, however, and a significant reduction in armour had to be accepted as well.<sup>3</sup>

(We may note in passing that the Germans also cheated, even before Hitler came to power. Their ships were also restricted to 10,000 tons, under Versailles rather than Washington, but the so-called "pocket battleships" of the Deutschland class displaced 11,700 tons standard and more than 15,000 tons at full load.<sup>4</sup>)

	Cornwall	Dorsetshire	Duquesne	Northampton	Zara	Myoko
Year Completed	1927	1930	1928	1930	1931	1929
Range (nm)	8,000	9,300	5,000	10,000	4,500	8,000
Main armament	8 x 8 inch	8 x 8 inch	8 x 8 inch	9 x 8 inch	8 x 8 inch	10 x 8 inch
Secondary armament	4 x 4 inch	4 x 4 inch	8 x 75 mm	4 x 5 inch	16 x 3.9 inch	6 x 4.7 inch
Torpedo tubes	8 x 21 inch	8 x 21 inch	6 x 21.7 inch	6 x 21 inch	None	12 x 24 inch
Aircraft	None	None	Two	Up to Six	Two	Up to four
Designed max speed (knots)	31.5	32.25	33.5	32.5	32	35
Designed standard displacement	9,942	9,925	10,000	9,050	11,500	c. 10,750
Actual standard displacement	9,750	9,830?	9,668	c. 9,050?	11,471	c. 11,550
Full load displacement	13,400	13,290	12,200	12,851	14,300	14,662
Weight of armour (tons)	992	1,060	452	1,057	1,500	1,481

**Table 1 – Key Characteristics of Selected Treaty Cruisers in their Original Configurations<sup>5</sup>**

Table 1 compares the key trade-offs the five treaty navies made (or did not make) in light of the 10,000 ton limit. It highlights in particular that the British designs had 400 to 500 tons less armour than the ships of their two future enemies. In the context of their sinking by 250 kg bombs, it is significant that horizontal armour, some of it rather thin, was provided only over the magazines and shell rooms (from 1 to 3 inches), the machinery spaces (1¾ inches), and the steering gear (1½ inches). The thickest armour was on the sides of the main and secondary magazines (4¾ and 3¾ inches, respectively).<sup>6</sup>

Manoeuvrability was also highly relevant in surviving a dive-bombing attack, and according to one source the Kents “were not handy ships, Kent’s tactical diameter being 1040yds at 14kts”.<sup>7</sup>

**Modifications**

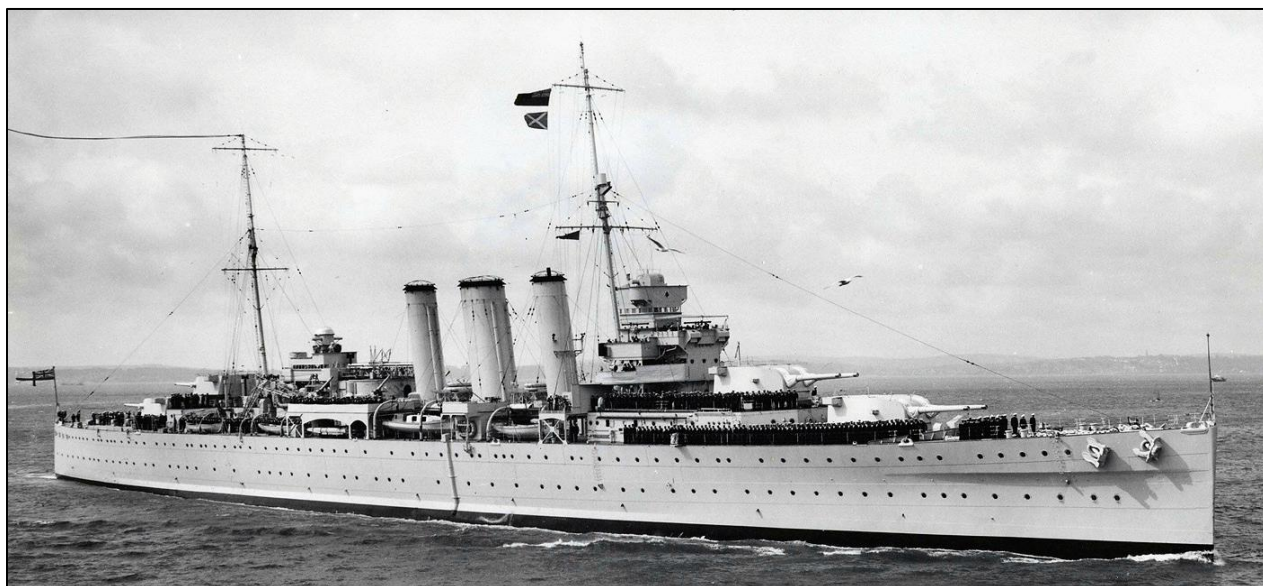
The first modification made to the Kents was to raise the funnels by 15 feet, since it was found that funnel smoke badly affected the bridge and fire control positions. It was also found that while their standard displacement was expected to be 9,942 tons, it was in fact less than this - 9,750 tons in the case of Cornwall. This windfall was used to add several features dropped at the design stage to respect the 10,000 ton limit. These included a floatplane and its catapult and crane, and increasing the 8-inch ammunition carried from 100 rounds per gun to, in the case of Cornwall, the originally intended 150 rounds per gun. These alterations were incorporated in all five RN Kents by 1932.<sup>8</sup>

The Kents received only one more addition of note during the first half of the 1930s, when they each received a pair of quadruple .5-inch machine guns in 1934. These had been included in the original design but were then still in development and not available when the ships were fitting out.



**This shot shows Cornwall with raised funnels but without the catapult fitted in 1931, thus dating it to 1928-1931. The two portside single 2-pounder pom poms are on the platform just aft of the fore funnel. The two portside single 4-inch guns are on a large platform further aft, below which is the port quadruple torpedo tube mount.<sup>9</sup>**

The Admiralty did not by any stretch of the imagination believe that these improvements were sufficient, and later in the decade circumstances allowed them to make additional alterations. The first of these resulted from the signing of the Second London Naval Treaty in 1936 by the UK, the US and France. During its negotiation the signatories informally agreed to show a degree of “tolerance” for the “natural growth” of crusiers completed within the 10,000 ton limit which might bring them to 10,300 tons. The second factor was that in 1934 Japan gave the required two years notice that it was withdrawing from all naval limitations, and the 10,000 ton limit expired on 31 December 1936.<sup>10</sup>



This image of Cornwall was taken in July 1936, just before its 1936-37 modernization. More clearly visible when viewed at <https://images5.alphacoders.com/380/380449.jpg> are the original trainable S.II.L catapult, installed in 1931, and the starboard quadruple .50-inch machine gun, installed in 1934 on a platform just aft of the bridge.<sup>11</sup>

Cornwall was modernized at Chatam Dockyard between July 1936 and December 1937. The alterations and additions brought its standard displacement to an estimated 10,367 tons and could not all have been undertaken had the 10,000 ton limit still been in effect. The changes included the following:

- No horizontal armour was added but an armour belt 4½ inches thick and 6 feet in height was fitted at the waterline inside the anti-torpedo bulge. Its length was limited, however, and covered only the machinery spaces and the transmitting station. As well, 4 inch internal armour plating was added to the sides of the boiler room fan compartments. The additional armour totaled about 288 tons.
- The S.II.L trainable catapult was removed and replaced by a more powerful E.I.H fixed cross-deck catapult capable of launching Walrus floatplanes.
- A hangar for two floatplanes was installed.
- The .5-inch quad machine guns were moved to the hangar roof.
- The four single 4-inch guns were replaced by four twin four-inch guns.
- The High Angle Control System (HACS) Mk I was removed and two High Angle Director Towers (HADTs) were installed on the compass platform, to control the fire of the 4-inch guns.
- The four single 2-pounder pom poms were removed and replaced by the two octuple mountings which had been included in the original design but which were not previously available.
- Pom-pom directors were fitted.
- The torpedo tubes were removed.

Modernization increased Cornwall's standard displacement to an estimated 10,367 tons. Cornwall underwent a number of refits before her loss, but they were apparently focused on routine maintenance. There were no further changes to her armament and no radar was installed.<sup>12</sup>



Cornwall in 1938, after modernization. She now has a hangar, the single 4-inch guns have been replaced by twins, octuple 2-pounder pom poms (under canvas here) have been added abreast the forward funnel, the two quad .5-inch machine guns have been moved to the hangar roof, and the torpedo tubes have been removed.

This image can be better viewed at <http://www.naval-history.net/Photo06caCornwall1.JPG>.



Dorsetshire was not modernized as extensively as Cornwall was but received an interim upgrade at Portsmouth Dockyard in 1937. The highlights included the following:

- The S.II.L catapult was replaced by an E.IV.H fixed cross-deck catapult capable of launching a Walrus. No hangar was fitted, however, and the ship remained able to carry only one aircraft.
- The four single 4-inch guns were replaced by twins and the 4-inch magazine was enlarged.
- A second HACS Mk I was fitted, in addition to one installed in 1931.
- The four single 2-pounder pom poms were removed and replaced by two octuple mountings.
- Positions for two pom-pom directors were provided, with the directors being installed later.
- Blast screens were fitted for the quad 0.5 inch machine guns.
- The bridge was extended to provide Air Defence Officer (ADO) positions and a larger signal deck.
- The torpedo tubes were retained.
- No additional armour was fitted.

After this refit Dorsetshire's standard displacement was an estimated 10,400 tons and its full load displacement **13,775 tons**.<sup>13</sup> (See also Appendix 1, The Evolution of HMS Dorsetshire)



Dorsetshire's starboard twin 4-inch high angle guns. S1, the forward mount, is in the foreground. S2 is behind it. Note the .5-inch quad mounting on the elevated platform just aft of S1, with three of the four barrels visible.<sup>14</sup>



A better look at a Vickers quad .5-inch machine gun. This one is on Suffolk, on the hangar roof. Cornwall and Dorsetshire had two of these not very effective weapons, with Cornwall's also on its hangar roof.<sup>15</sup>



**Octuple 2-pounder pom pom on the London class cruiser Shropshire. Cornwall and Dorsetshire had two of these. Cornwall’s were abreast the forward funnel while Dorsetshire’s were on the superstructure aft of the catapult.<sup>16</sup>**

In 1941 Dorsetshire was fitted with two radar sets, a Type 284 and a Type 290. The Type 284 was a gunnery set for the 8-inch guns. The Type 290 was a surface search set for detecting ships. It could also detect aircraft but only out to 30,000 yards (15 miles). The operator had to turn the antenna by hand and the display screen was an A-scan rather than the Plan Position Indicator (PPI) of today. The Type 290 “never functioned as planned”, according to one source.<sup>17</sup>

There is conflicting information as to what light anti-aircraft guns were added before 5 April 1942, but it appears that, apart from .303-inch machine guns, the only such addition to either ship was the fitting of one single-barrel 2-pounder pom pom on Dorsetshire’s quarterdeck at an unknown time.<sup>18</sup>

Table 2 summarizes the two cruisers’ vital statistics at the time of their loss.

	Cornwall	Dorsetshire
Standard Displacement	10,367 tons	10,400 tons
Full Load Displacement	14,297 tons	13,775 tons
Max speed available	27.5 knots	30 knots
8-inch guns	4 x 2	4 x 2
Torpedo tubes	Removed 1936-1937	2 x 4
4-inch AA guns	4 x 2	4 x 2
2-pdr pompom	2 x 8	2 x 8 1 x 1
.5-inch MG	2 x 4	2 x 4
.303-inch MG	4 x Vickers 2 x Vickers Gas Operated 1 x Lewis	?
Aircraft capacity	1 x Walrus on catapult 2 x Walrus in hangar	1 x Walrus on catapult No hangar
Radar	None	1 x Type 290 1 x Type 284

**Table 2 - Key Characteristics of Cornwall and Dorsetshire on 5 April 1942<sup>19</sup>**



**Cornwall and Dorsetshire at War, 1939-1942**

From September 1939 to December 1941, Cornwall and Dorsetshire operated mainly in the Indian and South Atlantic oceans, patrolling and escorting convoys. The highlight of Cornwall’s service during this period was its battle with the German raider Pinguin on 8 May 1941. Captain PCW Manwaring, in command from November 1940 to April 1942, succeeded in sinking Pinguin, but in a 1942 assessment the Admiralty “considered that the conduct of the operation left much to be desired” and criticised Manwaring for moving “dangerously close” to Pinguin before opening fire. This allowed the raider to open fire first, just as Cornwall’s forward 8-inch turrets suffered an electrical failure which disabled their power training, “and for a time the Cornwall was in grave danger”. Pinguin scored two hits but the two torpedoes it fired missed. Cornwall soon withdrew to a safer range and got all four 8-inch turrets into action. Pinguin was hit by four 8-inch shells and blew up, with the loss of 342 members of its crew and 203 prisoners from captured ships. Cornwall rescued 9 British, 15 Indian and 60 German survivors.

The damage inflicted by Pinguin was soon repaired and Cornwall resumed her patrolling and escort duties in the Indian Ocean. One of her historically more interesting jobs during the second half of 1941 was the escorting of the infantry landing ship HMS Glenroy and the steamer Clan Forbes to Addu Atoll in September. They had on board the 1,013 officers and men of Mobile Naval Base Defence Organization I (MNBDO I), the Royal Marines unit tasked to set up the defences and basic infrastructure needed to make Addu Atoll usable as a fleet anchorage. “Port T”, the cover name by which Addu Atoll was also known, was soon put to use. The battleship Prince of Wales refueled at Addu Atoll on 26 November, on its way to Singapore and its sinking by Japanese naval aircraft on 10 December.

Dorsetshire was under the command of Captain BCS Martin from July 1939 to August 1941. After nearly two years of mostly uneventful patrolling and escort duties, Dorsetshire was escorting a convoy from Freetown to the UK on 26 May 1941 when it copied a report from a Catalina indicating that the German battleship Bismarck was just 360 miles to the north. Martin parted company with the convoy and steamed at high speed for Bismarck’s position. Dorsetshire arrived on the scene the next morning and opened fire with its 8-inch guns at 0904, about 15 minutes after Rodney and King George V had opened fire. Just over an hour later Dorsetshire delivered the *coup de grâce*, firing two torpedoes into Bismarck’s starboard side at 1025 and a third into her port side at 1036. Bismarck sank four minutes later. After Dorsetshire and the destroyer Maori picked up 110 survivors they left the scene as a U-boat was suspected to be in the area.<sup>20</sup>



Dorsetshire’s portside quadruple torpedo tubes lined up on Bismarck on 27 May 1941

<b>NAVAL MESSAGE</b>		S. 1320d. 25M Parts of 891 2-11 (11-11) N.S. 111-9-1320d
To: <u>MOST IMMEDIATE.</u>	From :	
C in C H.F.	DORSETSHIRE.	
<hr/>		
I TORPEDOED BATTLE SHIP BISMARCK BOTH SIDES BEFORE SHE SANK SHE HAD CEASED FIRING BUT HER COLOURS WERE STILL FLYING		

Captain Martin’s message reporting Dorsetshire’s torpedoing of Bismarck<sup>21</sup>

After her encounter with Bismarck, Dorsetshire was refitted in the UK from early June until late July and received her Type 290 radar set. On 17 August she sailed to escort a convoy from the UK to Freetown, with Captain AWS Agar now in command. Dorsetshire arrived at Freetown on 28 August and remained on patrol in that area until early December. Her patrolling bore fruit on 1 December, when she intercepted the German supply ship Python, which was in the process of transferring supplies and fuel to two U-boats, U-68 and U-A. Python, carrying some 300 survivors from the raider Atlantis (sunk by county class cruiser Devonshire on 22 November), was scuttled by her own crew. U-A fired a total of five torpedoes at Dorsetshire. None hit, but the presence of the submarines forced Dorsetshire to depart without rescuing anyone from Python.



Captain Augustus Agar, VC, DSO<sup>22</sup>

When war with Japan broke out in December 1941, Cornwall was already in the Indian Ocean and Dorsetshire was at Simonstown. Both ships were soon heavily involved in escorting convoys across the Indian Ocean, to such destinations as Bombay, Batavia and Rangoon, but there were no encounters with the enemy. (See Appendix 2, Timeline.)

Between 1 December and 27 March, when she arrived at Colombo, Cornwall was at sea for a total of 89 days. Her operational tempo was especially high after 16 January, when she was at sea for 59 of the next 69 days. Her arrival at Colombo was supposed to mark the start of a break of about a fortnight, since her next planned duty was to escort Australian troop convoy SU 4 to Fremantle after it arrived at Colombo on 8 April from the Middle East, but she was destined to remain in port for only three days.

Dorsetshire arrived at Trincomalee on 5 March, having been at sea for 57 out of the preceding 82 days. She remained at Trincomalee for 19 days and then went to Colombo, arriving there on 25 March and entering the drydock two days later.<sup>23</sup> According to Agar's 1959 memoir, *Footprints in the Sea*, Dorsetshire was to undergo a two week refit. Work was to be done on her engines and boilers, a new radar set was to be installed and additional anti-aircraft guns were to be fitted – 20mm Oerlikons, according to another source. Agar described the start of the refit as follows:

*Working day and night, our engineers in Dorsetshire started to dismantle and refit our engines and boilers. The ship had been steaming almost continuously for eight months since leaving our last dockyard port in England. The boilers particularly needed a good scrape. [...] I dared not risk doing too much, or dismantle machinery which could not be put back at 24 hours' notice, for fear of the expected air attack.*<sup>24</sup>

It is worth noting at this point that *Footprints in the Sea* is riddled with factual errors concerning the January to April 1942 period, the following among them:

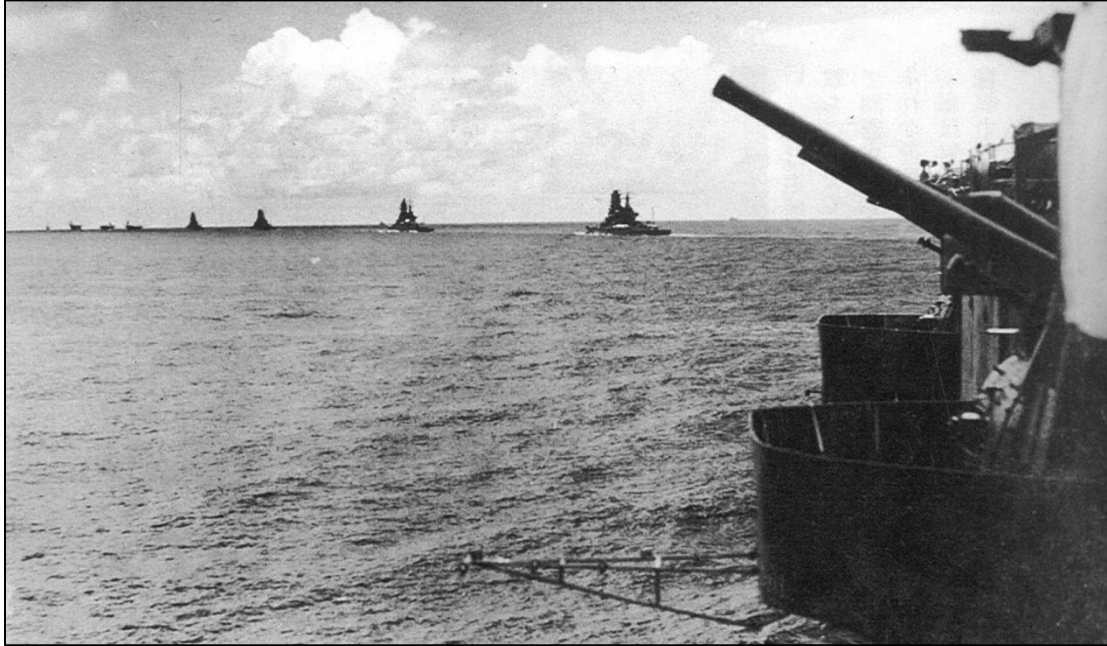
- (1) That Dorsetshire escorted "the last refugee convoy to leave Singapore", but Dorsetshire was 3,000 miles away, at Bombay, and never called at Singapore after the war with Japan began.
- (2) That Dorsetshire transported to Rangoon "100 Royal Marines to man armed river launches and harass the Japs". This small unit, Force Viper, was real enough, but it was taken to Rangoon by the light cruiser Enterprise. Dorsetshire was not involved in any way.
- (3) That Dorsetshire escorted the last convoy from Rangoon, when in fact it escorted the second-to-last convoy to Rangoon. It never escorted any convoy from Rangoon.
- (4) That while Dorsetshire was at Trincomalee Agar "took the opportunity to have the ship dry-docked and her bottom cleaned", but it appears that Trincomalee had no drydock in March 1942.
- (5) That the destroyer "Jarvis" was serving with the Eastern Fleet, but in fact Jervis (not "Jarvis") was in the Mediterranean.

These misstatements are not crucial to understanding the circumstances surrounding the loss of Dorsetshire and Cornwall, but they show that Agar relied primarily on a fallible memory in writing *Footprints in the Sea*. Indeed, Agar notes in it that at the conference held at Colombo, apparently on 29 March, to discuss the plan to ambush KdB, the assembled officers were addressed by "an airman ... whose name I cannot recall".<sup>25</sup> (This was probably Air Vice Marshall John D'Albiac, the commander of 222 Group, which controlled all air units on Ceylon.) It follows that passages which may be important for correctly understanding the events of 5 April cannot necessarily be taken at face value.



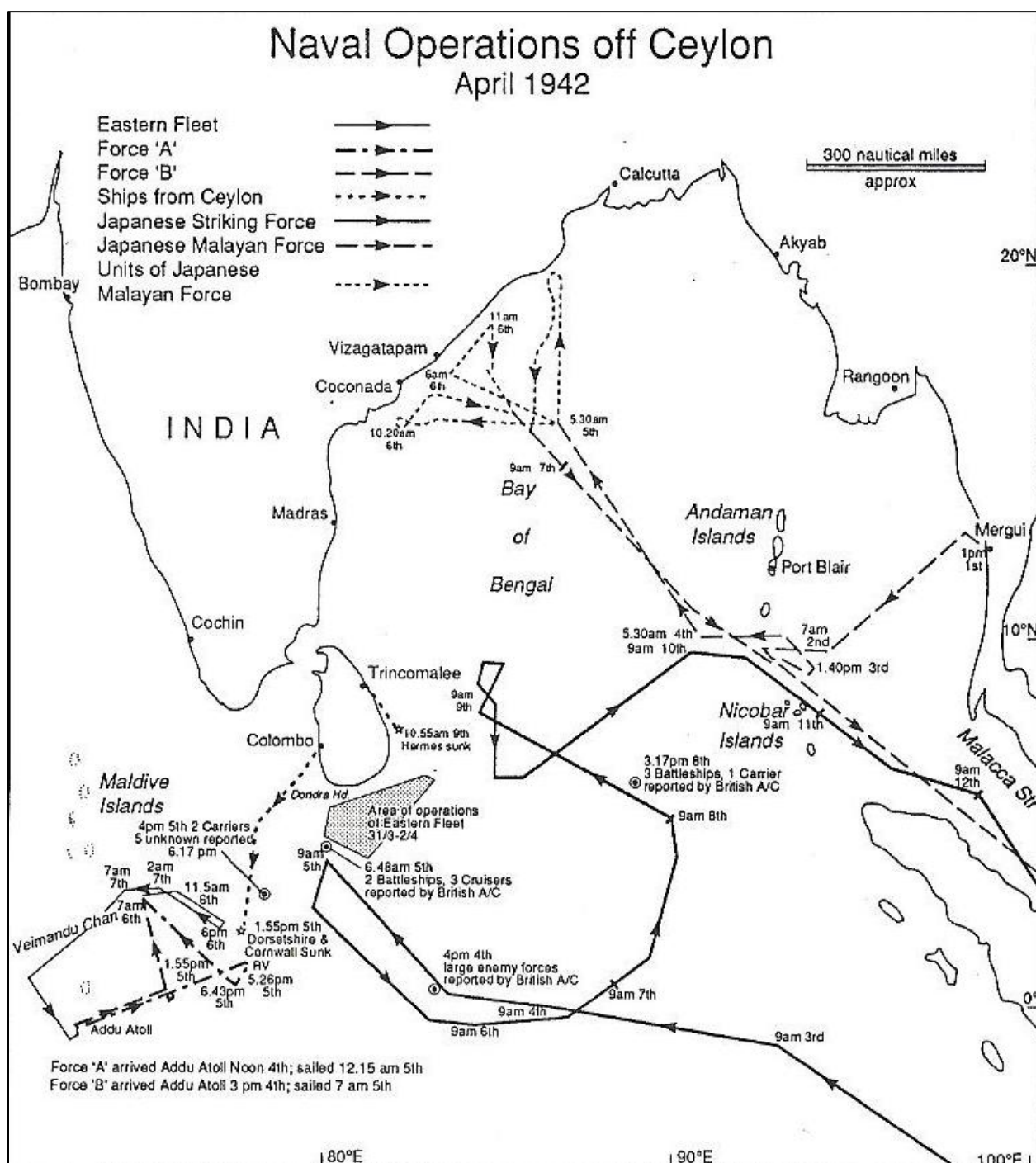
## Operation C Begins

Operation C began on 26 March at 0800 Japan Standard Time (GMT + 9), when the IJN carrier task force known as Kidō Butai (KdB) left Staring Bay on the east coast of Celebes (now Sulawesi). Kidō Butai means “Mobile Force” but is usually rendered as “Striking Force”. KdB was the larger of two forces committed to Operation C, and as it was KdB which sank Cornwall and Dorsetshire, its activities on 4 and 5 April are the focus of this analysis. The second force, Malaya Force, sortied from southern Burma on 1 April and sank 20 ships in the Bay of Bengal on 5 and 6 April, but its depredations are not examined in this article.



KdB exiting Staring Bay. The first two images were taken from Zuikaku. The third image was taken from Akagi a few minutes later. Following the flagship are Soryu, Hiryu, Hiei, Kirishima, Haruna, Kongo, Zuikaku and Shokaku. Akagi is presumably sailing to port of the line of ships following her so that they can all see her visual signals





Map 1 – An Overview of Operation C (As discussed below, this map incorrectly depicts KdB's 5 April track.)<sup>27</sup>

The aim of Operation C was given in Combined Fleet Telegraphic Operation Order Classified No. 86, issued on 9 March by Admiral Yamamoto, the Commander in Chief of the Combined Fleet:

*The Southern Task Force commander shall execute the carrier operation in the Ceylon area specified in the following:*

1. *Mission.* To conduct a surprise attack on the enemy fleet in the Ceylon area and destroy it.
2. *Date of the operation.* From mid-March until early April
3. *Participating forces.* The force with the Carrier Task Force as the core<sup>28</sup>

The "Carrier Task Force" was of course KdB, commanded by Vice Admiral Chūichi Nagumo. During Operation C it would consist of the carriers Akagi, Soryu, Hiryu, Shokaku and Zuikaku, battleships Kongo, Hiei, Haruna and Kirishima, heavy cruisers Tone and Chikuma, light cruiser Abukuma, and eight destroyers. Carrier Division 1 (CarDiv1) normally consisted of Akagi and Kaga, but the latter was in Japan for maintenance. Nagumo commanded CarDiv1 as well as the whole force. Soryu and Hiryu constituted CarDiv2, under Rear Admiral Yamaguchi, while Shokaku and Zuikaku made up CarDiv5, under Rear Admiral Hara. The four battleships constituted BatDiv3, under Rear Admiral Mikawa, and the two heavy cruisers formed CruDiv8, under Rear Admiral Abe. Rear Admiral Omori, who commanded Destroyer Squadron 1 (DesRon1) from Abukuma, led the destroyers.<sup>29</sup>



Nagumo<sup>30</sup>

The “enemy fleet in the Ceylon area” was the Eastern Fleet, commanded by Vice Admiral Sir James Somerville, who was promoted to full admiral on 6 April. Somerville was not an aviator, but from June 1940 to December 1941 he had commanded Force H, which was in essence a carrier task force, centred as it was on the carrier Ark Royal. Somerville had also been involved in the introduction of radar into the Royal Navy (he has been called the foster-father of British naval radar) and knew how to exploit its capabilities. He was well aware of the limitations of his ships and aircraft, but, although he visited the Admiralty before taking up his new appointment and presumably was briefed by the Naval Intelligence Division, it is not clear how well informed he was regarding Japanese naval aviation.

Somerville left the UK for Ceylon on 16 February aboard the carrier Formidable, putting its air group through a rigorous training program *en route*. He arrived at Colombo on 24 March and took command of the Eastern Fleet on 26 March at 0800 - three hours after KdB sortied from Staring Bay.<sup>31</sup>



Two shots of Somerville on Formidable. At left, he is with Captain Bisset, the ship's CO, on 16 February 1942, the day they left the UK for Ceylon. He is already in the uniform of a full admiral. In the second image, taken in March, Somerville is in the uniform of a full admiral who often observed training exercises from the air.<sup>32</sup>

The Eastern Fleet was not the only British naval command in the Indian Ocean. There was also an area commander, the Commander-in-Chief, East Indies, Vice Admiral Geoffrey Arbuthnot. Somerville commanded all battleships, aircraft carriers, cruisers, minelayers, destroyers and submarines, and was “in general strategical control of all Allied naval forces”, within the geographic limits of the East Indies station. Arbuthnot was responsible for all other vessels, e.g., sloops, corvettes and minesweepers, for the naval bases in the area, and for protecting and controlling the movement of merchant shipping. He was also concurrently Deputy Commander-in-Chief of the Eastern Fleet, with his headquarters ashore at Colombo, and he was to play a role in the events leading up to the loss of Cornwall and Dorsetshire.

As well as having a Deputy Commander-in-Chief, Somerville also had a second in command. This was Vice Admiral Sir Algernon Willis, styled Vice Admiral, Second in Command (VA 2 EF), who had two other hats – commander of the Third Battle Squadron (the R-class battleships) and commander of Force B.<sup>33</sup>



Arbuthnot in 1938



Willis in 1943



## Somerville Lays an Ambush

The naval and air operations which took place off and over Ceylon between 4 and 9 April 1942 are sometimes referred to as the Battle of Ceylon. Whatever its name, there are a number of remarkable similarities between it and the Battle of Midway two months later. The first of these is that in both cases signals intelligence ("Sigint") gave forewarning of the enemy's intentions which permitted the Allied commander to set up an ambush.

The IJN's switch on 4 December 1941 to a new additive table for JN-25B, its main operational code, temporarily cut off the Allies' best source of intelligence on Japanese intentions. Of course, the Allies' Sigint units spared no effort to break back into JN-25B, and on 3 March the Far East Combined Bureau (FECB), the Sigint centre at Colombo, read its first JN-25B message since 4 December. This message revealed that five Japanese submarines were to be based at Penang, on the northwest coast of Malaya, which clearly indicated that submarines would be operating in the Bay of Bengal and the Indian Ocean. By mid-March, Allied Sigint was also aware that CarDiv 1 and CarDiv2 were at Staring Bay, and that CarDiv5 was on its way to join them. In fact, five US submarines patrolling within reach of CarDiv5's route to Staring Bay were alerted by the submarine command at Pearl Harbor but none was able to intercept it. A sixth submarine, USS Sculpin (SS-191), was sent to patrol off Staring Bay.<sup>34</sup>

During the latter part of March, firmer indications of what KdB's next operation might be were seen. FECB later recorded that "about 20 March 1942 certain JN.25 messages concerned an operation by a Japanese carrier force, accompanied by another force (thought to be heavy cruisers), in the D area, including an air raid on DG on 2nd April." The identity of "DG" was deduced on 28 March from additional decrypts and FECB then "estimated that D was the Ceylon area and DG a town in Ceylon—probably Colombo." Somerville summoned the head of FECB's cryptanalysis branch to discuss the reliability of this intelligence and was persuaded that it was correct.<sup>35</sup>

On 29 March, at 1226 (0626Z), Somerville advised London that:

*According to a Combined Fleet telegram[,] orders were issued that an A/c [aircraft] carrier unit, which would normally be expected to consist of 2 carriers 4 cruisers and 12 destroyers, should leave Staring Bay on about 21st March for the attack on "D.G" on or about first April.*

*The unit referred to is similar to that used in Japanese report of American forces which attacked Mandated Island[s] last February. (These forces consisted of cruisers A/c carriers and destroyers.*

*Jap. A/c carrier KAGA had instructions some time ago to proceed [to] Japan, fill aeroplanes and subsequently take part in an attack on "D.G". Various other odd items of intelligence suggest Jap. A/c carrier KAGA is to be detached for some special operation.*

*A Japanese S/m [submarine] patrol report states 2 Japanese S/ms were operating in vicinity 150 to 200 miles from "D.D.C." and "D.G.C" and in vicinity eight degree channel. [The Eight Degree Channel lies west of Ceylon and just north of the Maldives.] In another para. reference is made to them operating in "D.G" area. All this goes to suggest that area "D.G" is the Ceylon area.*

*It is therefore deduced area in which A/c Carrier KAGA force is to attack is Ceylon.*

*It should be noted word "attack" rather than "invaded" or "advance" is used. Timing of operation appears for about 1st April.<sup>36</sup>*

As we now know, FECB was wrong about the composition of the attacking force—it had five carriers rather than two, and Kaga was in Japan undergoing repairs. FECB also got the date wrong. The original Japanese schedule did call for KdB to sail on 21 March and attack Ceylon on 1 or 2 April, but the schedule was pushed back because the arrival of CarDiv5 at Staring Bay was delayed until 24 March, and no indications of the postponement were picked up by Allied Sigint. Had aerial reconnaissance discovered KdB still at Staring Bay after 21 March it would have been realized that "DG" could not have been attacked until after 1 April, but Staring Bay was some 700 miles (800 statute miles) from the nearest Allied air base and no aircraft with the requisite range were available to keep it under observation. The US submarine Sculpin arrived off Staring Bay on 25 March but had to submerge before dawn the next day and did not detect KdB's departure.<sup>37</sup>

This was not to be the last time that Allied intelligence identified the planned date of a Japanese operation but did not learn of its postponement. US Navy Sigint knew in advance that KdB's attack on Midway was planned to begin on 3 June but did not learn of its last-minute postponement. As it happened the attack was delayed by only one day and the US carriers waiting off Midway were able to remain in position until 4 June and spring their ambush then.<sup>38</sup>

In the Report of Proceedings he submitted on 18 April, Somerville explained what he had expected the enemy force to do:

*4. It appear[ed] to me the enemy's probable target was an air attack on Colombo and/or Trincomalee and probably a simultaneous attack on both ports. Possible methods of attack were:*

*(a). A moonlight attack followed by a moonlight landing on the carriers.*

*(b). A moonlight attack followed by a dawn landing on the carriers.*

*(c). A daylight attack.*

*I considered (b) the most probable as I thought the Japanese would use to advantage the full moon for attacking their easily distinguishable targets in spite of the fact that none of their previous attacks had been at night. The landing on after dawn would facilitate the recovery of aircraft.*

*5. The enemy could approach Ceylon from the north-east, from the east, or from the south-east, to a position equidistant 200 miles from Colombo and Trincomalee. I considered an approach from the south-east most probable. This would enable to enemy to fly off aircraft between 0200 and 0400 and, after carrying out bombing attacks on Colombo and Trincomalee, allow the aircraft to return and fly on after the first light (about 0530); forces could then withdraw at high speed to the eastward. I was assuming that the Japanese carrier borne bombers could have approximately the performance of our Albacores.<sup>39</sup>*

Somerville was mistaken to expect that the Japanese air attack would be made in moonlight and that the Japanese force would immediately high tail it to the east after recovering its aircraft. On the other hand, he was right to think that the Japanese planned to attack Colombo and Trincomalee simultaneously from an equidistant point. This was Nagumo's original intention, if it was found that the British fleet was divided between the two ports. The submarine I-7, carrying a small floatplane, was tasked to conduct aerial reconnaissance of Colombo and Trincomalee prior to KdB's arrival, but I-7 was attacked on 1 April by a Catalina which near-missed her and several patrol vessels were encountered, and on 2 April the submarine's captain reported that due to the enemy's strict anti-submarine guard he had called off the overflights. Nagumo then decided, on 3 April, that only Colombo would be attacked on 5 April and he shifted his launch point to the west.<sup>40</sup> Map 2 shows the position from which Somerville expected the Japanese to launch their aircraft and KdB's actual 5 April launching point.

At this time Japanese aircraft were still thought to be inferior. Somerville accepted that Japanese carrier bombers had a similar performance to his Albacores, but the Albacore was a mediocre biplane and in fact its Japanese counterparts outperformed it on most fronts. However, Somerville did not greatly underestimate the range of IJN carrier aircraft, accepting that it was at least 200 miles.

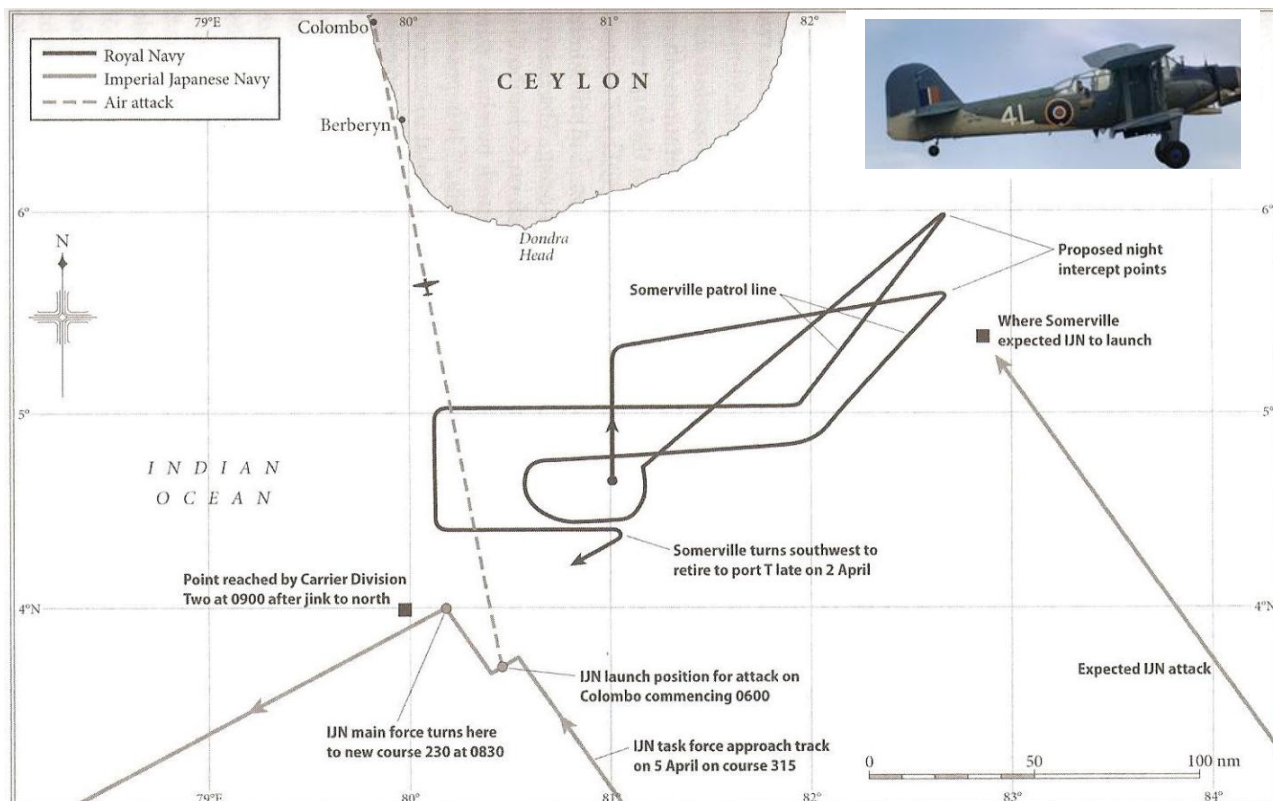
Somerville decided to exploit his foreknowledge of the reportedly imminent arrival of the two-carrier Japanese task force by taking the Eastern Fleet to sea and laying on an ambush:

*6. My plan was therefore to concentrate the Battlefleet, carriers, and all available cruisers and destroyers and to rendezvous on the evening of the 31st March in a position from which the fast division (Force A, consisting of WARSPITE, INDOMITABLE, FORMIDABLE, CORNWALL, EMERALD, ENTERPRISE, and 6 destroyers) could intercept the enemy during the night of 31st March/1st April and deliver a night air attack. The remainder (Force B, consisting of RESOLUTION, REVENGE, RAMILLIES, ROYAL SOVEREIGN, HERMES, DRAGON, CALEDON, and destroyers [and the Dutch light cruiser Jacob Van Heemskerk]) to form a separate force and to manoeuvre so as to be approximately 20 miles to the westward of Force A. If Force A intercepted a superior force, I intended to withdraw towards Force B.<sup>41</sup>*

Somerville sailed from Colombo at 1400 on 30 March aboard Warspite, with Formidable, Cornwall, three light cruisers and six destroyers. By 1600 the next day they were joined 80 miles south of Ceylon, at the point shown at the centre of Map 2, by ships from Trincomalee and Addu Atoll, and organized into Forces A and B as described above. Somerville commanded Force A, with its two carriers under Rear Admiral Denis Boyd, who had been Illustrious' captain when it attacked Taranto. Boyd's title was Rear Admiral Aircraft Carriers. As noted above, Force B was commanded by Willis, who was also Somerville's Second in Command.)<sup>42</sup>

Dorsetshire was unable to sail on 30 March. She had to be undocked, her libertymen recalled, and her partially dismantled machinery put back together. She left Colombo on 31 March, probably at 1900, and joined Force A at about 1430 on 1 April.<sup>43</sup>





**Map 2 - Somerville's movements from 31 March to 2 April, while waiting for KdB**  
The insert shows an Albacore from Formidable<sup>44</sup>

### Where Are The Japanese?

On seeing the Eastern Fleet assembled together for the first time, Somerville sent the following signal to all his ships:

*I am delighted to have you all in company. Some of us are not as young as we used to be, but there's many a good tune played on an old fiddle.*<sup>45</sup>

Somerville now had altogether 28 ships, including two fleet carriers, one light carrier and five battleships, lying in wait for a Japanese force expected to have probably only two carriers and fewer heavy surface ships than he had. Many of his ships and some of his aircraft had radar, he was supported by land-based long range search aircraft, he had a good chance of surprising the enemy and his planned night torpedo plane attack was perfectly feasible. Armed with hindsight, many historians condemn Somerville's attempted ambush as rash in the extreme, but he did not know that Nagumo actually had five carriers with 275 aircraft versus the 91 on his three carriers.

Somerville's plan for the night of 31 March was as follows:

*12. My movements for the night were governed by the following factors:*

*(i). The necessity to avoid the enemy's possible daylight air search area until after dark in order to achieve surprise.*

*(ii). The need to be at a convenient distance from the position which it was considered likely the enemy would select to fly off his aircraft, either for a moonlight attack and moonlight return to the carriers or as was considered probabl[e], a moonlight attack followed by a dawn land on. This position equi-distant from Colombo and Trincomalee was about 5-20N, 82-55E, and was about 120 miles from the fleet's position at 1800.*

*13. I decided on the following plan; to take Force A to the northward until dark and then alter to 80 degrees, 15 knots, continue on that course until about 0230 when I should be in the vicinity of the enemy's established fly off position. At the same time to carry out a continuous night ASV search ahead and to the southward of Force A. If nothing was sighted or located by 0230, to turn back to the southwest and withdraw outside the enemy's air search area. Force B to act as a supporting force to Force A, keeping 20 miles to the westward and conforming to Force A's movements throughout the night, rendezvousing at 0800 the following morning.*<sup>46</sup>

Somerville's movements during the night are depicted on Map 2, which also shows that his 1 April movements followed the same general pattern. Somerville described his operations on 2 April as follows:

17. During the day, Forces A and B had manoeuvred in an arc about 50 miles to the westward of those waters in which they steamed in daylight on the two previous days in order to keep clear of any enemy submarines that might have sighted the Forces. Throughout the day, several unconfirmed echoes were reported by destroyers in the screen. Opportunity was taken to oil 5 of the destroyers, 3 from the oiler APPLELEAF which had previously been ordered to the vicinity before I left Colombo; and two from 8" cruisers. [Cornwall fueled HMS Arrow, Dorsetshire fueled HMAS Napier.]

18. My next concern was my future course of action and the following are the main factors, which decided it:

(i). The fleet had now been operating 3 days and 2 nights off the south of Ceylon and probability of location by enemy submarines was increasing.

(ii). No further information had arrived which indicated that an air attack on Ceylon was likely to develop in the immediate future. The possible reasons for this were:

(a) the enemy's timing had been upset

(b) our deductions of his plans had been incorrect from the start

(c) he had received news of our fleet concentration. This latter reason appeared probable and I considered would influence the enemy in delaying his attack until we were compelled to return to harbour to refuel.

(iii). The R Class battleships were rapidly running out of fresh water. RESOLUTION would soon be compelled to use salt water in her 15" hydraulic system. The Vice Admiral, Second in Command [Willis], had informed me at the beginning of the operation that 3 days was the limit of the endurance of R class battleships for this reason. These ships still had ample fuel to remain at sea for a further period and it was unpleasant to me to find that the supply of fresh water was now the factor which limited their endurance at sea. This was in part due to the failure of a water tanker to arrive at Addu Atoll before Force B sailed. [The water tanker Aletta arrived at Addu Atoll at 0045 on 31 March, about 25 hours after Force B sailed.]

(iv). It was very desirable for me to have an early conference with my Flag and Commanding Officers to explain my polic[y] and intentions.

On the above factors, I decided not to repeat the big sweep [to] the north-east for the third time, but to continue my sweep to a much smaller one to the east. As nothing was seen by 2100, I abandoned the operation and shaped course south west to Addu Atoll.<sup>47</sup>

At 0930 the next day, 3 April, Somerville detached Cornwall and Dorsetshire to Colombo, to enable the former to escort Australian troop convoy SU 4 to Fremantle as planned and to permit the latter to resume her interrupted refit. The two cruisers arrived at Colombo at 1000 on 4 April, and both granted shore leave to a proportion of their crews.<sup>48</sup> Agar's recollection was that:

On arrival the next morning at Colombo the engineers started again to dismantle the machinery and clean the boilers. I reported at once to Admiral Arbuthnot [...] and was told that some of the light anti-aircraft guns we needed had arrived and would be mounted as soon as the fittings were ready, which would be within forty-eight hours. [...] we were allowed a fortnight for the refit before rejoining the Fleet.<sup>49</sup>

Hermes, with 12 Swordfish, was detached to Trincomalee with the destroyer HMAS Vampire to prepare for Operation IRONCLAD (the occupation of Diego Suarez), reducing Somerville's aircraft total to 79.

Somerville and his Force A arrived at Addu Atoll at 1200 on 4 April and immediately began to refuel from oilers pre-positioned there. Force B arrived three hours later.<sup>50</sup>

### **KdB Shows Up**

In what might be called a case of "better never than late" for the British, KdB finally appeared just after 1600 on 4 April, when Catalina QL-A from the RCAF's 413 Squadron reported sighting a large enemy force 155 degrees and 360 miles from Dondra Head, steering 330. (See Maps 1 and 4.) The composition of the Japanese force was not given and the aircraft was shot down before it could send any amplifying report.<sup>51</sup> It was instantly clear that Colombo and/or Trincomalee would be attacked the next morning, but there was precious little that Somerville could do about it:



24. The condition of my fleet at Addu Atoll at this time was as follows: owing to the limited number of oilers available, the vessels comprising Force A had taken about half their fuel and Force B had not yet commenced. In addition, the R Class battleships were very short of water which had to be taken in before they could sail. This meant that Force A (except EMERALD and ENTERPRISE) could proceed to sea immediately. EMERALD and ENTERPRISE would be ready to sail by midnight and Force B could not leave until 0700 on the 5th at the earliest.

25. It appeared that the enemy's probable plan was as follows: All the evidence supported my original appreciation that the enemy would attack Colombo (and possibly Trincomalee) with carrier borne aircraft either before dawn or shortly afterwards and would return to the carriers in a position about 150 miles south-east to south of Ceylon. On completion, the whole force would then withdraw to the east. The enemy's reported position made it apparent that this attack was to be made on the morning of Sunday 5th.

26. My possible courses of action were as follows:

(i). Force A, less EMERALD and ENTERPRISE, to proceed immediately at best speed to the area south of Ceylon, to be joined there by DORSETSHIRE and CORNWALL from Colombo and attack any enemy force located.

(ii). Delay the sailing of Force A until EMERALD and ENTERPRISE had completed refueling and sail about midnight. Force B to sail on the morning of the 5th and follow astern to act as a supporting force.

(iii). Delay the sailing of Force A until both forces could leave together on the morning of the 5th.

(iv). Forces A and B to remain at Addu Atoll and leave the Air Force to deal with the enemy attack.

27. My choice of plan was governed by the following considerations:

(a). First and foremost, the total defence of the Indian Ocean and its vital lines of communications depend on the existence of the Eastern Fleet. The longer this fleet remains "a fleet in being", the longer it will limit and check the enemy's advances against Ceylon and further west. This major policy of retaining "a fleet in being", already approved by Their Lordships [i.e., by the Admiralty], was, in my opinion paramount.

(b). The only hope of dealing the enemy an effective blow was by means of a carrier borne air striking force preferably at night. To operate the carriers escorted by WARSPITE out of supporting distance of the R Class battleships would offer the enemy an opportunity to cripple our only offensive weapon. I considered it a cardinal point in any operation that Force A should not proceed outside supporting distance from Force B unless it could be presumed that enemy capital ships would not be encountered.

(c). No matter which course of action I adopted the enemy force could not be intercepted either before or during the air attack on Ceylon on the morning of the 5th. My only hope was that the air striking force from Ceylon might "wing" some of the enemy's ships which I could attack later, or that the attack on Ceylon might be delayed for 24 hours.

28. I therefore decided to adapt course 26 (ii). I sailed Force A, including EMERALD and ENTERPRISE at midnight and ordered Force B to proceed as early as possible the following morning.<sup>52</sup>

### **Cornwall and Dorsetshire Sail**

The Catalina's sighting report was also received at Colombo. Arbuthnot promptly summoned Agar and Manwaring to his headquarters. Arbuthnot later reported that:

[I] pointed out to the Commanding Officers that in the bright moonlight of a clear night, it was quite out of the question that they could hope to deliver a night attack, even on an enemy transport convoy, and that their duty was to keep clear and join the Commander in Chief. Both Commanding Officers entirely agreed with this appreciation.

[I] therefore ordered the ships to raise steam and sail in company under the orders of the Senior Officer [Agar] at 1600Z/4 [2200 local] and proceed on course 220 degrees, 22 knots to be made good. This course would take the ships towards Addu Atoll and the Commander in Chief, Eastern

*Fleet, in HMS WARSPITE. The time ordered was selected to enable the DORSETSHIRE to assume complete readiness after having begun to take her engine room defects in hand, and to enable both ships to ensure the return of their libertymen.*<sup>53</sup>

Arbuthnot informed Somerville of these orders at 2005. The two cruisers duly unmoored at 2200 and threaded their way through the crowded harbour. Reaching the end of the cleared channel at 2300, they set course 220 for Addu Atoll and increased speed to 23 knots.

At 0311 the next morning, 5 April, Arbuthnot received a message from Somerville instructing him to order Cornwall and Dorsetshire to rendezvous with Force A at 1600 in position 00.58N, 77.36E. Arbuthnot radioed Agar accordingly at 0409, and at 0700 Agar changed course to 185 to comply.<sup>54</sup>

In *Footprints in the Sea*, Agar provides a very flawed account of the 4 April meeting with Arbuthnot. He wrongly claims, for example, that Somerville’s order for Cornwall and Dorsetshire to rendezvous with him was received prior to this meeting and that when they sailed from Colombo the two cruisers headed directly for the rendezvous point rather than toward Addu Atoll. He also claims that the time and location of the rendezvous was chosen during this meeting when in fact it was ordered by Somerville several hours later.<sup>55</sup>

Agar concludes his description of the meeting with the following, which is probably the most often quoted passage from his book:

*One point which had escaped the notice of everyone, including the C.-in-C. himself, was the range and performance of the Japanese naval aircraft. In the Operations Room and also in our ship’s plotting rooms we gave them the same performance as our own, but it later transpired that we had sadly underrated them. Actually, they had nearly double our performance. It is not surprising therefore that when next day we sighted the first Japanese “shadower” on the horizon astern, we had no idea at the time that they could possibly reach out so far, otherwise the R/V would have been placed even further to the west.*<sup>56</sup>

This is misleading in two ways. In the first place, while it is true that Japanese naval aircraft outperformed their British counterparts in most respects, it was a gross exaggeration to say that their range and overall performance was nearly twice as good. More importantly, when the first Japanese shadower was sighted the distance between KdB and the two cruisers was actually well within the search radius of even an Albacore, as is discussed below.

**KdB’s Coarse Tooth Comb**

By first light on 5 April, KdB was about 130 miles south of Ceylon (see Maps 3 and 4). Its five carriers had 275 aircraft, as laid out in Table 3.

	A6M2 “Zero” Fighters	D3A1 “Val” Dive Bombers	B5N2 “Kate” Torpedo Bombers	Total
Akagi	19	17	18	54
Soryu	20	18	18	56
Hiryu	18	18	18	54
Shokaku	18	19	19	56
Zuikaku	18	19	18	55
	93	91	91	275

Table 3 – KdB’s Carrier-based Aircraft<sup>57</sup>

Nagumo also had at his disposal the floatplanes carried by his cruisers and battleships. As shown in Table 4, they are believed to have totalled 23 aircraft of three different types.

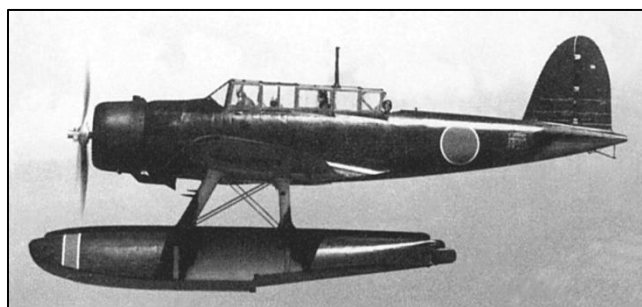
	E13A1 “Jake”	E7K2 “Alf”	E8N2 “Dave”	Total
Abukuma		1		1
Chikuma	1	1	3	5
Tone	1	1	3	5
Kongo			3	3
Haruna			3	3
Kirishima			3	3
Hiei			3	3
	2	3	18	23

Table 4 – KdB’s Floatplanes<sup>58</sup>

The Aichi E13A, introduced in 1940 and also designated the Navy Type 0 Reconnaissance Seaplane, was very successful, with the original model, the E13A1, remaining in production for almost four years without modification. Later codenamed Jake by Japan's enemies, it had a maximum speed of about 200 knots, a cruising speed of 120 knots and a maximum endurance of almost 15 hours. It was unfortunate for KdB that it had only two of these excellent machines during Operation C.

The Kawanishi E7K (Allied codename Alf) was also known to the IJN as the Navy Type 94 Reconnaissance Seaplane. Adopted in 1934, production of the E7K ceased in 1941 and it was withdrawn from front line service early in 1943, but in the meantime it had to soldier on. Compared with the E13A, its maximum speed was 50 knots less and its cruising speed 20 knots less, but its endurance, more than 11 hours, was very respectable.

Adopted in 1935 and out of production since 1940, the E8N (Allied codename Dave) had the same low cruising speed, 100 knots, as the E7K, but a range of only 485 nautical miles. As a search aircraft it was inferior to the E7K, the E13A and the B5N, but there were too few E7Ks and E13As to assign one to every search leg, and it was KdB's usual practice to reserve all B5Ns for offensive missions.<sup>59</sup>



An Aichi E13A1<sup>60</sup>



A Kawanishi E7K2, with an E8N1 in the background<sup>61</sup>

Nagumo's plans for the attack on Colombo were upset by QL-A's sighting of KdB on 4 April. The previous day, 3 April, Nagumo had issued his Order No. 72, which specified that all of KdB's B5Ns and D3As were to be committed to the attack on Colombo, with the latter taking off 30 minutes after the former and catching up *en route*. This scheme, already used for the 19 February attack on Darwin, would have seen Colombo attacked by a single wave consisting of 182 strike aircraft escorted by 36 fighters – a total of 218 aircraft, 30 more than at Darwin. However, after it was realized that QL-A had managed to transmit a sighting report before being shot down, Yamaguchi sent Nagumo the following recommendations at 1905:

*In view of today's development, it is felt necessary to advance the time of take-off as much as possible in tomorrow's attack on Colombo and the enemy air force, and at the same time to expand the area of search and patrol and keep on the alert planes ready to attack enemy surface vessels.*

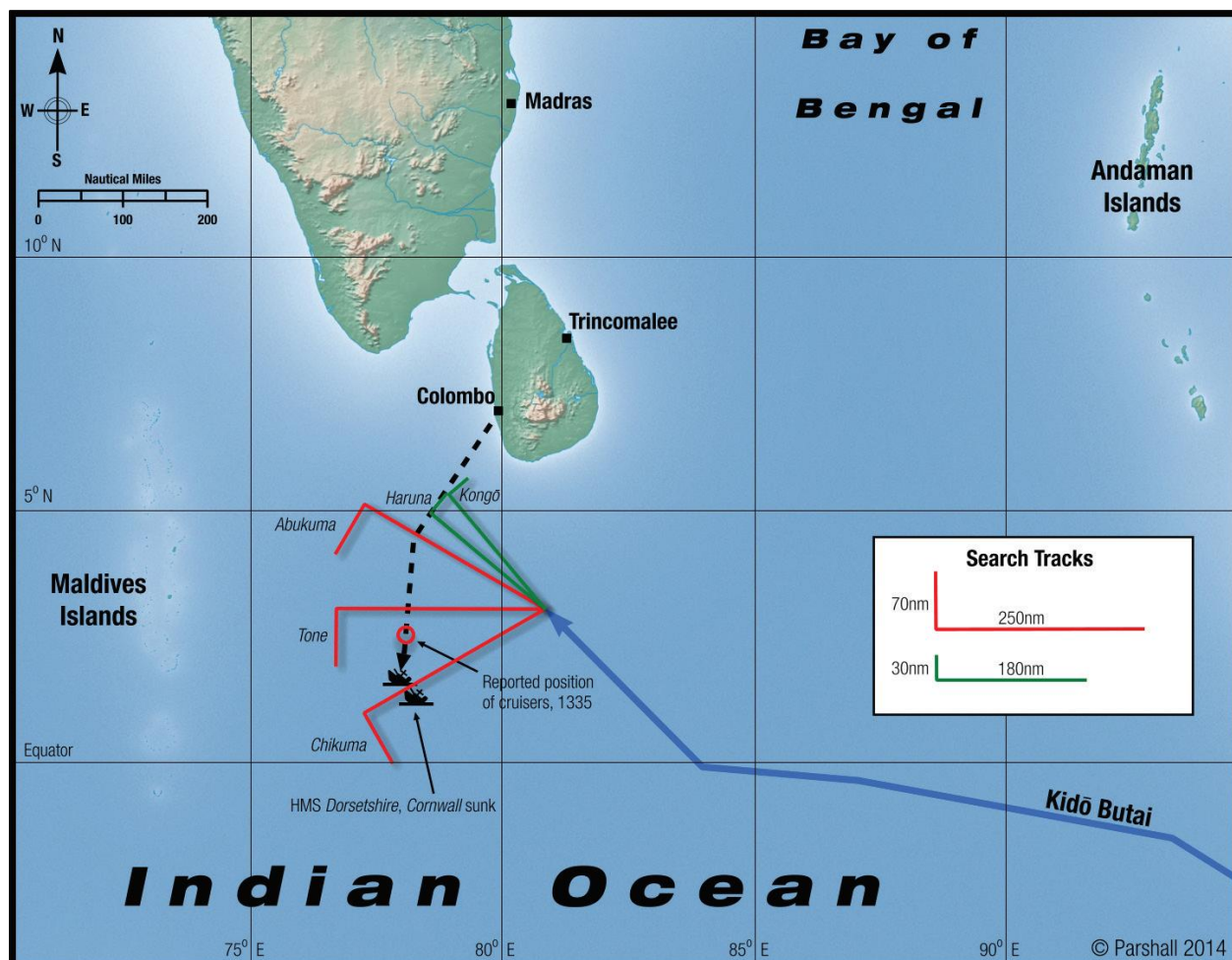
After receiving Yamaguchi's message, Nagumo issued a new order, No. 75, for the attack on Colombo. The strike was now to consist of the B5Ns from Akagi, Soryu and Hiryu, and the D3As from Shokaku and Zuikaku, thus reducing its planned strength from 218 to 127 aircraft - 53 B5Ns, 38 D3As and 36 Zeros. He also ordered that after the Colombo strike force departed the remaining strike aircraft, i.e., the D3As from Akagi, Soryu and Hiryu, and the B5Ns from Shokaku and Zuikaku, as well as Shokaku's fighter escort unit, "will be on the ready in the hangar". The B5Ns were to be armed with torpedoes.

The air search plan for 5 April was also modified. At 1545 on 4 April, just before QL-A sighted KdB, Nagumo had ordered that Abukuma, Tone and Chikuma were each to launch one E7K on search missions to the northwest, west and southwest, respectively. The floatplanes were to search to a depth of 200 miles on their outward legs, turn left and fly a 70 mile dog leg, and then return to their ships. However, after receiving Yamaguchi's message, Nagumo increased the E7Ks' outward legs to 250 miles. He also added two more search lines, ordering BatDiv3 to provide two E8Ns to search north of the area to be covered by the E7Ks, but only to a depth of 180 miles followed by a 30 mile dog leg to the right.

Accordingly, at 0600 on 5 April KdB launched five floatplanes to fly the modified search plan depicted in Map 3 and dispatched 127 aircraft to attack Colombo, holding back the 53 D3As aboard Akagi, Soryu and Hiryu and the 37 B5Ns on Shokaku and Zuikaku to attack any enemy warships detected fleeing Colombo in response to QL-A's warning.<sup>62</sup>

Cornwall and Dorsetshire were about 180 miles from KdB when its search planes were launched, and since their track was roughly perpendicular to the scouts' outward legs the distance to them changed very little. Given the 100 knot cruising speed of both the E8N and the E7K, one might have expected the two cruisers to have been located by around 0748, but in fact they were not spotted until more than two hours later. How this came to be is of great interest.





Map 3 – KdB's 5 April air search plan and Cornwall and Dorsetshire's track<sup>63</sup>

As noted above, Cornwall and Dorsetshire headed for Addu Atoll at 23 knots on course 220 after leaving Colombo, but altered to 185 degrees at 0700 in order to rendezvous with Force A at 1600 northeast of Addu Atoll. An hour later, at 0800, Agar increased speed to 27.5 knots. This was Cornwall's best speed, due to defects which there had been no opportunity to deal with. The increase in speed was prompted by a sighting report from a Catalina. After QL-A sent its sighting report at 1605 on 4 April other Catalinas were dispatched to shadow KdB. They sent a number of reports through the night and into the morning, providing roughly accurate information on KdB's movements but no indication of how many carriers were present. Agar appears not to have received any of these reports until one sent at 0648 by 240 Squadron's BN-L was rebroadcast by the naval radio station at Colombo. Received by Agar at about 0800, it placed a battleship and two cruisers in position 04.00N, 80.40E, steering 290 degrees.<sup>64</sup>

Agar wrote in *Footprints in the Sea* that this report put the Japanese 120 miles southeast of Colombo, "well clear of us to the East without any possibility of detection". In fact, and as Agar must have seen on 5 April when he plotted it, the reported position was about 180 miles south-south-east of Colombo and 150 miles from Cornwall and Dorsetshire. This was well within the range of an Albacore and thus within the assumed range of Japanese aircraft. Agar's executive officer, Commander C.W. Byas, was a Fleet Air Arm pilot. It is not known what advice he gave Agar about the threat the Japanese carriers posed, but Agar was concerned enough by BN-L's report to increase speed so as to make contact with Force A as soon as possible. "I was thinking ... of the comfortable feeling one gets when under the protective umbrella of our own aircraft from Indomitable and Formidable. The sooner we got near them, I thought, the better." He also ordered the anti-aircraft guns on both ships brought to second degree readiness, i.e., that half of them be manned.<sup>65</sup> It is possible that they were still at this level of readiness when the ships were attacked, since the reports submitted by Agar, Manwaring or Manwaring's executive officer, Acting Commander John Fair, do not mention the manning of all AA guns being ordered.

As can be seen on Map 3, the outward legs of three of Nagumo's five search planes intersected the cruisers' track. The most northerly of these was Haruna's E8N, flying an outward course of 310 degrees. It reached their track at around 0748, if it flew its outward leg as ordered, but by then the enemy ships had passed by about two hours earlier and were well out of sight over the southern horizon.

At first glance the E7Ks flying the next two search lines to the south had a good chance of making an early sighting of the enemy ships, but neither of them did. Abukuma's plane, flying the 300 degree search line, also crossed the cruisers' track astern of them at about 0748, if it was on schedule, but apparently just missed them. The two cruisers may have been only about 25 miles away on the plane's port side. If this estimate is correct then at least their mastheads and smoke would presumably have been above the horizon but they may have been hidden by cloud or haze, or the aircraft may have been somewhat behind schedule or perhaps a trifle off course to the north.

It should be highlighted at this point that while the three most northerly search lines, flown by the planes from Kongo, Haruna and Abukuma, were only 10 degrees apart, with these aircraft flying outward legs of 320, 310 and 300 degrees, the next search line, flown by Tone's E7K, was 270 degrees. This meant that 180 miles out from their launching point the gap between the planes from Abukuma and Tone would be 90 miles, as opposed to the 30 mile gap between Abukuma's E7K and Haruna's E8N.

Had Tone's E7K flown an outward leg of 290 degrees, or even 285 degrees, it would almost certainly have found Cornwall and Dorsetshire when it crossed their track at about 0748. However, as things actually transpired Tone's plane flew almost perpendicularly across the cruisers' track some 60 miles ahead of them and had not the slightest chance of sighting them at that time.

The failure to promptly find enemy ships located well within the 250 mile deep and 60 degree wide area searched by the E7Ks was due to the failure to use enough aircraft to permit the search lines to be close enough together. KdB's 4 June search, which failed to find the US carriers lying in ambush off Midway in a timely manner, has been endlessly pilloried by historians. One of their criticisms has been that the search lines, which were 23 degrees apart, were too widely spaced, but on 5 April, as we have just seen, the E7K search lines were 30 degrees apart. On 4 June Nagumo added two B5Ns to the four E13As and one E8N assigned to that morning's search. The authors of *Shattered Sword* argue that at least three more B5Ns should have been used, to bring the number of search aircraft to 10, calling it a false economy to reserve all but two B5Ns for strike missions. "By not being willing to sacrifice a fairly marginal number of aircraft for scouting duties, [KdB] had implicitly forfeited the fleet's ability to buy time for itself."<sup>66</sup> Exactly the same error was made on 5 April, and with hindsight we know that a few B5Ns from CarDiv5 could easily have been spared to fly searches, since in the event no B5N from either of its carriers flew any strike mission during the course of the day.

It is also worth noting that at 0855 one of four Albacores launched by Indomitable at 0650 to search for KdB sighted an enemy seaplane 76 degrees and 150 miles from Force A. This must have been Chikuma's E7K, which apparently did not see the Albacore. Had the E7K crew seen it, its presence so far from land would have revealed that at least one British carrier was close enough for the British and Japanese search areas to overlap. The discovery an hour later of Cornwall and Dorsetshire hurrying southward should then have prompted Nagumo to launch a serious search in that direction for the enemy carrier force, with potentially disastrous consequences for the Eastern Fleet. The E7K crew's failure to notice the Albacore denied Nagumo this opportunity and typified the very spotty record of KdB's air searches.

It perhaps cements the point to compare Nagumo's search with Somerville's. KdB's 0600 search covered a 60 degree arc with three aircraft. Indomitable's 0650 search covered a 50 degree arc with four aircraft, and its 1400 search covered 45 degrees with four aircraft, two of which found KdB.<sup>67</sup> It seems that Somerville had a more realistic understanding of the number of aircraft required to search a given area.

### **Tone's E7K Chances Upon Cornwall and Dorsetshire**

If they were on schedule, the E7Ks reached the end of their outward legs and turned left on to their doglegs at about 0830. Abukuma's E7K would have been about 90 miles northwest of the British cruisers at that time, and the distance decreased very little while it flew its dogleg, since the E7K and the cruisers were on diverging courses – 240 and 185 degrees, respectively. Tone's plane would have been at least 90 miles southwest of the two ships, a gap which increased as it flew its dogleg. There was therefore no chance at all that either plane could have sighted Cornwall and Dorsetshire while flying their doglegs.

Ironically enough, Abukuma's plane would have had a better chance of spotting the cruisers while on its dogleg if Nagumo had not increased the outward legs to 250 miles after KdB was sighted on 4 April. Had this change not been made, Abukuma's E7K would have turned on its dogleg at about 0800, when it may have been only 30 miles northwest of them. Their courses would still have diverged however, and barring a fortuitous event such as the E7K turning onto its dogleg short of the correct turning point due to a navigational error, the cruisers would likely still have escaped detection at this point.

Assuming again that they were on schedule, the three E7Ks reached the end of their doglegs at about 0912. This represented the end of the systematic phase of the search. Each of the three crews now steered a direct course for the point at which they could intercept KdB and be recovered, based on the information provided to them before launch about KdB's projected movements. Accordingly, Abukuma's crew flew off to the southeast while Tone's and Chikuma's steered northeasterly courses.

The next development in the search for enemy ships was the transmission of the following report by Tone's E7K at 1000, or shortly thereafter:

*Sight what appears to be two enemy cruisers 268 degrees 150 miles from launch point. Course 160 degrees, speed 20 knots.*<sup>68</sup>

It appears that Tone's E7K spotted Cornwall and Dorsetshire shortly before 1000, probably as it was about to pass in front of them as they headed south. It was not detected at this time by either ship.

Thus it was that Cornwall and Dorsetshire were finally spotted four hours after the search planes were launched, when they should have been found within two hours. They might have escaped detection altogether, had KdB's movements after 0600 not led Tone's E7K to pass near them as it headed home.

### **Order + Counterorder = Disorder**

For KdB, time had not stood still since 0600. The 127 aircraft of Commander Mitsuo Fuchida's strike force attacked Colombo starting at about 0740. They sank the old destroyer Tenedos, the armed merchant cruiser Hector and the Norwegian tanker Soli, but the destroyer Decoy, the submarine Trusty, the submarine depot ship Lucia, several naval auxiliaries and at least 20 merchant vessels survived. Probably aware that the five search aircraft had sighted nothing so far, Fuchida felt that Colombo should be attacked again and sent the following message to KdB at or shortly after 0818):

*Request that second strike be made ready. Some 20 transports are in the harbour. There is anti-aircraft fire. Enemy still has some aircraft. Dense clouds at 1,000 meters. 1118 [JST].*<sup>69</sup>

Fuchida's message apparently reached Nagumo at 0828.<sup>70</sup> The E8Ns had completed their doglegs 20 minutes earlier and were heading back to the fleet, and the E7Ks would be reaching the end of the outward legs momentarily. None had sighted anything during the 2.5 hours since they were launched.

No enemy force having been found by his scouts, Nagumo accepted Fuchida's advice and at 0852, about 20 minutes before his E7Ks reached the end of their doglegs, he ordered a second attack on Colombo to be prepared. Akagi, Soryu and Hiryu were to replace the 250 kg "ordinary" (i.e., Semi-Armour Piercing) bombs with 242 kg "land" (High Explosive) bombs on a third of their D3As, and Shokaku and Zuikaku were to replace the torpedoes on their B5Ns with 800 kg land bombs.

For Akagi, Soryu and Hiryu, the rearming of six D3As each was likely a simple matter, but switching the B5Ns from torpedoes to bombs was a tedious business for the carriers of CarDiv5. The first problem was that typically each carrier had enough of the heavy weapons carts used for torpedoes and 800 kg bombs to arm only one third of its B5Ns at a time, i.e., six carts. Shokaku and Zuikaku possibly had nine carts, since their nominal B5N complement was 27, but having nine carts would still have about doubled the time needed to remove the torpedoes from the 19 B5Ns on Shokaku and the 18 on Zuikaku. Each torpedo had to be lowered from the aircraft on to a cart and wheeled off to the weapons lift. However, since the lift would have been in use bringing the 800 kg land bombs to the hangars, the torpedoes were moved on to racks affixed to the hangar sides nearby for temporary storage until the lift was free to return them to the torpedo magazine.

The next problem was that while torpedoes and 800 kg land bombs were both suspended below the B5N by a dual-cabled sling which probably did not need to be changed, the brackets used to hold the weapon steady and at the right attitude were different. The four brackets used for torpedoes had to be removed and replaced by the two used for 800 kg land bombs, as well as the rod used to prevent the rotation of the arming propeller at the front of the bomb prior to dropping. When this was completed each aircraft would be ready for its bomb. However, there may have been a delay at this point, if it took longer for the carts to be relieved of their torpedoes and loaded with 800 kg bombs than for the mounting brackets to be changed. Alternatively, bomb carts loaded with 800 kg bombs may have been kept idle waiting for the mounting brackets to be changed. Loading the bomb on to the aircraft took probably five minutes, after which the cart could be used to rearm the next group of six or nine B5Ns.<sup>71</sup>



**Type 91 torpedoes on Akagi, with Hiryu in the background. The challenges involved in moving the 800 kg cart with an 848 kg torpedo or an 800 kg bomb through a crowded hangar on a moving ship are easy to imagine.**<sup>72</sup>



CarDiv5 began to change its B5Ns from torpedoes to bombs at 0910. The changeover was still underway at 1005 when the message from Tone’s E7K reporting the sighting of two enemy cruisers was received.<sup>73</sup>

We may imagine that Nagumo and his senior staff officers received the sighting report with some consternation, but any indecision on their part was short-lived. In what was apparently the first response to the sighting report, Nagumo immediately ordered that Tone and Chikuma were each to launch one E13A to keep contact with the enemy ships. Then, at 1023, Nagumo ordered that the D3As and B5Ns which had been rearming for the second attack on Colombo were now to attack the enemy cruisers, with the B5Ns being changed back to torpedoes “as far as possible”. At 1030 he ordered his carriers to “Inform possible time” for the launch of the attack on the enemy ships, and Hara reported at 1057 that he expected to be able to launch CarDiv5’s B5Ns by 1300.

Nagumo apparently also anticipated that other enemy ships might be sighted, because at 1050 he directed that the aircraft which had attacked Colombo, the last of which landed at 1025, were to be rearmed and await orders in their hangars. The B5Ns among them, i.e. those aboard Akagi, Soryu and Hiryu, were to be armed with torpedoes, their running depth set at three metres.<sup>74</sup>

The (re-)rearming exercise was presumably well under way when Abukuma’s E7K sent the following report at 1050:

*Sighted two enemy destroyers at 250 degrees 150 miles from launch point. Course 200 degrees, speed 24 knots.*<sup>75</sup>

It seems likely that the commander of Abukuma’s plane, Lt Tadashi Minobe, who was likewise on his return flight, heard the sighting report sent by Tone’s E7K and decided to divert to the reported position of the enemy ships to assist in shadowing them. He was to do the same on 9 April, diverting his plane to shadow the carrier Hermes after it had been spotted by an E8N from Haruna.

For Nagumo and his staff on Akagi’s bridge, Minobe’s report thoroughly muddled the waters. Tone’s E7K had reported two enemy cruisers bearing 268 degrees and 150 miles from KdB’s 0600 position and now Minobe was reporting two destroyers bearing 250 degrees and 150 miles from the same position. This put a second enemy force some 45 miles from the first. However, it was concluded that one or both of the scouts had made a navigational error and that they had sighted the same ships, as indeed they had. Both reports contained an error. The report sent by Tone’s plane gave an inaccurate bearing but correctly identified the ships. Minobe’s report did the opposite.

Nagumo now decided that the enemy ships were destroyers. It is not known why he came to this conclusion, but if Tone’s plane was commanded by a NCO then we can perhaps speculate that an officer may have been thought more likely to be able to correctly identify enemy ships.

Japanese doctrine held that large armoured vessels such as heavy cruisers could not be sunk solely with 250 kg SAP bombs and that torpedo hits would be needed to put paid to them. Destroyers, on the other hand, could be dispatched by bombs alone, and being small, fast and highly maneuverable they were in any case difficult targets for torpedo bombers. Consequently, having deemed the two enemy ships to be destroyers, Nagumo decided to drop the B5Ns from the forthcoming attack.

At 1118 Nagumo ordered the attack to be launched at 1200, without any fighter escorts. Nine minutes later he signaled that “Previously mentioned cruisers are actually destroyers” and that they were to be attacked only by the D3As. Take-off soon began. Akagi launched 17 D3As at 1149 while Hiryu and Soryu launched 18 apiece, at 1159 and 1203 respectively. While most of them were armed with 250 kg SAP bombs again, 16 still carried the 242 kg land bombs with which they had been rearmed for the second attack on Colombo.<sup>76</sup>

	D3As	Bombs
Akagi	17	16 x 242 kg HE bombs 37 x 250 kg SAP bombs
Soryu	18	
Hiryu	18	
	53	

Table 5 – Composition of D3A Strike on Cornwall and Dorsetshire<sup>77</sup>

The strike was commanded by Lt Cdr Takashige Egusa, the leader of Soryu’s dive bombers. Hiryu’s aircraft were led by Lt Michio Kobayashi, who was destined to die leading Hiryu’s first attack on Yorktown on 4 June. The commander of Akagi’s dive bombers, Lt Takehiko Chihaya, was ill, so for this attack they were led by Lt Zenji Abe.<sup>78</sup>



Soryu's Lt Cdr Takashige Egusa<sup>79</sup>



Hiryu's Lt Michio Kobayashi<sup>80</sup>



Akagi's Lt Zenji Abe<sup>81</sup>

At 1155, just as the D3As were taking off, the E13A launched by Tone reported sighting two enemy cruisers bearing 235 degrees, 158 miles from its launch point, course 200 degrees, speed 26 knots. Tone immediately ordered the E13A to "Confirm enemy ship type". The response was not received until 1256 – two minutes after Egusa reported sighting the targets:

*Enemy cruisers are Kent-class. There are no other ships in the vicinity of the enemy cruisers. Visibility 20 miles.*<sup>82</sup>

The exasperation on Akagi's bridge must have been palpable. It was no doubt shared by CarDiv5, which was given new orders yet again. It was to proceed with the previously cancelled B5N attack on the enemy ships, and was now to include "about half" of its D3As, according to an order issued by Nagumo at 1310. Hara gave the following order to his two carriers at 1325:

*Attack force launch at 1700 [1400 local]. Target Kent Type cruisers. Attack course 200 degrees, distance to target 150 miles.*<sup>83</sup>

### **Cornwall and Dorsetshire Spot the Spotters**

Agar was soon disabused of any notion that he was "without any possibility of detection". According to the 13 April report submitted by Commander Fair, Cornwall sighted a single-engine biplane with wheels at 1100 and reported it to Dorsetshire. In his 8 April report, Agar gives the timing of this sighting as "about 1130" and states that the aircraft was "a long way astern (estimated about 20 miles) for a few minutes, and its identity could not be established". This aircraft has to have been an E7K, probably Minobe's, which is believed to have approached the cruisers from the north. Its floats were no doubt mistaken for the wheels of an aircraft with a fixed undercarriage. Since Minobe's aircraft was recovered by Abukuma at 1258, it must have started its return flight soon after being spotted by the cruisers, which would explain why it was visible only "for a few minutes".<sup>84</sup>

Agar's comments on this sighting in his 1959 memoir are worth recounting at length:

*At 11.30 a.m. we sighted a dot bobbing up and down the horizon, every minute or so. It was an aircraft. Jack Byas, my Commander and Executive Officer, was an experienced pilot in the Fleet Air Arm and actually due to return to a carrier appointment. He, and all of us on the bridge, focused our binoculars on this object. There was no doubt that it was a Jap "shadower" and must, by our calculation of the plotted positions, have placed the enemy Carrier Force 100 miles nearer the ship than we reckoned; or alternatively, it gave the Jap "recco" plane a performance of 100 miles more than we thought they had. I was now confronted with a fresh problem and a rapid decision on which much might depend.*

*Should we alter course at once to the West and place ourselves further out of range of Nagumo's carrier force? Or should we press on to the R/V? There was about six hours' daylight left, and the smaller the distance between Somerville's striking force (of destroyers and torpedo bombers) and the enemy the better chance he had of getting in his night attack. This was always a strong consideration I had very much in mind, and I knew it was in his also. On the other hand, by altering course to the West this would force Somerville to follow suit and widen the gap between his Force and the enemy. At the same time I felt that Somerville did not realize that Nagumo's striking force might be closer than he thought. I decided to press on to the R/V and signalled Cornwall accordingly, and also to break wireless silence to report the shadower and inform the C.-in-C. of my intention.*<sup>85</sup>

This account implies that Agar advised Somerville shortly after 1130 that he had been sighted, but in fact he did not do so for another 90 minutes, as he related in his 8 April report to Somerville:

*At about 1300 another aircraft was sighted astern which closed to within 14 miles of the ship. This aircraft was considered to be hostile. At the same time another aircraft was sighted ahead 14 miles which was considered from its silhouette to be friendly.*

*In view of the proximity of the rendezvous (about 70 miles) and the risk of an enemy aircraft detecting the position of force 'A', I decided to break W/T silence and make a shadowing report which was done about 1308.*

In his report Fair referred to one of these aircraft:

*Just before 1300/5, a twin-float monoplane was sighted ten miles to the northward, and was reported to "DORSETSHIRE", who made a SHAD [shadowing] report.*

The aircraft sighted by both ships astern of them was undoubtedly an E13A, since there was no other twin float monoplane, British or Japanese, anywhere in the Indian Ocean.

The aircraft spotted ahead of Dorsetshire was not British. The four Albacores launched by Indomitable at 0650 landed at 1155, Somerville's next search was not launched until 1400, and no other friendly aircraft could have been in the vicinity. It is highly unlikely that it was Tone's E7K, as it had been launched at 0600 and would not still be present more than seven hours later, especially after being relieved. It is all but certain that the aircraft ahead of the British cruisers was the other E13A dispatched by CruDiv8. As will be explained below, it is suspected that Chikuma's plane was astern of the cruisers and Tone's was ahead of them.

Fair's statement that the aircraft astern of them was sighted before just before 1300 is substantiated by Arbuthnot's war diary, which states that Dorsetshire reported being shadowed in position 2.12N, 77.47E at 1257. Agar's own 8 April report states that his shadowing report was sent at "about 1308". The time given in Arbuthnot's war diary is far more likely to be correct than the timing given in Agar's report, which was undoubtedly written in haste in anticipation of an imminent meeting with Somerville and presumably without having any logs or other records available to confirm such details as timings.<sup>86</sup>

Somerville was to write in his letter forwarding Fair's report to London that:

*It was unfortunate that no SHAD report indicating position, course and speed was originated when the first aircraft was sighted at about 1100 on the 5 April. Had this been done I should have considered breaking wireless silence so as to effect an earlier rendezvous with the two cruisers and afford fighter cover during the closing stages of approach.<sup>87</sup>*

The implicit criticism of Agar's decision not to send a shadowing report as soon as the first enemy aircraft was sighted was well founded, since it was pointless to maintain radio silence after being sighted, but it was fortunate for Force A that Agar did not do so. Somerville could not have put enough fighters over Cornwall and Dorsetshire to save them, but their presence would have revealed that at least one British carrier was nearby when there was still enough daylight left to find Force A and attack it with up to 91 torpedo-armed B5Ns and 32 D3As, with a strong escort – everything he would then have had, other than the 53 D3As sent to attack Cornwall and Dorsetshire.<sup>88</sup>

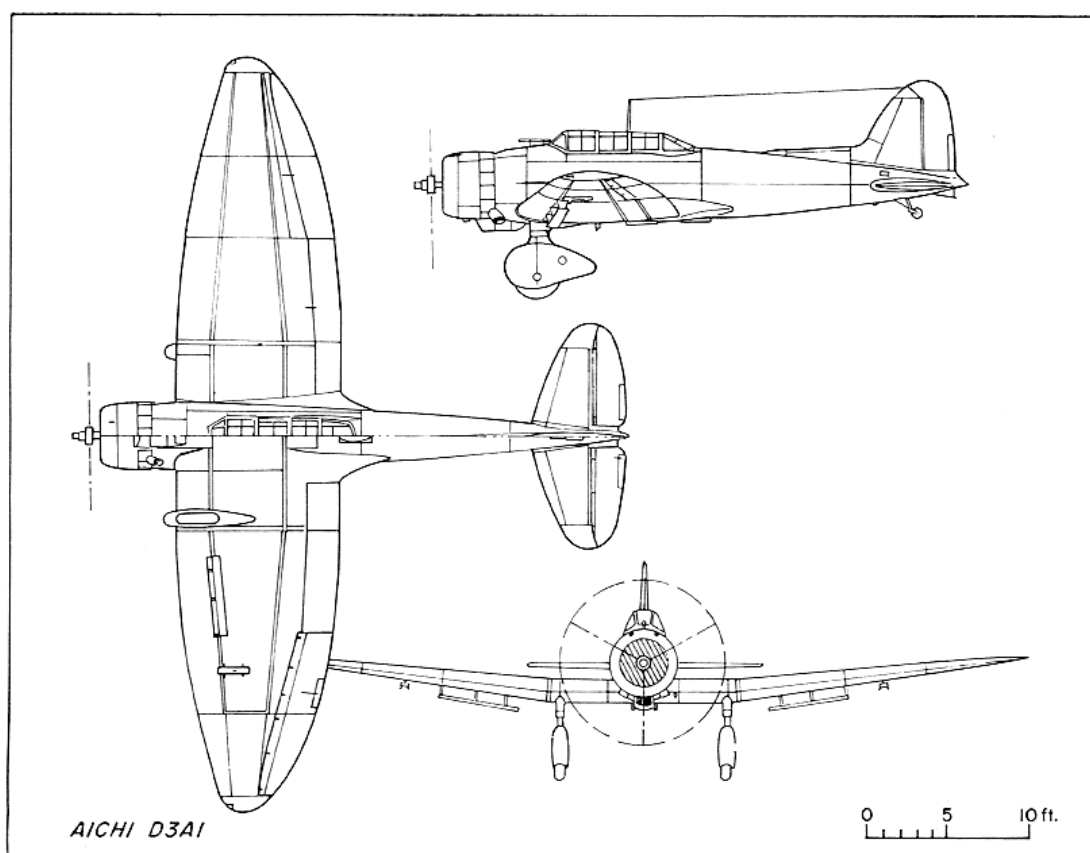
### **The D3A Attack – The Japanese Account**

The D3A was the mainstay of the IJN's dive bomber force and is reputed to have sunk more Allied warship tonnage than any other Axis aircraft. First entering service in China in late 1939, the D3A figured prominently in all the major Japanese carrier operations of the first year of the Pacific War.

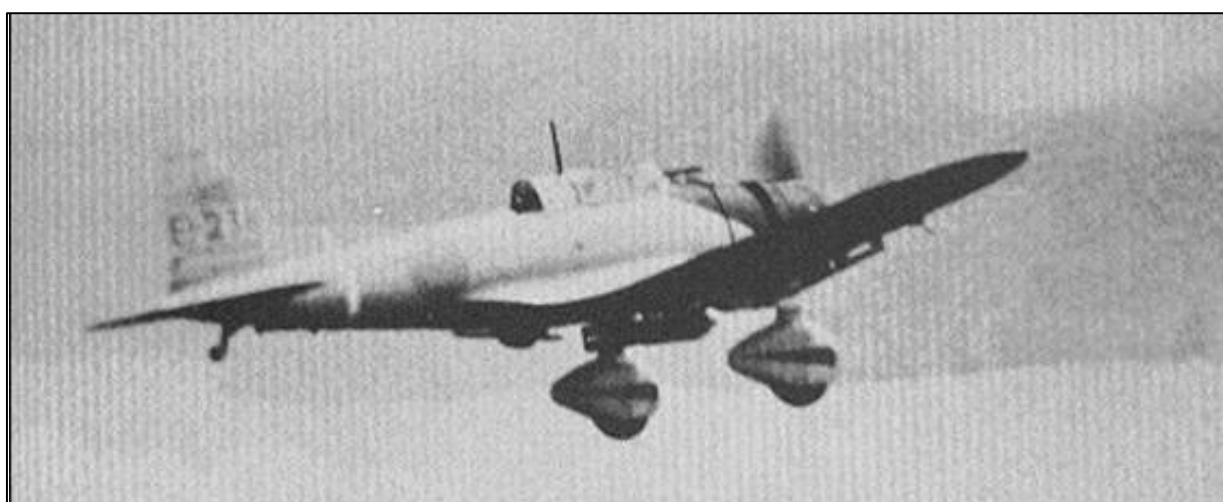
The original D3A1 model was still in use during Operation C. It had a maximum speed of 209 knots and its cruising speed was 160 knots. The standard bomb load was one 250 kg (or 242 kg) bomb under the fuselage and one 30 kg bomb under each wing, but on 5 April no wing bombs were carried. It had two forward firing 7.7 mm machine guns on the engine cowling and one hand-held 7.7 mm machine gun in the rear cockpit.

The D3A was also known to the IJN as the Type 99 Carrier Bomber, or kanjō bakugeki-ki, abbreviated to kanbaku. The British often referred to it as the Navy 99. The US later introduced codenames for all known Japanese aircraft and under this system, also adopted by its allies, the D3A was known as the Val.<sup>89</sup>

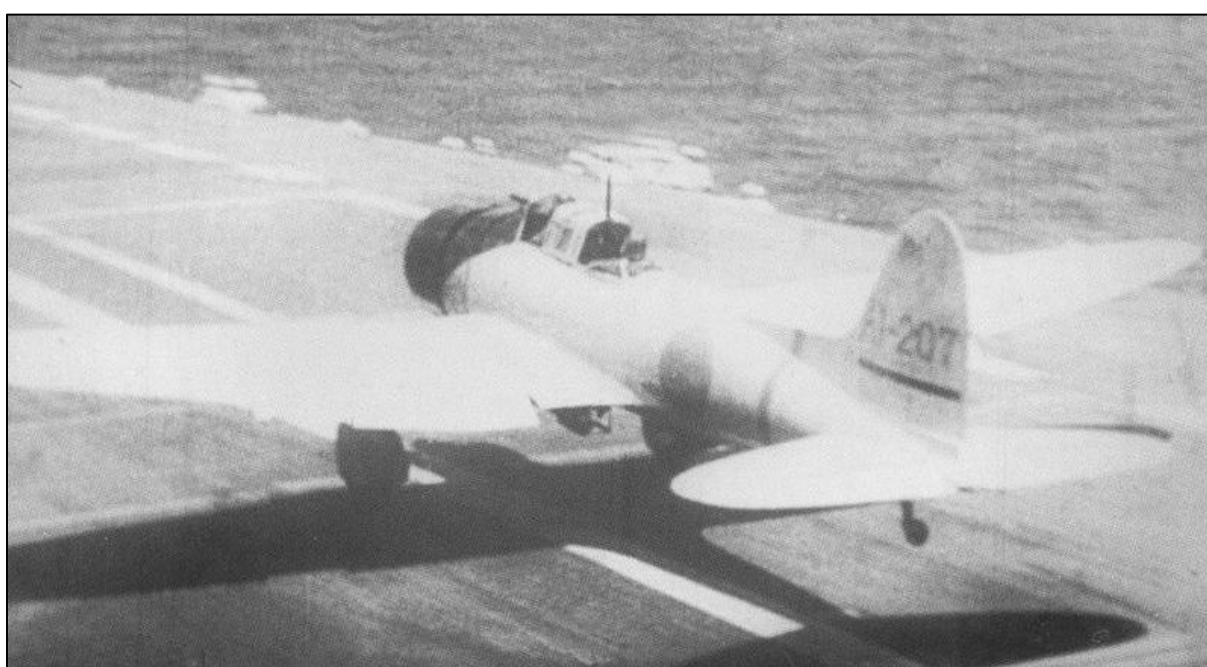




The D3A1<sup>90</sup>

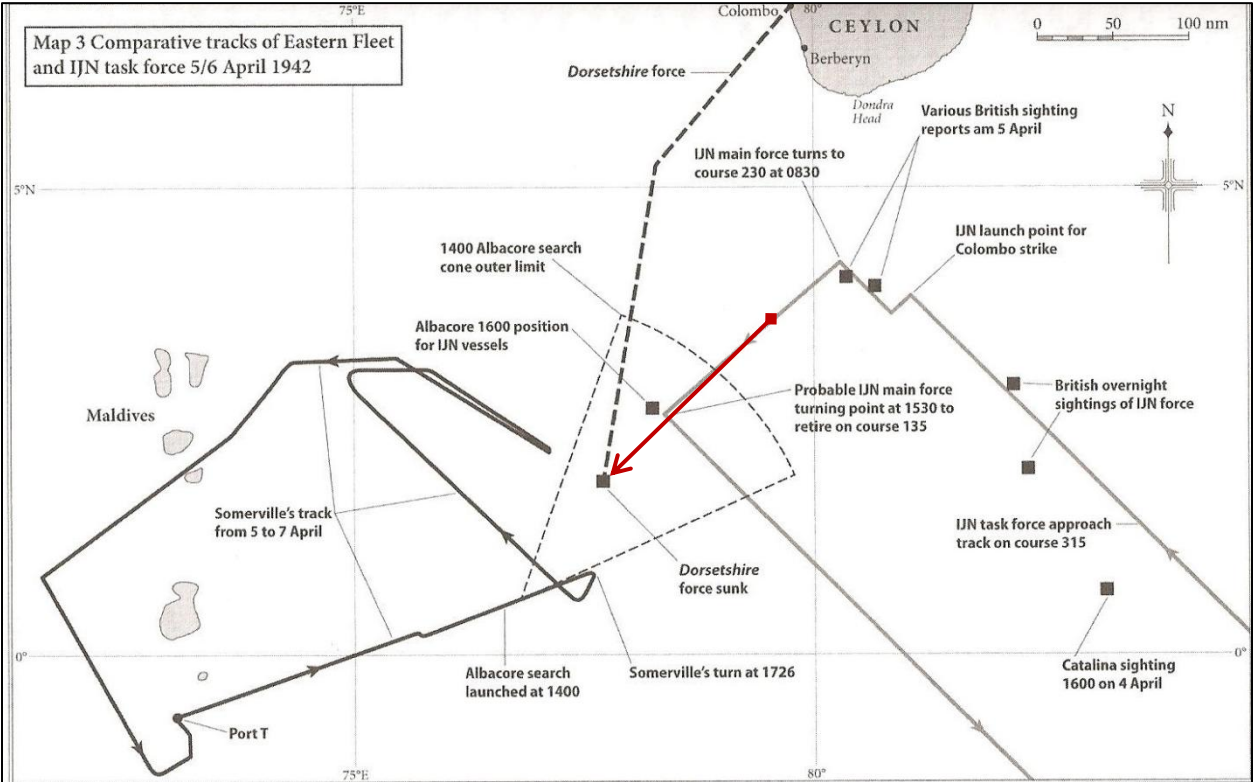


The D3A1 of Lt Cdr Kakuichi Takahashi over Rabaul, 20 January 1942, armed with a 250 kg "ordinary" bomb<sup>91</sup>



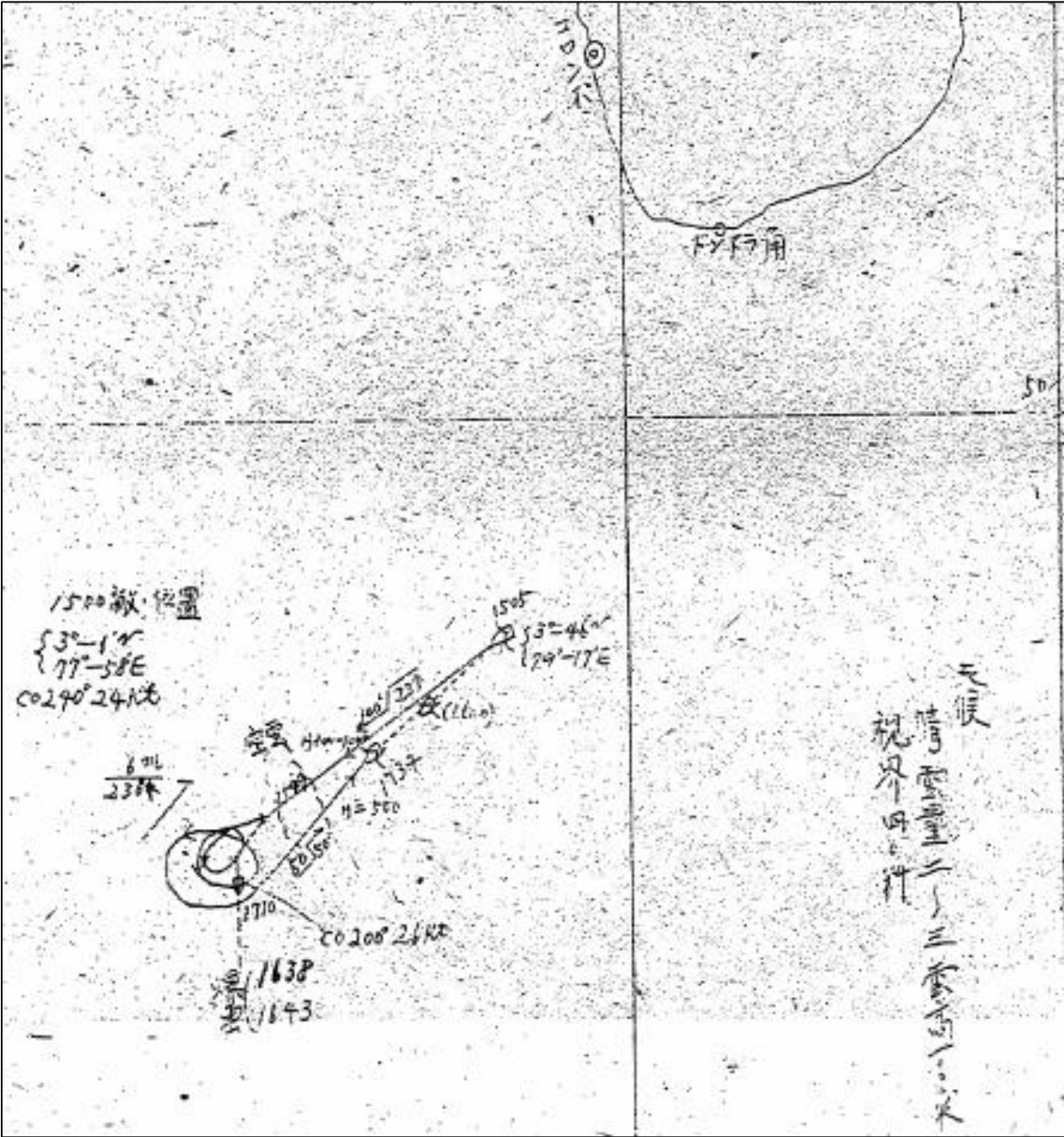
A D3A taking off from Akagi to attack Cornwall and Dorsetshire<sup>92</sup>

As already noted, 53 D3As took off from Akagi, Soryu and Hiryu between 1149 and 1203 to attack the two enemy ships, which at that time were still assessed to be destroyers. The strike force flew an outward course of 237 degrees, as shown on Maps 4 and 5, and Egusa reported sighting the enemy ships at 1254, just an hour after taking off.



Map 4 – Movements of KdB, Force A, and Cornwall and Dorsetshire

This is a copy of Map 3 from *The Royal Navy in Eastern Waters*, with the addition in red of the approximate take-off point and outward leg of the D3As which attacked Cornwall and Dorsetshire



Map 5 – Track Chart for Hiryu's D3As. The timings are in JST, which was three hours ahead of local time<sup>93</sup>

Approaching from the northeast, the kanbaku found themselves off the cruisers' port quarter (at about seven or eight o'clock from them) and hidden by a thick cloud bank. During the next 30 minutes, Egusa skillfully led his force around the enemy ships without being sighted, in order to attack them from ahead. With the wind coming from the southwest, this permitted the kanbaku to attack downwind and almost down the length of the target ships, both of which made it easier for them to bomb accurately. It also permitted the attack to be made from out of the sun and, although this would have been unknown to Egusa, few of the ships' AA guns could bear on aircraft approaching from ahead.

At 1329, Egusa gave his orders regarding the type of attack to be launched:

*Attack Method No. 2. Bombing direction 50 degrees. Wind 230 degrees, speed six metres. [Six metres per second = 12 knots.]*

In Attack Method No. 2, each chutai went into an echelon left formation, with the leader on the right closest to the target. The three shotai then attacked one after the other, with the three aircraft in each shotai diving on the target together.

Egusa also decided that his Soryu planes would attack the trailing cruiser, Cornwall, and ordered Hiryu's planes, following behind him, to attack the leading ship, Dorsetshire. Abe split his 17 kanbaku from Akagi, leading the nine in his leading chotai to attack Cornwall while Lt Shōhei Yamada's second chutai, with the remaining eight, attacked Dorsetshire.<sup>94</sup>

The attack opened at 1338, when Egusa and his two wingmen attacked Cornwall from out of the sun, taking her by surprise. All three claimed a hit. Soryu's other five shotai quickly followed, little hampered by the weak anti-aircraft fire. Egusa's 18 aircraft claimed 14 hits. They were soon followed by the nine planes of Abe's first Akagi chutai, who claimed eight hits, bringing the number of claimed hits on Cornwall to 22 (81%). As is noted in the next section, Fair's count was that "about 18" bombs were released, with ten direct hits, six near misses and two wide misses, but this accounts for only 18 of the 27 bombs dropped. It is unlikely that all nine of the other bombs were wide misses, so in all probability Fair's count understates the number of near misses, especially since he "considered that the sinking of the ship was due primarily to underwater damage caused by "near misses"". In any case, Cornwall was quickly overwhelmed by the attack and sank at about 1355, just 17 minutes after the attack began.<sup>95</sup>

Kobayashi attacked Dorsetshire a few moments after Egusa attacked Cornwall. His 18 kanbaku claimed 17 hits, plotting them in the diagram which is reproduced on the next page. The eight planes of Akagi's second chutai attacked immediately afterward. One of them could not release its bomb but the other seven all claimed hits, bringing the number of claimed hits on Dorsetshire to 24 of the 25 bombs dropped (96%). Agar acknowledged 10 direct hits and "several" near misses. It is not at all surprising that Agar had difficulty producing an accurate tally of the hits and misses, since Dorsetshire was overwhelmed by having 25 bombs aimed at her in well under 10 minutes. At about 1344, just five or six minutes after the attack began, Agar ordered his crew to cast off the rafts and stand by the boats, and about a minute later he ordered abandon ship. Dorsetshire sank at 1348.<sup>96</sup>

At 1355 Egusa reported "Two large cruisers sunk" and Nagumo immediately cancelled the launch of CarDiv5's torpedo-armed B5Ns, which were on the verge of taking off. The 53 kanbaku landed back on their carriers by 1445.<sup>97</sup>

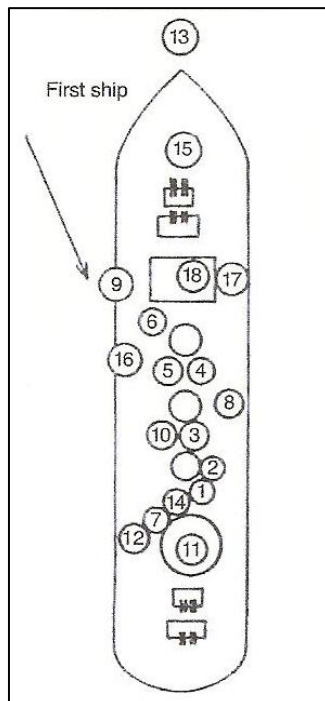
As already noted, 16 of the 53 D3As were armed with HE bombs. It is not clear which aircraft carried which type of bomb, except that six Hiryu aircraft carried HE bombs and the nine Akagi aircraft which attacked Cornwall were reportedly all armed with SAP bombs.<sup>98</sup> Since one third of each carrier's D3As had been ordered to rearm with HE bombs for the attack on Colombo, it would follow that up to six HE bombs were dropped on Cornwall by Soryu aircraft, and that up to twelve were carried by the 25 aircraft which attacked Dorsetshire.

The unplanned arming of some of the aircraft with "land" bombs had, to the surprise of the Japanese, proven very effective. Hiryu made the following observation in its after action report:

*[The] land bombs were effective in neutralizing anti-aircraft guns and machine guns on enemy vessels. In the attack on the large cruisers [...], the first three aircraft of each [chutai] were equipped with land bombs. On impact, the bombs instantly silenced the enemy's anti-aircraft fire and facilitated the bombings thereafter. Having the carrier-based bomber unit use the land bombs in simultaneous attacks with both torpedoes and [SAP] bombs was found effective, too.*

Hiryu was impressed enough with the success of the unplanned use of land bombs during its attack on Dorsetshire that during its next two dive-bomber attacks, on HMS Hermes on 9 April and on USS Yorktown on 4 June, it deliberately armed a third of its aircraft with the 242 kg HE bomb.<sup>99</sup>





**Sketch 1 - Bomb Plot for Hiryu's Attack on Dorsetshire.**

The diagram shows 17 hits and 1 miss. The arrow indicates the initial direction of Hiryu's attack.<sup>100</sup>

### **The British Account**

While we may suppose that the Japanese airmen likely claimed more hits than they made, as the airmen of every combatant often did, their accounts of the attack on Cornwall and Dorsetshire are likely to be accurate in most other respects. There were no casualties among the attacking aircrew and theirs were KdB's last attacks of the day, so they were undoubtedly debriefed under unhurried circumstances. In particular, we can be confident in the general accuracy of the timings provided in their reports.

The reports submitted by Agar, Manwaring and Fair were compiled under very different circumstances. Any running logs of the attack were lost when the two cruisers sank, so the reports they produced were based primarily on the memories of the authors and those they consulted.

Agar's first report is dated 8 April, the day that the survivors from Cornwall and Dorsetshire arrived at Addu Atoll. Somerville arrived less than four hours after Agar, who must have reported to him on Warspite immediately thereafter. This report was thus written rather hurriedly, probably without much consultation with other Dorsetshire officers. It includes some definite factual errors.

Agar submitted a follow-up report on 13 April. In the interval he had the opportunity to consult unnamed "other Dorsetshire officers", as well as Manwaring. In this report Agar revised a number of the things he said in his first report, particularly timings. For example, in the first report Agar said that Dorsetshire sank within 10 minutes of the attack opening, which was an accurate estimate, but in the second he revised this estimate to 7 to 8 minutes based on input from Manwaring.

Manwaring was wounded in the attack, so Cornwall's initial report was submitted by Fair. Ten pages long, it is easily the most detailed of the four reports. It was completed on 13 April aboard Revenge, to which Fair was transferred after arriving at Addu Atoll, and submitted to Willis. Fair commented that his information had been "compiled by the principal surviving officers with the assistance of rough notes and impressions recorded by all officers, and certain ratings, within twenty four hours of being picked up". It is fortunate for historians that Fair had the time to prepare a careful and thorough report. Manwaring did not complete any submission until 24 April, when he sent Willis a one page covering letter and a two page long report "amplifying and qualifying" Fair's report.<sup>101</sup>

These four submissions are the only known contemporary official reports completed by officers from Cornwall and Dorsetshire. Agar's first report was prepared in haste and mostly from his own memory. Fair's report and Agar's second report were both completed on 13 April but they were on different ships hundreds of miles apart and could not have consulted each other. Agar was also unable to consult his executive officer, who was wounded, and other key officers were killed or wounded. Manwaring was on a third ship when he prepared his brief submission. The four reports are in agreement on many points but contradict each other in several respects and are silent on some questions.

In 1943 the Admiralty completed a classified "battle summary" entitled *Naval Operations off Ceylon, 29th March to 10th April, 1942*. The section on the loss of Cornwall and Dorsetshire includes the following compilation of the reports submitted by Agar, Fair and Manwaring:

*At about 1340 [more likely 1338], 5<sup>th</sup> April, three aircraft were sighted by the Dorsetshire overhead at a high altitude; assuming them to be hostile, she opened fire immediately, but “within a few seconds they dived on the Cornwall” —which was about a mile on the port quarter—and released their bombs at a low altitude, the first striking the after hangar and the second scoring a near miss port side forward. Simultaneously, a separate formation of three aircraft attacked the Dorsetshire; avoiding action was taken to starboard, but all three bombs hit—one through the quarterdeck, disabling the steering gear, the second through the catapult, disabling both wireless offices, and the third port side amidships, putting out of action all the port A/A armament, except the pom-pom. Attacks by a “succession of formations of three” followed at intervals of a few seconds. Hits were received through the base of the foremost funnel, putting out of action S1-H/A group [the forward starboard high angle guns] and “A” boiler room; on the quarterdeck, disabling “X” turret, and at the base of the after funnel, bringing it down and at the same time blowing up the H.A. magazine. This bomb also put both pom-poms out of action.*

*Four minutes [“five minutes”, according to Agar’s first report] after the initial attack the ship took a definite list to port; “all communication between the bridge and other parts of the ship had gone, and looking down from the bridge aft, all that could be seen was flames and smoke extending to the stern.” At least four more hits were received (making a total of 10) in addition to several near misses, and 2 minutes later [“a few minutes later”, according to Agar’s first report] Captain Agar, realising the ship was sinking, ordered all hands on deck. This was followed in half a minute by the order to abandon ship, by which time she was slowly turning on to her beam ends. “Enemy aircraft were still flying low over the ship and using their machine-guns, and it was possible to get a clear picture of them and their occupants.” Almost immediately afterwards [“and about 9 to 10 minutes after the first attack”, according to Agar’s first report, and this would be consistent with the time recorded by the attackers] she capsized and sank stem first. “It was incredible how quickly the ship sank”—to quote Captain Agar—“she just took one plunge by the stern, and as we were thrown into the water, the bows towered up almost vertically alongside us. All around was wreckage of sorts and oil fuel, though not very thick. . .”*

*Meanwhile the Cornwall, though still afloat, had not fared much better. “For the next 2 minutes after the initial attack,” reported Commander Fair, “bombs fell almost continuously, some scoring direct hits, but the majority were very near misses.” Explosions followed each other so quickly that no exact idea could be formed of their sequence, or of the separate effect of each bomb. Altogether eight hits [sic] and six near misses were sustained; only two complete misses were observed. [Fair reported nine hits from conventional bombs and one from an oil bomb.]*

*A near miss port side, abreast the bridge, flooded large sections of the port bilges and dislocated electric power supplies all over the ship. All personnel in the after engine room were killed (it is believed) by a near miss on the starboard side, abreast the hangar, and both boiler rooms were flooded by near misses and had to be evacuated. A bomb on the waterline abreast the hangar, burst in the forward engine room, which rapidly filled with steam and smoke and had to be evacuated, most of the personnel being saved; hits were also received between the forward and centre funnel, between “X” and “Y” turrets, near the dynamo room, in the sick bay flat and in the recreation space. Many of the bridge personnel were killed or wounded by splinters of a bomb which exploded on the starboard paravane; in one case at least the bridge was also machine-gunned. An oil bomb which burst on S1 mounting produced a flame which enveloping S1, the starboard pom-pom and fore starboard superstructure, swept right over the air defence position and 8-in. director. Battle dress and anti-flash gear saved all except the gun’s crew of S1, whose clothing caught fire. In less than 5 minutes after the attack started all power had failed, and both boiler rooms and both engine rooms were flooding rapidly. The port gunwhale of the ship was awash, and the starboard outer propeller was breaking surface, the ship being slightly down by the bows. Thick black smoke was issuing from the foremost funnel uptake casings on both sides of the upper deck.*

*By 1351 the last bombs had been dropped, the Dorsetshire had sunk, and in the Cornwall endeavours were being made to correct the list to port and to get away a report by wireless. It soon became evident that the ship was sinking, and Captain Manwaring, who continued to direct operations, though wounded in the right shoulder, gave orders to prepare to abandon ship. He then, with the remaining bridge personnel, left the bridge and, making his way aft, saw to the launching of all available floats, etc. At 1355 the final order to abandon ship was given.*

*While this was being done, the Japanese aircraft, which had ceased attacking—either because it was obvious that the ship was doomed, or more probably because they had expended all their bombs—formed up in sub-flights and flew over the survivors. Twenty-seven dive-bombers and one float plane were counted; there was no machine-gunning of the men in the water.*

*The end was not long in coming. Some 4 minutes later the Cornwall heeled over to about 70° and went down by the bows, taking her final plunge at an angle of about 30° to the vertical and making singularly little disturbance. [These timings would have Cornwall sinking at 1359 but the attackers’ report that she sank at 1355 is more likely to be accurate.]*

*Once again the Japanese airmen had attacked and their dive bombing had been as successful as the torpedo and high level bombing they had used against the Prince of Wales and Repulse. The attacks were carried out by single-engined two-seater monoplanes, diving steeply at an angle of from 60° to 80° from ahead or fine on the bow. Captain Agar remarked that their tactics were facilitated by the ships being on a southerly course, thus enabling them to combine the advantages of attacking down sun and from ahead—the cruisers’ blind spot for A/A defences. The attacks were well pressed home, the height of release being estimated at from 500 to 1,000 ft., and the bombing was remarkably accurate. The bombs were dropped in such a manner as to have one falling at the moment the previous one was exploding. Slightly longer intervals were noticed after every three bombs, which suggested that the attack was organised in sub-flights. The size of the bombs dropped was thought in the Cornwall to be between 250 and 500 lb.; Captain Agar mentioned 1,000 lb. as the probable weight. Some burst on impact and in some the explosion was delayed. The great effect of the near misses which burst under water has already been remarked on. So sudden and severe was the attack that the main H.A. armament of both cruisers was put out of action before more than a few rounds could be fired. The short-range weapons continued to be fought with the utmost gallantry right up to the last; the Cornwall is credited with having damaged one aircraft and probably destroyed another which was seen to hit the water.<sup>102</sup>*

In 1952 the Admiralty compiled a list of ships sunk or damaged during the war. The entries for Cornwall and Dorsetshire are reproduced in Appendix 3. In October 1942 the Admiralty plotted the hits and misses reported by Fair on large schematics of Cornwall which have been reproduced in Appendix 4.

Table 6 recapitulates the reported results of the bombing. As noted above, the Japanese airmen claimed 46 hits from the 52 bombs dropped. It is likely that some of the preceived hits were in fact near misses, but even so there is a substantial gap between the Japanese claim of 46 hits and the total of 26 hits and near misses reported by their victims, plus however many near misses are encompassed by Agar’s statement that there were “several”. There is no way of knowing if this gap is due to the kanbaku crews making more wide misses than the six they acknowledged or to undercounting by their victims.

Target	Results Reported by D3As		Results Reported by Victims			
	Bombs Dropped	Hits Claimed	Bombs Dropped	Hits	Near Misses	Wide Misses
Cornwall	Soryu: 18 Akagi: 9	Soryu: 14 Akagi 8	18-24*	10	6	2
Dorsetshire	Hiryu: 18 Akagi: 7	Hiryu: 17 Akagi 7	Not counted+	10	“several”	None noted
Total	52	46		20	6+	2
*Fair claimed that about 18 bombs were dropped but Manwaring estimated that at least 24 were dropped. +Agar counted 50 planes in all and presumably would have said that about 25 bombs were aimed at Dorsetshire.						

Table 6 – Reported Bombing Results

In his report, Fair stated that the Japanese used three types of bombs against Cornwall:

*Normal HE bombs of 250-500 pounds, with delay or non-delay fuzes.* This description covered both types of bombs actually used, the SAP (delay) and HE (non-delay).

*“B” bombs.* Fair commented that these were described “as a depth charge with a pointed nose and small vanes. Fell as near misses. After a brief pause there followed a tremendous explosion, which caused great underwater damage and threw up a big column of water. Consider that these were responsible for sinking the ship.” A “B” (buoyant) bomb entered British service in 1939 but was never used. It was to be dropped ahead of a ship, sink, and then rise to strike the bottom of the target.<sup>103</sup>

*Oil bombs.* The effect of a so-called oil bomb exploding on Cornwall’s S1 twin 4-inch mount has been described above. Presumably the bomb in question was actually a 242 kg HE bomb.

Of course, no “B” bombs and no oil bombs were employed against either cruiser.



The Photographic Record

A remarkable series of 13 Japanese images of the attack on Cornwall and Dorsetshire have survived. At least 12 of them were taken by the same aircraft, undoubtedly one of the shadowing floatplanes. This was probably Chikuma’s E13A, since Tone and Abukuma’s E7Ks must have already returned to their ships and Tone’s E13A was engaged in a new search which is described in the next section. Image number 7 was likely taken by another aircraft, presumably a D3A after it dropped its bomb.<sup>104</sup>

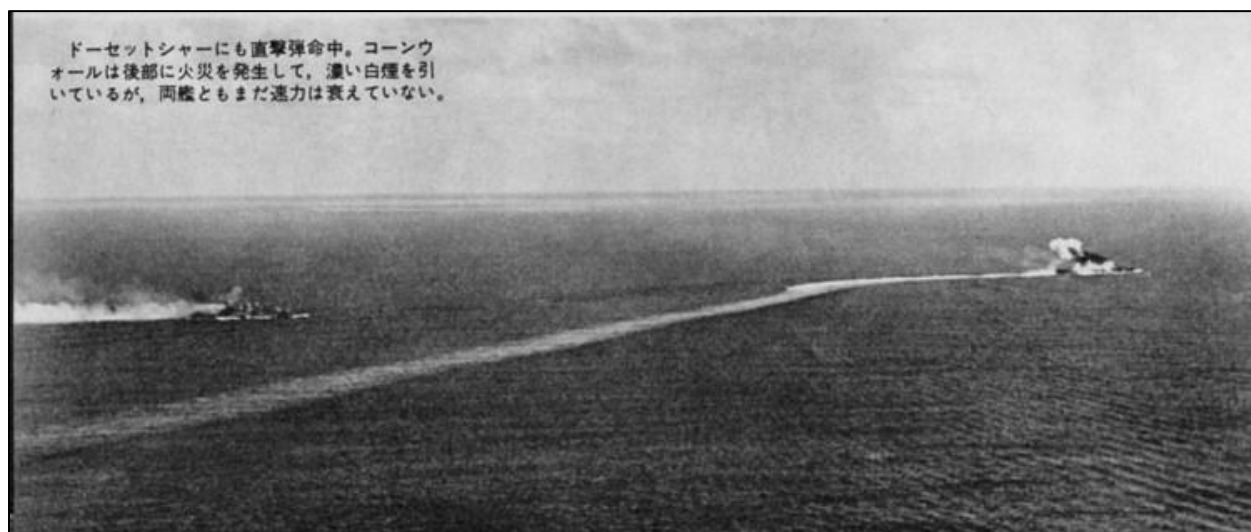
Stetch 2, from Hiryu’s DAR, shows the relative positions of Dorsetshire and Cornwall when the attack on them commenced and their subsequent movements. It depicts Dorsetshire, the leading ship, turning to starboard but succumbing before it got very far. (The arrow shows the direction from which Hiryu’s aircraft attacked Dorsetshire.) Cornwall, which lasted about seven minutes longer, is shown also turning to starboard but making a bit more than a full circle before coming to a halt and plunging to the bottom. The sketch has been of assistance in confirming the order in which the 13 images were taken.



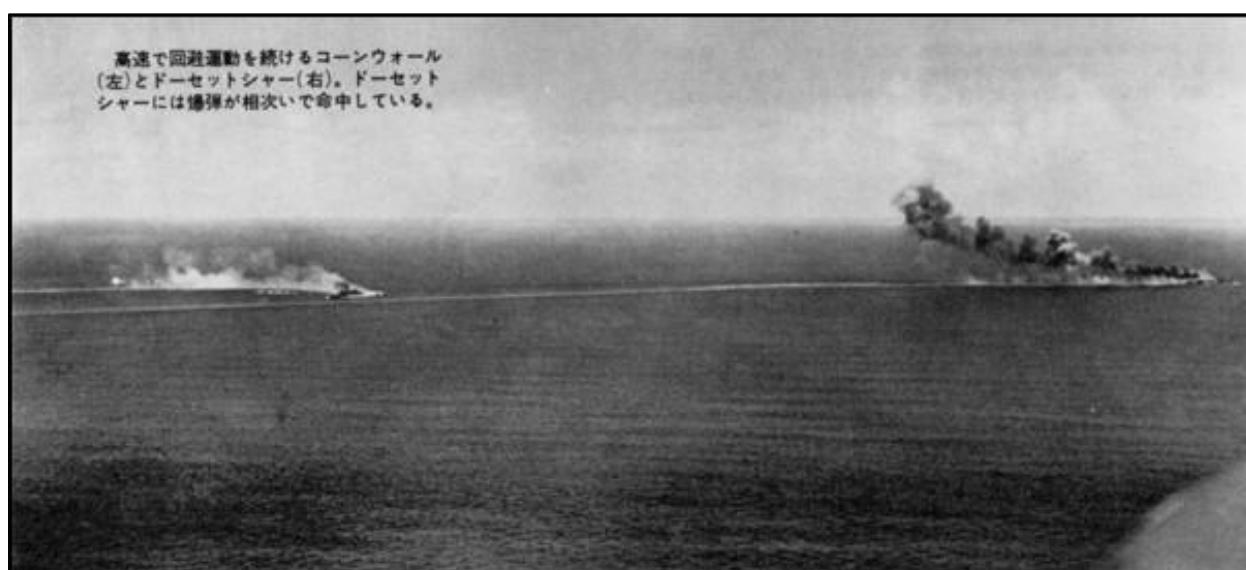
Sketch 2 – Cornwall and Dorsetshire Under Attack<sup>105</sup>



#1: Cornwall and Dorsetshire were steering 185° until the first bombs fell, when they immediately turned to starboard, so this image was taken by a camera located north of them and facing south. Splashes from near misses in the wake of Cornwall (on the left) before and after the turning point suggest this image was taken after the second trio of bombs was dropped on her. Dorsetshire was hit as it was turning to starboard by the first three bombs aimed at her. In this image Dorsetshire has just turned about 90 degrees to starboard and is emitting smoke evidently caused by hits but no splashes from near misses are visible, suggesting that perhaps only the first shotai from Hiryu has attacked her.



#2: This shot appears to have been taken 20-30 seconds later, since Dorsetshire, on the right, has moved by only about its own length. Bombs appear to be exploding on and/or alongside her, but there are no splashes in her wake, so this image may have been taken while Hiryu's second shotai was attacking.



#3: Its rudder jammed, Cornwall is now circling to starboard while Dorsetshire, smoking heavily, draws away from her. Visible lower right is what may be a protruding part of the aircraft, possibly a wingtip.



#4: A few second later Cornwall is continuing to circle to starboard



#5: Dorsetshire again, probably soon after #3 was taken.



#6: The aircraft is now west of the cruisers with the camera facing roughly east. Cornwall, to the rear, continues to circle to starboard. Dorsetshire's wake shows that after turning to starboard it jinked to port but has now again turned to starboard. A near miss along the port side has just been scored.



#7: In this image Cornwall is in the foreground, behind its own smoke, with Dorsetshire visible behind it, indicating that the aircraft is on the far side of Cornwall with its camera aiming west. A comparison of the wakes with those in #6 shows that very little time has passed between #6 and #7, suggesting that a second aircraft has taken this image. This conclusion is reinforced by the fact that #8 was again taken by an aircraft positioned roughly west of Dorsetshire with its camera is facing roughly east.

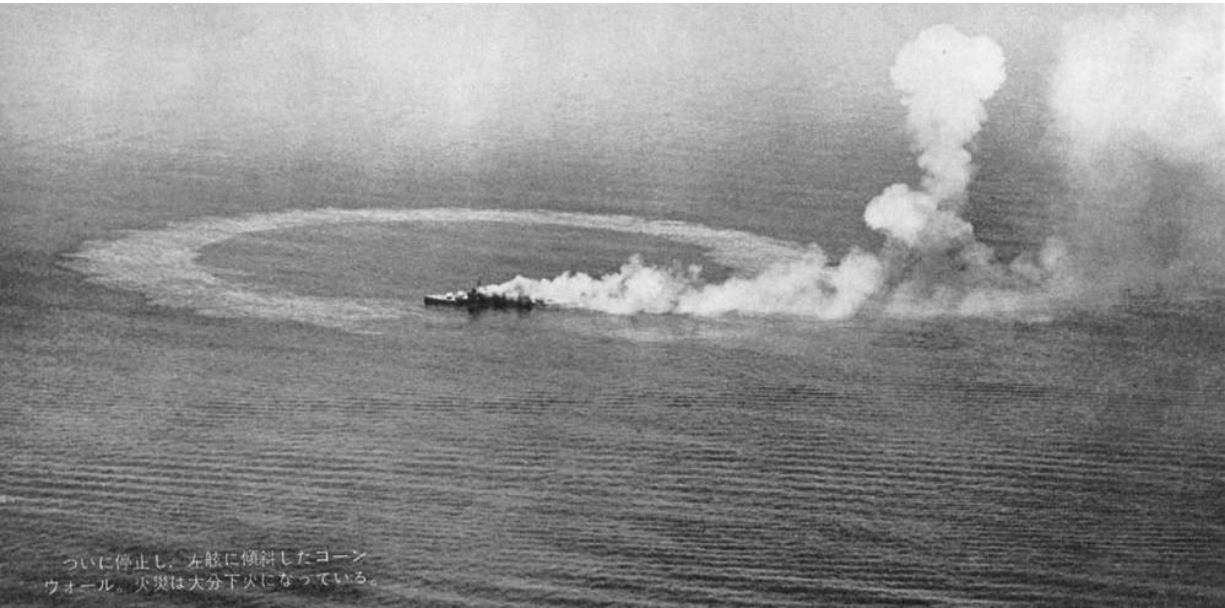




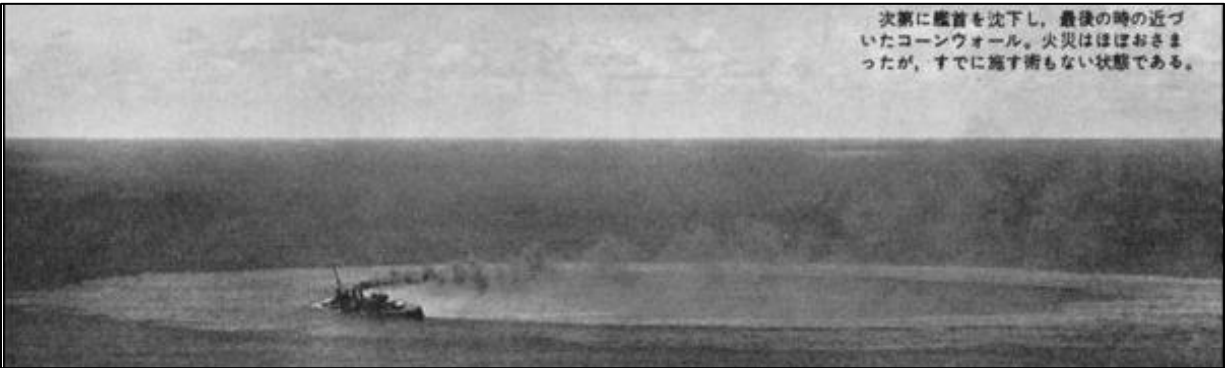
#8: Dorsetshire capsizing to port and going under. The wind was from 230° and the smoke is drifting away from the camera, confirming that this image was taken from roughly west of Dorsetshire and facing roughly east. Cornwall is at upper left, still circling.



#9: Dorsetshire's final moments.



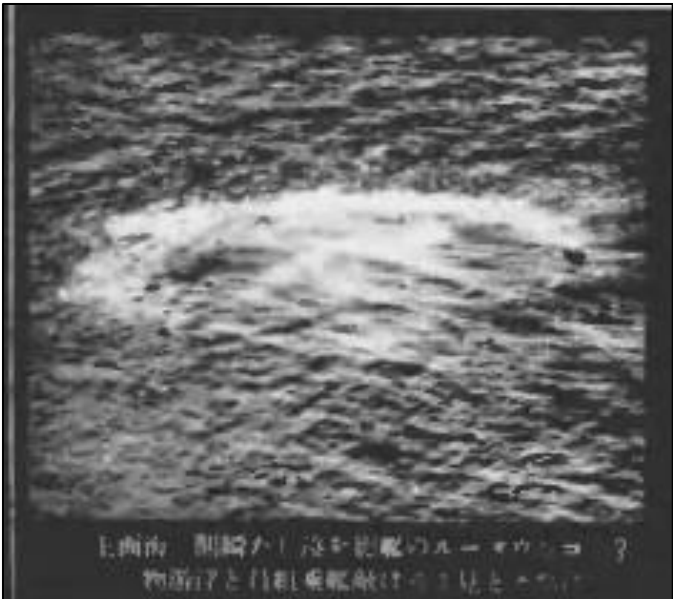
#10: Cornwall. The lack of a bow wave indicates that she has little way on her.



#11: Cornwall listing and down by the bow. The reduced amount of smoke suggests that this image was taken after the last bomb was dropped. Fair's report puts this at 1351 but it was likely earlier.



#12: Cornwall *in extremis*.



#13: Cornwall disappears.

## Rescue Delayed

When Cornwall and Dorsetshire sank 1,100 survivors found themselves in the water or in the small number of boats and rafts which they had been able to launch. Force A was just 80 miles away but the survivors were not rescued until 28 hours later. This section outlines the reasons for the delay.

The first problem was that Somerville did not learn in a timely manner of the loss of his heavy cruisers. The SHAD report Agar sent at 1257 was received by Somerville at 1327, when it was re-broadcast from Colombo, but it arrived in mutilated form and was not identified as having been sent by Dorsetshire until 1406, and of course it reported only that the two cruisers were being shadowed. Cornwall and Dorsetshire were attacked so suddenly and hits were scored so quickly that neither of them was able to report that they were under attack before their primary radio systems were knocked out. Cornwall did manage to send a report using its emergency transmitter, but it was apparently not received by any friendly station. At about the same time, at 1344, Warspite's radar detected an enemy air formation bearing 30 degrees, distance 84 miles. This was Egusa's force. The contact faded after five minutes, no doubt because the kanbakus dove to the attack and slipped below Warspite's radar horizon, but it was not realized aboard the flagship that this was an attack on the two cruisers and that it sank them.<sup>106</sup>

Somerville received a firmer indication of the possible fate of Cornwall and Dorsetshire at 1522, when Sub-Lieutenant RJF Streatfield, flying one of four Albacores launched by Indomitable at 1411 to search to the northeast to a depth of 200 miles for the Japanese, reported sighting wreckage in position 2.08N, 78.08E. A destroyer was detached to investigate but was recalled when at 1655 another Albacore from Indomitable, this one flown by Sub-Lieutenant RJ Grant-Sturgis, reported sighting an enemy force of "5 unknowns" in position 3.38N, 78.18E at 1600, but no course or speed were given. (On Map 4 the reported position of these five ships is marked "Albacore 1600 position for IJN vessels".) In his report of proceedings, Somerville commented that "It is unfortunately necessary [to report] that no relief shadowers were sent off by the Rear Admiral Aircraft Carriers [Boyd] as soon as [Grant-Sturgis'] report was received and that I omitted to obtain confirmation from Rear Admiral Aircraft Carriers that relief shadowers had been sent".<sup>107</sup>

Then, at 1700, Colombo reported indications of enemy aircraft carriers steering 230 degrees at 24 knots at 1400 from an unknown position. Somerville's assessment was that if the enemy "held on this course he would be at 0400 in a position to deliver a night air attack on Addu Atoll". To keep his ships clear of this threat, Somerville altered course to 210 degrees at 1726, and ordered Willis and Agar to steer south, "though by this time I entertained grave fears concerning the fate of the two 8" cruisers".<sup>108</sup>

Grant-Sturgis landed on Indomitable at probably 1815 and reported that his aircraft had been attacked by Zeros. (They were from Hiryu.) He escaped into cloud with little damage but his Telegraphist/Air Gunner, Leading Airman G. Dixon, was wounded, so he high-tailed it back to Indomitable almost immediately. Dixon later provided the following account:

*We sighted the Jap fleet – we could see the outline of the carriers and the battleships. Sub Lt Jaffray [the observer] gave me a signal to send. A simple message, repeated twice, indicating the sighting. It was while sending this message that the 'Zero' made the first attack. At this time we would have been flying at about 3,000 feet.*

*At once Grant-Sturgis dived to sea level. The 'Zero' then made a frontal attack. This we evaded by swerving side to side. The [Japanese] pilot fired his forward gun. It then attacked from the rear. I stood up in the cockpit with the Vickers GO [Gas Operated], and when the 'Zero' opened fire I responded with a burst, while Grant-Sturgis did a tight turn towards the fighter.*

*It was during the second attack from the rear that I was hit in the left forearm and left hip. The fighter engaged us for about 15 minutes, making four attacks from the rear and three frontal ones. All the time we were at sea level.*

*[...] We finally arrived back at the carrier and Jaffray fired a Very pistol, and we landed straight away. The Albacore had been hit by about 40 bullets.*<sup>109</sup>

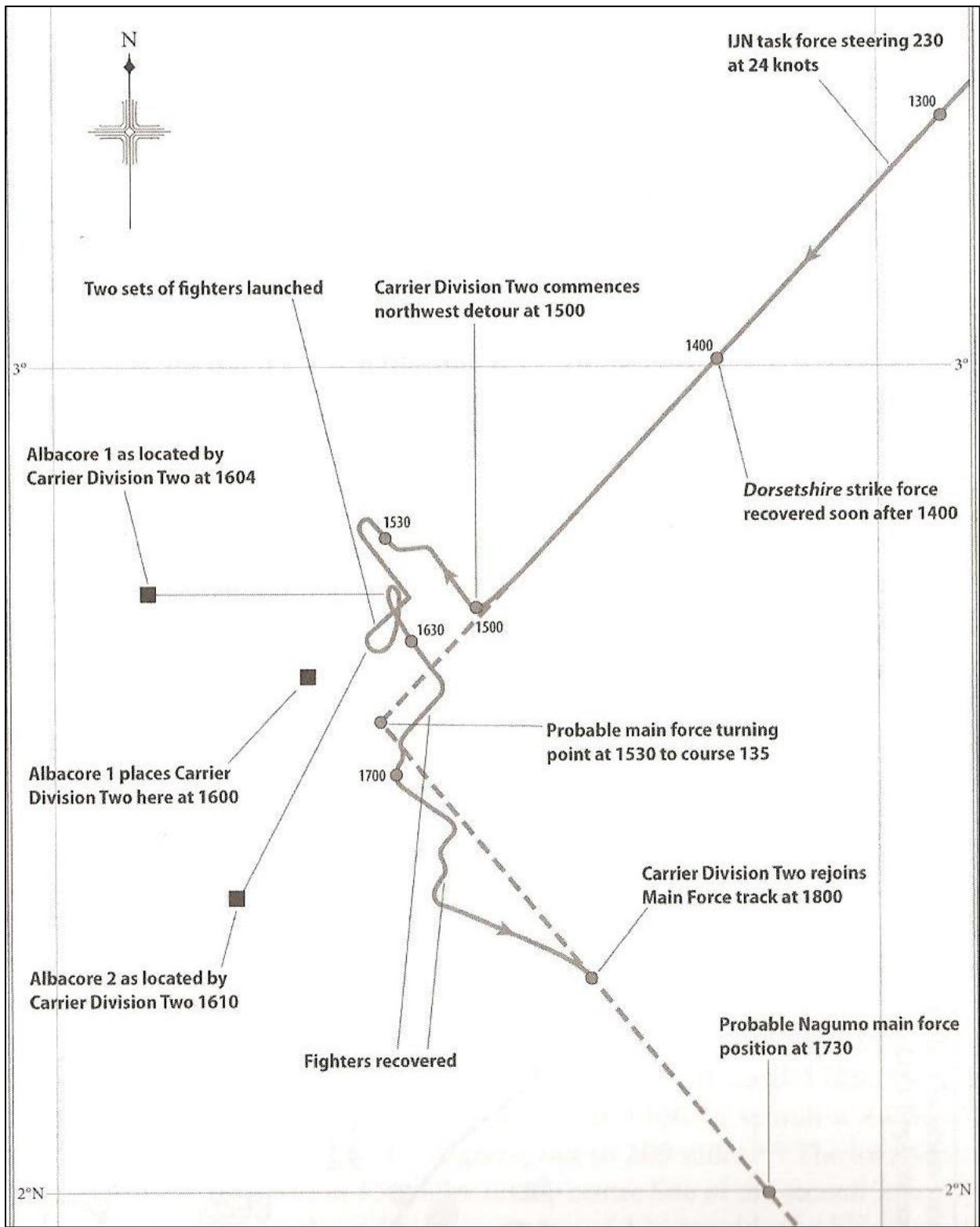
Grant-Sturgis apparently stated upon landing that at 1600 he had in fact seen two carriers and three unknown vessels steering northwest. Boyd immediately relayed this news to Somerville, as the latter recounted in his report of proceedings:

*43. At 1817 a further signal was received from Rear Admiral, Aircraft Carriers, adjusting the 1600 position of the enemy force, amplifying it to include 2 carriers and 3 unknown vessels and giving the course as northwest. This was the first indication I had of an enemy course to the northwest.*

44. I immediately ordered Force A to alter course to 315 degrees and instructed Vice Admiral, 2nd in Command [Willis] to conform. [According to Indomitable's log, course was changed to 315 degrees and speed increased to 20 knots at 1840.] These movements had the object of keeping Force A within night air striking distance of the enemy force, trusting to an A.S.V. search to locate the enemy, and to being [keeping?] Force B within supporting distance should it be necessary to retire in that direction. A dawn rendezvous was arranged with Force B in approximate position 3N, 75E.

45. As no news had been received of DORSETSHIRE and CORNWALL, the presumption was that they had been sunk.<sup>110</sup>

The failure to send another aircraft to shadow the Japanese when Grant-Sturgis' report was received at 1655 now came home to roost, because KdB was in fact not steering northwest at 1600. The two carriers spotted by Grant-Sturgis and his crew were evidently Hiryu and Soryu. CarDiv2 was probably steering northwest when briefly spotted, but, as shown on Map 6, the rest of KdB was steering 135 and CarDiv2 was simply executing a "detour" to the northwest. Grant-Sturgis, "Albacore 1" on Map 6, was apparently driven off before CarDiv2 turned southeast. Streatfield, "Albacore 2", evidently continued on his outward search leg after sighting the wreckage from Cornwall and Dorsetshire, for he was spotted and shot down by Zeros from Hiryu at 1628. By then CarDiv2 and the rest of KdB were heading southeast and Streatfield may have seen this, but he sent no sighting report before being shot down.<sup>111</sup>



Map 6 – KdB's Movements, 1500-1800<sup>112</sup>



The reason for CarDiv2's jink to the northwest is not known. *The Royal Navy in Eastern Waters* speculates that "Possibly the purpose was to check the most exposed flank of the force or, alternatively, to disguise a major course change from any watching eyes. If the latter was the intention [...] it was successful".<sup>113</sup>

Somerville's change of course at 1840 to 315 degrees to stay within night air striking range did the opposite, since KdB was steering the exactly reciprocal course of 135. Had Force A sent additional aircraft soon after 1655, the relief aircraft could possibly have re-gained contact with KdB by around 1840 and reported that it was steaming to the southeast. If Somerville had then changed course and steered 135 he could perhaps have hung off Nagumo's flank from around 150 miles away and launched his intended night attack with the two Albacores squadrons which, according to the post-war memoirs of two of the aircrew involved, were spotted by then.<sup>114</sup> This did not happen, so Somerville's intention to launch a night attack was foiled because KdB's Combat Air Patrol (CAP) shot down Streatfield before he could send a sighting report and drove off Grant-Sturgis after he had seen CarDiv2 heading northwest but before he saw it head southeast, and because Force A dispatched no relief shadowers.

Somerville continued on course 315 throughout the night of 5-6 April, using radar-equipped Albacores from Formidable to search for KdB to his northeast. These searches all proved fruitless, as KdB was steaming away from him well to the southeast.<sup>115</sup>

At 0615 on 6 April, Force A was about 175 miles from Cornwall and Dorsetshire's survivors. By 0720 it had rendezvoused with Force B and altered course to 090 degrees. To quote Somerville again:

*49. Whilst no further information had been received regarding the enemy's movements nothing occurred to diminish the possibility of the enemy's being in the vicinity of Addu Atoll, either to attack it by air this morning or to await the return of the Eastern Fleet.*

*50. I intended to keep clear of the superior enemy forces by day; to try to get in a position to attack them by night air striking force on their possible return from the Addu area, and also to rescue the survivors from DORSETSHIRE and CORNWALL. I therefore steered east and at 1115 course was altered to southward in the direction of the wreckage reported the previous evening.*

*51. At 1300, ENTERPRISE with [destroyers] PALADIN and PANTHER were detached to search for survivors in the vicinity of the wreckage position. Air search was provided to assist; further fighter escort was sent to cover the operation. These ships were successful in picking up a total of 1122 survivors and rejoined the fleet at noon the following day [...]*<sup>116</sup>

### **Rescue Effected**

The rescue ships reached the survivors at about 1800 on 6 April. Enterprise picked up Cornwall's crew, Paladin rescued Dorsetshire's, and Panther circled the area to guard against attack by enemy submarines. In all 1,122 survivors were rescued. Paladin's captain recorded in his post-war memoirs that his ship rescued 504 survivors from Dorsetshire, which would mean that Enterprise rescued 618 from Cornwall.<sup>117</sup>



Image taken from Paladin of survivors from Dorsetshire in the water<sup>118</sup>

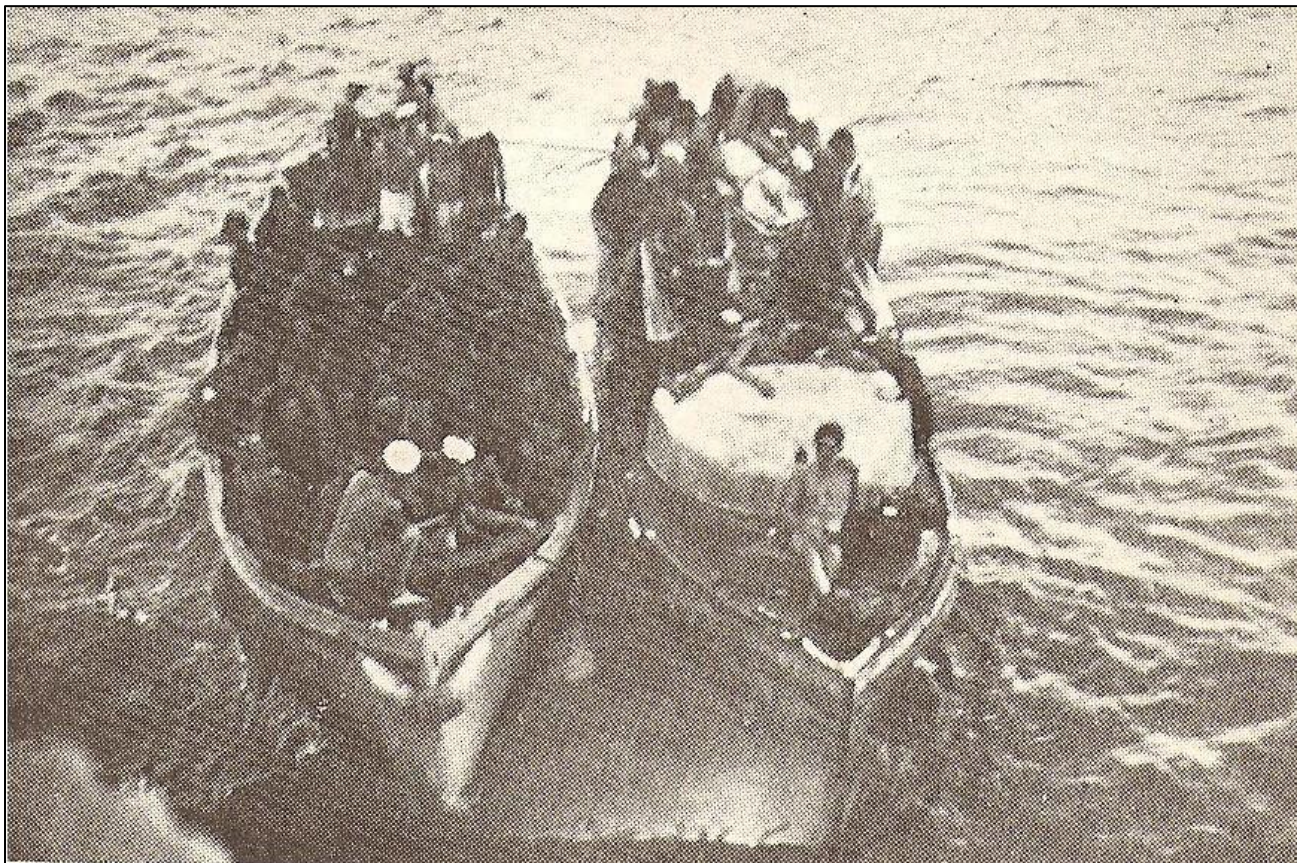


**Survivors from Dorsetshire board Paladin.**

In their reports, Agar, Fair and Manwaring included accounts of the experiences of the survivors while they awaited rescue. The following, from *Battle Summary No. 15*, summarizes their accounts:

*[The survivors] found themselves in a far from enviable plight—adrift in a shark-infested ocean, 300 miles from land, and with the scantiest of boat accommodation. Of the Dorsetshire there remained only two whalers - leaking badly - a skiff, a floatanet, two Carley floats, some Denton rafts and odd bits of wreckage. The wounded were placed in the boats or Denton rafts, and the remainder swam round collecting wreckage and joining it up as rafts round the boats. Captain Agar records that in quite a short time “all survivors from the ship, numbering over 500, formed one single body in the water, and were under perfect discipline and control.” A couple of miles off the Cornwall’s survivors were doing much the same. In their case a whaler, a motor boat (defuelled), two large oiling fenders and six Carley floats formed the rallying point. [...] they were cheered in the late afternoon by the appearance of an Albacore [Streatfield], followed shortly by a Fulmar [one of two launched by Indomitable at 1630, likely to investigate Streatfield’s sighting of the wreckage], which passed them a message to hold on. About sunset an aircraft believed to have been hostile was sighted flying very high overhead. [One of four radar-equipped Albacores launched by Formidable at 1930 to search for KdB.] Then the night closed down. All that night and the following day they drifted in an oily calm, the wounded and exhausted in the boats, which were loaded almost gunwale under, and the remainder in the water, holding on to what they could. The spirit, fortitude and discipline of the officers and men of both ships throughout this ordeal, as well as during the action, is described as “beyond all praise.” Soon after sunrise, 6th April, the heat became intense, and head coverings were fashioned from pieces cut from battledress. Sharks were numerous, but they seemed content to wait for the corpses which were from time to time committed to the sea, and made no attempt to molest anyone living. Both parties were short of food and drink; what they had was sparingly doled out at intervals. In the late afternoon, 6th April, the appearance of an Albacore put good heart into everyone, and shortly afterwards the masts of a cruiser and two destroyers were sighted over the horizon to the south-west [and] their 30 hours’ ordeal was nearly at an end. “The skill and seamanship displayed by the Commanding Officer of the Enterprise and his two destroyers,” reports Captain Agar, “can best be described by the bare statement of fact that 1,122 men in the water, for the most part exhausted, and with a large number of wounded, were brought on board within the space of an hour without the loss of a single life.”<sup>119</sup>*





Full of survivors but empty of fuel, Cornwall's motorboat (left) is brought alongside by Enterprise's pinnace.<sup>120</sup>



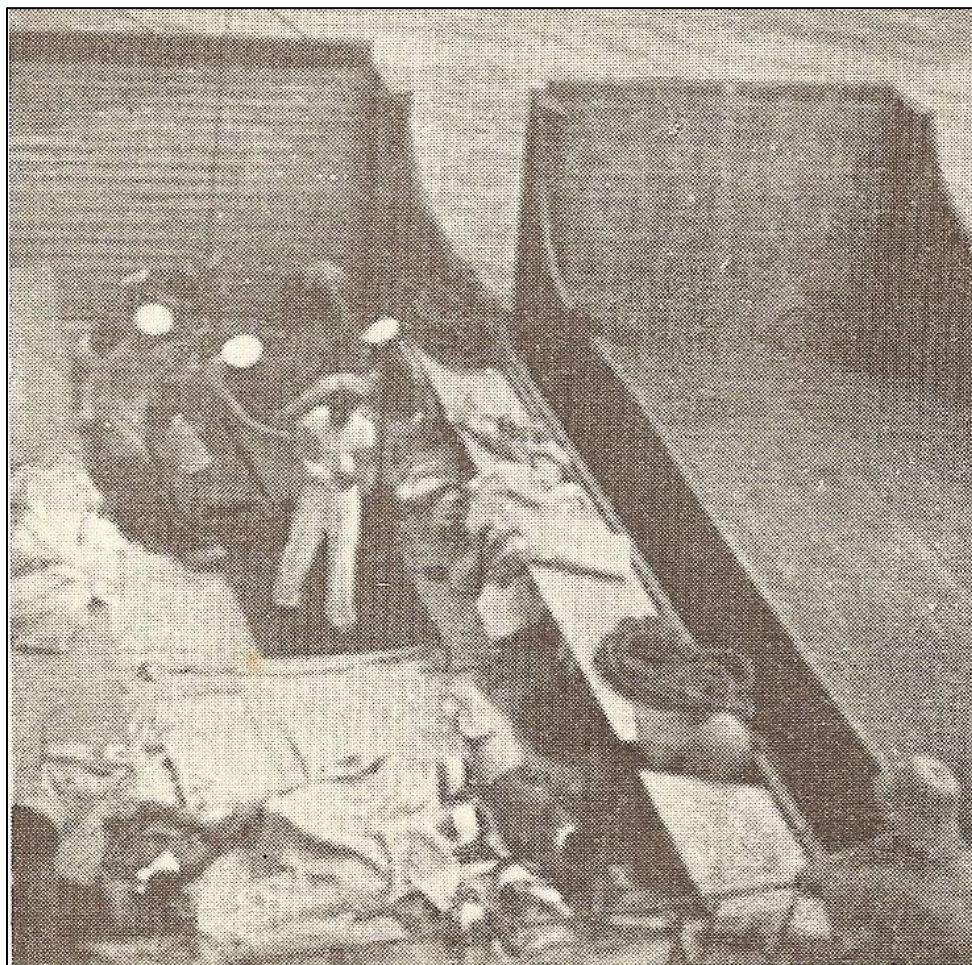
Survivors from Cornwall muster for roll call on Enterprise's quarterdeck.<sup>121</sup>

The presence of ships in the background suggests that this image was taken shortly after 1600 on 7 April, when Enterprise and Paladin parted company with Force A to take the survivors to Addu Atoll.

Enterprise, Paladin and Panther completed their rescue work by 1900 and set course to rendezvous with Force A, which they rejoined at 1600 on 7 April. Somerville promptly ordered Enterprise and Paladin to proceed to Addu Atoll ahead of the rest of his fleet. He also asked Arbuthnot to send the hospital ship Vita from Trincomalee to Addu Atoll.

Enterprise and Paladin arrived at Addu Atoll at 0725 on 8 April. The rest of the Eastern Fleet arrived at 1100. Unwounded survivors and the "walking wounded" were transferred to Resolution, Ramillies, Royal Sovereign and Revenge, while those requiring hospitalization were transferred to the base ship Haitan pending the arrival of Vita, which did not leave Trincomalee until the early hours of 9 April. Vita was further delayed when she became involved in rescuing survivors from Hermes and Vampire after they were sunk later that day, and she did not arrive at Addu Atoll until 2000 on 16 April.<sup>122</sup>





Wounded survivors from Cornwall being lowered from Enterprise into Motor Landing Craft (MLC) on 8 April for transfer to HMS Haitan, the Addu Atoll base ship, pending arrival of the hospital ship Vita on 16 April.<sup>123</sup>



Unwounded and walking wounded survivors from Dorsetshire prepare to transfer from Paladin to one of Force B's battleships at Addu Atoll on 8 April.<sup>124</sup>



**The Human Cost**

	Killed				Wounded	
	Officers	Ratings	NAAFI	Total	Embarked in Vita	Embarked in other Ships
Cornwall	10	180	2	192	?	?
Dorsetshire	19	212	3	234	?	?
Total	29	392	5	426	98	?

**Table 7 – Killed and Seriously Wounded**

Table 7 lists the casualties known to have been sustained by Cornwall and Dorsetshire. The figures for the fatal casualties are from the website (<https://www.cwgc.org/>) of the Commonwealth War Graves Commission, which is a very reliable source. Among them were 39 members of the South African Naval Forces (renamed South African Navy in 1951) and five civilians from the Navy, Army and Air Force Institute (NAAFI) who were on board to run the cruisers’ canteens. Five of the dead were only 17 years of age. Four were rated “Boy 1<sup>st</sup> Class” while the fifth was an Ordinary Seaman.

Three of the 1,122 survivors rescued on 6 April died of their wounds between 7 and 9 April and are included in the figure of 426 dead. Using 1,119 as the number of survivors, it can be calculated that the 426 fatalities represented almost 27.6% of the two ships’ crews.

It has not been possible to confirm the number of wounded. It can be stated with confidence only that on 16 April a total of 98 wounded survivors were embarked in Vita and taken to Durban for hospitalization.<sup>125</sup> The figure of 98 excludes the unknown number of wounded, such as Manwaring, who were fit enough to sail from Addu Atoll on 9 April on other ships.

There were no casualties among the 106 Japanese airmen who attacked Cornwall and Dorsetshire.

**Avoidable Losses?**

Military defeats often have multiple causes. While not denying that such matters as their limited horizontal armour, lack of effective radar and weak anti-aircraft suite played a role, the proximate cause for the loss of Cornwall and Dorsetshire was that they faced an overwhelming attack due to being in the wrong place at the wrong time as a result of the following factors:

1. There were intelligence and reconnaissance gaps.

FECB warned Somerville that a Japanese carrier task force was on its way to attack Colombo, but it got the date wrong. It knew that the task force was to have sortied from Staring Bay on 21 March but no Japanese message revealing that departure had been postponed to 26 March was intercepted and decrypted. FECB also underestimated the strength of the enemy force. This might not have mattered too much if regular aerial reconnaissance of Staring Bay had been possible. For example, a successful photo-reconnaissance mission flown on 25 March could have shown that the task force was still present and that it had five carriers. Even better would have been a report from Sculpin on 26 March warning of KdB’s departure and giving its composition, but it was not patrolling close enough to Staring Bay to do this.

Cornwall and Dorsetshire would not have been at Colombo on 4 April if Somerville had known that it was to be attacked on 5 April. (Nor would Hermes and Vampire have been at Trincomalee.) If he had also known that the Japanese task force had five carriers then he may well have taken the entire Eastern Fleet to a safe distance far to the west.

2. The timing of the detachment of Cornwall and Dorsetshire to Colombo was unfortuitive (if that is a word).

Somerville detached Cornwall and Dorsetshire at 0940 on 3 April, while Force A was in route to Addu Atoll, and ordered them to return to Colombo, where they arrived at 1000 on 4 April. Somerville could just as easily have kept them with him a few hours longer, for example until sunset on 3 April, in case a Catalina detected the Japanese force towards the end of the day. In this event the two cruisers would still have been in route to Colombo when KdB was spotted at 1605 on 4 April and could have immediately headed for Addu Atoll, passing through KdB’s 5 April air search area during the night of 4-5 April and thus avoiding detection. However, Somerville cannot fairly be criticised for sending the two cruisers to Colombo when he did, given his ignorance of the fact that the attack on Colombo was merely delayed by a few days and not cancelled. Both cruisers needed to return to Colombo and there appeared to be no good reason not to send them thither on the morning of 3 April.

3. Somerville seems not to have fully appreciated the risk entailed in ordering Cornwall and Dorsetshire to rejoin him.

When Somerville ordered at 0311 on 5 April that the two heavy cruisers were to rendezvous with him at 1600 he knew that they had left Colombo for Addu Atoll about five hours earlier, and from that he could estimate roughly what their track would be after they altered course to head for the rendezvous. He had also received reports from a 205 Squadron Catalina, Flight Lieutenant JR Graham's FV-R, of Japanese ships being sighted at position 1.59N, 82.20E, course 315, speed 20 knots, at 2237 and at position 54N, 82.10E course 325 degrees, speed 21 knots, at 0127. (These sightings are marked "British overnight sightings of IJN force" on Map 4.) Armed with the 1605, 2237 and 0127 sighting reports, it should have been possible to plot roughly where the enemy force could be at dawn and see that they might be within 200 miles of Cornwall and Dorsetshire.<sup>126</sup>

Since he knew that Japanese carrier aircraft had a range of at least 200 miles, a strong argument can be made that Somerville, having examined his plot, should have ordered Cornwall and Dorsetshire to head west at high speed upon departing Colombo until well clear of the danger area. After that they could perhaps have joined Force B, which was about 115 miles behind Force A. However, if Somerville plotted the cruisers' anticipated track a few miles further to the west than their actual track and if he also placed KdB's launch point somewhat further to the east than proved to be the case, then the cruisers' track may have appeared likely to be more than 200 miles away. Furthermore, Somerville apparently still anticipated that the Japanese force would make a single attack on Colombo and "then withdraw at high speed to the eastward". With the two cruisers heading south, the distance between them and the enemy force would then be increasing.

In fact, KdB turned southwest at 0830 and stayed on that heading until 1530, and Somerville did not learn of this very promptly. FV-R was shot down by Zeros from Hiryu at 0746.<sup>127</sup> Another Catalina, Flight Lieutenant W. Bradshaw's BN-L, took off at 0534 and sent three reports which were noted by Somerville in his report of proceedings as follows:

*Between 0720 and 1145 I received reports of battleships in approximately positions 3-55N, 80-40E steering 290 degrees at 0648, 120 degrees at 07030 [0730], and at 1004 in position 4N, 25E, steering 282 degrees. This suggested the battleships were marking time whilst the carriers recovered their aircraft. The estimated position of DORSETSHIRE and CORNWALL at this time was 150 miles from the enemy and opening.*<sup>128</sup>

While 150 miles was a fair estimate of the distance between KdB and the two cruisers at 1004, the enemy was not marking time. He was in fact steering 230 by then, not 282, and the distance was closing rather than opening. We may note as well that by 1004 Tone's E7K had already found Cornwall and Dorsetshire, and that Somerville apparently did not receive Bradshaw's 1004 report until 1145, only four minutes before the first D3A took off.

Somerville's belief that the Japanese probably had only two carriers may also have played a role. He may have assessed that the Japanese commander would commit the bulk of his strike aircraft to the attack on Colombo, in which case no strike on Cornwall and Dorsetshire could have been launched until the Colombo strike force was recovered, rearmed and refueled, by which time his cruisers would be that much further away. Alternatively, if the two enemy carriers held some aircraft in reserve to attack ships found at sea, he may have felt that such a strike would not necessarily be in overwhelming strength, especially since British naval intelligence underestimated the size of Japanese carrier air groups. For example, Hiryu and Soryu were thought to carry only 42 aircraft - three less than Indomitable.<sup>129</sup>

Somerville was not responsible for the intelligence and reconnaissance gaps which resulted in the arrival of KdB off Ceylon on 4 April taking him by surprise, nor can he justly be blamed for Cornwall and Dorsetshire being at Colombo. There is no denying, however, that he made a serious miscalculation in assessing that Cornwall and Dorsetshire could skirt or safely pass through an area which could easily be within 200 miles of the Japanese carriers, as proved to be the case. Furthermore, it was not essential for the success of his intended night torpedo bomber attack that he be joined by his two heavy cruisers.

Dipping a toe briefly and trepidatiously into the brackish water of historical speculation, it is worth contemplating what might have happened differently if Cornwall and Dorsetshire had been diverted westward and never found by KdB's morning search. The most obvious result would be that Colombo would have been attacked a second time. The second strike would have been about as strong as the first, albeit with more dive bombers and fewer level bombers, so most likely several more ships would have been sunk, but none as valuable as Cornwall and Dorsetshire remained in the harbour.

Not yet mentioned in this narrative is the fact that at some point after Egusa began his attack on Cornwall and Dorsetshire, the E13A from Tone which had continued to shadow them broke contact and

flew ahead in the general direction in which the cruisers had been heading. At 1405 this aircraft reported seeing no enemy after searching 50 miles to the southwest, and KdB's attack aircraft were stood down for the day. It has been estimated that if this aircraft had flown a further 10 or 15 miles it would have sighted Force A.<sup>130</sup> Since about four hours of daylight remained, there would have been ample time for KdB to launch one or more powerful attacks, so quite clearly Somerville's decision to have Cornwall and Dorsetshire steer to join him, passing through an area in which they might be found and shadowed, put Force A at great risk. If instead he had sent them clear of the danger area, the two E13As most likely would never even have been launched.

In the end, the verdict must be that the loss of Cornwall and Dorsetshire was avoidable, since it was not too late at 0311 to send them out of harm's way and we can say, with hindsight anyway, that this is what Somerville should have done. Of course, it is also true that he based his decision on incomplete information, and in the words of another naval commander of 1942, Admiral Frank Jack Fletcher, "After an action is over, people talk a lot about how the decisions were deliberately reached, but actually there's always a hell of a lot of groping around".<sup>131</sup>

### **Agar's Delayed SHAD Report – A Lucky Break for Somerville?**

Agar did not send his shadowing (SHAD) report until 1257, despite the fact that he knew they were being shadowed by probably about 1100. Somerville criticized Agar for not sending an earlier shadowing report but his failure to do so made no difference to the cruisers' fate, which was already sealed, while at the same time it was probably a lucky break for Somerville.

It seems likely that Tone's E7K, which spotted them by 1000, was never seen by either of the two cruisers. Agar's 8 April report says that an aircraft was sighted a long way astern "at about 1130", but Fair's more detailed report says that this aircraft was spotted by Cornwall half an hour earlier and reported to Dorsetshire, and in his report Manwaring expressed agreement with this. This aircraft was probably Abukuma's E7K, which apparently arrived prior to 1050. Agar decided not to send a SHAD report at this time, and finally sent one, at 1257, only when additional aircraft were sighted.

Agar claims in his memoirs that he sent his SHAD report shortly after sighting the first aircraft at 1130. This is not consistent with his 8 April report or with the fact that his report was received at Colombo at 1257. However, Agar also says in his memoirs that his navigator reminded him that there was a strict rule against breaking radio silence to report the sighting of a single aircraft. He says that he ignored this advice, but perhaps the truth is that he followed it when the first aircraft was sighted before finally deciding to send a SHAD report when more aircraft were sighted towards 1300.

It was certainly an error in judgement on Agar's part to maintain radio silence when a shadower was first spotted, but it would not have saved Cornwall and Dorsetshire if he had indeed sent a SHAD report shortly after 1100. Once the ships were sighted, they could have been saved only if the aircraft shadowing them were shot down and if they then made a radical course change to the west, but at 1100 Force A was nearly 250 miles away. This was too far for any of Somerville's fighters, with the possible exception of the Fulmar, but with a cruising speed of only about 140 knots it would have taken a Fulmar nearly 90 minutes to reach the two cruisers, which would have steamed a further 40 miles to the south while it was airborne. If a group of two to four Fulmars had been dispatched to deal with shadowers, they could not have arrived until about 1300, and Egusa arrived and sighted the two cruisers by 1254.

As already noted, Somerville commented that had a SHAD report been sent at about 1100 "I should have considered breaking wireless silence so as to effect an earlier rendezvous with the two cruisers and afford fighter cover during the closing stages of approach". Had Force A and the two cruisers altered course toward each other soon after 1100, Somerville could not have put enough fighters over Cornwall and Dorsetshire to have stemmed an attack by 53 D3As, but the presence of fighters over them would have revealed that at least one British carrier was nearby and Force A would most likely have been found. It was therefore fortunate that Agar's SHAD report was delayed as much as it was.

### **Japanese Missteps**

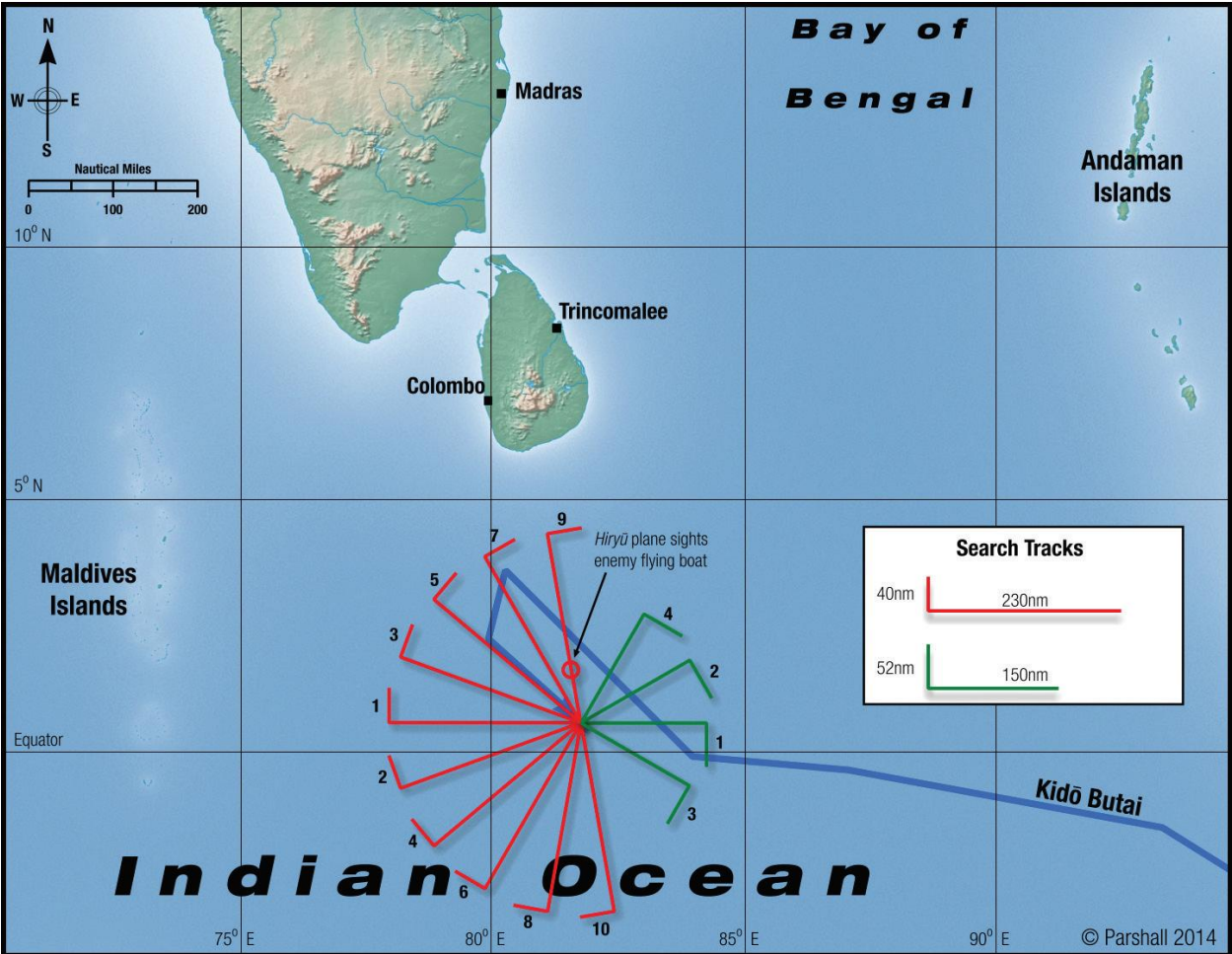
The dive bombing attack on Cornwall and Dorsetshire was one of the most effective of the war. Great skill was shown in the attack itself, and in the way that Egusa, approaching from astern, stealthily led the kanbaku around the targets and attacked them from ahead and out of the sun, taking them completely by surprise. All the same, there had been a number of missteps earlier in the day.

The principal misstep was the launching of a morning search which was not dense enough. At about 0750, less than two hours after they were launched, one E7K passed astern of Cornwall and Dorsetshire while the next one to the south passed ahead of them, with both planes too far away to see them. There can be no clearer proof that this search was simply too porous. Nor was there any overriding reason why

a few B5Ns could not have been used to thicken it up. Nagumo may have preferred to reserve his strike aircraft for strikes, but on 5 April this proved to be a case of “penny wise and pound foolish”, since CarDiv5’s 37 B5Ns launched no strike at all that day. If just two of them had joined the three E7Ks in combing their 60 degree wide search arc, then the five search aircraft would have been only 15 degrees apart rather than 30. The employment of two of CarDiv5’s B5Ns in this manner would have made it far more likely that Cornwall and Dorsetshire would have been found by about 0750, with the result, *inter alia*, that CarDiv5’s remaining 35 B5Ns could probably have attacked something before the day was out.

Nagumo can also be criticized for ordering his anti-shipping reserve to rearm for an attack on Colombo 20 minutes before his E7Ks reached the end of their dog leg. To be fair, he probably did not know how long it would take to rearm CarDiv5’s B5Ns with bombs or how long it would take to switch back to torpedoes if enemy ships were spotted by the E7Ks in the middle of that process. On the other hand, it was only 0852 when he gave the rearming order, and there was no compelling requirement to attack Colombo again immediately. There was no need to soften it up for some imminent landing because no landing was in the works. On 4 June Nagumo genuinely needed to attack Midway a second time, since a landing was scheduled for 6 June, but this was not the case on 5 April. Nagumo was in the Indian Ocean primarily to destroy as much of the Eastern Fleet as he possibly could. Knowing that his search was porous, he should have waited until his search aircraft had flown at least some distance down their return legs before rearming his anti-ship reserve for a second attack on Colombo. Alternatively, since Fuchida’s report made it clear that no important warships remained in the harbour, he could have abandoned all thought of attacking Colombo again and instead headed off to the southwest to try to find them.

It is interesting to note that the very next day, 6 April, Nagumo employed 10 B5Ns to search a 180 degree arc to the west, with the outward legs separated by 20 degrees rather than the 30 degree separation of the 5 April search. Four floatplanes were also employed to search the arc between 30 and 120 degrees, bringing the number of aircraft committed to the search to 14, almost three times as many as were used on 5 April. (See Map 7.) This much more serious search effort was made because the appearance of two Albacores in KdB’s vicinity between 1600 and 1628 on 5 April revealed that a British carrier was located within about 200 miles. The 6 April search failed because KdB and Force A had moved too far apart from each other during the night. Nagumo would have done better to have added just a couple of these B5Ns to his 5 April morning search and the rest to an afternoon search the same day. The thickened morning search would likely have found Cornwall and Dorsetshire much earlier than actually transpired and a reasonably dense afternoon search would likely have found Force A – quite possibly before Force A found him, since his B5Ns had a longer range and a higher cruising speed than Somerville’s Albacores.



Map 7 - KdB’s 6 April air search plan<sup>132</sup>



5 April Versus 4 June

Many studies of the Battle of Midway start, after a general setting of the strategic scene, with a discussion of the Battle of the Coral Sea. It would be better if they started with Operation C, for it foreshadowed Midway in many ways. This article highlights a number of parallels between them, including the tardy sighting of enemy ships (by a plane from Tone in both cases), the premature rearming of B5Ns with bombs for a second attack on a land target, and the delays caused by the reversal of the rearming order. There were also such similarities as the 9 April incident, not discussed here, when nine Blenheims arrived over KdB undetected and made an unopposed attack on Akagi. It was probably only because they were level bombers and not dive bombers that Akagi was not hit.

It is probably not going too far to say that such issues as the extent to which Nagumo should be blamed, or not blamed, for the defeat of 4 June cannot be fairly assessed without understanding what happened during Operation C, and the lessons he learned or did not learn from it. For that reason this article concludes with a comparison of key aspects of Operation C and Operation MI.

5 April	4 June
Sigint provided early warning of the Japanese plan, in part by identifying “DG” as Colombo	Sigint provided early warning of the Japanese plan, in part by identifying “AF” as Midway
RN forces were deployed in ambush on the western flank of KdB’s expected launch point	USN forces were deployed in ambush on the eastern flank of KdB’s expected launch point
The area south of Ceylon was beyond the reach of shore-based IJN aircraft	The Midway area was beyond the reach of shore-based IJN aircraft
Japanese submarine reconnaissance failed to detect Eastern Fleet ships sortieing from Colombo, Trincomalee and Addu Atoll	Japanese submarine reconnaissance failed to detect the transit of TF 16 and TF 17 toward Midway
Planned reconnaissance of Colombo by submarine floatplane was cancelled	Planned reconnaissance of Pearl Harbor by large flying boat was cancelled
KdB was four days late. The RN force withdrew from its ambush position.	KdB was one day late. The USN force remained in its ambush position.
KdB was found by Catalinas which did not see all five carriers	KdB was found by Catalinas which did not see all four carriers
KdB sent half its aircraft to attack Colombo, held others in reserve with B5Ns armed with torpedoes	KdB sent half its aircraft to attack Midway, held others in reserve with B5Ns armed with torpedoes
Five search aircraft were launched concurrently with the launch of the strike aircraft	Seven search aircraft were launched concurrently with the launch of the strike aircraft
Fuchida recommended a second attack on Colombo	Tomonaga recommended a second attack on Midway
No landing on Ceylon was scheduled	KdB was required to soften up Midway’s defences prior to the planned invasion two days later
Nagumo ordered his reserve to rearm with land bombs for a second attack on Colombo	Nagumo ordered his reserve to rearm with land bombs for a second attack on Midway
Enemy ships were spotted by a plane from Tone four hours after search launched. The floatplane was on its return leg.	Enemy ships were spotted by a plane from Tone three hours after search launched. The floatplane was on its return leg (having turned on to it early).
There was uncertainty regarding enemy ship types	There was uncertainty regarding enemy ship types
Nagumo reversed his order to rearm with land bombs	Nagumo reversed his order to rearm with land bombs
The rearming of the B5Ns was very slow	The rearming of the B5Ns was very slow
Recovery of the aircraft which attacked Colombo did not delay the attack on the enemy ships	Recovery of the aircraft which attacked Midway delayed the attack on the enemy ships
D3As took off about two hours after enemy ships sighted. B5Ns ready to launch two hours later.	Akagi, Kaga and Soryu were disabled about two and a half hours after enemy ships sighted
Egusa’s leading dive bomber formation attacked the more distant target. Both targets were attacked by an equal number of dive bombers.	Most of McClusky’s dive bombers attacked the nearer target. The more distant target was attacked by only three dive bombers.

Table 8 – A Comparison of Key Aspects of Operation C and Operation MI