2 HMAS SYDNEY

This chapter provides an overview of the materiel state of HMAS SYDNEY at 19 November 1941, the main systems in the ship, her crew, and the location of personnel when closed up at action stations. It is necessary to have a grasp of these factors when analysing the ship’s engagement with HSK KORMORAN, the damage SYDNEY suffered during the engagement, and the probable effect of this damage on her fighting capacity, her buoyancy, her crew and the crew’s prospects of survival. Appendix E provides a brief history of SYDNEY’s war record.

Laying down

HMAS SYDNEY was a Modified Leander Class light cruiser laid down on 8 July 1933 under the name HMS PHAETON. It had been planned that PHAETON would be the sixth of the Leander Class of cruisers conceived by the British Admiralty in the early 1920s as a light, durable cruiser to be used for the purpose of commerce protection. In the early 1930s, before PHAETON was laid down, the British Admiralty adopted...
a new design approach—the Unit System layout favoured by the US
Navy— to the machinery layout for its cruiser program. PHAETON was
constructed according to this new approach. For this reason she and the final two ships of the Leander Class program are known as the
Modified Leander Class.

2.3 In 1934, while still under construction, PHAETON was bought by the
Commonwealth of Australia. On 22 September 1934 she was launched
by Mrs Ethel Bruce, wife of Stanley Melbourne Bruce, the Australian
High Commissioner in London and former prime minister. Two other
ships of the Modified Leander Class were launched as HMS APOLLO
and HMS AMPHION. The Commonwealth also bought these ships in
1938 and renamed them HMAS HOBART and HMAS PERTH. HOBART arrived in Australia at the end of 1938 and PERTH was
commissioned in Britain in June 1939.

The Modified Leander Class

2.4 Leander Class cruisers had both their boilers in one compartment and
both their engines in another compartment. Damage to either space,
disabling either the boilers or the engines, could disable the ship. The
Unit System adopted in the Modified Leander Class resulted in each
boiler and each engine being placed in separate compartments, thus
giving protection against both boilers or both engines being disabled
simultaneously. This resulted in a larger vessel with two funnels rather
than one.

2.5 The layout of the main and secondary armaments in Modified Leander
Class cruisers was similar to that in contemporary British cruisers. The
principal armament was four twin-mount 6-inch gun turrets, two
forward and two aft. The secondary armament, mainly for anti-aircraft
fire, was four 4-inch anti-aircraft guns mounted slightly aft of
amidships. Two quadruple-mount torpedo tubes were fitted on either
side of the ship, below the 4-inch gun deck.

2.6 The fire-control arrangements for the principal and secondary
armaments and the torpedoes were also conventional for British
cruisers of the time.

2.7 An aircraft catapult and crane were fitted amidships between the
funnels. The crane was designed for the recovery of the ship’s aircraft

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5 PUB.021.0001 at 0156
6 PUB.031.0001 at 0005
7 PUB.028.0001 at 0099
8 PUB.028.0001 at 0099

The Loss of HMAS SYDNEY II
and the launch and recovery of the ship’s boats—except for two cutters, which had their own davits. The ship’s boats were stowed amidships.

2.8 The armour of Modified Leander Class cruisers consisted of 1-inch-thick hull plates overlaid by 3-inch-thick armour plate covering the machinery spaces and 2-inch plating below the waterline covering the 6-inch shell rooms and magazines.9

2.9 SYDNEY’s hull was made of steel frames and plates.10 She was transversely framed, with spacing varying from 3 feet at the ends to 6 feet amidships. There were 23 transverse watertight bulkheads below the platform deck, 16 of which extended up to at least the upper deck. The purpose of this subdivision was to create separate compartments in the manner of oil tanks and to provide considerable resistance to flooding in the event of damage.11

2.10 SYDNEY also contained a number of longitudinal watertight bulkheads; their purpose was to form a boundary around important compartments such as magazines and the transmitting station.12 The introduction of divided machinery spaces in Modified Leanders, as well as all subsequent British cruiser designs, also required longitudinal bulkheads, which were well off the centreline, in these spaces.

2.11 Longitudinal bulkheads give rise to the possibility of asymmetrical flooding causing dangerous angles of heel if the ship incurs side damage. Contemporary damage-control doctrine recommended rapid counter-flooding in order to reduce the angle of heel.13 This aspect of cruiser design was criticised by David K Brown RCNC, a past Deputy Chief Naval Architect in the UK Ministry of Defence. He pointed out that, in the event of flooding of one wing space, both engine rooms and the aft boiler room, rapid capsize was likely.14

SYDNEY’s as-built statistics

2.12 Table 2.1 shows SYDNEY’s as-built statistics.15

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9 NAA.017.0017
10 DSTO.003.0001 at 0088
11 DSTO.003.0001 at 0089
12 DSTO.003.0001 at 0089
13 DSTO.003.0001 at 0090
14 DSTO.003.0001 at 0090
15 PUB.021.0001 at 0157; DSTO.003.0001 at 0065 and 0066
### Table 2.1  HMAS SYDNEY: as-built statistics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement, light</td>
<td>6,701 tons</td>
</tr>
<tr>
<td>Displacement, half oil</td>
<td>8,056 tons</td>
</tr>
<tr>
<td>Displacement, full load</td>
<td>8,940 tons</td>
</tr>
<tr>
<td>Displacement, standard</td>
<td>7,198 tons</td>
</tr>
<tr>
<td>Length overall</td>
<td>562 feet 3¾ inches</td>
</tr>
<tr>
<td>Length between perpendiculars</td>
<td>530 feet 0½ inches</td>
</tr>
<tr>
<td>Breadth, extreme</td>
<td>56 feet 8½ inches</td>
</tr>
<tr>
<td>Breadth, moulded</td>
<td>56 feet 0 inches</td>
</tr>
<tr>
<td>Depth, from underside of keel to underside of upper deck amidships</td>
<td>32 feet at side</td>
</tr>
<tr>
<td>Draught, at standard displacement</td>
<td></td>
</tr>
<tr>
<td>Forward</td>
<td>15 feet 3 inches</td>
</tr>
<tr>
<td>Aft</td>
<td>17 feet 3 inches</td>
</tr>
<tr>
<td>Oil fuel capacity</td>
<td>1,800 tons</td>
</tr>
<tr>
<td>Machinery</td>
<td>Parsons single-reduction geared steam turbines</td>
</tr>
<tr>
<td>Boilers</td>
<td>Four</td>
</tr>
<tr>
<td>Shafts</td>
<td>Four</td>
</tr>
<tr>
<td>Power</td>
<td>72,000 shaft horsepower</td>
</tr>
<tr>
<td>Maximum speed (designed)</td>
<td>32½ knots</td>
</tr>
<tr>
<td>Range</td>
<td>7,000 nautical miles at 16 knots</td>
</tr>
<tr>
<td>Armament</td>
<td>Eight 6-inch Mk XXIII guns on twin mountings Mk XXI, with stowage for 200 rounds per gun</td>
</tr>
<tr>
<td></td>
<td>Four 4-inch MkV guns on single mountings Mk IV, with stowage for 200 rounds per gun</td>
</tr>
<tr>
<td></td>
<td>Three 0.5-inch machine guns quadruple mountings Mk II, with stowage for 2,500 rounds per barrel</td>
</tr>
<tr>
<td></td>
<td>Eight 21-inch torpedo tubes on two quadruple mountings QR VII, with eight Mk 9 torpedoes</td>
</tr>
<tr>
<td></td>
<td>One depth charge rack for four depth charges, with stowage for two additional depth charges</td>
</tr>
<tr>
<td></td>
<td>One aircraft catapult</td>
</tr>
<tr>
<td>Complement</td>
<td>570 (as a private ship in peacetime)</td>
</tr>
</tbody>
</table>

2.13 SYDNEY’s as-built statistics differed somewhat from those in the Admiralty Legend for Modified Leanders, where it was estimated that the displacement would be 7,250 tons. As a result of improved welding techniques developed during the construction of HMS LEANDER, SYDNEY’s actual displacement was 7,198 tons. During her trials in July 1935, on a displacement of 7,105 tons with 72,340 shaft horsepower, SYDNEY produced a speed of 33.05 knots.

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16 PUB.021.0001 at 0161
17 PUB.021.0001 at 0161
18 PUB.021.0001 at 0161
The main armaments

The 6-inch guns

2.14 SYDNEY’s main armament consisted of eight 6-inch Mark XXIII guns. These were housed in four twin-gun turrets—two forward (A and B turrets) and two aft (X and Y turrets). The 6-inch Mark XXIII gun had a maximum range of about 25,000 yards at an elevation of 45 degrees. SYDNEY’s 6-inch guns could be depressed to 5 degrees below the horizon. Firing at a horizontal elevation occurred only when the ship was close to her target. The late LCDR WH Ross RAN recalled that SYDNEY fired her 6-inch guns at such an elevation in the action against the Italian destroyer ESPERO when SYDNEY had approached to about 2,000 yards, a position he described as ‘point-blank range’.

2.15 Figure 2.2 shows a cross-section of the general arrangement of the 6-inch Mark XIII mounting.

Shells for the 6-inch guns were stored in each turret’s shell room, located on the hold deck. The cordite charges required to propel the shells were stored in two cordite magazines, one forward for A and B turrets and the other aft for X and Y turrets. The shells and cordite were delivered to the shell-handling lobby below each turret by separate hoists and then transferred to another set of hoists to deliver them into the turret. (The revolving part of the turret was referred to as the ‘gun house’.) The shells and cordite hoists were motor driven but could be operated by hand in the event of a power failure.

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19 The use of ‘A’, ‘X’, and so on, to refer to the turrets on Royal Navy and Royal Australian Navy ships was generic. This can be seen in Admiralty publications such as BR 224, The Gunnery Pocket Book (Admiralty, London, 1945) (SPC.014.0001) and SYDNEY’s as-fitted plans.
20 Raven & Roberts (1980, British Cruisers of World War Two, Arms and Armour Press, London), p. 434 (PUB.021.0001 at 0434), gives the maximum range of the 6-inch Mk XXIII gun as 24,800 yards. J Campbell (PUB.015.0001) at 0034 gives the maximum range as 25,480 yards.
21 SPC.014.0001 at 0022; TRAN.002.0001_R at 0004_R
22 A former SYDNEY crew member, Mr Thomas Fisher, recalls that SYDNEY’s 6-inch guns fired at about the horizontal during the last stage of the action against the Italian destroyer ESPERO: TRAN.002.0001_R at 0004_R.
23 PUB.041.0001 at 0143
24 TRAN.002.0001_R at 0029_R line 33
25 WIT.001.0001_R at 0012_R. Mr Tom Fisher served in SYDNEY from 16 March 1941 to 26 October 1941. For most of that time his action station was in A turret. The cordite hoist hand gear can be seen in Figure 2.3.
Manning and operation

2.16 At action stations, there were 20 men in each turret. The turret personnel and their roles were as follows:

- the officer of the turret
- the petty officer of the turret
- the ‘phone number’ — the person manning the internal telephone

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20 SPC.014.0001 at 0140
• seven men for each gun
  - the layer (no. 1)
  - the breach worker (no. 2)
  - two rammers (nos 3 and 4)
  - the tray worker (no. 5), who received the tray containing the shell, which had been placed there by the handler (no. 6). The tray worker also received the cordite charge from the cordite handler (no. 7), who took the cordite from the cordite hoist, removed it from its cardboard cylinder and handed it to the tray worker.

In addition, there were three men in the forward cabinet between the guns; they were there to assist in the laying of the guns if the turret went into local control and were called ‘the layer’, ‘the trainer’ and the ‘instrument hand’. Together, they were called the ‘cabinet crew’.27

2.17 The supporting spaces for each turret were as follows:

• Ammunition lobbies. There was an ammunition lobby immediately below each turret’s gun house. In this space, personnel removed the shells and cordite cartridges that came up from the magazine and shell rooms and transferred them to hoists that delivered them to the gun house. Figure 2.3 shows crew in the ammunition lobby feeding 6-inch shells into shell hoists. There were 10 men in each of the four ammunition lobbies, making a total of 40 personnel.

• Shell rooms. Each turret had its own shell room in which personnel transferred shells to fixed hoists that delivered the shells to the ammunition lobby. There were six men in each of the four shell rooms, making a total of 24 personnel.

• Handling rooms. Each turret had its own handling room in which personnel transferred cordite cartridges to the fixed hoists to be delivered to the ammunition lobby. There were three personnel in the handling rooms of each of A, B and X turret and four in the handling room of Y turret, making a total of 13 personnel.

27 WIT.001.0001_R at 0002_R
• **Magazines.** There were two magazines—one for A and B turrets and one for X and Y turrets. Personnel in the magazines would pass the cordite cartridges through the flash-proof scuttles to the handling room of the turrets. There were five men in each magazine, making a total of 10 men.

2.18 The 6-inch guns were not loaded until an order was given to load them. Similarly, cordite and shells were not hoisted up into the turret until ordered by the turret officer. Loading could be done quickly because ready-use shells were stowed in each turret.

2.19 The order to load was ‘All guns load, load, load’.

The shell was placed with the cordite on the gun-loading tray, ready to be rammed home. After the shell and cordite had been rammed home, the breach worker closed the breach, put the firing tube in and closed the interceptor switch. This last step allowed current to flow to the firing...
circuits and also caused a light in the director control tower to illuminate, showing that the gun was in a condition to fire.34

2.20 With each of her 6-inch guns SYDNEY could achieve a rate of fire of between four and eight rounds a minute.35

Gunnery control

2.21 Gunnery was controlled in one of four modes:

- **Director control.** Gunnery is controlled remotely by personnel in the director control tower.

- **Secondary control.** Gunnery is controlled from the after control position, normally by the executive officer in circumstances where the director control tower is out of action.

- **Group control.** This involved B turret controlling A turret and X turret controlling Y turret.

- **Local control.** Each turret controls its own gunnery.36

In battle, should damage render director control unavailable, gunnery control could revert to any of the other three options.37

Director control

2.22 Director control was the usual and most effective control of gunnery.38 The director control team, led by the gunnery officer, was based in the director control tower, immediately aft of and above the upper bridge. In the main compartment of the tower was the gyro director sight, which was operated by a four-man direction team that included the director layer.39 On a raised platform at the rear of the main

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34 TRAN 002 0001_R at 0007_R Line 39
35 In the action with the BARTOLOMEO COLLEONI on 19 July 1940 the average rate of fire was 5.15 salvos a minute: NAA 069 0042 at 0045. Mr Fisher considered that the rate of fire for a good 6-inch gun crew was eight rounds a minute (TRAN 002 0001_R at 0008_R). Mr Adams, who served in SYDNEY from January 1940 until 11 November 1941, said that in his experience, when trained up, a 6-inch gun crew could achieve a rate of fire of about three to four rounds a minute (WIT 010 00001_R at 0004_R). This is comparable with the rate of fire achieved by British cruisers at Jutland that mounted the Mark XIII or the similar Mark XII 5.9-inch gun. There, the rate of fire was limited to the rate of supply of ammunition, which was about three to five rounds per gun per minute: PUB 040 0001 at 0360. It is also comparable with analysis carried out by ADM Jellicoe in 1906, which found that in battle 6-inch gun crews achieved a rate of fire of four rounds a minute while in gun-layer tests 12 rounds a minute was achieved. These statistics are very similar to those for the Japanese rate of fire at the battle of Tsushima: PUB 048 0001 at 0156.
36 WAM 021 0006
37 This is implicit in the language of SYDNEY’s commanding officer, CAPT Waller, in a minute concerning SYDNEY’s fighting efficiency dated 21 October 1938: WAM 021 0006. He described the four types of gunnery control as ‘alternatives’ and said the third level of control would ‘normally’ be group control.
38 It was also referred to as ‘primary control’: WAM 021 0006.
39 SPC 014 0001 at 0054
compartment were three spaces, for the gunnery officer, the rate officer and the spotting officer. Below these compartments was the rangefinder compartment, where two crewmen manned the 15-foot rangefinder.

2.23 The procedure for firing the 6-inch guns in director control was as follows:

- The crew came to action stations.
- Each turret officer reported that his turret was formed-up and ready.
- The commanding officer conveyed to the gunnery officer the target’s relative bearing—red or green—and other details, such as apparent range.
- In the gunnery department
  - the range taker measured the range and sent this information electronically, by pushing buttons on his console, down to the transmitting station
  - the gunnery officer passed any corrections to the transmitting station by voice pipe
  - the transmitting station sent electronically the required elevation to the range-to-elevation unit operator
  - by turning handles, the range-to-elevation unit operator aligned two arrows on a dial on his console, thus setting the range of the target. The resulting information was passed electronically to each of the turrets, where the turret officer had a dial replicating the dial on the range-to-elevation unit.
- By voice-pipe, the commanding officer ordered the gunnery officer to fire.
- The gunnery officer conveyed the order to the director layer, who pulled a handle on his right that passed the electric signal to the guns. The signal was gyro-controlled so that the pulse to the guns would be sent only when the ship was on an even keel.\(^{40}\)

\(^{40}\) This explanation of the operation of SYDNEY’s 6-inch guns is taken from the evidence of Mr Gordon White MID, who served in SYDNEY throughout the 1940–1941 Mediterranean campaign: WIT.006.0001_R at 0003_R and 0004_R. He was in a position to observe the operation of the 6-inch guns, being the operator of the range-to-elevation unit in the director control tower. Mr White’s explanation of director control is consistent with the explanation of director control gunnery in the British Admiralty’s 1945 Gunnery Pocket Book (SPC.014.0001 at 0050). I accept his evidence as an accurate description of the method of operation of the 6-inch guns.
2.24 The transmitting station, located on the hold deck below the forward superstructure, housed the Admiralty fire-control table Mark V. This machine was used to calculate the range and bearing of the target for each turret. The fire-control table provided a unique firing solution for each turret, taking into account the slightly different bearing of each turret vis-à-vis the target and the fact that the director control tower was situated higher than the turrets. The required range and bearing were transmitted to each gun, this information being displayed at the gun layer’s position.

2.25 After the firing of the first salvo, the spotting officer in the director control tower monitored the fall of shells and reported whether the shot was short, long or straddling. This information was fed back to the transmitting station so that the firing solution could be corrected if necessary.

Secondary control

2.26 If the director control tower was out of action, the ship could revert to secondary control, whereby firing of the 6-inch guns was controlled by the after control position through the transmitting station. The after control position did not have the capacity to remotely fire the guns; nor did it have a rangefinder. But it was equipped with a Mark II training sight, a gun range receiver, a gun deflection receiver and an Evershed Target Bearing Indicator and was in telephone communication with the bridge and the turrets.

As discussed shortly, the evidence is that contingency planning in SYDNEY was such that if the bridge was out of action the executive officer would make his way from the lower steering position to the after control position and command the ship and the firing of the 6-inch guns from there.

2.27 In a 21 October 1938 report about SYDNEY’s gunnery controls, the Commanding Officer of SYDNEY, CAPT JWA Waller RN, wrote that, although the change from director control to secondary control could be rapidly effected, there was a considerable loss of gunnery and tactical efficiency in secondary control. This was because of the loss of director firing, the fact that the after control position was much affected by blast and smoke from X turret firing on forward bearings, the absence of provision for a rate officer, the lack of gun-ready lamps in the after control position, and the fact that the rangefinders that would be relied

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41 SPC.014.0001 at 0050
42 WAM.021.0006
43 NAA.017.0016
44 WAM.021.0006
on in this mode (those on the compass platform) might well have suffered damage along with the director control tower.

**Group control**

2.28 The third level of gun control would normally be group control—B turret controlling A turret and X turret controlling Y turret.\(^{45}\) In this mode B turret personnel and X turret personnel would be responsible for calculating the range and deflection and conveying this information and orders to fire to the subordinate turret by telephone.\(^ {46}\)

The procedure for changing to group control—and for changing to local control—took a few minutes and was carried out by personnel in the local control cabinet in each turret.\(^ {47}\) The local control cabinet was at the forward end of each turret, between the gun barrels. Three personnel manned the local control cabinet—the trainer, the layer and the instrument hand. The first step was to activate the changeover switch, which switched the turret from the main power circuit to its own 24-volt battery power, supplied by two rows of batteries in the pump space under the turret.\(^ {48}\) The batteries supplied emergency power to the lights in the turret, the firing circuits and the instruments in the local control cabinet.\(^ {49}\)

When changing to group control, the local control cabinet crew in A and X turrets opened the panels at the front of the turret. Through this, the layer took readings of the target’s range. He entered this information on dials that were replicated on a range receiver dial in front of the gun layer manning each gun in the turret.\(^ {50}\) Each gun layer adjusted the elevation manually by spinning a wheel attached by cogs to the gun.\(^ {51}\) At the same time the turret officer, using a periscope at his position at the rear of the turret, determined the bearing of the target. He would then supply this information to the trainer in the local control cabinet, who would hand-train the turret. The turret officer would also pass on the target range and bearing details, followed by orders to fire, to the subordinate turret by telephone. The turret officer would spot the fall of shot and relay corrections to the local control cabinet personnel via a voice-pipe and to the subordinate turret by telephone. The guns were then elevated or depressed by the gun layers, in accordance with

\(^{45}\) WAM.021.0006 at 0008  
\(^{46}\) WAM.021.0006 at 0008  
\(^{47}\) TRAN.002.0001\_R at 0012\_R Line 37. While Mr Fisher’s evidence is given in the context of his explanation of local control, it logically applies to group control as well.  
\(^{48}\) TRAN.002.0001\_R at 0010\_R Line 9  
\(^{49}\) TRAN.002.0001\_R at 0010\_R Line 15  
\(^{50}\) WIT.001.0001\_R at 0003\_R  
\(^{51}\) TRAN.002.0001\_R at 0011\_R Line 1
the pointers on their range receivers, and then the layer fired them on the orders of the turret officer.

2.29 CAPT Waller had opined in 1938 that group control was in practice unworkable because ‘... the only communication between turrets of a pair is one telephone from Gunhouse to Gunhouse, which, in the noisy conditions of firing, is quite inadequate for passing Range, Deflection and orders to fire between the turrets cabinets’.52

Local control

2.30 The local control procedure was similar to that for group control, except that each turret determined its own firing solution.53 Thus, when going to local control each turret’s local control cabinet personnel would open the panels at the front of the gun house so that the layer could determine the required elevation.

The indicator that the turret needed to go to local control was the failure of the 220-volt power, resulting in the lights being extinguished.54 If that occurred the turret officer informed the turret personnel that they were going into local control and took control of the guns.55

2.31 The rate of firing of SYDNEY’s turrets in group control or local control in action is a matter of conjecture since before the action with the KORMORAN there appears to have been no occasion when her guns were fired in group control or local control, apart from when practising.56 CAPT Waller commented in 1938 that local control was ‘extremely inefficient owing to the impossibility of distinguishing own fall of shot without any appliances for the purpose’.57

The 6-inch ammunition

2.32 SYDNEY’s 6-inch guns fired either armour-piercing shells or high-explosive shells.58

Piercing shells were designed to perforate thick armour at battle ranges and to burst effectively when inside the target.59 To achieve this, the shells were made with a thick casing and carried a relatively small amount of explosive. The type of piercing shell used in SYDNEY was the common pointed ballistic cap shell60, which in 1945 the Admiralty

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52 WAM.021.0006 at 0008
53 TRAN.002.0001_R at 0011_R – 0012_R
54 TRAN.002.0001_R at 0011_R Line 6
55 TRAN.002.0001_R at 0011_R Line 28
56 TRAN.002.0001_R at 0013_R Line 10
57 WAM.021.0006 at 0008
58 SPC.004.0037; TRAN.002.0001_R at 0013_R Line 23 and 0014_R Line 28; WIT.006.0001_R at 0006_R
59 SPC.014.0001 at 0040
60 TRAN.002.0001_R at 0013_R Line 43; WIT.001.0001_R at 0012_R
described as ‘The latest type of piercing shell for 6-in. guns’. Light steel domes (called ballistic caps) were fitted onto the shell’s nose to give the shell the optimum shape for flight. Fuses for piercing shells were fitted in the base, where they were protected from damage during penetration. Piercing shells were always used in ship-to-ship action.

High-explosive shells were usually used for anti-aircraft fire and shore bombardment but could be used against ship targets. These shells, which had nose fuses, were distinguishable by having a small black ‘plunger’ in the nose designed to burst with ‘... great shattering effect on unarmoured targets, but have little or no penetration’.

The 4-inch guns

SYDNEY was armed with four 4-inch quick-firing Mark V guns on four high-angle Mark IV mountings. The 4-inch guns were mounted on the 4-inch gun deck, two on each side of the ship. They fired a 31-pound high-explosive shell and for surface warfare had a maximum range of 16,430 yards. The guns could be fired remotely from the high-angle control station, in a fashion similar to firing the 6-inch guns from the director control tower. They could also be fired independently.

Although the 4-inch guns were used primarily for anti-aircraft defence, they were fitted with loading platforms for low-angle loading, allowing them to be fired slightly below the horizontal against low-flying aircraft and against nearby surface targets. At least once during the Mediterranean campaign the 4-inch guns were used against surface targets – Italian motor torpedo boats in the Aegean Sea. The rate of fire was not affected by the guns being fired horizontally. In practice, the maximum rate of fire was timed at 20 rounds a minute.
Seven men under the command of an officer and a senior sailor manned each of the 4-inch guns. The gun crews loaded the guns only if they were ordered to. Once the order was given, it took just a few seconds to load the guns.

Munitions were held in 12 ready-use lockers on the 4-inch gun deck, each locker containing twenty 4-inch shells. Additional shells were stored in the 4-inch shell magazine, on the hold deck aft of B turret shell room. A hoist brought shells to the upper deck just forward of the bridge; the shells were then carried almost a third of the length of the ship to the 4-inch gun deck.

The 4-inch shells presented a fire risk. In 1941 it was thought the 4-inch ammunition would not explode in a fire, but by 1943 studies of the causes of the loss of ships, including HMS HOOD and HMS BARHAM, showed that the 4-inch ammunition could explode in a fire.

In 1938 and 1939 respectively the two other Modified Leander cruisers, HOBART and PERTH, had their single 4-inch gun mounts replaced with twin 4-inch high-altitude mountings with a gun crew shelter in between. Due to the outbreak of war, SYDNEY was not subject to this major refit. In Alexandria in mid-1940 SYDNEY had 3-foot plating secured to the guard rails around the 4-inch gun deck. In October 1941, however, the Commodore-in-Charge of HMA Naval Establishments, Sydney, recognised that to ensure adequate protection to 4-inch gun crews, shields should be fitted to the 4-inch guns. No design for shields was held at Garden Island, so no shields were fitted to SYDNEY’s 4-inch guns. Her 4-inch gun crews had no effective protection against machine-gun fire or shrapnel fragments.

**Other guns**

SYDNEY had three mountings of four Mark III Vickers 0.5-inch machine guns, one on the aft searchlight platform and one on each side of the flag deck. The Mark III was a Navy-adapted version of the Vickers 0.5-inch machine gun. Its four-barrel mounting had its guns adjusted to provide a spread of fire 60 feet wide and 50 feet high at...
1,000 yards.\(^83\) The ammunition belts carried 200 rounds per gun. Shields for these guns were fitted in October 1941.\(^84\)

Vickers asserted that the gun ‘could deal with aircraft at ranges of 1,500 yards … and below’, suggesting an effective range of only 1,500 yards.\(^85\) These guns had a ‘very limited effective range’ according to the Vice Admiral, Light Forces, Mediterranean, VADM HD Pridham-Wippell RN, when after the first six months of the Mediterranean campaign he reported on the defensive capabilities of the light cruisers, including SYDNEY, under his command.\(^86\) In his view, the 0.5-inch machine gun did not provide sufficient protection against aircraft at close range.

In addition, SYDNEY had pedestals for .303-inch Lewis Mk 1 machine guns on the aft searchlight platform, the amidships searchlight platform and the lower bridge.\(^87\) The evidence is, however, that these guns were not carried by SYDNEY during the war.\(^88\)

SYDNEY had four 3-pound Hotchkiss saluting guns, two mounted on either side of the aft superstructure.

### Torpedoes

SYDNEY had two sets of Quad Rotating Mark VII above-water torpedo tubes firing 21-inch Mark IX torpedoes with 750-pound warheads. The tubes were in two quadruple mountings on either side of the main deck, immediately below the 4-inch gun deck.\(^89\) The Mark IX torpedo had a range of 11,000 yards at 41 knots and 15,000 yards at 35 knots.\(^90\) Whilst the ship was at sea each of the eight tubes would be loaded and a spare torpedo would normally be stored in the workshop, which was between the two torpedo mounts.\(^91\)

Each torpedo mount had its own crew of five men.\(^92\) At action stations a torpedo gunner’s mate was in charge of each of the two torpedo crews. In each team a leading torpedo operator, stationed under a canopy in the midst of the tubes, would be in telephone contact with the bridge (through a headset). He controlled the firing of the tubes. On either side of the leading torpedo operator was a junior rating standing by two...
torpedo tubes. Another leading torpedo operator was on the deck behind the tubes, controlling the releasing of the safety forks fitted to the end of each tube.

The safety forks (also known as ‘pins’) were fitted as a device to stop the torpedoes being launched prematurely when the main guns were fired.93 Torpedo crews had found that firing the 6-inch guns had occasionally caused premature release of the firing pin in the chamber at the rear of the tubes, which set off the charge creating the compression needed to launch the torpedoes.94 Removal of the safety forks allowed priming of the tubes immediately before they were fired.95 The leading seaman behind the battery ordered the removal of the pins before the order to fire the torpedoes. This need to remove the safety forks delayed the launching of the torpedoes by a second or two.96

2.40 In preparation for firing, the bridge passed instructions for the path and depth of travel to the leading torpedo operator controlling the torpedo battery.97 Instructions were also given on whether the torpedoes were to be launched as a fan, straight ahead or zig-zagging.98

2.41 The torpedoes could be fired locally or from the lower bridge.99 When the captain gave the order to fire, the torpedo officer manning the torpedo control sight on the bridge pressed the fire-control lever, which activated a buzzer at the torpedo battery. The leading torpedo operator controlling the torpedo battery then passed orders to fire to the sailors manning the tubes.100

2.42 When the ship was coming to action stations, the torpedo tubes were turned from their usual stowage position of fore-and-aft to face outboard.101 The torpedo teams turned the tubes inboard when the ship was stood down from action stations.102

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93 TRAN.004.0001_R at 0004_R Line 19
94 WIT.004.0001_R at 0004_R
95 WIT.001.0001_R at 0005_R
96 TRAN.004.0001_R at 0004_R Line 29
97 TRAN.004.0001_R at 0004_R Line 33
98 TRAN.004.0001_R at 0004_R Line 36
99 TRAN.002.0001_R at 0019_R Line 25. The firing pistol on the lower bridge can be seen in the as-fitted ship’s plans: NAA.017.0009.
100 TRAN.002.0001_R at 0019_R Line 35; WIT.004.0001_R at 0004_R; TRAN.004.0001_R at 0004_R
101 WIT.004.0001_R at 0003_R. Mr Radcliffe, who served as a torpedo man in SYDNEY between October 1938 and February 1941 and thereafter in other RAN ships, could not remember ever being at action stations and getting an order to stow—that is, turn inboard—the torpedoes.
102 WIT.004.0001_R at 0003_R
Anti-submarine warfare equipment

2.43 SYDNEY was equipped with an ASDIC deployable transducer, which was housed in a void in the hull near the bow. The ASDIC equipment was encased in its own dome to overcome the problem of noise from passing water. Effective use of the equipment still required a considerable reduction in the ship’s speed.\textsuperscript{103}

SYDNEY had five depth charges located on a stern rail\textsuperscript{104} and operated from the upper bridge.\textsuperscript{105}

Smoke-laying

2.44 SYDNEY was capable of laying a smoke screen by delivering a jet of atomised oil into a boiler furnace, causing the production of heavy black smoke.\textsuperscript{106} She also had up to three smoke floats that were stowed at the quarterdeck rail.

Armour

2.45 In general terms, SYDNEY’s armour plating consisted of a hull that was about 1 inch thick overlaid by 3-inch-thick armour plates at the machinery spaces and 2-inch-thick plates below the waterline covering the 6-inch shell rooms and magazines.

2.46 A detailed breakdown of the armour is as follows (note that ‘NC’ denotes non-cemented armour and ‘D1’ denotes high-tensile steel):

- machinery spaces—sides, 4 inches (comprising 3-inch NC and 1-inch D1); crown, 1½-inch D1; ends, 1½-inch D1
- magazines, B shell room—sides, 3⅞ inches (comprising 3½-inch NC and ⅜-inch D1); crown, 2⅜ inches (comprising 2-inch NC and ⅞-inch D1); ends, 2⅞ inches (comprising 2½-inch NC and 7⅛-inch D1)
- transmitting station, forward low power switch room and gyro compass compartment—sides, 1-inch D1; crown, 1½-inch D1; ends, 1⅛–2⅝-inch D1
- A, X and Y shell rooms and thrust block recesses—sides, 1-inch D1; crown, 1-inch D1; ends, 1-inch D1

\textsuperscript{103} The inquiry into the torpedoing of HMAS HOBART found that ASDIC’s effectiveness began to decline at speeds above 15 knots, and it was essentially unusable at 20 knots or greater (NAA.043.0020).
\textsuperscript{104} As seen in as-fitted plans (NAA.017.0015 and NAA.029.0002).
\textsuperscript{105} Depth-charge release gear can be seen on the plans of the upper deck (NAA.017.0009).
\textsuperscript{106} DSTO.003.0001 at 0088

The Loss of HMAS SYDNEY II
• steering gear compartment—sides, 1½-inch D1; crown, 1¼-inch D1; ends, 1½-inch D1

• turrets—faces, 1-inch D1; sides, 1-inch D1; rears, 1-inch D1; crowns, 1-inch D1

• turret trunks and ammunition lobbies—1-inch D1

• director control tower—sides, 1-inch D1; crown, 1-inch D1

• compass platform, remote—sides, ¾-inch D1 (bulletproof)

• control office and plotting room—crown, ½-inch D1 (bulletproof)

• upper bridge—sides, ¾-inch D1 (bulletproof)

• after control—sides, ¾-inch D1 (bulletproof); crown, ½-inch D1 (bulletproof).  

Perceived shortcomings in combat capability

2.47 In a report to the Rear Admiral Commanding the Australian Squadron (RACAS) in October 1938, the captain of SYDNEY, CAPT Waller, expressed three concerns about SYDNEY’s gun-control systems. His first concern was that the cables from the director control tower and the high-angle control station to the platform deck were ‘… extremely vulnerable to gunfire or bombs, even of small calibre’. He was concerned that the cables passed through a number of spaces where there was limited armour plating and were not duplicated.

His second concern was that the main spaces for both the 6-inch gun control and the 4-inch gun control below decks (the transmitting station, the high-altitude calculating room and the No. 1 low power room) were not protected by the side armour plates:

While No. 1 Low Power Room is out of action the entire centralised Fire Control Systems go out of action irreparably. It will therefore be seen that for the main 6-inch control and the H.A. Control the eggs are all very much in one basket, and a rather flimsy basket at that.
His third concern was about the inefficiencies and barriers to effective secondary control, group control and local control, as discussed. He concluded:

The position for the Commanding Officer is therefore the uncomfortable one of desiring to close to an effective fighting range while knowing that at any moment he may find his rate of hitting seriously reduced or even vanished due to very minor damage.111

2.48 CAPT Waller proposed that the control cables be encased in armour plating to afford protection against all but major shrapnel. He also recommended improvements to the after control position (gun-ready lamps, a second telephone headset and provision for a rate officer) and improvements to the gun houses (provision to transmit range and deflection information, gun-ready lamps and fall-of-shot indicators) to improve group control and local control firing.

2.49 CAPT Waller’s proposals were endorsed by RACAS, RADM Custance RN, who passed them to the Australian Commonwealth Naval Board on 6 December 1938.112 RADM Custance added his view that the only really satisfactory solution for the problems of alternative firing control was the fitting of an after director control. The report was considered by, among others, the Assistant Chief of Naval Staff, CAPT JA Collins, who was to succeed CAPT Waller as commanding officer of SYDNEY in November 1939. CAPT Collins had previously been SYDNEY’s executive officer and was a gunnery specialist. He implicitly concurred with CAPT Waller since he recommended that the report be sent to the Admiralty for advice and that cost estimates be prepared.113

2.50 On 18 January 1939 the Secretary of the Naval Board sent CAPT Waller’s report to Australia House, London, for transmission to the Admiralty, with a request for Admiralty advice as to whether any action along the lines proposed by CAPT Waller was being taken in Royal Navy ships or was recommended for Royal Australian Navy ships.114 There appears to have been no response from the Admiralty before CAPT Waller wrote a follow-up minute on 20 September 1939 to RACAS, copied to the Naval Board, asking whether there had been any Admiralty response to the January 1939 request. CAPT Waller added that this matter was ‘now one of vital importance’.115 A request was then made to the Admiralty by wireless telegraphy for a response, resulting in Admiralty advice to the RAN Naval Liaison Officer on

111 WAM.021.0006 at 0008
112 NAA.093.0016
113 NAA.093.0017
114 NAA.093.0012
115 NAA.093.0010
23 November 1939 that the matter was ‘still under consideration’. There is no evidence of further correspondence with the Admiralty about this. CAPT Waller left SYDNEY in November 1939, and it appears that neither his successor CAPT Collins nor the Naval Board pursued the matter, presumably because such deliberations were overtaken by the war.

2.51 It is noteworthy that CAPT Burnett had joined Navy Office in October 1939 and that his initials, dated 25 January 1940, appear on a letter to RACAS from the Secretary of the Naval Board updating RACAS about the matter. One can presume therefore that CAPT Burnett was aware of the concerns of CAPT Waller and RACAS about SYDNEY’s fighting efficiency.

2.52 Concerns about the director control cables’ vulnerability to damage by splinters and about the unsatisfactory equipment in the aft control position in SYDNEY (and certain other Royal Navy light cruisers) were also expressed in a 28 December 1940 memorandum from Vice Admiral, Light Forces, Mediterranean, VADM Pridham-Wippell, to the Commander-in-Chief, Mediterranean, ADM AB Cunningham RN. In that memorandum it was acknowledged that:

> It is probably impracticable in the majority of cases to carry out all if any of the following proposals to mitigate the above weaknesses, but occasions may arise during refits or damage repairs when some of this work may be undertaken and it is considered a long term policy is required.

2.53 CAPT Burnett read VADM Pridham-Wippell’s report in Navy Office on 2 February 1941. His comment was that he would like to discuss it with some of the staff officers because ‘… it may need action’.

The proposals advanced in October 1938 and in December 1940 involved major rearrangements, as did the alternative proposals. None of the proposals was implemented on any of the three Australian Modified Leander Class ships or Royal Navy cruisers.

2.54 In a submission to RACAS on 27 June 1941 CAPT Burnett noted the fact that SYDNEY’s four single-mount 4-inch guns were not replaced with twin 4-inch mounts, as occurred with her sister ships. He submitted that such a refit would improve SYDNEY’s anti-aircraft firing ability.
but acknowledged that this refit could be deferred since the ship was at ‘long notice’.

CAPT Burnett also suggested that the existing 4-inch guns be fitted with shields in order to give ‘some cover and psychological effect’. RACAS forwarded this memorandum to the Australian Commonwealth Naval Board with his endorsement. The Secretary of the Naval Board responded on 6 August 1941 by noting that Naval Board policy was that it was not practicable to re-arm SYDNEY with twin 4-inch mountings in ‘present conditions’ and that the proposal to fit shields to the existing 4-inch guns was ‘under consideration’.

On 17 October 1941 the Naval Board wrote to the Admiralty asking for designs for this work. On 30 October the Admiralty responded, seeking clarification. On 19 November 1941 it advised that no drawing for a protective shield for SYDNEY’s type of 4-inch gun mount was available.

In his 27 June 1941 memorandum CAPT Burnett had also suggested the additional mounting of two twin Lewis guns, two twin Vickers guns and six shoulder-firing Lewis guns to be stowed in handy positions for upper deck crew. The Naval Board’s response of 6 August was that experiments were being carried out with double-barrelled and four-barrelled .303 Vickers guns and that it was hoped these would be in production before long. The Naval Board advised that all surplus supplies of Lewis guns had been sent to the United Kingdom in 1940.

On 5 September 1941 RACAS advised the Naval Board that eight of 12 Lewis guns earmarked for Tribal-class destroyers were available for temporary use and proposed that four with mountings be allocated to each of SYDNEY and PERTH. The Naval Board approved this on 17 September. SYDNEY did not spend any time alongside in Sydney after this and, since there is no record of the fitting of these guns in SYDNEY’s alterations and additions list, the only realistic conclusion is that the guns were not fitted.

Whatever alterations might have been proposed to provide additional protection or safety measures on SYDNEY, there is no basis for a view
that she was not in battle-ready condition or that she was deficient in combat readiness because of materiel deficiencies. She had, after all, fought through the Mediterranean campaign in the same condition she was in in November 1941.

**Machinery**

2.57 The distinguishing feature of the Modified Leander Class was the unit design of the machinery space. The machinery sequence was forward boiler room, forward engine room, aft boiler room, aft engine room.\(^{131}\) The forward boiler room contained ‘A1’ and ‘A2’ boilers which normally supplied steam to the two turbine sets in the forward engine room that drove the two outer (forward) propeller shafts. Similarly, the aft boiler room housed ‘B1’ and ‘B2’ boilers, supplying steam to the after engine room, which drove the two inner propeller shafts.\(^{132}\) Figure 2.4 shows SYDNEY’s forward boiler room.

![Photo courtesy of the Australian War Memorial (negative number 005714)](image)

**Figure 2.4** The forward boiler room in HMAS SYDNEY\(^{133}\)

Although each boiler usually supplied steam to each corresponding turbine, the machinery was cross-connected so that any boiler could supply any turbine.\(^{134}\) The advantage of this was that if one engine room or boiler room became damaged or flooded the ship retained the ability to generate power from the remaining boiler room and engine room.\(^{135}\)

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\(^{131}\) NAA.098.0004; NAA.092.0001

\(^{132}\) NAA.092.0001

\(^{133}\) AWM.009.0030

\(^{134}\) PUB.055.0001 at 0004

\(^{135}\) PUB.055.0001 at 0004 and 0005
The unit system of machinery resulted in weight saving, but this was offset by the weight of the additional armour needed to protect the longer machinery space. Each boiler room contained two Admiralty-type Yarrow three-drum boilers. They each supplied superheated steam to a Parsons geared turbine set. Each of these sets comprised a low-pressure astern turbine, a high-pressure turbine and a cruising turbine. At full power these sets, coupled through gear cases to the four propeller shafts, were capable of producing a combined total of 72,000 shaft horsepower.\footnote{PUB.055.0001 at 0004 and 0005}

**Draining, flooding and pumping**

2.58 The draining, flooding and pumping out of spaces in the ship were facilitated by a system of pipes connected to all major compartments and by various pumps and steam bilge ejectors.\footnote{SYDNEY’s pumping, flooding and draining arrangements are shown in the as-fitted plans: NAA.029.0004, NAA.030.0001, NAA.030.0002, NAA.030.0003, NAA.031.0001, NAA.031.0002, NAA.031.0003 and NAA.032.0001.} The pumping out of compartments was performed by the ‘main suction’, a 5-inch pipe that ran the length of the port side of the ship inside the hull, about 4 feet above the average water line. The main suction was linked by pipes to all main compartments on the platform deck. Valves were fitted to the main suction where it passed through main transverse bulkheads in order to preserve watertight integrity.

2.59 For removing water from compartments and spaces, SYDNEY was fitted with various pumps and ejectors. Each boiler and engine room had an electrically driven fire and bilge pump connected to the main suction. These pumps had the capacity to discharge between 50 and 75 tons of water an hour. There were also six steam bilge ejectors—two in each boiler room and one in each engine room—capable of discharging 200–300 tons of water an hour. The remaining pumps were two electric centrifugal pumps, mounted on the platform deck, each capable of discharging 50 tons per hour, the forward pump being below B turret, the aft one below Y turret. SYDNEY also had two portable electrically driven submersible pumps, these being of the ‘Drysdale Snorer’ type, with a capacity to discharge 50 tons of water an hour.

Water in the main suction could be diverted to other compartments, to correct trim or heel for damage-control purposes, or be discharged overboard.

2.60 The main service delivered water throughout the ship for machinery and services such as sanitary services, deck cleaning and fire fighting. It ran along the starboard side, under the upper deck—except in the
machinery rooms, where it diverted to the port side to connect with the bilge pumps. Valves and hose fittings allowed the isolation and by-passing of the main service if necessary.

2.61 Cross-connection between the main suction and the main service, with both connected to the bilge pumps, meant that both systems could be used for removing or supplying water to compartments. It also allowed the main service and the main suction to by-pass damaged areas.138

Ventilation

2.62 Modified Leander Class ships had a ventilation system providing for the supply of fresh air and the exhaust of stale air, gases and odours from compartments.139 Electric fans were required for the supply of air to many living and working spaces and for the forced exhaust of air from compartments producing heat, water vapour, gases or odours. The intakes and exhausts were placed as high as possible on the ship and could quickly be closed from inside the ship in case of action.

2.63 The boiler rooms were ventilated by turbine-driven forced draught fans, the air being exhausted up the funnels. Engine rooms were ventilated by both supply and exhaust fans.

The electrical system

2.64 Modified Leander Class cruisers had two sources of electrical power—main power and low power. The main electrical system was a 220-volt ring main that provided power to lights and the electric motors, including those used to train the turrets, elevate the 6-inch guns and operate various pumps.140 Electric current was produced by two turbo-powered dynamos, one in each engine room, and two diesel-powered dynamos, one in each of the compartments outboard of the aft boiler room.

2.65 Distribution of power through the ring main was controlled in the switchboard room, which was located above the waterline on the port side of the platform deck, about half-way between the forward funnel and the forward superstructure. It was immediately above—and therefore not protected by—the side 3-inch armour belt.141 The ring main consisted of a positive and a negative conductor in armour-

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138 DSTO.003.0001 at 0101 to 0102
139 DSTO.003.0001 at 0103 to 0106
140 The information in this section comes from two sources: SPC.008.0268 and WIT.013.0001_R.
141 Compare ship’s plans NAA.017.0017 and NAA.034.0006.
encased cabling. It was laid in cable passages (compartments between the machinery spaces and the ship’s side) on the platform deck.142

2.66 Normally only the turbo generators were continuously on-line. When SYDNEY went to action stations, however, the two diesel generators were started and brought on-line.143 By the use of ring main breakers, the ring main was then split into quarters, each powered by one of the four generators. Each quarter provided power to a part of the ship and one gun turret, thus minimising the effects of battle damage.144 In this mode all four circuits were controlled through the switchboard room, and shell damage to that compartment could disable all four circuits.145

2.67 In the event of an emergency, any part of the ring main could be isolated provided there was a circuit created by at least one generator.146 The switchboard operator could control the generator producing the electrical supply by using the ring main breakers and cross-connections.

2.68 Electrical branch lines supplied high power from the ring main to equipment that ran on mains power, and power on these lines was controlled by branch breakers.147 The breakers could be opened or closed locally or by the operator in the switchboard room.148 They would open automatically in the event of an electrical fault, such as an overload or explosive shock.

2.69 Low power electricity was supplied through three 14-kilowatt generators in the No. 1 low power room, which was immediately below the switchboard room and thus not protected by the side armour.149 The low power supply powered the armament control and firing instruments, the torpedo mounts, the searchlight controls, the gyro compasses and the internal telephone system.

2.70 The torpedo department in SYDNEY was responsible for the electrical system in the ship. As part of their duty at sea, torpedo men were

142 DSTO.003.0001 at 0106
143 PUB.055.0001 at 0005; WIT.013.0001_R
144 WIT.013.0001_R at 0001_R
145 WIT.013.0001_R at 0002_R
146 DSTO.003.0001 at 0107
147 DSTO.003.0001 at 0107
148 DSTO.003.0001 at 0107
149 As shown in the plans of SYDNEY’s armour: NAA.017.0017.
responsible for fixing and maintaining all the electrical circuits and appliances throughout the ship, including the phones.\textsuperscript{150}

2.71 SYDNEY had various reserve systems that operated if electrical power failed. In the case of a 220-volt power failure, battery-powered emergency lighting illuminated important compartments\textsuperscript{151}; for example, emergency lighting would operate in the cordite and the shell rooms.\textsuperscript{152} In the turrets, batteries supplied emergency power to the firing circuits for the guns and the aiming instruments in the local control cabinet.\textsuperscript{153} Hand-operated gearing allowed for manual training of the turrets, raising and lowering of the guns, and using the hoists supplying shells and cordite to the main guns.\textsuperscript{154}

2.72 If the low power system was unserviceable the main guns could still be operated. In the local control cabinet in the front of each turret there was a changeover switch that, if selected, isolated the low power circuit and fed in power from the turret batteries.\textsuperscript{155} This power was sufficient only to work the instruments, firing circuits and emergency lighting in the gun house.

Communications

Wireless equipment

2.73 For communication with ships and establishments beyond visual range SYDNEY was fitted with the following wireless equipment:

- one Type 48 transmitter set in the main wireless telegraphy office
- one Type 49 set in the second W/T office
- one Type 45 set in the auxiliary W/T office

\textsuperscript{150} WIT.004.0001\_R at 0002\_R; WIT.001.0001\_R at 0004\_R. The April 1947 trade certificate for Mr Radcliffe for the qualification Seaman Branch—Torpedo Gunner’s Mate states that, in order to qualify, a sailor had to have a sound knowledge of the maintenance and testing of electrical machines, instruments, torpedoes and explosives (WIT.011.0005).

\textsuperscript{151} TRAN.002.0001\_R at 0010\_R Line 15

\textsuperscript{152} TRAN.004.0001\_R at 0011\_R Line 45

\textsuperscript{153} TRAN.002.0001\_R at 0010\_R Line 15

\textsuperscript{154} WIT.001.0001\_R at 0012\_R

\textsuperscript{155} WIT.001.0001\_R at 0003\_R
• one 43A set in the auxiliary W/T office.\textsuperscript{156}

2.74 None of SYDNEY’s wireless sets had the capacity for voice transmission.\textsuperscript{157}

2.75 The Type 48 transmitter was the ship’s most powerful unit, capable of transmitting signals worldwide.\textsuperscript{158} It could, however, transmit only by Morse code entered by means of manual keying by a trained telegraphist.\textsuperscript{159} The Type 48 transmitter was located towards the rear of the ship, in the centreline of the lower deck aft of the 4-inch gun platform.

2.76 The Type 49 transmitter was less powerful than the Type 48 (with an 8-kilowatt power input compared with the Type 48’s 20-kilowatt input) but was capable of transmitting long distances, including from the site of the SYDNEY–KORMORAN action to receiving stations in eastern Australia.\textsuperscript{160} It could transmit only by Morse code.\textsuperscript{161} The Type 49 was situated on the platform deck, below and aft of the forward superstructure.

2.77 The Type 45 transmitter was a back-up transmitter used in battleships and cruisers. It had a range of 30–70 miles and was used mainly when a flagship was manoeuvring a fleet, squadron or flotilla by W/T signals.\textsuperscript{162}

2.78 The Type 43A transmitter was a low-powered short-range unit used mainly when a flagship was manoeuvring a fleet, squadron or flotilla by W/T signals.\textsuperscript{163} It had a range of about 20 miles.\textsuperscript{164}

\textsuperscript{156} See SYDNEY’s as-fitted plans (NAA.068.0003; NAA.068.0004; NAA.068.0005; NAA.068.0001) and the records of her external communication trials, 1 November 1935 (NAA.090.0015). This is consistent with the submissions and evidence of Mr Gordon Johnson, who served for 26 months in HMAS HOBART during World War 2 as a wireless telegraphist and was a petty officer wireless instructor after the war at the RAN Signal School at HMAS CERBERUS and in the United Kingdom (SUBM.000.0001_R). While Mr Johnson, based on his experience in HOBART, did not think SYDNEY would have had a Type 45 unit, the presence of a Type 45 set in SYDNEY is evidenced by the as-fitted plan of the auxiliary W/T office (NAA.068.0005) and the records of SYDNEY’s external communication trials.

\textsuperscript{157} That SYDNEY’s transmitters were not equipped to transmit voice messages was confirmed by former SYDNEY W/T operator, Mr Ruston (WIT.012.0001_R at 0003_R), and Mr Johnson, who served in her sister ship HOBART (SUBM.001.0001_R at 0003_R). The ability to transmit voice messages, known as radio telegraphy, was fitted to HMA Ships not earlier than 1942, with the fitment of a VHF radio telephone transceiver in HOBART in April 1942: (SUBM.001.0001_R at 0004_R). These sets had a range limited to line of sight (SUBM.001.0001_R at 0004_R).
2.79 The Type 45 and Type 43A transmitters were located in the third (or ‘auxiliary’) office, which was on the platform deck beneath the forward superstructure.  

2.80 Installation of an emergency Type 60E W/T transmitter was requested for SYDNEY, pursuant to Confidential Admiralty Fleet Order 1612 of 1940 and was approved by the Naval Board, but it had not been fitted by the time SYDNEY was lost.

2.81 All W/T transmitters in the ship could be operated remotely from the remote control office, which was immediately under the bridge.

2.82 SYDNEY rarely broke radio silence while at sea. The wireless telegraphists who served in her and gave evidence could not recall transmitting a wireless message from SYDNEY at sea during wartime. Their evidence was that the telegraphists were under strict instructions not to break W/T silence because to do so risked revealing the ship’s presence and location. Their duty was to listen for transmissions.

There was no rule requiring wireless silence, but a common approach among Royal Navy and Royal Australian Navy ships during the World War 2 was that wireless was to be used as sparingly as possible, having regard to the efficient performance of the operation at hand. In practice, warships broke wireless silence only when the ship was in action with the enemy or when a situation was extremely hazardous. In those circumstances it was acceptable for a commanding officer to send an emergency uncoded message—also referred to as a ‘plain language’ message.

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165 SUBM.001.0001_R at 0003_R
166 The request for fitment of the Type 60E unit pursuant to Confidential Admiralty Fleet Order 1612 of 1940 is recorded at NAA.073.0218 and was item no. 292 in SYDNEY’s alterations and additions list. A minute from the Commodore-in-Charge of Garden Island to the Naval Board dated 3 February 1942 records item 292 as one of the items that was not taken in hand by the dockyard before SYDNEY was lost: NAA.073.0191. Even if it had been fitted, the Type 60E was not capable of voice transmission: SUBM.001.0026_R at 0029_R.
167 SUBM.001.0001_R at 0003_R
168 SUBM.001.0001_R at 0005_R; WIT.012.0001_R at 0002_R; CORR.004.0173_R at 0175_R. There note the reference in the report of Captain Gibbons of AQUITANIA to the CAMSI instruction about radio silence. See also UKAA.010.0198 at 0206 and UKAA.009.0194_CAFO1017/41.
169 SUBM.001.0001_R at 0005_R; WIT.012.0001_R at 0002_R. See also UKAA.009.0053_CAFO197/41
170 PUB.056.0001 at 0137. At footnote 2 on p. 137, Mr Brown wrote that security in respect of wireless silence can be ‘overdone’ and gave the examples of the decision by HMS CUMBERLAND in October 1939 to maintain wireless silence, which resulted in information not reaching the Commander-in-Chief, South Atlantic, that in his opinion might have led to the early destruction of GRAF SPEE and, second, CORNWALL’s encounter with Raider 33 (which she sank) in May 1941. In relation to the latter, the Admiralty remarked, ‘...rigid adherence to wireless silence resulted in essential reports not being made ...
171 SUBM.001.0001_R at 0005_R; CORR.004.0173_R at 0175_R. Mr John Brown gave an example of the sending of an emergency message in plain language on the captain’s orders whilst serving in HMAS KARU when she came under enemy attack. He said commanding officers knew that once you engaged the enemy your location was revealed, so the ship could transmit in plain language.
2.83 All W/T transmission was in Morse code, and in wartime it was encoded.\footnote{WIT.012.0001_R at 0003_R; CORR.004.0173_R at 0175_R} These latter transmissions were thus received as seemingly random letters or numbers that were written down by the W/T operator. Another operator would decode the message. A prefix to the message would denote the code book to be used.\footnote{CORR.004.0173_R at 0178_R} The plain-language message was then distributed, a copy being retained in the wireless log book for that day.

2.84 W/T signals could not be transmitted or received if there were no serviceable aerials. Six transmitting aerials were slung between the mainmast and foremast, and receiving aerials were slung from the top of the foremast to a point just abaft the bridge.\footnote{As per as-fitted plan of aerials: NAA.068.0001. This accords with the evidence of the W/T operator Mr John Brown: TRAN.005.0001_R at 0018_R Line 21.} Each of the ship’s transmitters was connected to an aerial via a lead-in wire. If the aerials or their attached feeders were brought down by battle damage, the downed aerials—lying on the deck, over the side or severed—became completely inoperative because the wires were not insulated and would be earthed as a result of contact with the ship’s plating or trailing in the sea.\footnote{SUBM.001.0001_R at 0007_R to 0008_R}

2.85 Wireless telegraphists were trained in rigging a jury aerial.\footnote{TRAN.005.0001_R at 0017_R Line 23. That W/T aerials might be a target of German raiders is demonstrated in information resulting from interrogation of German prisoners of KETTY BROVIG and COBURG, that raider aircraft had a trailing hook device for fouling and carrying away W/T aerials.} Pre-cut jury aerials were kept in the main wireless telegraphy office and the remote control office.\footnote{SUBM.001.0001_R at 0008_R} Transmitting aerials could be jury-rigged only if there were two high fixing points such as the masts.\footnote{WIT.008.0001_R at 0005_R} Receiving aerials required only one mast and were easier to jury-rig than transmitting aerials.\footnote{TRAN.005.0001_R at 0018_R Line 28} Mr Gordon Johnson, whose duties as a W/T operator in HMAS HOBART included maintenance of the aerials and who once rigged a jury aerial as an exercise, said that erecting a jury aerial when the upper deck was being subjected to 5.9-inch shelling, machine-gun and other smaller calibre gunfire and while the ship’s upper deck was burning would have been impossible.\footnote{SUBM.001.0001_R at 0008_R} He noted that a W/T operator seeking to get to the foremast to deal with an aerial problem would have to travel along the upper deck past the torpedo space and the ship’s waist and so would be exposed to gunfire.

2.86 SYDNEY’s ability to receive W/T transmissions depended on the strength of the transmission. SYDNEY monitored HMAS HARMAN’s
frequency when serving on the Australia Station\textsuperscript{181}, and when she was off the Western Australian coast she had no difficulty receiving transmissions from HARMAN.\textsuperscript{182}

**Visual signalling**

2.87 There were two methods of visual signalling—lamps and flags.

**Signal lamps**

2.88 SYDNEY was fitted with the following signal lamps:

- two 18-inch signal lamps mounted on either side of the flag deck
- two 18-inch signal lamps mounted on each bridge wing
- two 11-inch hand-held signal lamps stowed in lockers on the flag deck.\textsuperscript{183}

2.89 Mr Ernest Briddick, a signalman who served in SYDNEY, gave evidence that in good conditions a signal sent with the 18-inch lamp could be seen on another ship’s superstructure once that ship was visible above the horizon.\textsuperscript{184}

**Flag signals**

2.90 Flag signals were run up the signal halyard from the flag deck, which was immediately aft of and below the bridge and at the foot of the mainmast.\textsuperscript{185} At action stations there were between six and eight signalmen on the flag deck and five or six personnel in the signal office, at the forward end of the flag deck.\textsuperscript{186} The signal office communicated with the bridge by voice-pipe.\textsuperscript{187} In daylight in good visibility, flags could be read up to a distance of 5 miles\textsuperscript{188}, although it was accepted that it was sometimes difficult to read a flag at as little as a mile.\textsuperscript{189}

\textsuperscript{181} A distinct Naval command area, the Australia Station was established in 1859, after the Crimean War. HMAS HARMAN was a signal station in Canberra.

\textsuperscript{182} WIT.008.0001_R at 0004_R. HMAS HARMAN is located at Canberra.

\textsuperscript{183} As shown on the as-fitted plans (NAA.017.0009) and discussed by signalmen who served in SYDNEY (TRAN.002.0001_R at 0041_R Line 25); WIT.007.0008_R at 0012_R. Signal lamps were also known as Aldis lamps after their inventor, Arthur Aldis.

\textsuperscript{184} TRAN.002.0001_R at 0041_R Line 3

\textsuperscript{185} As-fitted plans: NAA.017.0009. Discussed by signalman, Kenneth Brown at WIT.007.0001_R at 0003_R.

\textsuperscript{186} WIT.007.0001_R at 0003_R

\textsuperscript{187} WIT.007.0001_R at 0003_R

\textsuperscript{188} NAA.074.0064. See also WIT.025.0001_R at 0003_R, TRAN.022.0001_R at 0029_R and 0032_R.

\textsuperscript{189} NAA.074.0065
2.91 A former signalman who served in SYDNEY gave evidence that signal lamps were preferred over flag signalling when challenging unidentified merchant ships.\textsuperscript{190}

**Lookout**

2.92 SYDNEY had a crow’s nest at the top of her mainmast, and it was usually manned by a signalman on the lookout for other ships.\textsuperscript{191} On sighting another ship or ships, the lookout would communicate this to the bridge by voice-pipe.\textsuperscript{192}

**Signalling during challenges to unidentified ships**

2.93 When challenging an unidentified merchant ship, SYDNEY sent signals by signal lamp from one of the bridge wing lamps.\textsuperscript{193} Signalmen were trained daily in merchant ship challenge procedure.\textsuperscript{194}

**Recording of signals**

2.94 Every message SYDNEY received by wireless telegraphy, signal lamp or flag was called a ‘signal’ and recorded by the wireless telegraphers or the signalmen, or both, in their respective logs.\textsuperscript{195}

**Direction finding**

2.95 SYDNEY was fitted with an LM1 radio direction finding set.\textsuperscript{196} As part of a modernisation program, in September 1938 it was proposed to replace this with an RA1 direction finding outfit.\textsuperscript{197} This was still pending in January 1941\textsuperscript{198}, and there is no record of the outfit’s installation.

SYDNEY’s direction finding equipment was located in a compartment at the aft end of the lower bridge. The direction finding set was attached to a sense-finder aerial suspended from a direction finding spar and outriggers on the foremast that were secured to the front and sides of the bridge roof.\textsuperscript{199}

\textsuperscript{190} WIT.007.0001\_R at 0005\_R  
\textsuperscript{191} TRAN.002.0001\_R at 0038\_R Line 47  
\textsuperscript{192} TRAN.002.0001\_R at 0039\_R Line 21  
\textsuperscript{193} WIT.007.0001\_R at 0005\_R; TRAN.002.0001\_R at 0039\_R Line 30  
\textsuperscript{194} TRAN.005.0001\_R at 0005\_R Line 23  
\textsuperscript{195} WIT.008.0001\_R at 0003\_R  
\textsuperscript{196} NAA.102.0001  
\textsuperscript{197} NAA.102.0001  
\textsuperscript{198} NAA.073.0120  
\textsuperscript{199} NAA.068.0001
Direction finding was possible only if another ship was transmitting a signal and the direction finding unit was operating and happened to be monitoring the bandwidth of the signal at that time.\textsuperscript{200}

**Internal communication**

2.96 SYDNEY’s as-fitted construction plans show that she was fitted with an internal telephone system and voice-pipes and a public address system.\textsuperscript{201} Important spaces and compartments—such as the bridge, machinery rooms, the director control tower, the 6-inch turrets, the torpedo mounts, the 4-inch gun deck, the lower steering position, the flag deck, the after control position and the power rooms—were fitted with a telephone and voice-pipe, both of which connected back to the bridge.\textsuperscript{202}

**Conning**

2.97 The plan of the upper bridge (see Figure 2.5) shows the compass platform located forward on the upper bridge, covered by a bulletproof roof.\textsuperscript{203} On the compass platform were the following:

- a magnetic compass
- a pelorus\textsuperscript{204}
- a revolving chart table
- voice-pipes\textsuperscript{205}
- a sighting vane to the plot table, which was immediately below on the lower bridge.\textsuperscript{206}

Outside the compass platform on the upper bridge were the following:

- two captain’s sights, one each on the port and starboard sides
- two 12-foot rangefinders, one each on the port and starboard sides
- two compass repeaters, one each on the port and starboard sides, aft.\textsuperscript{207}

\textsuperscript{200} SUBM.001.0001_R at 0006_R
\textsuperscript{201} As can be seen in various as-fitted plans, such as that of the bridges (NAA.017.0010) and the aft control position (NAA.017.0016).
\textsuperscript{202} As seen in SYDNEY’s as-fitted plans of the fire-control arrangements on the bridges (NAA.017.0010).
\textsuperscript{203} NAA.017.0009
\textsuperscript{204} The pelorus was a sighting vane to the gyro compass repeater immediately below in the wheelhouse: NAA.017.0009.
\textsuperscript{205} WEB.001.0016_V
\textsuperscript{206} NAA.017.0009
\textsuperscript{207} NAA.017.0009
Figure 2.5 Plan of SYDNEY’s upper and lower bridges

NAA.017.0009
2.98 The vantage afforded by the upper deck and its apparatus made that deck the natural place from which to command the ship. CAPT Burnett commanded the ship, including when the ship was at action stations, from the upper bridge.209

In the event of the bridge being out of action, emergency conning of the ship could occur from the aft control position.210 This position was fitted with voice-pipes, telephones, a Mark II training sight, target-bearing and range indicators, a wireless telegraphy station and gunnery controls (‘fire’ and ‘cease fire’ bells).211

**Navigation and plotting**

2.99 Navigation and plotting were done on the lower bridge (see Figure 2.5), which contained the following:

- the chart house
- the plotting office
- the wheelhouse
- a silent compartment for ASDIC monitoring
- the remote control office for wireless telegraphy.212

2.100 SYDNEY had two electric gyro compasses, one located in the No. 1 power room and one in the gyro compass room. A gyro compass repeater and a magnetic compass were located in the wheelhouse, which also contained telegraphs to both engines. There were gyro compass repeaters in the lower steering position as well and on the aft searchlight platform.213 The gyro signal fed into the fire-control table in the transmitting station.

**Steering**

2.101 There were two forward steering pedestals—one in the wheelhouse, on the lower bridge, and the other in the lower steering position, which was below the bridge on the platform deck. At cruising stations

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209 WIT.001.0028_R at 0029_R. Mr Fisher was the depth-charge operator on the upper bridge at cruising stations and would remain there until relieved by the action stations crew. He recalls that at action stations CAPT Burnett remained on the upper bridge.
210 NAA.017.0016. See also discussion under the heading ‘Location of the executive officer’, later in this chapter.
211 NAA.017.0016
212 NAA.017.0009
213 NAA.017.0009
SYDNEY was steered from the wheelhouse, while at action stations she was steered from the lower steering position.\(^{214}\)

2.102 The lower steering position contained engine room telegraphs and gyro compass repeaters in addition to the steering pedestal.\(^{215}\) Wheel orders from the bridge or the aft control position to the lower steering position were relayed by voice-pipe or telephone. The lower steering position was unprotected by armour but was afforded a degree of protection by its location in the ship, near the waterline and on the centreline.\(^{216}\)

2.103 SYDNEY was equipped with electro-hydraulic steering gear, which linked the steering pedestals in the wheelhouse and lower steering position to the steering gear compartment, immediately above the rudder.\(^{217}\) Wheel order inputs at a steering pedestal activated a ram in a cylinder (the telemotor transmitter), which forced a fluid through pipes to another cylinder (the telemotor receiver) in the steering gear compartment. The reciprocal movement of a ram in the telemotor receiver activated a lever controlling the flow of pressurised oil from two steering-motor pumps to two double-ended hydraulic rams, one on either side of the rudder crosshead, which in turn caused the rudder to move proportionally to the movement of the wheel.\(^{218}\) The location of telemotor pipes in SYDNEY is not known but, on the basis of information for her sister ship HOBART, the pipes are likely to have run close to the ship’s side and been vulnerable to shell fire between the lower steering position and the forward boiler room bulkhead, being unprotected by armour.\(^{219}\)

2.104 Emergency steering could be done from the steering gear compartment, either by a wheel in the forward part of the compartment that could operate the steering gear or, should power be lost, by two hand-driven hydraulic pumps.\(^{220}\)

**Fire fighting**

2.105 The main fire-fighting service supplied sea water to various fire mains and hose connections throughout the ship.\(^ {221}\) Canvas hoses were stowed ready for use next to these points. The main service also facilitated the flooding of compartments. Key munitions spaces (such as magazines,
shell rooms and the inflammables store) were fitted with flooding valves and overhead spray nozzles.\footnote{As shown in SYDNEY’s as-fitted plans: \url{NAA.030.0003}.} These spaces could also be flooded by using valves and sea cocks on the deck immediately above.

Damaged sections of the main service could be bypassed by canvas hoses.

Foam generators were proposed by Confidential Admiralty Fleet Order 2293 of 1939 but were not fitted in SYDNEY.\footnote{NAA.073.0200 and NAA.073.0191}

2.106 SYDNEY’s crew regularly practised going to emergency stations—the mode in which the ship’s company would engage in fire fighting or damage control, or both.\footnote{WIT.005.0001_R at 0006_R} Sailors who were not needed to man the guns were responsible for these tasks.\footnote{WIT.005.0001_R at 0006_R} Each week the crew received training in using fire extinguishers, attaching and operating canvas hoses, and extinguishing fires with buckets of sand.\footnote{WIT.005.0001_R at 0006_R} They were also taught about flooding and the stability of the ship.\footnote{WIT.005.0001_R at 0006_R}

2.107 The decks in the sailors’ messes and living spaces were covered with linoleum or corticene, the officers’ compartments had korkoid flooring, and most compartments were painted with oil-based paint.\footnote{WIT.001.0001_R at 0013_R} The upper decks were covered by Borneo whitewood planks. All these materials are combustible. In later war years, the fire risk associated with deck coverings, furniture and oil-based paint was recognised, and steps were taken to redress the situation.\footnote{Mr Fisher gave evidence that in 1942 all the compartments below decks in HMAS HOBART had their paint stripped back to bare metal and the surfaces repainted with yellow chromate, replacing the oil-based red lead. He said all corticene and the heavy-duty linoleum below decks were removed and the crew thereafter lived on bare metal. He recalls being informed that these measures were to reduce the fire risk: \url{WIT.001.0001_R at 0013_R}.}

### Damage control

2.108 Shipwrights and other crew were assigned to carry out immediate battle damage repairs—known as ‘damage control’. All RAN ships had a damage-control organisation that had a cruising stations mode and an action stations mode.\footnote{As discussed in the report on damage-control operations in HMAS HOBART after she was torpedoed in 1943: \url{NAA.043.0028}.} In SYDNEY a damage-control headquarters was situated at the lower steering position, and there were three damage-control teams.\footnote{NAA.043.0028}
If the watertight integrity of the ship was compromised, damage-control parties mustered at damage-control stations. Their aim was to slow down, and preferably stop, the ingress of sea water and thus preserve the buoyancy and stability of the ship. Damage-control stations were located throughout the ship at or below the waterline and contained tools and timber for making repairs. The damage-control teams worked to assess the damage, isolate damaged compartments from fire mains, establish flooding boundaries and shore up the surrounding ship structure. They were trained to cut and fashion the timber into pieces that could cover breaches in the hull and to shore up damaged bulkheads, doors and hatches.

Damage control was aided by Admiralty-issued instructions and schematic diagrams of the ship, as well as data on the impact on stability of various flooding scenarios.

Pumps could be used for emptying a flooded compartment or for counter-flooding. The pumps all relied on electricity and were thus reliant on the ship producing steam to fire the boilers or turbo-generators. Six of the eight pumps in SYDNEY were located on the port side of the ship below the main suction line. In addition to the turbo-generators, SYDNEY had two diesel generators behind the armour belt on the lower deck port and starboard, between frames 116 and 126. Even if all steam was lost, power could possibly have been provided for some time by these generators, assuming they were undamaged. Pumping of fuel oil between compartments could also be done to counter asymmetrical flooding.

Aircraft

SYDNEY initially embarked a Supermarine Seagull V aircraft launched from a 53-foot catapult. After this aircraft was forced down in the Middle East in July 1940 she embarked a Supermarine Walrus, which was the type of aircraft on board on 19 November 1941. The Seagull and the Walrus were similar aircraft, the main difference being the Walrus’ engine had to be hand-cocked while the Seagull’s engine could be started automatically from the cockpit.
The Walrus was available for searching for and identifying vessels, calling the fall of shot, and bombing. Four 250-pound and ten 100-pound aircraft bombs were stowed in the bomb room, which was on the hold deck between the torpedo warhead room and X turret shell room.

2.110 When stowed on its catapult, the Walrus was susceptible to having its fabric damaged by gun-blast.

2.111 There were logistical considerations for captains in deciding whether to deploy a ship’s aircraft. Both launch and recovery of the aircraft were considered complex operations. The Walrus was fired from the outslung ship’s catapult, which meant the ship had to turn side-on to the wind so that the aircraft was catapulted into the wind. Assuming that the ship wanted to recover its aircraft at the end of a flight—that is, the ship was beyond range of a friendly shore—the ship had to turn across the wind to create a ‘slick’ downwind surface for the pilot to ‘land’ on. The ship then had to slow down so that the aircraft could be hoisted aboard by crane and carefully secured in its catapult cradle. There was also a risk of the aircraft being damaged during a recovery procedure conducted in short, steep seas, as occurred when SYDNEY recovered her aircraft after the action at Scarpanto, Italy, on 4 September 1940.

2.112 Fuelling and de-fuelling the aircraft were difficult and dangerous processes. The routine in SYDNEY was that the Walrus was fuelled one-and-a-half hours before first light each day at sea. Towards last light it was de-fuelled. The aviation spirit tanks were in the bow of the ship. The valve cocks for delivery of aviation fuel were on the upper deck, slightly forward of the catapult. Stokers pumped the fuel from the aviation spirit tanks through an arrangement of pipes to the valve cocks and then by canvas hose to the aircraft. Stokers at various points along this chain coordinated by telephone the delivery of fuel.

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241 PUB.051.0001 at 0083; WIT.017.0001_R at 0004_R
242 NAA.060.0001 at 0003
243 NAA.060.0001; PUB.051.0001 at 0074. The value of embarking these types of aircraft in ships operating in a fleet was questioned at the height of the Mediterranean campaign by the Commander-in-Chief, Light Forces, Mediterranean, VADM HD Pridham-Wippell RN. He wrote that ‘almost general opinion’ was that it would be better to have a further two multiple machine gun mountings in the place usually occupied by the aircraft and catapult. This was particularly so, he said, given that ‘…the value of a single aircraft with no stowage space does not compensate for the risks attendant with the petrol arrangements, the additional expense, personnel and topweight that the machine entails, particularly in the case of cruisers employed primarily on fleet work’. VADM Pridham-Wippell also noted that HMS LIVERPOOL’s aircraft’s petrol had exploded in a surprise attack: NAA.060.0001.
244 PUB.051.0001 at 0073; TRAN.003.0001_R at 0021_R Line 33
245 AWM.001.0335
246 PINQ.SUBS.015.0110 at 0111
247 NAA.033.0001
De-fuelling involved the reverse process, except that it relied on gravity rather than pumps to drain the fuel back into the storage tanks.\textsuperscript{248}

A fully fuelled aircraft on its catapult presented a fire hazard—particularly since it was located immediately forward of the 4-inch gun deck manned at action stations by 30 men and housing 4-inch rounds in ready-use lockers.\textsuperscript{249}

## Boats and life rafts

2.113 As at November 1941 SYDNEY had embarked two 32-foot cutters, two 35-foot motorboats, two 27-foot whalers, a 36-foot pinnace, a 30-foot gig and a 16-foot jolly boat.\textsuperscript{250} This was virtually the same as her initial complement of small boats, the only change being that a 36-foot motor pinnace had been replaced by a 35-foot motorboat.\textsuperscript{251} Table 2.2 shows the type and location of ship’s boats on SYDNEY at November 1941.

<table>
<thead>
<tr>
<th>Boat type</th>
<th>Number</th>
<th>Location</th>
<th>Capacity (men)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-foot pinnace</td>
<td>1</td>
<td>Port side, abreast forward funnel</td>
<td>76</td>
</tr>
<tr>
<td>35-foot motorboat</td>
<td>2</td>
<td>Starboard side, abreast forward funnel</td>
<td>84</td>
</tr>
<tr>
<td>32-foot cutter</td>
<td>2</td>
<td>One each starboard and port side, forward funnel</td>
<td>118</td>
</tr>
<tr>
<td>27-foot whaler</td>
<td>2</td>
<td>One each starboard and port side, abreast seaplane catapult turntable</td>
<td>54</td>
</tr>
<tr>
<td>16-foot jolly boat</td>
<td>1</td>
<td>Port side, in motor pinnace</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>342</td>
</tr>
</tbody>
</table>

\textsuperscript{248} PINQ.SUBS.015.0110 at 0112
\textsuperscript{249} An example of the ease with which the Walrus could be set alight by battle damage is provided by HMS NEPTUNE, a Leander Class light cruiser. Mr Gordon White gave evidence about an occasion when SYDNEY was in company with NEPTUNE in the Mediterranean and they were attacked by enemy bombers: ‘I can remember we were with a ship called the HMS Neptune, a Leander class cruiser, and bombers came over and they dropped a bomb between us and the Neptune and the splinters got into their aircraft and it caught fire and they catapulted the plane off, left it there, burnt it—it burnt in the water and fell down into the sea’. TRAN.004.0001 at 0024 Line 23.
\textsuperscript{250} As shown in SYDNEY’s as-fitted plans: NAA.029.0002. See also the evidence of Mr Lavender, one of SYDNEY’s small boat ratings: TRAN.003.0001 at 0007. These sources differ slightly from the findings of the Defence Science and Technology Organisation: DSTO.003.0001 at 0120.
\textsuperscript{251} DSTO.003.0001 at 0120
\textsuperscript{252} DSTO.003.0001 at 0120
2.114 SYDNEY’s small boats did not have flotation devices: if holed, they were at risk of sinking.\textsuperscript{253} The boats stored extra life jackets.\textsuperscript{254}

2.115 Apart from the two cutters, which had their own davits, the ship’s crane was required for deployment of each of the boats.\textsuperscript{255} When deploying a cutter, the boat’s party would board the cutter while it was still secured to the davits. The ship needed to reduce its speed to about 5 knots as the cutter was being lowered.\textsuperscript{256} The cutter was lowered until just above the water, when the party would be ordered to ‘out pins’ and the cutter dropped into the water.\textsuperscript{257} All this took about 5 minutes.\textsuperscript{258}

2.116 With the exception of the 32-foot cutters, the ship’s boats were secured to the deck by means of a brace over the gunwales of the boat, securing it in its cradles. The braces were screwed into place. These fittings were designed to keep the boats secure in rough seas. The restraints were not removed when the ship went to action stations.\textsuperscript{259} If the restraints were not removed the boats were unable to float free if the ship sank.\textsuperscript{260}

The boats’ wooden construction meant they were vulnerable to shrapnel, bullet and blast damage, as were the cranes and davits.

2.117 SYDNEY’s secondary life-saving equipment was a number of Carley floats. These consisted of a large-diameter copper tube formed into an oval ring divided by bulkheads into a number of watertight compartments.\textsuperscript{261} The tube was covered with a layer of cork and then painted canvas. A platform of slatted wood was slung under the inner edge of the tube by rope netting, and a life line was fitted around the outside of the tube.

Carley floats had been used on Royal Navy and Royal Australian Navy warships since 1915.

2.118 The two types of Carley float used in SYDNEY in late 1941 were the pattern 18, which was 14 feet long and had a lifesaving capacity of 67, and the pattern 20, which was 10 feet long and had a lifesaving capacity
of 20.\textsuperscript{262} The lifesaving capacity included the men inside the Carley float as well as those outboard clinging to the life lines.\textsuperscript{263}

2.119 Photographs of SYDNEY show that, from her time in the Mediterranean in 1935 until the time she was sunk, the location, type and number of Carley floats varied greatly.\textsuperscript{264} Photos of SYDNEY taken in mid to late 1941 (see Figures 2.6, 2.7 and 2.8) show there were nine Carley floats onboard.\textsuperscript{265} Table 2.3 shows the type, number and location of Carley floats on SYDNEY in November 1941.

![Figure 2.6](image)

Figure 2.6 Two small Carley floats outboard of the pinnace and gig on SYDNEY’s port side. The camouflage painting on the funnel shows that this photo was taken in mid-1941.\textsuperscript{266}

\textsuperscript{262} DSTO.003.0001 at 0112
\textsuperscript{263} DSTO.003.0001 at 0112
\textsuperscript{264} DSTO.003.0001 at 0112
\textsuperscript{265} This correlates with the Defence Science and Technology Organisation’s findings: DSTO.003.0001 at 0118.
\textsuperscript{266} This photo is reproduced at DSTO.003.0001 at 0117.
### Table 2.3

<table>
<thead>
<tr>
<th>Pattern no.</th>
<th>Number</th>
<th>Location</th>
<th>Capacity (men)</th>
<th>Photograph</th>
</tr>
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<tbody>
<tr>
<td>18</td>
<td>2</td>
<td>Stern</td>
<td>134</td>
<td>Figure 2.7</td>
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<tr>
<td>20</td>
<td>1</td>
<td>Stern</td>
<td>20</td>
<td>Figure 2.7</td>
</tr>
<tr>
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<td>2</td>
<td>Starboard, timber stowage rack</td>
<td>40</td>
<td>Figure 2.8</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>Port, timber stowage rack</td>
<td>40</td>
<td>Figure 2.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Port, in place of the 30-foot gig</td>
<td>40</td>
<td>Figure 2.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>outboard of the 36-foot pinnace</td>
<td></td>
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</tr>
<tr>
<td>TOTAL</td>
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<td></td>
<td>274</td>
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</tbody>
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**Figure 2.7**  
SYDNEY escorting QUEEN MARY and QUEEN ELIZABETH past Wilsons Promontory, 4 September 1941.²⁶⁸ The two pattern 18 Carley floats, one containing a pattern 20 Carley float, can be seen on the quarterdeck.

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²⁶⁷ DSTO.003.0001 at 0118
²⁶⁸ This photo appears to be the one CAPT Burnett attached to his report of proceedings for September 1941 (AWM.001.0133); it is reproduced in JA Collins 1965, As Luck Would Have It, Angus & Robertson, Sydney (PUB.026.0001 at 0085).
It is not known whether emergency food and water were stowed in the Carley floats in SYDNEY. Confidential Admiralty Fleet Order 3291, dated July 1941, advised that action was being taken to provision all floats with emergency water and tins of concentrated food, but SYDNEY’s alterations and additions list does not record this happening.

Life belts and life buoys

All crew members were issued with a personal inflatable life belt, colloquially known as a ‘Mae West’, which was meant to be worn or at least be in close reach when at action stations.

The life belts, consisting of a rubber tube with a woollen cover, were worn around the waist and were designed to keep an individual afloat for a number of hours. Before a sailor entered the water, he was to place the deflated tube over his neck. Sailors were instructed to inflate the tube only after they were in the water so as to avoid neck injury. Figure 2.9 shows two SYDNEY crew members with life belts tied around their waist.

AWM.009.0037. Enlarged section added by the inquiry.
WIT.001.0001_R at 0005_R; WIT.004.0001_R at 0004_R; DSTO.003.0001 at 0122
SUBM.006.0323_R
DSTO.003.0001 at 0122
2.123 SYDNEY was also fitted with a number of round life buoys.\textsuperscript{273}

**Modification and refitting**

2.124 In July–August 1940 in Alexandria, Egypt, SYDNEY’s eight torpedo tubes were modified by the fitting of safety pins to the rear of each tube.\textsuperscript{274} At about this time she also had degaussing equipment installed as protection against magnetic mines.\textsuperscript{275}

2.125 Additionally, whilst in Alexandria SYDNEY had 0.5-inch armour plating attached to her guard rails on the 4-inch gun deck\textsuperscript{276} (see Figure 2.10). This was intended to afford some protection against shrapnel from bombs falling into the sea near the ship: it afforded no protection against direct fire.\textsuperscript{277}

![Photo courtesy of the family of the late Harold Adams]

**Figure 2.9** SYDNEY crew members with life belts\textsuperscript{278}

![Photo courtesy of the Australian War Memorial (negative number 306723)]

**Figure 2.10** One of SYDNEY’s 4-inch guns with armour plating\textsuperscript{279}

2.126 In Malta between 24 December 1940 and 13 January 1941 SYDNEY had her lower deck side scuttles plated over—with the exception of one scuttle on each side of the mess deck and in each cabin flat.\textsuperscript{280} This was done to improve the ship’s watertight integrity.

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{273} WIT.004.0001\_R at 0003\_R; DSTO.003.0001 at 0122
\item \textsuperscript{274} TRAN.004.0001\_R at 0003\_R Line 43
\item \textsuperscript{275} AWM.009.0031
\item \textsuperscript{276} NAA.075.0208; WIT.014.0001\_R at 0003\_R
\item \textsuperscript{277} WIT.014.0001\_R at 0003\_R
\item \textsuperscript{278} WIT.010.0022
\item \textsuperscript{279} AWM.009.0032
\item \textsuperscript{280} NAA.073.0116 at 0118
\end{itemize}
\end{footnotesize}
2.127 In July 1941 shields were made and fitted to the 0.5-inch machine gun mounts.\textsuperscript{281}

The general condition of the ship

2.128 In 1940 SYDNEY steamed more miles than she had in the first four years of her commission.\textsuperscript{282} On returning to Sydney in February 1941 she had 14 days alongside at Garden Island, during which time most of her crew proceeded ashore on leave and working parties went aboard to do maintenance and repair work. The ship did not go into dry dock at this time.\textsuperscript{283} The work carried out included work on her boilers, but planned repairs to B turret were deferred because in late February SYDNEY was ordered to sail so that she could escort convoys.\textsuperscript{284}

2.129 SYDNEY went into dry dock on 5–8 April, 24–28 July and 4–8 August 1941.\textsuperscript{285} In June 1941 CAPT Burnett forwarded a series of defect lists to the Commodore-in-Charge, Sydney, and specified the items that were most urgent and necessary for seagoing and fighting efficiency.\textsuperscript{286} There were five such items. The first three dealt with the main condensers, the main turbine sliding feet and the turbo generator condensers. The fourth item concerned B turret: ‘Turret to be lifted for detailed examination. Roller path segments to be removed and rectified by adjustments to spigots’.\textsuperscript{287} The fifth item concerned the wear of A bracket bushes.\textsuperscript{288}

2.130 On 1 August CAPT Burnett wrote:

The period in Sydney enabled certain important defects to be remedied by Dockyard and Ship’s Staff, viz. Main Condenser and Turbo Generator Condensers. This leaves only important defects, viz ‘B’ Turret, Rewooding ‘A’ Bracket and repairs to Feed Tanks, which require docking or a lengthy period of notice.\textsuperscript{289}

2.131 On 3 September he wrote:

During the month, the ship was employed on escort duties except for a short period at Sydney when the Ship was docked and some of the outstanding defects were made good. Principal of these were routine

\textsuperscript{281} NAA.075.0208
\textsuperscript{282} In his report of proceedings for December 1940 (AWM.001.0153), CAPT Collins records that in 1940 SYDNEY steamed 65,615 miles, whereas in the four years of commission before the war she steamed a total of 57,477 miles.
\textsuperscript{283} NAA.014.0001
\textsuperscript{284} AWM.002.0322
\textsuperscript{285} NAA.014.0162, NAA.014.0097 and NAA.013.0116
\textsuperscript{286} This was on 21 June 1941: NAA.073.0154. The supplementary defect list is at NAA.073.0155 and the spare gear defects list is at NAA.073.0170.
\textsuperscript{287} NAA.073.0155 at 0164
\textsuperscript{288} NAA.073.0154
\textsuperscript{289} AWM.001.0136
docking, all ‘A’ bracket’s bushes rewooded, three feed tanks leaking from sea made watertight and an extensive overhaul of Asdic equipment. This was a valuable examination and maintenance period.290

2.132 In his September report of proceedings, dated 4 October 1941, CAPT Burnett mentioned only one defect, that being a defect in A turret.291 He described this as a ‘difficulty in training “A” Turret’ that developed during the passage across the Great Australian Bight between 19 and 24 September. The fact that there is no mention of any other defect in this report makes it clear that all other major defects had been rectified.

Was there damage to A turret in November 1941?

2.133 In his book Who Sank the Sydney? Mr Michael Montgomery asserted that A turret was damaged by heavy seas during passage across the Great Australian Bight and was not repaired before SYDNEY left Fremantle on 11 November 1941. He wrote:

However, there was, irrefutably, another factor: namely, the damage suffered by A turret during very heavy seas met on 20 to 22 September while escorting a convoy across the Great Australian Bight. R. Lennis recalls an impression of it being almost lifted off its mountings by a huge wave, and it was left jammed in a position almost 90 degrees to port … On arrival at Fremantle it was man-handled back into fore-and-aft position from the inside, and the rollers taken out and machined; the roller path itself, however, had also been damaged, so that even when the rollers were replaced the turret could only be trained manually and, at best, extremely slowly. The necessary repairs constituted a major undertaking, for which there were no facilities at that time in Fremantle; that they had still not been carried out by 19 November would seem to be amply confirmed by the numerous references in the German evidence to one of the Sydney’s forward turrets being lifted off and hurled overboard. However great the demands placed on the limited number of cruisers at their disposal, the wisdom of the Naval Board’s decision not to transfer the Sydney to another, less vulnerable, area until the turret could be repaired would obviously have been open to argument. (This is not to imply that this was a contributory factor to the outcome of the action itself, because under ordinary circumstances she should still have had no difficulty in disposing of the Kormoran with her remaining three turrets. On the other hand, in the hypothetical, but increasingly likely, event of Japan’s sudden entry into the war, and the possibility of the Sydney encountering a Japanese warship in waters relatively close to the

290 AWM.001.0135
291 AWM.001.0133
primary target of Singapore, such a disability could well have put her at a very real disadvantage.)

2.134 Mr Montgomery was right in asserting that A turret was damaged by heavy seas during this passage across the bight between 19 and 24 September 1941. He was wrong, however, in asserting that the damage was not rectified before SYDNEY sailed on 11 November 1941. CAPT Burnett reported to RACAS on 5 November 1941, ‘A defect in the training of “A” Turret was reported and remedied as shown in my letters 78/622 of 25th October and 78/436 of 24th September, 1941’.

The Inquiry’s searches of archives did not result in letters 78/622 or 78/436 being found. Nevertheless, the remedying of the defect to A turret was also confirmed in oral evidence given by Mr Templeton and Mr Fisher.

2.135 When SYDNEY left Fremantle on 11 November 1941, A turret and all other armaments were in sound operational order.

**Officers and men**

**CAPT Joseph Burnett RAN**

2.136 On 15 May 1941 CAPT Joseph Burnett RAN (see Figure 2.11) assumed command of SYDNEY, relieving CAPT John A Collins RAN.

2.137 Joseph Burnett had been born in Singleton, New South Wales, on 26 November 1899. On 12 December 1912, at age 13, he was part of the first intake into the newly formed Royal Australian Naval College at HMAS CRESWELL. In 1917 he graduated from the college with the rank of midshipman. On 5 April 1917 he joined HMAS AUSTRALIA, then serving with the Grand Fleet in the North Sea. He served in AUSTRALIA until just before the Armistice. On 1 January 1918 he was appraised by AUSTRALIA’s commanding officer, CAPT O Backhouse CB RN, as ‘Above average … Very keen and intelligent’.

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292 PUB.002.0001 at 0116
293 AWM.001.0268
294 AWM.001.0132
295 TRAN.014.0001_R at 0043_R to 0046_R
296 WIT.001.0001_R at 0009_R
297 AWM.002.0019
298 Unless otherwise noted, the information about CAPT Burnett’s career before joining SYDNEY is taken from CAPT Burnett’s personnel file (NAA.095.0001) and the article, ‘Captain Joseph Burnett, RAN’ by his son, CMDR PR Burnett RAN, published in the Naval Historical Society Journal in December 1973 (COI.003.0113).
299 NAA.095.0058
On 1 October 1918 Burnett was promoted to sub-lieutenant, and on 25 October he was briefly posted to the gunnery school HMS EXCELLENT and the Torpedo Boat Destroyer Depot HMS COLUMBINE. From 1 April 1919 to 27 September 1919 he served again in AUSTRALIA.

On 1 January 1920 he was promoted to lieutenant. From January to June 1920 he took courses at the Royal Naval College, Greenwich. During the next 18 months he had brief postings to various Royal Navy ships and establishments. From January 1922 to January 1924 he was posted to EXCELLENT and completed two years of training to qualify as a gunnery officer.

In April 1924 Burnett joined HMAS ADELAIDE, then on deployment to the British Isles, as the gunnery officer and served in her until August 1925. He then spent two years as gunnery officer at HMAS CERBERUS.

In 1927 Burnett returned to the United Kingdom and to EXCELLENT for further gunnery training preparatory to being the gunnery officer in
the commissioning crew of HMAS CANBERRA. He served as gunnery officer in CANBERRA from 10 November 1927 to May 1930. In 1928 he was promoted to lieutenant commander.

In the second half of 1930 CAPT Burnett took a requalifying gunnery course at EXCELLENT before spending 1931 as the squadron gunnery officer in a Royal Navy destroyer flotilla.

2.140 Without exception, CAPT Burnett’s performance appraisals throughout the years from 1920 to 1932 rated him above average or average to above average.\(^{301}\) The comments made by his commanding officers during this period were mostly positive and included ‘Natural leader … most efficient ‘G’ [gunnery] Officer & Good Seaman’ (1924); ‘Unusually earnest & undustrious [sic] … Strong character’ (1927); ‘Excellent Officer … Good leadership & influence Smart & of good appearance …’ (1927); ‘Most capable & trustworthy … V.G. Gunnery Officer’ (1930); ‘Marked influence, tact & leadership’ (1931); and ‘Above av. to excep. [exceptional]. Very capable Staff Officer endowed with tact, good judgement & reliability’ and ‘Zealous, efficient and thorough’ (1932).

Among some less positive comments were ‘Inclined to worry over trifles’ (1924); ‘Too retiring. Needs to develop distinctive executive qualities & personal appearance’ (1927); and ‘Takes job almost too seriously’ (1930). This last comment was made when Burnett was the gunnery officer in CANBERRA, and his personnel file notes that the Australian Commonwealth Naval Board was appreciative of the fact that at such an early stage of CANBERRA’s commission she had earned the Admiralty’s congratulations for her gunnery efficiency.

All these reports recommended promotion in the ordinary course of events.

2.141 In 1932 the then LCDR Burnett attended the staff course at HMS PRESIDENT, where he continued to be appraised well. Also attending this course was LCDR John Collins. In a 30 April 1932 minute from the Director of the Royal Naval Staff College to the college president the director recommended that both be promoted: ‘These officers are at present qualifying at the Royal Naval Staff College & are working hard. They are zealous, efficient & thorough & should also [perform] extremely well as Commanders. I have been impressed with their

\(^{301}\) NAA.095.0024. His performance reports throughout this period are summarised in a two-page document in his personnel file.
personality’. LCDR Burnett was promoted to commander in December 1932.

2.142 In February 1933 CMDR Burnett returned to Australia and was posted to Navy Office, Melbourne, for two years, during which time he was temporarily Assistant Chief of Naval Staff and second in charge to the Director of Naval Intelligence. On posting out, the First Naval Member, VADM GF Hyde RN, wrote that CMDR Burnett was a ‘very keen and deserving officer’.

From April 1935 to April 1937 Burnett served as CANBERRA’s executive officer. His first performance appraisal by CAPT HTE Walker RN, on 20 April 1936, stated:

A very fine gentleman, morally and physically, who should be respected by everyone. As an Officer he is a good organizer and administrator, but is at present somewhat lacking in experience. Has taken particular interest in the training of Officers and men.

A good athlete, and very fit. Plays Rugby football and tennis particularly well. Level tempered, and takes reproof in good part, being thoroughly loyal.

His next appraisal was on 27 April 1937, just before he posted off the ship, by CANBERRA’s then captain, CAPT AGB Wilson RN. There was by this time no mention of lack of experience:

A very keen, loyal and efficient Officer who has carried out the duties of Executive Officer of the Flagship with conspicuous success. A good organiser, tactful, level-headed and always willing to help. A good leader and a good influence in the ship, especially in his capacity as President of the Wardroom Mess. Good manner with subordinates and helpful to young Officers and ratings. Excellent physique and proficient at most games. Good social qualities. A strong character and a thoroughly capable and trustworthy Officer.

2.143 In April 1937 Burnett returned to the United Kingdom. On 17 June he became Staff Officer, Operations, to the Rear Admiral of the Second Battle Squadron, RADM LD MacKinnon RN, flying his flag in the battleship HMS ROYAL OAK, to which Burnett was posted. He served in this capacity until 16 January 1939, a period of 18 months. During this time ROYAL OAK participated in operations associated with the Spanish Civil War and in the Mediterranean at the time of the Munich
crisis. This earned Burnett praise from RADM MacKinnon, who wrote of him on 23 September 1937:

> During the month I have known this Officer I have formed the same high opinion of him as, I know, was held by my predecessor. In his work in connection with the North Spanish patrol he has shown himself to be a most capable Staff Officer—alert, thorough and energetic, with a good grasp of the whole situation. He has a cheerful and pleasant personality and is physically fit. I have formed the impression that he would make a very good Executive Officer of a ship.\(^{306}\)

In March 1938 RADM MacKinnon provided a further appraisal:

> Further experience of this Officer has more than confirmed my previous opinion of his high qualities and ability. He has a comprehensive knowledge of the details of his profession, combined with sound common sense in applying that knowledge. He is hardworking, willing and loyal, strong minded but tactful, and of a cheerful disposition. He keeps himself very fit. Though chiefly employed on Staff Work, I am satisfied that he has a good power of command, and plenty of initiative. I am confident that he will do well in the higher ranks of the service.\(^{307}\)

2.144 The Commander-in-Chief, Home Fleet, ADM Sir Roger Blackhouse RN, commented, ‘An excellent officer’.\(^{308}\)

On 15 September 1938 RADM MacKinnon provided a further appraisal:

> Since my last report Commander Burnett has fully maintained the high opinion I have of him. I regard him as an outstanding officer, in comparison to the standard of R.N.Officers. I consider that his promotion would be in the best interests of both the Royal Navy and the Royal Australian Navy, especially in view of the long experience he has obtained in both Services.\(^{309}\)

2.145 In December 1938 CMDR Burnett was promoted to captain. Before leaving the Second Battle Squadron, on 10 January 1939 VADM MacKinnon wrote his final appraisal of him:

> During the 18 months this officer has served with me he has been of the greatest assistance. He has a comprehensive knowledge of his profession and can always be relied upon to give a good opinion on any subject. He is broadminded and takes a keen interest in world affairs. He is tactful, but firm, and has a good influence on his subordinates. He plays games well, and keeps himself very fit. Is an

\(^{306}\) NAA.095.0011  
\(^{307}\) NAA.095.0009  
\(^{308}\) NAA.095.0009  
\(^{309}\) NAA.095.0007
excellent messmate, has a good sense of humour, and is an asset at any social function.310

From January to September 1939 CAPT Burnett took courses at the Imperial Defence College at HMS PRESIDENT before returning to Australia.

2.146 On 18 October 1939 CAPT Burnett joined Navy Office and succeeded CAPT Collins as Assistant Chief of Naval Staff to ADM Sir Ragnar Colvin RN, then the Chief of the Naval Staff. As part of his duties, in October 1940 CAPT Burnett was sent to Singapore as the senior Royal Australian Navy representative at the Allied conference planning for war with Japan.

On 12 May 1941 ADM Colvin wrote of him:

I have the very highest opinion of Captain Burnett at [sic] a Staff Officer and have no doubt that he will do equally well at sea.

As Deputy Chief of the Naval Staff his work has been outstanding and he has a grasp as wide as I have known in any officer. He is full of initiative, most loyal and tactful and extremely hard working. One of the most promising and exceptional officers I have met.311

In May 1941 CAPT FE Getting RAN replaced CAPT Burnett as Assistant Chief of Naval Staff, and on 14 May 1941 CAPT Burnett assumed command of SYDNEY.

2.147 This brief history of CAPT Burnett’s career progress and the comments on his work as a gunnery officer, executive officer and staff officer make it plain he was a Naval officer of exceptional ability. By 1941 he had extensive seagoing experience, although not in a command position. His knowledge, initiative and diligence influenced the Naval Board in determining that he had the qualities necessary to command SYDNEY.

Executive officers

2.148 SYDNEY had 16 officers in the executive department, including the commanding officer.

2.149 On 19 July 1941, two months after CAPT Burnett assumed command, there was a change in executive officer: CMDR EW Thruston DSC RN, previously SYDNEY’s intelligence officer, replaced CMDR TJN Hilken DSO RN.312

310 NAA.095.0005
311 NAA.095.0003
312 AWM.001.0279; NAA.054.0464
2.150 CMDR Thruston’s personal Naval file notes that he was loaned from the Royal Navy to the Royal Australian Navy in September 1937 for a two-year posting as a lieutenant commander (with seniority of 15 March 1935). He joined SYDNEY on 30 September 1937, having served in the battleships HMS IRON DUKE and HMS NELSON and in the cruiser HMS CARLISLE, in this last case for two years on the Africa Station.313 At the outbreak of war his exchange service with the Royal Australian Navy in SYDNEY was continued. He was awarded the Distinguished Service Cross in December 1940 for the Cape Spada action in which the BARTOLOMEO COLLEONI was destroyed. He was promoted to commander on 30 June 1941. On 19 November 1941 CMDR Thruston was 38 years old.

2.151 Other senior officers of the executive branch who had served during SYDNEY’s Mediterranean campaign also remained with the ship and were part of SYDNEY’s complement when she was lost. The navigator, LCDR CAC Montgomery RN MID, joined the ship as an exchange officer on 28 June 1939.314 He had previously served in Royal Navy battleships, an aircraft carrier, a cruiser and smaller warships. He was promoted to lieutenant commander in 1938 whilst undergoing advanced navigation studies at the navigation school HMS DRYAD.315 He was mentioned in despatches after the action with the BARTOLOMEO COLLEONI. On 19 November 1941 he was aged 33 years.

2.152 Gunnery Officer LCDR MM Singer RN DSC was also on loan to the Royal Australian Navy in 1939, joining SYDNEY as gunnery officer on 17 January that year.316 He had served in cruisers, including two years in the Leander Class light cruiser HMS ACHILLES, serving in the home fleet. In 1936–37 he completed the gunnery officers’ course at EXCELLENT. In January 1938 he was briefly the assistant gunnery officer in the battleship HMS RODNEY and then in April 1938 became the gunnery officer in IRON DUKE, by then a training ship. LCDR Singer received his Distinguished Service Cross for the action with the BARTOLOMEO COLLEONI. On 19 November 1941 he was aged 31 years.

Crew

2.153 Throughout CAPT Burnett’s command, SYDNEY’s wartime complement remained at about 645 officers and men. Appendix F

313 COI.004.0256 at 0258
314 NAA.054.0444
315 COI.004.0256
316 COI.004.0256 at 0257
provides a breakdown of the categories of the officers and men lost with the ship.

2.154 There was some changeover in officers and ratings after SYDNEY’s return from the Mediterranean in 1941. In February there was a changeover of 50 ratings (mostly of the Seaman Branch), one chief petty officer, one petty officer and the five-man RAAF aircraft maintenance detachment.\(^{317}\) In March there was a changeover of a midshipman, three chief petty officers, a petty officer and 15 ratings.\(^{318}\) In April SYDNEY gained a new surgeon commander, one lieutenant, one pilot officer, eight petty officers and 10 ratings.\(^{319}\) In May she gained two chief petty officers and 11 ratings.\(^{320}\)

2.155 CAPT Burnett appreciated the effect of this changeover in officers and crew. He wrote in the report of proceedings for the month of June 1941:

> During this period the ship has been almost constantly at sea on escort duties (i.e. 25 days). Opportunity has been taken to carry out as big a training class programme as possible, and considerable progress has been made. With numerous changes in officers and ratings a great deal of instruction of these newcomers in their action and ship duties has also been necessary.\(^{321}\)

The report demonstrates CAPT Burnett’s focus on providing instruction to the newcomers. SYDNEY’s ship’s log for the period of CAPT Burnett’s command records his frequent conduct of training and exercises relating to all facets of his ship’s operation.

2.156 There is no evidence, either in the documents provided to the Inquiry or in the evidence of former SYDNEY sailors, of any decline in the morale of the ship’s company during CAPT Burnett’s command. Sailors who served under both CAPT Collins and CAPT Burnett gave evidence that there did not appear to be any major change in the functioning of the ship after CAPT Burnett assumed command, other than a slight increase in exercises and drills.\(^{322}\) Mr Fisher said:

> CAPT Burnett was very well regarded by the men in my mess, he was considered to be a good man and a good ship handler. I never heard anyone say a bad thing about him. I didn’t notice any particular changes in the ships [sic] routine between Captains Collins and Burnett.\(^{323}\)
Mr Ravenscroft said:

My impressions were that Captain Burnett was a capable ship handler. He was aware that he commanded a highly skilled and well trained ship’s company and was backed up by highly trained, experienced and battle hardened senior officers. He struck me as a man who would listen and take advice.

The day to day ships routine did not change. Drills went on as usual. Cruising stations remained unchanged and action station drill continued.324

**Clothing**

2.157 The crew’s clothing is important when considering the evidence of German survivors and the scientific evidence relating to the remains of the sailor found in the Carley float off on Christmas Island.

2.158 At sea, a variety of uniforms were worn by the officers and ship’s company and by the RAAF personnel embarked to fly and maintain the Walrus aircraft. Evidence from former SYDNEY sailors and photographs in evidence support the following findings.

On the upper decks, bridge and bridge wings:

- Officers, including the turret officers325, wore rig of the day—whites in summer, blues in winter.326
- Sailors of the rank of petty officer and above wore rig of the day.327
- Seamen (including those manning the 4-inch guns and the other anti-aircraft guns and the ratings in the director control tower and the high-angle control tower328) wore blue overalls.329
- Torpedo men wore either rig of the day or blue overalls.330
- The signalmen on the bridge (including the chief yeoman, the yeoman of the watch, the leading signalman and two signalmen on either bridge wing) wore rig of the day.331
- The signalmen on the flag deck (about 14 of them) wore rig of the day.332
Pilots and air crew wore flying suits. Ground crew wore dark cotton drill overalls with black shoes or boots.333

Below decks:

- Officers wore rig of the day unless they were in the engineering branch, in which case they wore white overalls.334
- Warrant officers wore fawn overalls.335
- Stokers from the rank of chief petty officer down wore blue overalls.336
- Members of the Miscellaneous Branch (stewards, bandsmen and supply ratings) wore blue overalls or rig of the day.337
- Cooks (also members of the Miscellaneous Branch) wore white pants, white shirts, white aprons and white peaked caps.338 Their workspaces included not only the various galleys but also the ‘spud locker’, which was immediately forward of the port side torpedo mount. In the morning and before the evening meal, cooks would attend the spud locker, where there was a potato-peeling machine.339
- Canteen staff are believed to have worn a pale-coloured, possibly white, shirt and dark trousers.340

2.159 All sailors were issued anti-flash masks, anti-flash gloves, inflatable life belts and gas masks.341 These were meant to be worn when on duty, although it appears that some sections of the crew did not wear this gear but kept it within reach.342 Sailors on the upper decks were issued tin helmets.343 At action stations, torpedo men and the 4-inch gun crews wore anti-flash masks, gloves and tin hats (which were always stowed at their action station), as shown in Figure 2.12.344
SYDNEY’s movements under CAPT Burnett

2.160 SYDNEY’s ship’s log (see Appendix G)\textsuperscript{346} and signal traffic record the following ship movements after CAPT Burnett assumed command in Fremantle on 15 May 1941:

- Apart from two periods at sea patrolling and exercising, from 18 to 21 May and from 25 to 28 May, SYDNEY spent the second half of May alongside in Fremantle.

- On 31 May she sailed for the Sunda Strait, escorting ZEALANDIA and returning on 10 June. On 14 June she again sailed for the Sunda Strait and escorted ZEALANDIA back to Fremantle, arriving on 21 June. On 24 June she sailed for Sydney, arriving on 2 July.

- From 2 July 1941 she was alongside in Sydney for five days. She put to sea for a day on 8 July. On 9 July she sailed for 10 days of exercises, including damage-control drills, gunnery training and firing, launching and recovery of aircraft, and steering breakdown. She briefly returned to Sydney Harbour on 19 July before sailing to

\textsuperscript{345} AWM.009.0028

\textsuperscript{346} NAA.014.0129; NAA.014.0195; NAA.014.0162; NAA.013.0116; NAA.013.0085; NAA.013.0052

Figure 2.12 A 4-inch gun crew\textsuperscript{345}
Noumea, arriving there on 21 July. On 22 July she sailed for Sydney, engaging in exercises en route and arriving on 24 July.

- On 29 July SYDNEY escorted a convoy south to Gabo Island, returning to Sydney on 3 August. She conducted a full suite of exercises during this voyage. She docked in Sydney from 4 August until 8 August, when she sailed for Auckland, arriving on 11 August. She left Auckland for Suva on 14 August, arriving on 16 August. She remained alongside in Suva until departing for a week of exercises and returning to Suva on 24 August. That day she set sail for Sydney. Arriving in Sydney on 28 August, she remained in harbour for the rest of that month.

- On 1 and 2 September she exercised off Sydney. On 3 September she sailed for Melbourne, arriving on 7 September. The First Naval Member, VADM Sir Guy Royle KCB CMG RN, came aboard to inspect the ship on 11 September. SYDNEY spent a week in local waters, including time alongside at Westernport. On 19 September she sailed for Fremantle, escorting a convoy, and arrived on 25 September.

- On 27 September she sailed from Fremantle for the Sunda Strait and conducted drills during passage. She returned to Fremantle on 11 October and remained alongside until 17 October, except for 13–14 October, when she was at sea for exercises. On 17 October SYDNEY sailed for Geraldton, arriving on the 18th and remaining alongside until the 20th, when she returned to Fremantle, arriving on 21 October. On 27 October she sailed for Bunbury, returning on 29 October. On 31 October she put to sea for 6-inch full-calibre practice firing.

- In early November SYDNEY sailed south to rendezvous with ZEALANDIA in the Great Australian Bight and escorted her to Fremantle. On 11 November she left Fremantle to escort ZEALANDIA to the Sunda Strait, giving her estimated time of arrival back in Fremantle as ‘P.M.’ on Thursday 20 November.\textsuperscript{347} This was SYDNEY’s fourth voyage to the Sunda Strait under CAPT Burnett’s command.

\textsuperscript{347} As recorded in the daily movements log held by Navy Office (SPC.004.0004) and signal sent by SYDNEY at 0426Z (1226H) on 11 November (SPC.006.0002).
Gunnery exercises

2.161 The last gunnery exercise during CAPT Collins’ command was a full-calibre 4-inch HA shoot on 8 May 1941.\(^{348}\) After CAPT Burnett assumed command, on 14 May 1941, the following gunnery exercises are recorded in the ship’s log\(^{349}\):

19 May Turret crews exercise loading drill
21 May 4-inch full calibre low angle firing
27 May Ranging exercise
4 June Exercised dawn action stations with ZEALANDIA. Fired star shell
5 June Gunnery exercises
9 June Gunnery drills
10 June Range and inclination exercise with Rottnest Island
11 June Gunnery drills (twice)
13 June Gunnery drills
14 June 6-inch full calibre firing practice
16 June Gunnery drills
18 June Gunnery drills
19 June Depth Charge and smoke laying exercise
20 June Range finder exercise
8 July 4-inch full calibre HA and close-range weapons firing exercise
10 July Gunnery drills
14 July 6-inch sub-calibre firing exercise
15 July Exercise repel aircraft
16 July Gunnery drills
18 July Depth Charge exercise
22 July Gunnery Training classes and Gunnery exercises
23 July Gunnery classes
29 July 4-inch High Altitude and close-range weapons firing exercise
31 July Gunnery Classes
13 August Gunnery Exercise

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\(^{348}\) AWM.002.0019
\(^{349}\) NAA.014.0129; NAA.014.0195; NAA.014.0162; NAA.013.0116; NAA.013.0085 and NAA.013.0052
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 August</td>
<td>6-inch sub-calibre firing exercise</td>
</tr>
<tr>
<td>1 September</td>
<td>6-inch sub-calibre firing exercises (twice); 4-inch full-calibre high angle and close range firing exercise</td>
</tr>
<tr>
<td>2 September</td>
<td>6-inch full-calibre firing practice at BPT (Battle practice target)</td>
</tr>
<tr>
<td>12 September</td>
<td>6-inch sub-calibre firing at Pat 6 target. Torpedo exercises</td>
</tr>
<tr>
<td>2 October</td>
<td>Exercised training armament on convoy</td>
</tr>
<tr>
<td>8 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>9 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>10 October</td>
<td>Gunnery Training classes (twice)</td>
</tr>
<tr>
<td>13 October</td>
<td>6-inch sub-calibre firing at towed target; night encounter exercise firing star shells</td>
</tr>
<tr>
<td>14 October</td>
<td>Exercise repel aircraft against RAAF Wirraway, dummy dive bombing</td>
</tr>
<tr>
<td>15 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>16 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>17 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>22 October</td>
<td>Gunnery Training and torpedo classes</td>
</tr>
<tr>
<td>24 October</td>
<td>Gunnery Training classes (twice)</td>
</tr>
<tr>
<td>28 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>30 October</td>
<td>Gunnery Training classes</td>
</tr>
<tr>
<td>31 October</td>
<td>6-inch full-calibre firing at float; torpedo firing exercise</td>
</tr>
</tbody>
</table>

2.162 CAPT Burnett’s report of proceedings for the month of August 1941 records that he was focused on gunnery efficiency. He wrote, ‘Every opportunity was taken to carry out Gunnery Training Classes, but, owing to the time spent at sea and rough weather encountered, it was only possible to hold classes on ten days during the month’.

2.163 In his report of proceedings for the month of October 1941, dated 5 November 1941, he wrote, ‘Opportunity was taken during the month for extensive exercises. 6” sub calibre and full calibre firings were carried out. The 4” and close range weapons were also exercised, a sleeve target towed by a ‘Battle Aircraft being made available for the first time’.

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350 AWM.001.0274
351 AWM.001.0132
The ship’s log bears out the diligence with which gunnery exercises were carried out under CAPT Burnett’s command. It records that during each voyage CAPT Burnett conducted firing exercises, either sub-calibre or full-calibre, of her main armament. In addition, there are numerous examples of his using the opportunity provided by escort duty to conduct ranging and gun-training exercises with her consort. Further, on each occasion SYDNEY approached Fremantle, she conducted an exercise against the fortress on Rottnest Island.

I am satisfied that CAPT Burnett did, during the period of his command of SYDNEY, take every reasonable opportunity to conduct gunnery exercises and gunnery training exercises. There is no material to suggest that SYDNEY’s gunnery crews were not trained to a high state of competence and readiness.

**Torpedo exercises**

2.164 Torpedo firing is recorded as occurring on 9 May 1941\(^{352}\) and 12 September 1941\(^{353}\)

**Anti-scuttling exercises**

2.165 It has been postulated that, in her encounter with KORMORAN, SYDNEY’s first salvo might have been an intentional near-miss as a precursor to anti-scuttling operations.\(^{354}\) SYDNEY’s ship’s log records that anti-scuttling parties were exercised five times during CAPT Burnett’s command—on 16 June, 21 August, and 3, 9 and 24 October. These exercises were interspersed with many other non-gunnery exercises, such as fire stations, abandon ship stations, steering breakdowns, lowering boats for man overboard, collision stations, destroying confidential documents, underwater explosions and demolition parties.

Although anti-scuttling exercises were frequently conducted, that fact does not mean that CAPT Burnett had a predisposition towards action to prevent scuttling of an enemy merchant vessel rather than sinking such a vessel identified as an enemy raider.

**CAPT Burnett’s use of the Walrus**

2.166 A study of the ship’s log offers an understanding of CAPT Burnett’s approach to the use of the Walrus aircraft embarked in SYDNEY. The

\(^{352}\) [AWM.002.0019]

\(^{353}\) [AWM.001.0271]

ship’s log for May to October 1941\textsuperscript{355} records the following aircraft operations and exercises during CAPT Burnett’s command:

16 May  
Hoisted in Aircraft

17 May  
Recovered aircraft

21 May  
Launched for practice assault on Rottnest Is

30 May  
Hoisted out aircraft. Recovered aircraft

2 June  
Exercised clearing out the catapult

10 June  

16 June  
Exercised Catapulting Aircraft to starboard

21 June  
Launched for Patrol while ship entering Fremantle

22 June  
Hoisted in aircraft. 1400h. Hoisted out aircraft

2 July  
Launched as entering Sydney Harbour

3 July  
Hoisted out Aircraft

7 July  
Exercised catapulting and recovering for RAAF officers (twice)

8 July  
Launched aircraft for exercises hoisted in aircraft

11 July  
Exercised Catapulting and recovering Aircraft, exercised clearing away catapult and aircraft for launching

14 July  
Launched for exercises (recovered by slick method)

15 July  
Launched to cover arrival at Noumea, launched aircraft for repel aircraft exercise. Recovered aircraft by slick method

21 July  
Launched to cover arrival approaching Noumea

29 July  
Launched

4 August  
Hoisted out aircraft

8 August  
Hoisted in aircraft

1 September  
Launched for exercises

2 September  
Hoisted in aircraft. Launched aircraft

10 September  
Hoisted out aircraft

12 September  
Launched for exercises. Recovered aircraft.

\textsuperscript{355}NAA.014.0129; NAA.014.0195; NAA.014.0162; NAA.013.0116; NAA.013.0085; NAA.013.0052
25 September  Launched for exercises and proceeded ship into Fremantle
2 October    Launched for exercises carried out high level bombing practice (recovered by slick method at 8kts)
7 October    Launched while entering Fremantle harbour
13 October   Launched while leaving Fremantle harbour
17 October   Aircraft hoisted and Captain flown about for three hours (ex Fremantle)
31 October   Launched for exercises

The availability of the Walrus for purposes chosen by the commanding officer, should conditions permit its launching, is thus not in doubt.

2.167 There is no entry in the log recording CAPT Burnett’s use of the Walrus as part of a process of identifying a merchant ship. Rather, his use of the aircraft appears to have been limited to patrolling while entering and leaving harbour and exercising the ship’s armaments and the aircraft itself. One possible conclusion is that CAPT Burnett did not consider he needed the Walrus for the purpose of identifying merchant ships around the Australian coast.

Degrees of readiness

2.168 During World War 2 there were four degrees of readiness for a warship; they were known as the first, second, third and fourth degrees of readiness.356 The first degree was known as ‘action stations’ and the fourth degree was known as ‘cruising stations’. Under CAPT Burnett and his predecessor CAPT Collins, SYDNEY operated at either the first or the fourth degree of readiness. The only exception to this was when SYDNEY was in the Mediterranean in 1940, where, when at sea at night, the ship reverted to second degree of readiness.357 In this state all hands were at their action stations, but they were allowed to rotate in two watches.358

2.169 The ship’s log recorded changes in the degree of readiness. Generally, when at sea SYDNEY went to the first degree of readiness at about dawn for between 30 and 60 minutes. This was because of the possibility of surprise attack by enemy vessels at daylight. She reverted from that state to the fourth degree of readiness, and this was recorded in the log.

356 See Chapter 6.
357 AWM.001.0331
358 AWM.001.0331
Cruising stations

2.170 The evidence of former SYDNEY sailors is that at cruising stations during wartime two of the 6-inch turrets and at least two of the 4-inch guns would be manned with sufficient men to fire them, if required, at short notice. This practice was consistent with wartime doctrine. The 1945 *Pocket Gunnery Book* provided:

408. The ship’s company does not remain at action stations all the time that the ship is at sea but normally mans a proportion of the armament by watches.

When at Defence Stations, the hands are in two watches and probably half the guns are manned. At Cruising Stations a smaller proportion of the armament is manned and the hands work in three or four watches, according to the ship’s organization.

The object of having some guns manned is to ensure that if any target presents itself suddenly, it can be engaged at once.

2.171 Mr John Ravenscroft gave evidence that in SYDNEY the crew at the 4-inch guns at cruising stations were not always the action stations crew:

When I was at Cruising Stations, all of the 4 inch guns would be manned with enough men to fire them in an emergency. The crews there at Cruising Stations would not necessarily be the same crew manning the guns if the ship went to Action Stations. Also, while crew members may have been based on the 4 inch gun deck when the ship was at Cruising Stations, they may have had other duties which would take him [sic] elsewhere. For example, in 1941, I was detailed to become a writer for CMDR Hilken and thus, if he needed me (for example, to type up his Night Orders or his orders for the next day), I would leave the 4-inch gun deck and go off to confer with him.

2.172 That evidence is consistent with contemporary gunnery doctrine. The *Pocket Gunnery Book* provided:

410. … If at any time during the watch, “Action Stations” is ordered, the crew must remain at their cruising or defence watch stations until

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359 TRAN.014.0001_R at 0076_R to 0078_R; WIT.003.0001_R at 0002_R. Mr Lavender’s cruising station was as a trainer on the starboard forward 4-inch gun; WIT.004.0001_R at 0005_R and WIT.011.0173_R at 0175_R. Mr Ravenscroft, whose cruising station was on the 4-inch gun deck, said the skeleton crew at the 4-inch guns during cruising stations would not necessarily be the same crew manning the guns if the ship went to action stations. Another former sailor whose cruising station was on the 4-inch gun deck was Mr Kenneth Wundenberg (WIT.014.0001_R at 0002_R and 0003_R).

360 BR 224/45: *The Gunnery Pocket Book* (1945, chapters II and III) provided that the typical arrangement in British cruisers was that, for descending degrees of readiness, diminishing numbers of personnel would man the low-altitude and high-altitude armament (SPC.014.0001 at 0014 to 0018).

361 SPC.014.0001 at 0081

362 WIT.011.0173_R at 0175_R
they are properly relieved by their opposite numbers in the Action Gun’s crew.

...  

411. ... It is doubtful whether, at Defence and Cruising Stations, enough hands will always be available to form a complete gun’s crew and from those that are allocated to the gun’s crew, it may be necessary to take one or more at a time to keep look-out tricks on the bridge.363

2.173 At cruising stations there were protocols aimed at preserving the watertight integrity of the ship. All watertight doors and hatches were to be closed.364 Whenever a person passed through a watertight door and hatch (marked with either an ‘X’ or a ‘Y’), the person rang the bridge to report this.

**Action stations**

2.174 Under CAPT Burnett SYDNEY went to action stations (apart from each dawn at sea) on three occasions in daylight during 1941. The ship’s log records each occasion:

- At 1402H on 2 June 1941 SYDNEY was escorting ZEALANDIA to the Sunda Strait when she sighted an ‘unknown vessel’.365 At 1415H she increased speed to 18 knots and assumed the first degree of readiness. At 1425H she ‘Identified vessel as GS LIVANOS (Greek), Reverted to 4th Degree of Readiness. Decreased to 12 kts’366 The log does not record the Walrus being launched.

- At 1740H on 2 October 1941 SYDNEY altered course to close on an ‘unknown vessel’ and went to action stations.367 She increased speed. At 1800H the vessel was identified as the Norwegian tanker BRAMORA, and SYDNEY reverted to ‘4th degree of Readiness’. The log does not record the Walrus being launched. SYDNEY had earlier that day launched the Walrus for bombing exercises.

- At 1810H on 3 October 1941 SYDNEY altered course and speed to close on an object seen floating in the water.368 She went to action stations. At 1830H she stopped and lowered her cutter. By 1900H she had retrieved a floating rectangular target. CAPT Burnett wrote the next
day that there was ‘just the possibility’ that this might be a target left by a raider. The log does not record the Walrus being launched.

2.175 Action stations were sounded by bugle during daytime and by bell at night, each broadcast over the loudspeaker system. On the sounding of action stations the following occurred:

- All crew went immediately to their action station.
- All armaments, including torpedoes, were manned. (Two of the four turret crews would already be formed-up with ready-use shells available, as was required at cruising stations.) Personnel also formed-up in the shell rooms, cordite magazines and ammunition lobbies.
- As part of closing up at action stations, turret crews started the hydraulic pump motors for the training of the turrets and the elevation of the guns. The hydraulic systems were then tested by elevating and depressing the guns and by training the turret around on different bearings.\(^{369}\) The firing circuits were tested with the firing of a ‘dummy’ firing tube.\(^{370}\)
- All watertight doors and hatches were secured.\(^{371}\)
- The turbine power generators were brought on-line and the ring main separated into four separate circuits, each providing power to a separate part of the ship including one turret.\(^{372}\)
- A team of seamen under the command of an officer formed-up at the steering gear compartment for emergency steering.\(^{373}\)

It took between three and five minutes to secure the ship at action stations.\(^{374}\)

**Distribution of the crew at action stations**

2.176 SYDNEY’s casualty lists\(^{375}\), evidence from former SYDNEY sailors and a knowledge of the categories of the various members of the ship’s company allow for a reasonably accurate understanding of where the

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\(^{369}\) TRAN.002.0001_R at 0010_R Line 6
\(^{370}\) The reference to ‘dummy’ firing tubes should not be misunderstood as a reference to exercise firing.
\(^{371}\) WIT.004.0001_R at 0005_R; WIT.003.0001_R at 0002_R
\(^{372}\) WIT.013.0001_R at 0001_R; PUB.055.0001 at 0005
\(^{373}\) WIT.005.0001_R at 0004_R
\(^{374}\) TRAN.002.0001_R at 0046_R Line 26; WIT.006.0001_R at 0002_R; WIT.005.0001_R at 0004_R. It is noted that Mr Guthrie was giving his estimate based on peacetime service in SYDNEY and wartime service in SYDNEY’s sister ship HMAS PERTH.

\(^{375}\) SPC.004.0222; SPC.004.0286
crew, both officers and ratings, were located when the ship closed up at action stations. The evidence establishes the following:

- **On the upper bridge were**
  - four officers—the commanding officer, the navigator, the officer of the watch and the assistant officer of the watch
  - four ratings—a wireless telegraphy rating and runners or messengers, or both
  - seven signalmen—the chief yeoman, the yeoman of the watch, the leading signalman and two signalmen on each bridge wing
  - four seamen, in two pairs, manning the 12-foot rangefinders, one on either bridge wing
  - two ratings standing by the depth-charge release lever.

- **On the lower bridge were**
  - the officers and ratings maintaining the plot—given the workplaces in the plotting office on the lower deck, it is assumed that there were four personnel stationed here
  - the assistant navigator and chart-room personnel—given the workplaces in the chart house on the lower deck, it is assumed that there were four navigation personnel, including the assistant navigator, stationed on the lower bridge
  - two wireless telegraphy ratings in the remote control office
  - one rating in the silent compartment
  - two men standing by the torpedo range indicator and two by the torpedo firing pistol on either side of the lower bridge
  - the helmsmen and assistants in the wheelhouse.

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376 WIT.006.0001_R at 0008_R to 0009_R. There is an assumption that there would have been an assistant officer of the watch.
377 Harold Adams’ action stations position was on the bridge as a captain’s runner (WIT.010.0001_R at 0002_R). These ratings could have had a number of tasks, such as manning the Evershed Bearing Indicators, of which there was one on either bridge wing (WIT.011.0173_R at 0174_R to 0175_R) or as a lookout (WIT.006.0001_R at 0008_R to 0009_R).
378 WIT.007.0001_R at 0003_R
379 The personnel numbers listed are deduced from the plan of the lower bridge, which shows the probable work stations of personnel: NAA.017.0009.
In the director control tower were
- in the forward compartment (called ‘the director’), four personnel—the director layer, the inclinometer setter, the range to elevation unit operator and the director trainer
- in the aft compartment, four personnel—the rate officer, the gunnery officer, the spotting officer and the ‘phone number’

In the high-angle control station there were four or five men.

On the flag deck there were six to eight signalmen out on the deck, and there were five to six signalmen in the signal office, at the front of the flag deck.

At the aft control position, there were three personnel.

Each of the three searchlight platforms was manned by two seamen.

In each of the four turrets there were 20 men:
- the officer of the turret
- the petty officer of the turret
- the phone number
- seven men operating each gun
- three men manning the local control cabinet

In relation to the supporting spaces for the 6-inch guns there were
- 10 men in each of the four ammunition lobbies, giving a total of 40 personnel
- six men in each of the four shell rooms, giving a total of 24 personnel

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380 WIT.006.0001_R at 0009_R
381 WIT.005.0001_R at 0009_R
382 WIT.006.0001_R at 0009_R
383 WIT.007.0001_R at 0003_R
384 WIT.006.0001_R at 0009_R. Further, the plan of the aft control position indicates two seated positions, and another rating or officer would man the training sight (NAA.017.0016).
385 WIT.006.0001_R at 0009_R
386 WIT.001.0001_R at 0002_R
387 Turret Gun Drill for 6-inch B.L. Guns Mark XIII on Twin Mark XXI Mountings, UK Admiralty, London, 1933 (with amendments). Reproduced in the submission of Mr Gary Oakley (PTE.005.0142 from 0306). The description of these ammunition spaces is at PTE.005.0142 at 0339. Many of these men would have been members of the Miscellaneous Branch: WIT.006.0001_R at 0007_R.
three men in the handling rooms of each of A, B, and X turrets and four men in the handling room of Y turret, giving a total of 13 personnel.

- five men in each of the two magazines, giving a total of 10 personnel.

- On the 4-inch gun deck, each of the four 4-inch guns was manned by seven men, with a senior hand and an officer in charge of the gun deck.388

- Each of the two torpedo mounts was manned by five torpedo men, including two leading hands and a petty officer. An officer and chief petty officer were in charge of the torpedo batteries.389

- Three seamen manned each of the three 0.5-inch multiple machine gun mounts.390

- On the quarterdeck three to four men manned the depth charges.391

- In the aft (emergency) steering compartment five men were standing by the emergency steering gear.392

- In respect of the Walrus aircraft and catapult393
  - six RAAF personnel, including the pilot, plus one RAN observer officer were formed-up near the aircraft
  - five stokers were formed-up ready to swing out the catapult.

- In the lower steering position there were four men:
  - the executive officer
  - three hands—a signaller, a wireless telegraphy operator and a messenger.394

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388 WIT.009.0001_R at 0003_R
389 WIT.004.0001_R at 0004_R; WIT.001.0001_R at 0005_R
390 Two able seamen and a leading hand: WIT.007.0001_R at 0003_R; COI.003.0018 at 0022.
391 WIT.006.0001_R at 0010_R
392 WIT.006.0001_R at 0008_R
393 WIT.006.0001_R at 0010_R. The Walrus flight consisted of one RAAF pilot and five maintainers according to SYDNEY’s casualty list (SPC.004.0222).
394 Mr Briddick gave evidence that during action stations for the Battle of Calabria he was detailed to go to the lower steering position as the signalman for the executive officer, Commander Hilken: WIT.002.0001_R; TRAN.002.0001_R at 0044_R Line 40. On this basis, it is assumed that the executive officer would have a runner and a W/T operator or signalman when closed up in the lower steering position at action stations.
• In the wireless rooms (main wireless room, second wireless room and auxiliary wireless room) there were about 20 members of the Communications Branch.395

• According to SYDNEY’s casualty list, there were a further 198 officers and men in the Engineering Branch and the Electrical and Technical Branch (including torpedo men being the electricians in the ship). Given that there were 12 torpedo-men manning the torpedo mounts and five stokers manning the aircraft catapult, there would have been about 181 members of the Engineering Branch and the Electrical and Technical Branch who would be at action stations below decks in the boiler rooms, engine rooms and other engineering spaces (such as the fan rooms and engineering workshops) and formed-up at vital electrical equipment (such as at the pumps, the low power rooms and the switchboard room).396

• In the sickbay there were the surgeons (including the ship’s dentist) and seven sick-berth attendants.397

• Below deck, presumably allocated to action station duties such as damage control, were eight specialist officers—six paymasters, one schoolmaster and one chaplain.

• There were four civilian canteen staff.398

• Members of the Miscellaneous Branch (such as cooks, writers, bandsmen and stewards) and some members of the Seaman Branch would be formed-up to man the 4-inch ammunition hoists, the aviation spirit tanks and pumps in the bow, damage-control parties, fire parties, first aid parties and as extra hands in sickbays and power rooms. It is estimated that there would have been about 99 ratings allocated to these duties.399

395 This is an approximation based on SYDNEY’s casualty list recording 42 members of the Communications Branch, of whom about 18 to 20 were signalmen who would have closed up at action stations on the flag deck or bridge and about five would have been on the upper bridge standing by the captain or on the lower bridge in the remote control office (SPC.004.0222).
396 WIT.001.0001_R at 0004_R
397 SPC.004.0222
398 SPC.004.0222
399 This estimate is based on the residual number of men not otherwise accounted for. The assumption that there would have been some members of the Seaman Branch below deck allocated to these various parties is based on the fact that there were 277 members of that branch, not all of whom were on the upper decks manning the armament or on other duties. See also WIT.005.0001_R at 0002_R.
Location of the executive officer

2.177 At action stations the executive officer closed up at the lower steering position. The lower steering position housed a gyro compass repeater and the other instruments required to navigate and control the ship, including engine room telegraph and rudder and steering motor indicators.

In the event that the bridge was rendered non-operational and the captain was unable to command the ship, the executive officer moved aft from the lower steering position to the after control position on the aft superstructure and commanded the ship from there.

The route from the lower steering position to the aft superstructure was a relatively long one, requiring the executive officer to ascend three decks to get to the upper deck and then walk about one-third of the length of the ship to ascend further ladders on the aft superstructure.

Summary

2.178 In summary, Table 2.4 shows the likely distribution of crew at action stations.

Emergency stations and abandon ship stations

2.179 SYDNEY’s ship’s company were assigned an emergency station and a leaving ship station. Each person’s leaving ship station (or ‘abandon ship’ station) was either next to a Carley float or in the waist, near one of the ship’s boats. Every person was allocated a place in one of the ship’s boats or in a Carley float or hanging on to the outside of a Carley float. Mustering at abandon ship stations and launching of boats were practised at various times under CAPT Burnett.

400 TRAN.002.0001_R at 0015_R Line 41 and 0044_R Line 37; WIT.006.0001_R at 0009_R; TRAN.004.0001_R at 0027_R Line 30
401 TRAN.002.0001_R at 0016_R Line 8
402 WIT.006.0001_R at 0002_R; WIT.009.0001_R at 0004_R; WIT.007.0001_R at 0004_R; TRAN.004.0001_R at 0018_R
403 WIT.006.0001_R at 0002_R; (TRAN.005.0001_R at 0026_R)
404 TRAN.004.0001_R at 0023_R Line 38
405 See, for example, log entries for 3 June and 6 June (NAA.014.0195), 1 August (NAA.013.0116) and 3 October 1941 (NAA.013.0052).
Table 2.4  Distribution of SYDNEY’s crew at action stations

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of men</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper decks</strong></td>
<td></td>
</tr>
<tr>
<td>Upper bridge and bridge wings</td>
<td></td>
</tr>
<tr>
<td>Officers</td>
<td>4</td>
</tr>
<tr>
<td>Wireless telegraphists and runners</td>
<td>4</td>
</tr>
<tr>
<td>Signalmen and lookouts</td>
<td>7</td>
</tr>
<tr>
<td>Rangefinder operators</td>
<td>4</td>
</tr>
<tr>
<td>Depth-charge release level</td>
<td>2</td>
</tr>
<tr>
<td><strong>Lower bridge</strong></td>
<td></td>
</tr>
<tr>
<td>Plotting office staff</td>
<td>4</td>
</tr>
<tr>
<td>Assistant navigator and chart-room personnel</td>
<td>4</td>
</tr>
<tr>
<td>Wireless telegraphy ratings in the remote control office</td>
<td>2</td>
</tr>
<tr>
<td>One rating in the silent compartment</td>
<td>1</td>
</tr>
<tr>
<td>Personnel standing by the torpedo controls</td>
<td>4</td>
</tr>
<tr>
<td>Helmsmen and wheelhouse</td>
<td>3</td>
</tr>
<tr>
<td><strong>Crow’s nest</strong></td>
<td></td>
</tr>
<tr>
<td>Flag deck signalmen</td>
<td>14</td>
</tr>
<tr>
<td>After control position</td>
<td>3</td>
</tr>
<tr>
<td>Three searchlight platforms</td>
<td>6</td>
</tr>
<tr>
<td>Director control tower staff, including spotting officer and gunnery officer</td>
<td>12</td>
</tr>
<tr>
<td>High-angle control station staff</td>
<td>5</td>
</tr>
<tr>
<td>Four 6-inch turrets—20 men per turret</td>
<td>80</td>
</tr>
<tr>
<td>4-inch gun deck—7 men for each of the 4 guns plus 2 supervising</td>
<td>30</td>
</tr>
<tr>
<td>Torpedo teams—5 men for each of the 2 teams plus 1 supervising</td>
<td>11</td>
</tr>
<tr>
<td>AA gun crew—3 men for each of the 3 crews</td>
<td>9</td>
</tr>
<tr>
<td>Catapult crew</td>
<td>5</td>
</tr>
<tr>
<td>RAAF detachment (1 pilot officer, 5 ratings) and RAN observer</td>
<td>7</td>
</tr>
<tr>
<td>Depth-charge operators</td>
<td>4</td>
</tr>
<tr>
<td><strong>Below decks</strong></td>
<td>227</td>
</tr>
<tr>
<td>Lower steering position, including executive officer</td>
<td>4</td>
</tr>
<tr>
<td>Ammunition lobbies (4 x 10)</td>
<td>40</td>
</tr>
<tr>
<td>Shell rooms (4 x 6)</td>
<td>24</td>
</tr>
<tr>
<td>Handling rooms (3 for A, B and X turrets; 4 for Y turret)</td>
<td>13</td>
</tr>
<tr>
<td>Magazines (2 x 5)</td>
<td>10</td>
</tr>
<tr>
<td>Steering gear compartment</td>
<td>5</td>
</tr>
<tr>
<td>Wireless telegraphers</td>
<td>20</td>
</tr>
<tr>
<td>Engineering Branch and Electrical/Technical Branch</td>
<td>181</td>
</tr>
<tr>
<td>Surgeons (3) and sick-berth attendants (7)</td>
<td>10</td>
</tr>
<tr>
<td>Other officers (paymaster, schoolmaster, chaplain)</td>
<td>8</td>
</tr>
<tr>
<td>Civilian canteen staff</td>
<td>4</td>
</tr>
<tr>
<td>Other—Miscellaneous Branch, allocated to 4-inch ammunition hoists, aviation</td>
<td>99</td>
</tr>
<tr>
<td>spirit tanks and pumps, damage-control and fire parties, and extra hands at critical places such as sickbay and pumps</td>
<td>418</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>645</td>
</tr>
</tbody>
</table>