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THE PRESIDENT: Thank you.

CMDR RUSH: Sir, I will ask Mr Buckland to stay there, and we will have a change of personnel, Mr Lyon.

<TIMOTHY DAVID LYON, affirmed: [3.18pm]

CMDR RUSH: Mr Lyon, would you state your full name and address to the Commissioner, please?

MR LYON: Timothy David Lyon, [REDACTED]

CMDR RUSH: Are you a qualified Naval architect?

MR LYON: I am.

CMDR RUSH: Could you indicate what your qualifications are?

MR LYON: I have a Bachelor of Engineering degree in Naval Architecture and a Master of Science degree in Mechanical Engineering.

CMDR RUSH: Where was the Master of Science completed?

MR LYON: At the University of Houston, as it turns out.

CMDR RUSH: Mr Lyon, I don't think you do at the moment, but you have spent much of your life practising as a Naval architect?

MR LYON: Yes. I spent 18 years with the Department of Defence as an employee, mostly working in ship design. Some relevant areas - I was Head of the New Construction Group in the Directorate of Naval Ship Design. I was Assistant Design Manager (Hull) for the AOR Project, the Minesweeper Project and the Australian Frigate Project. And I was Design Manager for the ANZAC Ship Project.

Then I spent nine years as a consultant, mostly to the Department of Defence, and relevant in there I was Consultant Naval Architect for the design of the Armadale Class Patrol Boat Project.

CMDR RUSH: And you are a member of the Royal Institution

1 of Naval Architects and a member of the American Society of
2 Naval Engineers?

3
4 MR LYON: Yes.

5
6 CMDR RUSH: It was in your capacity as being involved with
7 the Institution that you became involved to look at the
8 design and hull features and other features of
9 HSK Kormoran?

10
11 MR LYON: Yes. I'm on the Divisional Council with John
12 and Stuart.

13
14 CMDR RUSH: Perhaps if we turn to page 119 of the report,
15 which deals with Kormoran, you set out a diagram at
16 page 119 of the general arrangements of Kormoran.

17
18 MR LYON: Yes.

19
20 CMDR RUSH: Firstly, in relation to displacement, Kormoran
21 displaced 19,900 tonnes.

22
23 MR LYON: That would be its design displacement as
24 a merchant ship. We'll probably never know what it
25 displaced in its warship configuration. But that would
26 have been fully loaded with cargo, which it never was when
27 it was operating as Kormoran.

28
29 CMDR RUSH: Its dimensions were 167.5 metres.

30
31 MR LYON: Length overall.

32
33 CMDR RUSH: In terms, is that a large ship for its time?

34
35 MR LYON: As a merchant ship, yes, quite a large merchant
36 ship. It was a cargo liner. It was designed to carry
37 cargo as well as passengers.

38
39 CMDR RUSH: Its means of propulsion are set out as four
40 9-cylinder 4-stroke diesel engines and two propulsion
41 electric motors. How did that work?

42
43 MR LYON: It was a diesel-electric ship, so the four
44 diesel engines drove generators and generated electric
45 power, which provided the entire power for the ship. Then
46 a proportion of that power, about 80 per cent, was used for
47 propulsion by two large electric motors - one electric

1 motor per shaft. It was a two-shaft ship.

2

3 CMDR RUSH: In relation to its fuel and fuel capacity,
4 there were 5,200 tonnes of diesel?

5

6 MR LYON: Yes.

7

8 CMDR RUSH: And, depending on speed, a range of
9 84,500 miles at 10 knots to 50,000 miles at 17 knots?

10

11 MR LYON: Yes. These are fairly large figures for ships
12 at that stage, but of course it stayed at sea for a year,
13 so those sorts of figures are actually needed.

14

15 CMDR RUSH: You referred to "protection" and "splinter
16 protection". Kormoran, as you have indicated, initially
17 was built as a cargo liner under the name Steiermark. Did
18 it ever operate as a cargo liner?

19

20 MR LYON: No, it never entered service as a cargo ship.
21 It was completed just before the war.

22

23 CMDR RUSH: Was there any form of armament or protection
24 given to Kormoran?

25

26 MR LYON: Nothing in its original design as a merchant
27 ship. The only reference I could find was to some splinter
28 protection around the chart house, the helm and the engine
29 room. That is a reference by Detmers. I can't verify it,
30 but it wouldn't be relevant to this engagement, anyway.

31

32 THE PRESIDENT: Kormoran was, in other words, about the
33 same length as Sydney?

34

35 MR LYON: Slightly shorter, yes, but about the same size.

36

37 CMDR RUSH: Dealing with the armament of Kormoran, there
38 were six 15cm guns in single mounts?

39

40 MR LYON: Yes.

41

42 CMDR RUSH: Perhaps if we can look at figure 84 on
43 page 121. By using the pointer, are you able to indicate
44 on the ship where Kormoran's 15cm guns were positioned?

45

46 MR LYON: Number 1 and 2 guns were concealed under the
47 forecastle.

1
2 CMDR RUSH: Where you have the green arc, is that showing
3 the --
4
5 MR LYON: That is showing the arc of fire once it is
6 decamouflaged. Number 3 gun is in the number 2 hold, with
7 a slightly reduced arc of fire.
8
9 CMDR RUSH: Was that capable of firing only to port, or
10 could it fire to starboard?
11
12 MR LYON: It could fire to starboard as well, but not
13 forward or aft. The number 3 gun was in the number 5
14 hold - actually, that is the number 4 hold.
15
16 CMDR RUSH: Also, could that fire to port and to
17 starboard?
18
19 MR LYON: Yes. That is the number 5 gun in the number 4
20 hold. Then the number 5 and number 6 guns are underneath
21 the quarterdeck, with those designated arcs of fire.
22
23 THE PRESIDENT: So she could fire a salvo of four guns --
24
25 MR LYON: Yes, a maximum salvo of four guns to each side.
26
27 THE PRESIDENT: -- to either port or starboard?
28
29 MR LYON: A maximum of two forward and two aft.
30
31 CMDR RUSH: There were two 3.7cm anti-aircraft guns?
32
33 MR LYON: Yes. Just aft and below the bridge, one on the
34 starboard side and one on the port side.
35
36 CMDR RUSH: Again, they were in single mounts?
37
38 MR LYON: Single mounts.
39
40 CMDR RUSH: And there were five 2cm cannons in single
41 mounts?
42
43 MR LYON: Yes, two on the forecastle, two just behind the
44 funnel and one on the quarterdeck.
45
46 CMDR RUSH: Kormoran was fitted with torpedo tubes?
47

1 MR LYON: Yes, six torpedo tubes, two twin swivelling
2 mounts above the waterline either side of number 2 hold,
3 and below the waterline two single torpedo tubes angled
4 35 degrees abaft of the beam.

5
6 CMDR RUSH: How was the camouflage in relation to the
7 torpedo tubes organised?

8
9 MR LYON: The torpedo tubes were inside the hull and had
10 a flap which opened outside the hull, run by
11 counterweights.

12
13 CMDR RUSH: Were there also underwater torpedo tubes on
14 Kormoran?

15
16 MR LYON: Yes.

17
18 CMDR RUSH: Are you able, just by reference to that
19 figure, to indicate where those tubes were?

20
21 MR LYON: Yes, the underwater torpedo tubes are there and
22 there (indicating).

23
24 CMDR RUSH: Feel free to answer jointly as you see fit,
25 but I want to ask firstly about the armament, the 15cm
26 guns. Mr Buckland, firstly, are you able to give any
27 indication of the rate of firing of those guns?

28
29 MR BUCKLAND: Of the 15cm --

30
31 MR LYON: I certainly can. It's five to seven rounds per
32 minute, but that's dependent on having a ready supply of
33 ammunition. This ship doesn't have the ammunition hoists
34 that the Sydney had, so when there's ready-use ammunition,
35 it's five to seven rounds per minute. That would fall away
36 as that ammunition was consumed.

37
38 CMDR RUSH: As to the guns themselves, Mr Buckland, at
39 figure 85 you have drawn a sketch in relation to the guns
40 as they were fitted to KM Baden.

41
42 MR LYON: That is a World War I German battleship, and it
43 carried the same guns.

44
45 CMDR RUSH: It is purely to indicate the nature of the
46 gun?

47

1 MR LYON: There are two possible candidate guns that could
2 have been fitted. That drawing shows you, if you look at
3 the underwater photographs, that this is the right gun
4 because of the notches in the barrel. The other candidate
5 gun has a smooth barrel.

6
7 CMDR RUSH: If I could ask you to turn to page 127, at
8 figure 87 you have a diagram in relation to the number 1
9 and number 2 guns.

10
11 MR LYON: Yes.

12
13 CMDR RUSH: As I understand it, these were mounted beneath
14 the forecastle deck of Kormoran?

15
16 MR LYON: Yes.

17
18 CMDR RUSH: Would explain to us what you are indicating by
19 that diagram as to the camouflaged position of the number 1
20 gun?

21
22 MR LYON: Yes. At the top, that is actually the upper
23 deck, and that is the guardrail on the upper deck, and this
24 is the side of the ship. They have essentially cut across
25 there and across there and taken out a piece of the side of
26 the ship and a piece of the deck and hinged it so that it
27 could swing upwards. In order to effect the swinging
28 upwards, they have attached an arm with a light
29 counterweight on it and secured that with a quick-release
30 pin, so that this becomes a mechanism, which, when you pull
31 the quick-release pin, will automatically swing downwards.
32 The weight swings downwards, the door hatch over here
33 swings upwards, and almost instantaneously the camouflage
34 is removed without any use of physical force, any power or
35 any requirement of that sort.

36
37 CMDR RUSH: So the diagram as you have drawn it has the
38 barrel --

39
40 MR LYON: And the gun has to be fore and aft at the time
41 that it is camouflaged. It can't be swung out before the
42 camouflage door is lifted.

43
44 CMDR RUSH: So as it is there, the gun is fore and aft?

45
46 MR LYON: Fore and aft.

47

1 CMDR RUSH: The weight mechanism then, in effect, is
2 lifting up a section of deck and hull?
3

4 MR LYON: Yes.
5

6 CMDR RUSH: From the position of a ship that is training
7 or sighting Kormoran prior to the decamouflage, from your
8 investigation would there be anything to indicate the
9 system and the hull structure that you have identified as
10 being part of the camouflage from 1,000 yards, 1,500 yards
11 or 2,000 yards?
12

13 MR LYON: You would have to be within a few metres to
14 detect it. From 1,000 metres away, you wouldn't know it
15 was there. You couldn't possibly see it.
16

17 CMDR RUSH: In relation to the decamouflage of those guns,
18 have you done any form of calculation in an attempt to try
19 to ascertain how long it would take to expose the guns,
20 that is, for the deck and the hull section to be lifted up?
21

22 MR LYON: Yes, both a technical analysis and a survey of
23 the other available supporting evidence to show that there
24 was evidence to support that this could be done in that
25 time, yes.
26

27 CMDR RUSH: What sort of time are we talking about?
28

29 MR LYON: For those particular guns under the forecastle,
30 I think that they could be decamouflaged and fire opened in
31 about 15 to 18 seconds.
32

33 CMDR RUSH: In relation to the lifting itself, have you
34 any idea --
35

36 MR LYON: About 2 seconds.
37

38 CMDR RUSH: How do you reach that figure?
39

40 MR LYON: I have designed the mechanism, and it is only
41 the time taken for a weight to swing down through that arc,
42 and it would swing at that sort of speed. It's not that
43 scientific, but there's nothing stopping it; the weight is
44 going to swing at that pace. That's how long it's going to
45 take.
46

47 THE PRESIDENT: It's called gravity, isn't it?

1
2 MR LYON: Yes, gravity. The gun then has to be trained
3 through 90 degrees to bear on the target. I have done some
4 research to find out what the training rate of guns of that
5 era was. I couldn't find this exact gun, but I found
6 a similar German gun, and I have used those training rates
7 and I have been conservative. I have taken a lower rate
8 than that one and a yet further lower rate than that to
9 determine the rates.

10
11 CMDR RUSH: For the training rate, you have indicated in
12 your report to us that, in your opinion, it would take some
13 15 to 18 seconds for the 1 and 2 guns to commence firing?
14

15 MR LYON: Yes.

16
17 CMDR RUSH: What was the training rate? What was the
18 capacity? You've been conservative. Could you give us an
19 idea of the training rate?
20

21 MR LYON: I have a more detailed document here. For the
22 later German gun, which is the one on the Graf Spee, it was
23 capable of training at 8 degrees per second, so I've used
24 7.5 degrees per second as the most optimistic and 6 degrees
25 per second as the pessimistic, so that's where you get the
26 15 to 18 seconds.
27

28 CMDR RUSH: Mr Buckland, turning to the armament for the
29 15cm guns, I think we have already discussed this, but the
30 weight of the munition fired by those guns was 45.3kg?
31

32 MR BUCKLAND: That's right.

33
34 CMDR RUSH: What was the approximate range of the
35 15cm guns?
36

37 MR BUCKLAND: Again, it was approximately 25 kilometres
38 that it could fire.
39

40 CMDR RUSH: In relation to the shells fired by Kormoran,
41 were there two different types of shell?
42

43 MR BUCKLAND: Yes. There is the armour-piercing type
44 shell with the rear fusing, and the contact-fuse, nose-fuse
45 shells that were high-explosive shells.
46

47 CMDR RUSH: What was the difference between the two types

1 of shell?

2

3 MR BUCKLAND: The high-explosive shells, on contact, have
4 about 4kg of bursting charge, so they burst and create
5 approximately 4,000 fragments. The armour-piercing rounds,
6 which have basically only about 1kg of bursting charge, are
7 more for being able to penetrate deep into the ship. There
8 is a bursting charge that detonates and generates probably
9 about 2,000 fragments from that shell. But with the
10 penetration into the ship, you're creating a lot of
11 secondary fragments as it rips through the ship.

12

13 CMDR RUSH: Going back to you, Mr Lyon, the numbers 3
14 and 4 15cm guns were mounted in the centre line of the
15 ship. Maybe you want to explain what is depicted in
16 figure 91, apart from the swimming pool?

17

18 MR LYON: That's the number 3 gun, which is inside the
19 hold. Obviously, a hold goes all the way down to the
20 bottom of the ship. The Germans, of course, rebuilt the
21 entire internals of this ship so that it's a warship
22 inside. They could have just filled in the deck inside the
23 hatch combing of that hatch and put the gun on top of that,
24 but then the gun would have appeared above the top of the
25 hatch combing and been visible. So they built a pit inside
26 the hatch combing to lower the gun so that it's below the
27 level of the hatch sides.

28

29 They put the hatch sides on hinges and held them up -
30 we can't see all of the evidence, but most likely with
31 a solid rod or a pipe on an angle with a quick-release pin,
32 so that all four segments are independent. They have
33 covered the whole lot with a canvas tarpaulin, which is the
34 purpose of the picture of the swimming pool, because it
35 also has the same canvas tarpaulin over it. In that hatch,
36 not only is there a swimming pool but there is a light
37 motorboat.

38

39 So you have a canvas tarpaulin, which you can pull off
40 with a couple of ropes. You then pull four quick-release
41 pins, and the sides of the hatch combings fall down. You
42 pull some more quick-release pins, and the guardrails fall
43 down. If you look at the underwater photograph, you can
44 see the hinges on the guardrails because they are lying
45 flat on the deck. Then you can traverse the gun and
46 commence firing. It is, however, slightly lower than other
47 guns and is more restricted in its field of fire.

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CMDR RUSH: For these guns to be decamouflaged, there was removal of a tarpaulin?

MR LYON: Removal of a tarpaulin.

CMDR RUSH: And just pulled off the hatch combing?

MR LYON: Pulled off the hatch combing.

CMDR RUSH: And then collapsible sides?

MR LYON: Pull four pins. Gravity drops the side walls.

CMDR RUSH: Have you undertaken a calculation to form your opinion as to how long it would take to train and fire that gun from the order to open fire?

MR LYON: Yes, that is about the same. It takes slightly longer to decamouflage, but within that hatch, you can have the gun trained 45 degrees to either side while it's still camouflaged, so it reduces the amount of time taken to train it, so it is about the same amount of time to open fire.

CMDR RUSH: You have included at figure 86 a photograph of the 3.7cm anti-aircraft guns.

MR LYON: Yes. They're an Army anti-aircraft gun.

CMDR RUSH: They were capable of firing at what rate?

MR LYON: A theoretical rate of fire of 160 rounds per minute, but they are fed by clips of ammunition and the effective rate of fire was 80 rounds per minute.

CMDR RUSH: You mentioned clips. Were they loaded by a clip of ammunition?

MR LYON: Yes, a five-round clip by hand.

CMDR RUSH: Mr Buckland, the projectile of that armament was what weight?

MR BUCKLAND: The weight was 685 grams. There were various types of shells that could be fired, but it was around 700 grams.

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CMDR RUSH: Was there just the one type of shell?

MR BUCKLAND: There were several types of shell, but they were mainly contact-fuse type shells. There was the armour-piercing shell as well. We presume that there were a lot of armour-piercing shells for the 3.7cm.

THE PRESIDENT: This gun was designed as an anti-tank gun, was it not?

MR LYON: No, an anti-aircraft gun. It could be used as an anti-tank gun.

CMDR RUSH: Some authors have referred to this gun as an anti-tank gun. In your opinion, is it likely that this could be so described?

MR LYON: No, because the 37mm PAK, which was the anti-tank gun, had an effective range of only 600 yards. At any range greater than that, it had no system to hit a target. You would have no idea whether you were hitting a target or, indeed, how to hit a target. However, this had an effective range of 4,400 metres and a sophisticated sight.

CMDR RUSH: In relation to the armour-piercing capability of the munition fired by this gun, Mr Buckland, was it possible to locate, from the imagery of Sydney, any damage specifically that you could allocate to this gun?

MR BUCKLAND: We will come to that in a later section, but, no, we couldn't do anything because with the quality of the underwater imaging, we weren't looking for that size damage.

CMDR RUSH: In relation to the munition fired by this gun, from the point of view of the effectiveness of the gun, have you any opinion on that?

MR BUCKLAND: The effectiveness of?

CMDR RUSH: Of this munition fired against a ship such as Sydney.

MR BUCKLAND: From close range, up to 6,000 metres, against exposed personnel, it's lethal. It's a matter of

1 accuracy, of being able to accurately hit something at that
2 distance, because of the relative movements of the platform
3 itself. But if you are spraying, at 80 rounds per minute,
4 there's a lot of rounds being hit in a short time frame.

5
6 CMDR RUSH: Would tracer rounds be used with that
7 munition?

8
9 MR BUCKLAND: In the AA type, there would be tracer
10 rounds.

11
12 CMDR RUSH: Mr Lyon, from the order to fire to the ability
13 to train and fire that gun as fitted on Kormoran, what sort
14 of timing is involved?

15
16 MR LYON: It should be only a few seconds. It was hidden
17 behind light metal screens that were just dropped by
18 gravity, and it is an anti-aircraft weapon, so it tracks
19 and trains extremely rapidly.

20
21 CMDR RUSH: The other type of armament fitted to Kormoran
22 is described as the 2cm cannon. I think you have indicated
23 that, in all, there were five fitted to Kormoran?

24
25 MR LYON: Yes, of which three could bear on either side.

26
27 CMDR RUSH: The 2cm cannon, Mr Lyon, I think fired
28 a 120mm shell or round?

29
30 MR LYON: A 20mm shell. I think that is 120 grams of
31 explosive, not the weight of the shell.

32
33 CMDR RUSH: And what was the rate of fire?

34
35 MR LYON: It had a theoretical rate of fire of 240 rounds
36 per minute, but 20-round magazines had to be put on, so the
37 effective rate of fire was about 100 to 120 rounds per
38 minute.

39
40 CMDR RUSH: And the range of the gun?

41
42 MR LYON: The range of the gun was about 4,000 metres,
43 4,400 metres.

44
45 CMDR RUSH: In relation to the use of the gun, principally
46 in this type of engagement what was it directed at?

47

1 MR LYON: My understanding is that it was directed at the
2 torpedo tubes in the 4 inch gun deck.

3
4 MR BUCKLAND: It wouldn't typically be used as an
5 anti-ship weapon.

6
7 MR LYON: No, it is an anti-aircraft weapon

8
9 MR BUCKLAND: It's an anti-aircraft type gun.

10
11 MR LYON: And it would have fired tracer ammunition, so
12 they would have closed the target.

13
14 THE PRESIDENT: And an anti-personnel gun?

15
16 MR LYON: They're explosive shells, so an effective
17 anti-personnel weapon.

18
19 CMDR RUSH: Mr Buckland, what was the explosive or TNT
20 content of the torpedoes carried by Kormoran?

21
22 MR BUCKLAND: Call it TNT equivalent. There was 300kg of
23 hexonite, the actual explosive.

24
25 CMDR RUSH: And the range of the torpedo?

26
27 MR BUCKLAND: We have it here that it was 6,000 metres at
28 44 knots, but up to 14,000 metres at 30 knots.

29
30 CMDR RUSH: Was the firing of those torpedoes conventional
31 in the sense of being fired from the tube itself by torpedo
32 party?

33
34 MR BUCKLAND: As I understand it, yes.

35
36 MR LYON: Yes. Whereas Sydney could fire its torpedoes
37 from the bridge and in fact the torpedo officer on the
38 bridge of the Sydney could fire the torpedoes, they could
39 only be fired on the Kormoran from the tubes after
40 a telephone order from the torpedo officer.

41
42 CMDR RUSH: As to the wreck site and the damage sustained
43 by Kormoran - firstly, Mr Lyon, you have examined the
44 imagery, photographic and video, as it concerns Kormoran?

45
46 MR LYON: Yes.

47

1 CMDR RUSH: At page 136, you have a diagram in relation to
2 effectively what is left of Kormoran?

3
4 MR LYON: Yes.

5
6 CMDR RUSH: If I could ask you to go to figure 97, the
7 diagram shows the extent of damage to Kormoran as it lies
8 on the ocean floor. What does the red hatched section
9 represent?

10
11 MR LYON: The red hatched section is missing entirely, and
12 I mean entirely, and the unhatched section is what's there.

13
14 CMDR RUSH: In relation to length of the ship,
15 approximately how much is left?

16
17 MR LYON: About 45 per cent.

18
19 CMDR RUSH: From your review of photographic and video
20 imagery, firstly did you satisfy yourself that it was
21 Kormoran?

22
23 MR LYON: It is the Kormoran, yes.

24
25 CMDR RUSH: What are the features that enable you to say
26 that?

27
28 MR LYON: From what we can see, it certainly has the three
29 holds that are listed there. It has the quarterdeck. It
30 has the mast in the right spot. I must admit, there's not
31 a whole hell of a lot else left, but that's what you can
32 see. And, of course, we can see the weapons that are in
33 that section. We can see two 20mm cannons, three of the
34 5.9 inch guns and the torpedo tube camouflage system. So
35 they all check as well.

36
37 CMDR RUSH: In relation to what is left of that bow
38 section, was there any damage that you could pinpoint by
39 gunfire or shellfire to that particular section of the
40 ship?

41
42 MR LYON: No. The only damage I found was as
43 a consequence of the sinking.

44
45 CMDR RUSH: On page 137, figure 98 shows the 15cm gun, and
46 you say "in the hold"?

47

1 MR LYON: Yes, in number 2 hold, yes.
2
3 CMDR RUSH: Located where on the ship?
4
5 MR LYON: If we go back to the previous diagram, it is in
6 that hold there (indicating).
7
8 CMDR RUSH: That is identifiable in the imagery that you
9 have looked at as to that hold and the gun there?
10
11 MR LYON: Yes, yes. There are more photographs, of
12 course.
13
14 CMDR RUSH: In figure 99, that is the 15cm gun in the
15 number 2 hold?
16
17 MR LYON: No, that is the forecastle.
18
19 CMDR RUSH: Again, could you take us to where that is on
20 the diagram?
21
22 MR LYON: That's that gun there (indicating). This gun is
23 in the forecastle. The one in the hold is that gun there
24 (indicating). You can see that the deck is slightly
25 crushed down. That's presumably due to the sinking. And,
26 of course, the camouflage hatches are missing. They have
27 been torn off. There is no gunfire damage.
28
29 CMDR RUSH: I think you are at page 141. If I could ask
30 you to go back to page 139, figure 103. You referred in
31 your evidence to a torpedo or a flap.
32
33 MR LYON: Yes. That is the flap behind which the
34 above-water torpedo tubes were concealed.
35
36 CMDR RUSH: So the position was that up until the torpedo
37 tubes were trained, that flap would be the camouflage?
38
39 MR LYON: No. In fact, you had to open that camouflage
40 flap before you could train the tubes.
41
42 CMDR RUSH: But up until the training, that was the
43 camouflage flap?
44
45 MR LYON: That would be down, once again counterweighted,
46 and would conceal where the tubes were.
47

1 CMDR RUSH: Over the page at figure 105 is the below-water
2 torpedo tube, starboard side?

3
4 MR LYON: Yes.

5
6 CMDR RUSH: As you indicated in your evidence, the
7 Kormoran was fitted with underwater tubes on port and
8 starboard side?

9
10 MR LYON: Yes.

11
12 CMDR RUSH: We'll come to it later, but there are two
13 matters I want to ask you about now in relation to the
14 firing of the underwater torpedo. What sort of speed did
15 the ship have to be at before the underwater torpedo could
16 be fired?

17
18 MR LYON: Detmers says that it has to be 3 knots or less,
19 and that makes sense in terms of the hydrodynamics,
20 because, as you can imagine, when your ship is sailing
21 along, the water next to the hull is doing the same speed
22 as the ship, say 14 knots if it is doing 14 knots, and the
23 water a little bit away from the hull is doing no speed.
24 So if a torpedo is just exiting the ship's hull, the stern
25 of the torpedo is doing 14 knots being pulled forward, and
26 the bow of the torpedo is in water not moving at all, so
27 the torpedo is being pulled off course. So if you fire the
28 torpedo in anything above about 3 knots, you can't be sure
29 where it's going to go.

30
31 CMDR RUSH: Were the underwater torpedo tubes set at any
32 particular angle for firing?

33
34 MR LYON: The drawing shows 35 degrees, and that
35 photograph shows a non-circular hole, so that fairly well
36 confirms that they were at an angle of about 35 degrees
37 abaft the beam.

38
39 CMDR RUSH: What we have just looked at is starboard side.
40 Figure 106 is a torpedo tube on port side?

41
42 MR LYON: Yes.

43
44 THE PRESIDENT: You can't tell if torpedoes have been
45 fired from either side?

46
47 MR LYON: No. There is something in the hole, but we're

1 not sure what it is. It is not a torpedo, but it is not an
2 empty hole.

3

4 CMDR RUSH: As you have indicated, only the bow section of
5 Kormoran remains. In relation to the stowage of mines on
6 Kormoran, is that indicated at figure 109 on page 142?

7

8 MR LYON: Yes. That is based on exhibit 16, which is a
9 drawing of the Kormoran, which shows a mine deck has been
10 built below the main deck from the stern almost to the
11 superstructure.

12

13 CMDR RUSH: At figure 110, you have set out the area of
14 damage as a consequence of the mass detonation of mines?

15

16 MR LYON: Well, at DSTO direction.

17

18 MR BUCKLAND: Yes, that is based on 360 mines.

19

20 CMDR RUSH: Is what we've seen of the extant bow of
21 Kormoran, as opposed to what is not there, consistent with
22 that sort of detonation?

23

24 MR BUCKLAND: Very consistent, yes. It is very
25 consistent.

26

27 CMDR RUSH: If that is a convenient time, sir, I will go
28 to the wreck site of Sydney tomorrow morning.

29

30 THE PRESIDENT: Yes, very well. We will adjourn until
31 10am.

32

33 AT 3.55PM THE COMMISSION WAS ADJOURNED TO TUESDAY,
34 13 JANUARY 2009 AT 10AM

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